

COMPUTER-ASSISTED LANGUAGE LEARNING IN THE CONTEXT OF HIGHER
EDUCATION IN NAMIBIA: A CASE STUDY OF THE UNIVERSITY OF NAMIBIA AND
NAMIBIA UNIVERSITY OF SCIENCE AND TECHNOLOGY

A RESEARCH SUBMITTED IN FULFILLMENT
OF THE REQUIREMENTS FOR THE DEGREE OF
DOCTOR OF PHILOSOPHY IN ENGLISH AND APPLIED LINGUISTICS

AT
UNIVERSITY OF NAMIBIA

BY

LAZARUS GAWAZAH

201501426

OCTOBER 2025

SUPERVISOR: PROF COLLEN SABAO
CO-SUPERVISOR: PROF JAIROS KANGIRA

ABSTRACT

The purpose of this study was to investigate the role of Computer-Assisted Language Learning (CALL) in higher education in Namibia by examining the attitudes and perceptions of students towards CALL, identifying the factors and characteristics that best support their language learning, exploring the challenges that impede the delivery of CALL, and determining mitigation strategies to inform the development of a framework for effective CALL implementation. It further examined how technology driven approaches and the application of Artificial Intelligence (AI) can contribute to improving English proficiency and support teaching and learning. CALL has gained increasing prominence in recent years as an interactive instructional technique that utilises information and communication technology (ICT) to enhance language education, offering a multimodal learning environment that combines text, graphics, sound and video to facilitate language learning. Despite the adoption of CALL, learners at various levels of their study in Namibia still struggle with English proficiency. This challenge is partly attributed to the inadequate utilisation of interactive ICT methods during learners' formative years, stressing the need to examine CALL integration from primary grades through to the tertiary level. This study is situated within the field of Instructional Design and Technology in Higher Education Studies, with a specific focus on the integration of Computer-Assisted Language Learning (CALL) in Namibian tertiary institutions. The study employed a convergent parallel mixed-methods research design, informed by a pragmatic paradigm, to explore the integration and impact of CALL. Data were collected from undergraduate students and language lecturers at UNAM and NUST. The study population included 448 second-year English majors, from which a proportionate sample of 207 students was selected through stratified random sampling, ensuring representation from both institutions. The sample was allocated proportionally, with 159 students from UNAM and 48

students from NUST ($\Sigma S = 207$). In addition, purposive sampling was used to select 30 lecturers with language teaching experience (18 from UNAM and 12 from NUST). ($\Sigma S = 30$). Data collection instruments included semi-structured questionnaires for quantitative analysis and open-ended questions for qualitative data. Quantitative data was analysed using descriptive statistics, while thematic analysis was applied to qualitative data. The study's conceptual framework integrated the Technology Acceptance Model (TAM), Social Learning Theory (SLT), Diffusion of Innovation Theory (DOIT), and Assessment Theory (AT) for a comprehensive analysis. The study findings revealed that students held positive attitudes towards CALL, recognising its potential to enhance language learning. However, students also identified challenges such as limited access to technology, technical difficulties, and the need for better integration of CALL into the curriculum. Results indicated that students' socio-economic backgrounds significantly impacted their access to and utilisation of CALL tools. It was further revealed that students valued the interactive and engaging nature of CALL but expressed the need for more training and support to effectively use the technology. The study revealed that lecturers acknowledged the importance of integrating CALL into language teaching but faced challenges such as lack of infrastructure, technical support, and training. The Universal Computer-Assisted-Language Learning Model (UCALM) was developed and proposed to enhance learning. A course outline that provides a systematic and progressive delivery of CALL content was also proposed, spanning from undergraduate levels (NQF Level 7 and Level 8) to postgraduate studies at the Master's level (NQF Level 9).

The study concluded that while both students and lecturers recognised the potential benefits of CALL in language learning, significant challenges hindered its effective implementation in the Namibian higher education context. The findings revealed the need for improved infrastructure,

technical support, and training to facilitate the successful integration of CALL. The study also concluded that addressing the socio-economic disparities among students was crucial to ensure equitable access to CALL resources. Furthermore, the study concluded that it is important to integrate CALL interventions with the curriculum and provide adequate support for both students and lecturers to maximise the potential of CALL in enhancing language education. The study recommends that higher education institutions invest in improving the technological infrastructure to support CALL implementation, including providing reliable internet access and up-to-date computer equipment. It is recommended that comprehensive training programmes be developed and offered to both students and lecturers to enhance their technological proficiency and facilitate the effective use of CALL tools. Institutions are advised to provide adequate technical support to address any challenges or issues encountered during CALL implementation. Furthermore, CALL should be systematically integrated into the language learning curriculum, ensuring alignment with learning objectives and assessment strategies. Collaborative efforts between institutions, policymakers, and stakeholders should be developed to address socio-economic disparities and ensure equitable access to CALL resources for all students. Further research is recommended to explore the long-term impact of CALL on language learning outcomes and to identify best practices for CALL implementation in the Namibian context.

KEYWORDS: Computer-Assisted Language Learning (CALL), Artificial Intelligence (AI) Instructional Design and Technology, language acquisition, higher education, digital literacy, English language proficiency, educational technology, student engagement, mobile learning.

ZUSAMMENFASSUNG

Ziel dieser Studie war es, die Rolle des Computerunterstützten Sprachlernens (CALL) im Hochschulwesen Namibias zu untersuchen. Dabei wurden die Einstellungen und Wahrnehmungen der Studierenden gegenüber CALL analysiert, die Faktoren und Merkmale identifiziert, die ihr Sprachenlernen am besten unterstützen, die Herausforderungen ermittelt, die die Umsetzung von CALL behindern, sowie Strategien zur Bewältigung dieser Herausforderungen entwickelt, um die Erstellung eines Rahmens für eine effektive CALL-Implementierung zu ermöglichen. Darüber hinaus wurde untersucht, wie technologiegestützte Ansätze und der Einsatz Künstlicher Intelligenz (KI) zur Verbesserung der Englischkenntnisse beitragen und Lehr- und Lernprozesse unterstützen können. CALL hat in den letzten Jahren zunehmend an Bedeutung gewonnen, da es sich um eine interaktive Unterrichtsmethode handelt, die Informations- und Kommunikationstechnologien (IKT) nutzt, um den Sprachunterricht zu verbessern. Es bietet eine multimodale Lernumgebung, die Text, Grafiken, Ton und Video kombiniert, um das Sprachenlernen zu erleichtern. Trotz der Einführung von CALL haben Lernende auf verschiedenen Bildungsebenen in Namibia weiterhin Schwierigkeiten mit der englischen Sprachkompetenz. Diese Herausforderung wird teilweise auf die unzureichende Nutzung interaktiver IKT-Methoden in den frühen Lernjahren zurückgeführt, was die Notwendigkeit unterstreicht, die Integration von CALL von der Primarstufe bis zur Hochschulebene zu untersuchen. Diese Studie ist im Fachbereich Instruktionsdesign und Technologie im Hochschulwesen verortet und konzentriert sich speziell auf die Integration des Computerunterstützten Sprachlernens (CALL) in namibischen tertiären Bildungseinrichtungen. Das Forschungsvorhaben verwendete ein konvergentes paralleles Mixed-Methods-Design, das von einem pragmatischen Paradigma geleitet wurde, um die Integration und Wirkung von CALL zu erforschen. Die Daten wurden von Studierenden im Grundstudium sowie von

Sprachdozierenden an der University of Namibia (UNAM) und der Namibia University of Science and Technology (NUST) erhoben. Die Grundgesamtheit der Studie umfasste 448 Studierende des zweiten Studienjahres im Fach Englisch, aus der eine proportionale Stichprobe von 207 Studierenden mittels geschichteter Zufallsauswahl gezogen wurde, um die Repräsentation beider Institutionen sicherzustellen. Die Stichprobe setzte sich aus 159 Studierenden der UNAM und 48 Studierenden der NUST zusammen ($\Sigma S = 207$). Zusätzlich wurden 30 Dozierende mit Unterrichtserfahrung im Sprachbereich durch gezielte Stichprobenziehung ausgewählt (18 von UNAM und 12 von NUST) ($\Sigma S = 30$). Zur Datenerhebung wurden halbstrukturierte Fragebögen für die quantitative Analyse sowie offene Fragen für qualitative Daten eingesetzt. Quantitative Daten wurden mithilfe deskriptiver Statistik ausgewertet, während für die qualitativen Daten eine thematische Analyse angewandt wurde. Der konzeptionelle Rahmen der Studie integrierte das Technology Acceptance Model (TAM), die Social Learning Theory (SLT), die Diffusion of Innovation Theory (DOIT) sowie die Assessment Theory (AT), um eine umfassende Analyse zu gewährleisten. Die Ergebnisse der Studie zeigten, dass die Studierenden positive Einstellungen gegenüber CALL hatten und dessen Potenzial zur Förderung des Sprachenlernens anerkannten. Gleichzeitig wurden jedoch Herausforderungen wie begrenzter Zugang zu Technologie, technische Schwierigkeiten sowie der Bedarf an einer besseren Integration von CALL in das Curriculum festgestellt. Die Ergebnisse zeigten auch, dass der sozioökonomische Hintergrund der Studierenden einen erheblichen Einfluss auf ihren Zugang zu und die Nutzung von CALL-Werkzeugen hatte. Darüber hinaus wurde festgestellt, dass die Studierenden den interaktiven und motivierenden Charakter von CALL schätzten, jedoch den Wunsch nach mehr Schulungen und Unterstützung äußerten, um die Technologie effektiv einsetzen zu können. Auch die Dozierenden erkannten die Bedeutung der Integration von CALL in den Sprachunterricht an, sahen sich jedoch

mit Herausforderungen wie mangelnder Infrastruktur, unzureichender technischer Unterstützung und fehlender Weiterbildung konfrontiert. Im Rahmen der Studie wurde das Universelle Modell des Computerunterstützten Sprachlernens (UCALM) entwickelt und vorgeschlagen, um das Lernen zu verbessern. Darüber hinaus wurde ein Kursentwurf vorgeschlagen, der eine systematische und schrittweise Vermittlung von CALL-Inhalten vorsieht – beginnend auf Bachelor-Niveau (NQF Level 7 und 8) bis hin zum Masterstudium (NQF Level 9).

Die Studie kam zu dem Schluss, dass sowohl Studierende als auch Dozierende die potenziellen Vorteile von CALL im Sprachunterricht anerkennen, jedoch erhebliche Herausforderungen einer effektiven Umsetzung im namibischen Hochschulkontext im Wege stehen. Die Ergebnisse unterstreichen die Notwendigkeit einer verbesserten Infrastruktur, technischen Unterstützung und Schulung, um eine erfolgreiche Integration von CALL zu gewährleisten. Zudem wurde hervorgehoben, dass die sozioökonomischen Unterschiede unter Studierenden berücksichtigt werden müssen, um einen gerechten Zugang zu CALL-Ressourcen sicherzustellen. Ferner wurde festgestellt, dass die Integration von CALL in das Curriculum sowie die Bereitstellung angemessener Unterstützung für Studierende und Dozierende entscheidend sind, um das Potenzial von CALL zur Förderung der Sprachbildung voll auszuschöpfen. Die Studie empfiehlt, dass Hochschulen in die Verbesserung der technologischen Infrastruktur investieren, um die Umsetzung von CALL zu unterstützen, einschließlich des Zugangs zu zuverlässigem Internet und moderner Computerausstattung. Es wird empfohlen, umfassende Schulungsprogramme für Studierende und Dozierende zu entwickeln, um deren technologische Kompetenzen zu stärken und die effektive Nutzung von CALL-Werkzeugen zu fördern. Institutionen sollten außerdem ausreichende technische Unterstützung bereitstellen, um Herausforderungen während der Implementierung zu bewältigen. CALL sollte systematisch in das Sprachlern-Curriculum

integriert und mit Lernzielen und Bewertungsstrategien abgestimmt werden. Schließlich wird empfohlen, kooperative Initiativen zwischen Institutionen, politischen Entscheidungsträgern und relevanten Akteuren zu fördern, um sozioökonomische Unterschiede zu verringern und einen gleichberechtigten Zugang zu CALL-Ressourcen für alle Studierenden sicherzustellen. Zukünftige Forschung sollte sich auf die langfristigen Auswirkungen von CALL auf die Sprachlernergebnisse konzentrieren und Best Practices für die Implementierung von CALL im namibischen Kontext identifizieren.

SCHLÜSSELWÖRTER: Computerunterstütztes Sprachlernen (CALL), Künstliche Intelligenz (KI), Instruktionsdesign und Technologie, Spracherwerb, Hochschulbildung, digitale Kompetenz, Englischsprachkompetenz, Bildungstechnologie, Studierendenengagement, Mobile Learning.

DECLARATION

I, **Lazarus Gawazah**, hereby declare that this study is a true reflection of my own research and that this work, or any part thereof, has not been submitted for a degree at any institution of higher education. No part of this thesis may be reproduced, stored in any retrieval system, or transmitted in any form or by any means (electronic, mechanical, photocopying, recording, or otherwise) without the prior permission of the author or The University of Namibia in that regard. **Lazarus Gawazah**, grant The University of Namibia the right to reproduce this thesis, in whole or in part, in any manner or format that The University of Namibia may deem fit, for any person or institution requiring it for study and research, provided that the University of Namibia shall waive this right if the whole thesis has been or is being published in a manner satisfactory to the University.



Lazarus Gawazah

DEDICATION

This dissertation is dedicated to honesty, ambition, the enduring flame of desire and the relentless quest for knowledge. It is a tribute to the drive that never settles for the surface but always presses deeper: to understand, to question, and to transform. May this effort stand as evidence that, with desire and a purposeful quest, even the most distant goals can become a lived reality. I "*Commit thy works unto the Lord, and thy thoughts shall be established.*"

ACKNOWLEDGEMENTS

First and foremost, I give all glory and honour to The Sovereign Lord, God Almighty, The Ancient of Days, The One Who Is Immortal, The Great I AM and Creator of the universe. All creation bows in reverence before Your throne. *“At the mention of the name of Jesus Christ every knee shall bow, in heaven, on earth, and under the earth, and every tongue confess that Jesus Christ is Lord, to the glory of God the Father”*. The source of my strength, wisdom, and perseverance. *“By His stripes we were healed,”* in fulfilment of prophecy. I believe and confess that Jesus Christ is The Messiah, and that through Him we receive salvation. Through the Word of Truth; the Word of God; that I have found guidance, clarity, and comfort throughout this study. Without His divine presence and provision, the completion of this dissertation would not have been possible.

“10 Concerning this salvation, the prophets, who spoke of the grace that was to come to you, searched intently and with the greatest care, 11 trying to find out the time and circumstances to which the Spirit of Christ in them was pointing when he predicted the sufferings of the Messiah and the glories that would follow. 12 It was revealed to them that they were not serving themselves but you, when they spoke of the things that have now been told you by those who have preached the gospel to you by the Holy Spirit sent from heaven. Even angels long to look into these things.”

This generation stands in the fulfilment of what the prophets longed to understand. What was revealed in part to them has been made known to us in fullness through Christ, a privilege even angels longed to see.

“1 Then I saw in the right hand of him who sat on the throne a scroll with writing on both sides and sealed with seven seals. 2 And I saw a mighty angel proclaiming in a loud voice, “Who is worthy to break the seals and open the scroll?” 3 But no one in heaven or on earth or under the earth could open the scroll or even look inside it. 4 I wept and wept because

no one was found who was worthy to open the scroll or look inside. 5 Then one of the elders said to me, "Do not weep! See, the Lion of the tribe of Judah, the Root of David, has triumphed. He is able to open the scroll and its seven seals."

Only Jesus Christ is revealed as worthy to open the scroll and bring God's redemptive plan to completion.

I acknowledge the academics who supported and inspired me during my undergraduate studies, whose foundational teaching and mentorship provided the intellectual grounding for future academic growth. I also gratefully acknowledge the financial support received from my Creative Art Production Company customers in Namibia and the rest of the world, whose support made a meaningful contribution toward the funding of my studies from as early as my initial undergraduate enrolment.

I extend my gratitude to my Main Supervisor, Professor Collen Sabao, and my Co-Supervisor, Emeritus Professor Jairos Kangira, for their guidance, constructive feedback, and encouragement.

I would like to extend my gratitude to the dedicated librarian services I received from the University of Namibia, Namibia University of Science and Technology, Arizona State University, Maricopa County Community Colleges Libraries, the City of Phoenix Public Libraries (AZ) and the Milwaukee Public Libraries (WI). Books that were not in store were loaned from libraries across the United States.

To my beloved wife, Lizzy Gawazah, thank you for your endless patience, unconditional love, and quiet strength. Your faith in me has been my anchor. To my children, thank you for your resilience, understanding, and for enduring my absence during the many long hours spent on this work. Your love and laughter kept me afloat.

TABLE OF CONTENTS

ABSTRACT.....	II
ZUSAMMENFASSUNG.....	V
DECLARATION.....	IX
DEDICATION	X
ACKNOWLEDGEMENTS.....	XI
LIST OF TABLES	XXIV
LIST OF FIGURES	XXV
LIST OF ABBREVIATIONS	XXVI
CHAPTER ONE	1
INTRODUCTION AND BACKGROUND OF THE STUDY.....	1
1.1 INTRODUCTION.....	1
1.2 BACKGROUND OF THE STUDY	4
1.3 INSTRUCTIONAL DESIGN AND TECHNOLOGY AS A FOUNDATION FOR SYSTEMIC CALL INTEGRATION	8
1.4 STATEMENT OF THE PROBLEM.....	11
1.5 RESEARCH QUESTIONS.....	14
1.6 SIGNIFICANCE OF THE RESEARCH.....	14
1.7 DELIMITATION OF THE RESEARCH	15
1.8 LIMITATIONS OF THE STUDY	17
1.9 PERCEIVED STRENGTHS OF THE STUDY	18
1.10 OPERATIONAL DEFINITIONS.....	20
1.11 ORGANISATION OF THE THESIS	23
1.12 SUMMARY	27
CHAPTER TWO	29
LITERATURE REVIEW AND THEORETICAL FRAMEWORK	29
2.1 INTRODUCTION.....	29

2.2 THE HISTORY AND EVOLUTION OF CALL.....	30
2.3 OVERVIEW OF CALL IN NAMIBIAN HIGHER EDUCATION.....	41
2.4 THE ANTHROPOCENE OF CALL.....	46
2.5 GOBBLEDYGOOK AS A BARRIER TO COMPUTER-ASSISTED LANGUAGE LEARNING	47
2.6 CURRENT TRENDS IN CALL AND THEIR IMPACT ON LANGUAGE LEARNING .	52
2.6.1 Mobile technology(ies) in language learning.....	52
2.6.2 Gamification in language learning.....	53
2.6.3 Artificial intelligence (AI) in language learning.....	56
2.6.4 Chatbots and voice assistants in language learning.....	58
2.7 THE ROLE OF COMPUTATIONAL LINGUISTS IN THE DEVELOPMENT OF CALL	60
2.8 INSTRUCTIONAL DESIGN STRATEGIES IN CALL.....	63
2.8.1 Scaffolding as an Instructional Design Strategy in CALL.....	64
2.8.2 Sequencing as an Instructional Design Strategy in CALL.....	66
2.8.3 Chunking as an instructional design strategy in CALL.....	68
2.8.4 Lesson duration as an instructional design strategy in CALL.....	69
2.8.5 Active learning as an instructional design strategy in CALL	71
2.8.6 Rehearsal and long-term retention	72
2.9 ATTITUDES AND PERCEPTIONS TOWARDS CALL	78
2.10 FACTORS AND CHARACTERISTICS IDENTIFIED BY USERS OF CALL.....	80
2.10.1 Benefits of CALL in Higher Education	83
2.10.2 Challenges and Limitations of CALL in Higher Education.....	87
2.10.3 Directions for CALL in Higher Education.....	93
2.11 BARRIERS THAT IMPEDE THE DELIVERY OF CALL	104
2.11.1 Technological barriers in the delivery of CALL.....	104
2.11.2 Lack of training and support.....	106
2.11.3 Limited access to technology.....	107
2.11.4 Cost and availability of software and hardware	108
2.11.5 Pedagogical Barriers and Resistance to Change	109
2.11.6 Maintenance and upkeep of CALL resources.....	110
2.11.7 Integration with curriculum and assessment	111

2.11.8 Internet connectivity and bandwidth limitations	112
2.11.9 Student motivation and engagement	113
2.11.10 Issues with data privacy and security	114
2.12 MITIGATION STRATEGIES AND THE DEVELOPMENT OF A CALL MODEL.....	116
2.12.1 Teacher training and professional development as an intervention strategy	117
2.12.2 Learner training as an intervention strategy	118
2.12.3 Technical support as an intervention strategy	119
2.12.4 Access to technology as an intervention strategy	120
2.12.5 Curriculum design as an intervention strategy.....	121
2.13 RESEARCH GAPS.....	123
2.14 THEORETICAL FRAMEWORKS	125
2.14.1 Technology Acceptance Model (TAM)	125
2.14.2 Diffusion of Innovation Theory (DOIT)	130
2.14.3 Assessment Theory (AT).....	135
2.14.4 Social Learning Theory (SLT).....	139
2.15 THEORETICAL INTEGRATION AND ALIGNMENT WITH RESEARCH QUESTIONS	143
2.16 SUMMARY	146
CHAPTER THREE.....	148
RESEARCH METHODOLOGY.....	148
3.1 INTRODUCTION.....	148
3.2 RESEARCH DESIGN	149
3.2.1 Quantitative Design	150
3.2.2 Qualitative Design	150
3.2.3 Convergent Parallel Mixed-Methods Design	151
3.2.4 Research Design Flow Chart.....	151
3.3 RESEARCH PARADIGM	152
3.4 AXIOLOGY AND RESEARCHER POSITIONALITY	154
3.5 STUDY SETTING	155
3.6 POPULATION AND SAMPLING	157

3.6.1 Target Population.....	157
3.6.2 Sampling Methods.....	158
3.7 RESEARCH INSTRUMENTS	160
3.7.1 Questionnaire for Students.....	160
3.7.2 Questionnaire for Lecturers	161
3.7.3 Theoretical Grounding of Instruments	162
3.8 PILOT STUDY	163
3.8.1 Purpose of the Pilot Study.....	163
3.8.2 Pilot Participants	163
3.8.3 Procedures and Feedback.....	164
3.8.4 Revisions and Finalisation.....	164
3.9 DATA COLLECTION PROCEDURES.....	165
3.9.1 Preparation for Data Collection	165
3.9.2 Student Data Collection	166
3.9.3 Lecturer Data Collection	166
3.9.4 Use of Digital Tools (SurveyMonkey and Tableau)	167
3.10 MAPPING OF RESEARCH QUESTIONS TO INSTRUMENT ITEMS.....	167
3.11 ETHICAL PROCEDURES DURING DATA COLLECTION.....	173
3.11.1 UNAM and NUST Ethical Approval Process	173
3.11.2 Informed Consent	174
3.11.3 Voluntary Participation	175
3.11.4 Privacy and Confidentiality	175
3.11.5 Anonymity and Data Anonymisation	175
3.11.6 Secure Data Handling.....	176
3.11.7 Transparency and Communication	176
3.11.8 Language and Cultural Sensitivity	176
3.12 DATA ANALYSIS	177
3.12.1 Quantitative Data Analysis	177
3.12.2 Qualitative Data Analysis	177
3.12.3 Integration of Quantitative and Qualitative Findings	178
3.13 VALIDITY AND RELIABILITY	181

3.14 TRUSTWORTHINESS.....	182
3.15 LIMITATIONS OF THE METHODOLOGY	183
3.16 SUMMARY	183
CHAPTER FOUR.....	186
ATTITUDES AND PERCEPTIONS OF STUDENTS AND LECTURERS TOWARDS COMPUTER- ASSISTED LANGUAGE LEARNING (CALL)	186
4.1 INTRODUCTION.....	186
4.2 RESPONSE RATE FOR QUESTIONNAIRES	187
4.2.1 Student Response Rates.....	188
4.2.2 Lecturer Response Rates	189
4.2.3 Total Response Rates	189
4.3 DEMOGRAPHIC INFORMATION	189
4.3.1 Student Participant Institution	190
4.3.2 Gender Distribution	191
4.3.3 Age of Student Participants.....	192
4.4 ATTITUDES AND PERCEPTIONS OF STUDENTS AND LECTURERS TOWARDS CALL	193
4.4.1 Students' Views on the Effectiveness of the Use of Computers in Language Learning	194
4.4.2 Students' Knowledge of the Definition of CALL	197
4.4.3 Students' Self-Evaluation of Computer Skills	199
4.4.4 Frequency of Students' Use of CALL Tools.....	200
4.4.5 Students' Competence in Handling and Producing Digital Texts	202
4.4.6 Students' Confidence in Implementing CALL in Their Studies	203
4.4.7 Students' Perceived Advantages of CALL in Language Learning	205
4.4.8 Lecturers' Understanding of CALL.....	209
4.4.9 Lecturers' Self-Assessment of Computer Competence	211
4.4.10 Lecturers' Familiarity with Learning Management Systems (LMS)	213
4.4.11 Lecturers' Preferred CALL Tools for Language Teaching	214
4.4.12 CALL Instructional Design Methods Preferred by Lecturers	217

4.5 SUMMARY	218
CHAPTER FIVE	222
FACTORS AND CHARACTERISTICS IDENTIFIED BY THE USERS OF CALL THAT BEST SUPPORT THEIR LANGUAGE LEARNING	222
5.1 INTRODUCTION.....	222
5.2 STUDENTS' FAMILIARITY WITH LEARNING MANAGEMENT SYSTEMS (LMS)	223
5.3 STUDENTS' RATINGS OF LMS USER-FRIENDLINESS	225
5.4 LANGUAGE SKILLS ENHANCED BY CALL.....	228
5.4.1 Frequency distribution for language skills	228
5.4.2 Mean Scores for language skills as rated by students	230
5.5 ASSESSMENT STRATEGIES FOR EVALUATING STUDENT LEARNING	232
5.6 COMPARISON OF STUDENT ENGAGEMENT AND OUTCOMES WITH CALL VS. TRADITIONAL METHODS	234
5.6.1 Increased Engagement Through Interactivity.....	235
5.6.2 Enhanced Learning Outcomes Through Feedback.....	237
5.6.3 Supporting Diverse Learning Needs	240
5.6.4 Challenges and Limitations of CALL.....	243
5.6.5 Comparative Analysis of Effectiveness: Blending CALL with Traditional Methods .	246
5.7 SUMMARY	249
CHAPTER SIX.....	251
BARRIERS TO THE DELIVERY OF COMPUTER-ASSISTED-LANGUAGE LEARNING (CALL)	251
6.1 INTRODUCTION.....	251
6.2 IMPACT OF SOCIO-ECONOMIC BACKGROUND ON ACCESS TO CALL TOOLS	252
6.2.1 Limited Access to Devices and Technology	253
6.2.2 Inconsistent or Costly Internet Access	255
6.2.3 Lack of Dedicated Study Environment(s).....	257
6.2.4 Dependence on External Support	258

6.2.5 <i>Financial Constraints and Resource Allocation</i>	259
6.3 STUDENTS' OPINION FOR BETTER INTEGRATION OF CALL INTO THE CURRICULUM.....	260
6.3.1 <i>Increased Access to Technology and Resources</i>	261
6.3.2 <i>Training and Technical Support</i>	263
6.3.3 <i>Integration into Regular Class Activities</i>	265
6.3.4 <i>Enhanced Interactivity and Engagement</i>	266
6.3.5 <i>Progress Tracking and Feedback</i>	268
6.4 LECTURERS' VIEWS ON THE IMPACT OF SOCIO-ECONOMIC BACKGROUND ON ACCESS TO CALL	270
6.4.1 <i>Limited Access to Devices and Internet Connectivity</i>	270
6.4.2 <i>Geographic and Infrastructure Challenges</i>	272
6.4.3 <i>Financial Constraints and Competing Responsibilities</i>	274
6.4.4 <i>Impact on Learning Continuity and Academic Performance</i>	275
6.4.5 <i>Psychological and Social Impacts of Inequality in Access</i>	277
6.5 FACTORS IMPEDING THE DELIVERY OF CALL IN LANGUAGE TEACHING	279
6.5.1 <i>Access to Technology and Infrastructure</i>	279
6.5.2 <i>Technical Issues</i>	281
6.5.3 <i>Training and Confidence</i>	282
6.5.4 <i>Curriculum Alignment and Integration</i>	283
6.5.5 <i>Student Engagement and Differentiation</i>	284
6.6 SUMMARY	286
CHAPTER SEVEN	288
MITIGATION STRATEGIES AND MODEL DEVELOPMENT FOR EFFECTIVE CALL IMPLEMENTATION IN HIGHER EDUCATION	288
7.1 INTRODUCTION.....	288
7.2 SUPPORT NEEDS FOR IMPLEMENTING CALL STRATEGIES	289
STUDENTS' RESPONSES ON CALL MITIGATION STRATEGIES.....	290
7.2.1 <i>Perceived Benefits for Improved Integration</i>	290
7.2.2 <i>Institutional Support and Access to Resources</i>	294

7.2.3 Increased Access to Technology and Resources	296
7.2.4 Training, Tutorials and Individualised Guidance.....	299
7.2.5 Collaborative Learning and Study Support	301
7.3 COLLABORATIVE LEARNING AND ENGAGEMENT WITH CALL.....	304
7.3.1 Enhanced Peer Support and Feedback.....	305
7.3.2 Increased Engagement and Motivation	307
7.3.3 Real-World Conversational Practice	309
7.3.4 Skill-Building and Teamwork.....	312
7.3.5 Enhanced Language Practice and Skill Improvement.....	315
7.3.6 Flexibility and Self-Paced Learning	317
7.3.7 Progress Tracking and Motivation.....	319
7.3.8 Enhanced Student Engagement and Motivation	321
7.3.9 Immediate Feedback and Progress Tracking.....	323
7.3.10 Flexibility and Accessibility of Learning Materials.....	325
7.4 SUMMARY	327
CHAPTER EIGHT	329
PROPOSED MODEL FOR CALL INTEGRATION IN HIGHER EDUCATION	329
8.1 INTRODUCTION.....	329
8.2 LOGICAL FRAMEWORK FOR CALL.....	332
8.3 INTRODUCING THE UNIVERSAL COMPUTER-ASSISTED LANGUAGE LEARNING MODEL (UCALM)	335
8.4 THE UNIVERSAL COMPUTER-ASSISTED LANGUAGE LEARNING MODEL (UCALM)	337
8.5 PROPOSED COURSE FOR CALL FOR HIGHER EDUCATION.....	346
COURSE TITLE:.....	346
PRINCIPLES AND PRACTICAL APPLICATION OF COMPUTER-ASSISTED-LANGUAGE LEARNING (PPA-CALL).....	346
8.6 JUSTIFICATION FOR THE DERIVATION OF THE UNIVERSAL CALL MODEL BASED ON FINDINGS	350

8.7 SUMMARY	352
CHAPTER NINE.....	354
SUMMARY OF FINDINGS, CONCLUSION AND RECOMMENDATIONS	354
9.1 INTRODUCTION.....	354
9.2 SUMMARY OF FINDINGS.....	355
RESEARCH QUESTION ONE - SUMMARY OF FINDINGS	355
9.3 ATTITUDES AND PERCEPTIONS OF STUDENTS TOWARDS CALL	355
9.3.1 Attitudes and Perceptions Towards CALL	356
9.3.2 Positive Perceptions and Motivators for Adoption of CALL	356
9.3.3 Concerns Regarding Usability and Accessibility.....	357
9.3.4 Influence of Culturally Relevant Content on CALL Perceptions	357
9.3.5 Barriers Related to Socioeconomic Factors and Access to Resources	357
9.3.6 Comparison to Other Contexts and Implications for Namibian Higher Education ..	358
RESEARCH QUESTION TWO - SUMMARY OF FINDINGS	359
9.4 FACTORS AND CHARACTERISTICS IDENTIFIED BY THE USERS OF CALL THAT BEST SUPPORT THEIR LANGUAGE LEARNING.....	359
9.4.1 Impact of CALL on Language Proficiency.....	359
9.4.2 Flexibility and Self-Paced Learning	360
9.4.3 Use of CALL for Diagnostic, Formative, and Summative Assessment	360
9.4.4 Limitations to CALL's Effectiveness in Namibia.....	361
9.4.5 Cultural Relevance and CALL Content	362
9.4.6 Social Interaction and Collaboration in CALL	362
RESEARCH QUESTION THREE - SUMMARY OF FINDINGS	363
9.5 FACTORS THAT IMPEDE THE DELIVERY OF CALL	363
9.5.1 Infrastructure and Accessibility Challenges	363
9.5.2 Financial Constraints	364
9.5.3 Insufficient Teacher Training and Support	365
9.5.4 Resistance to Technological Change and Cultural Barriers	366
9.5.5 Digital Literacy and Technical Proficiency Gaps.....	367

9.5.6 Challenges with Curriculum Integration and Assessment Alignment	367
RESEARCH QUESTION FOUR - SUMMARY OF FINDINGS.....	368
9.6 MITIGATION STRATEGIES AND THE DEVELOPMENT OF A CALL FRAMEWORK	368
9.6.1 Integration Challenges In CALL.....	369
9.6.2 Infrastructure Limitations and Accessibility Barriers	370
9.6.3 Cultural Resistance and Preference for Traditional Learning Methods	371
9.6.4 Financial Constraints and Budget Limitations.....	371
9.6.5 Teacher Training and Support Limitations	372
9.7 THEORETICAL INTEGRATION OF RESEARCH FINDINGS.....	373
9.7.1 Technology Acceptance Model (TAM) Integration	373
9.7.2 Diffusion of Innovation Theory (DOI) Integration	374
9.7.3 Assessment Theory (AT) Integration.....	375
9.7.4 Social Learning Theory (SLT) Integration.....	376
9.8. INTEGRATION OF QUANTITATIVE AND QUALITATIVE FINDINGS: JOINT DISPLAY ANALYSIS.....	377
9.9 STUDY CONCLUSIONS.....	381
9.9.1 Attitudes and Perceptions	381
9.9.2 Supportive Features and Characteristics	382
9.9.3 Barriers to Effective Delivery	382
9.9.4 Mitigation Strategies and Future Directions	382
9.10 STUDY RECOMMENDATIONS	383
9.10.1 Policy-Level Recommendations	383
9.10.2 Institutional-Level Recommendations.....	384
9.10.3 Lecturer-Level Recommendations.....	384
9.10.4 Student-Level Recommendations	385
9.10.5 Curriculum and CALL Course Structure Recommendations.....	385
9.11 REINTRODUCTION OF THE PROPOSED PRODUCT: THE UNIVERSAL CALL MODEL (UCALM)	385
REFERENCES	388

APPENDICES	448
APPENDIX A: STUDENTS’ QUESTIONNAIRE	448
APPENDIX B: LECTURERS’ QUESTIONNAIRE	454
APPENDIX C: UNAM ETHICAL CLEARANCE CERTIFICATE	459
APPENDIX D: UNAM RESEARCH PERMISSION LETTER	460
APPENDIX E: REQUEST TO CONDUCT RESEARCH AT NUST	461
APPENDIX F: APPROVAL TO CONDUCT RESEARCH AT NUST	463
APPENDIX G: NUST REQUEST TO CONDUCT RESEARCH WITH STAFF MEMBERS.	464
APPENDIX H: APPROVAL TO CONDUCT RESEARCH WITH NUST STAFF	466
APPENDIX I: LETTER FROM THE LANGUAGE EDITOR.....	467

LIST OF TABLES

Table 2.1: Evolution of Computer-assisted learning from the 1960s to 2024.....	34
Table 2.2: Examples of CALL Technical Jargon terminology (Gobbledygook).....	48
Table 2.3: Summary of the Technology Acceptance Model (TAM)	127
Table 2.4: Summary of the Diffusion of Innovation Theory (DOIT)	132
Table 2.5: Summary of the Assessment Theory (AT)	136
Table 2.6: Summary of the Social Learning Theory (SLT)	140
Table 3.1: Instrument Mapping Table for Research Question 1	166
Table 3.2: Instrument Mapping Table for Research Question 2.....	167
Table 3.3: Instrument Mapping Table for Research Question 3.....	168
Table 3.4: Instrument Mapping Table for Research Question 4.....	169
Table 3.5: Joint Display of Convergent Findings for Each Research Question.....	177
Table 3.6: Summary of the Quantitative and Qualitative Convergent Mixed Methods Design..	178
Table 4.1 Response Rate Statistics	185
Table 4.2: Students' Perceived Advantages of CALL	204
Table 5.1: Assessment Strategies used by lecturers	230
Table 8.1: Logical Framework – Attitudes and Perceptions of Students towards CALL.....	330
Table 8.2: Logical Framework – CALL Features Supporting Language Learning.....	331
Table 8.3: Logical Framework – Barriers to CALL Delivery.....	332
Table 8.4: Logical Framework – Mitigation Strategies for CALL.....	332
Table 8.5: Implementation Phases for the CALL Framework	338
Table 8.6: Course Outline for Computer-Assisted-Language Learning (CALL)	341
Table 9;1: Joint Display of Convergent Findings for Each Research Question.....	374

LIST OF FIGURES

Figure 3.1: Research Design Flow Chart.....	150
Figure 4.1: Student Participant Institution	188
Figure 4.2: Gender Distribution	189
Figure 4.3: Age of Student Participants	190
Figure 4.4: Student Responses on the Effectiveness of Computers Usage	193
Figure 4.5: Students' Knowledge of the Definition of CALL	196
Figure 4.6: Students' Self Evaluation on Computer Proficiency	197
Figure 4.7: Frequency of Students' Use of CALL Tools	199
Figure 4.8: Students' Competence in Handling and Producing Digital Texts	200
Figure 4.9: Students' Confidence in Implementing CALL	202
Figure 4.10: Lecturers' Understanding of CALL	208
Figure 4.11: Lecturers' Self-Assessment of Computer Competence	210
Figure 4.12: Lecturers' Familiarity with Learning Management Systems	211
Figure 4.13: Lecturers' Preferred CALL Tools for Language Teaching	213
Figure 4.14: CALL Instructional Design Methods Preferred by Lecturers	214
Figure 5.1: Student Familiarity with Learning Management Systems (LMS)	222
Figure 5.2: Students' ratings of LMS user-friendliness	224
Figure 5.3 Language Skills Frequency Distribution Chart for Student Ratings	227
Figure 5.4: Mean Scores for language skills as rated by students	229
Figure 8.1: The Universal CALL Model (UCALM).....	334
Figure 9.1: Reiteration of The Universal CALL Model (UCALM).....	381

LIST OF ABBREVIATIONS

AI: Artificial Intelligence

API: Application Programming Interface

AR: Augmented Reality

AT: Assessment Theory

CALL: Computer-Assisted Language Learning

CALT: Computer-Assisted Language Testing

CD-ROM: Compact Disc Read-Only Memory

CFL: Chinese as a Foreign Language

ChatGPT: Chat Generative Pre-Trained Transformer

CLT: Communicative Language Teaching

CMC: Computer-Mediated Communication

CMS: Content Management System

CRM: Customer Relationship Management

CSS: Cascading Style Sheets

DEC: Departmental Ethics Committee

DOIT: Diffusion of Innovation Theory

DVD: Digital Versatile Disc

ERP: Enterprise Resource Planning

ESL: English as a Second Language

EUROCALL: European Association for Computer-Assisted Language Learning

FTP: File Transfer Protocol

GDPR: General Data Protection Regulation

GUI: Graphical User Interface

HCI: Human-Computer Interaction

HTML: Hypertext Markup Language

ICT: Information and Communication Technology

IDT: Instructional Design and Technology

LCTL: Less Commonly Taught Languages

LMS: Learning Management System

M & E: Monitoring and Evaluation

MALL: Mobile-Assisted Language Learning

MIT: Massachusetts Institute of Technology

ML: Machine Learning

NLP: Natural Language Processing

NSSCO: Namibian Senior Secondary Certificate Ordinary

NUST: Namibia University of Science and Technology

PEOU: Perceived Ease of Use

PLATO: Programmed Logic for Automated Teaching Operations

PU: Perceived Usefulness

SaaS: Software as a Service

SADC: Southern African Development Community

SCT: Social Cognitive Theory

SLT: Social Learning Theory

SSL: Secure Sockets Layer

STI: Science, Technology, and Innovation

TAM: Technology Acceptance Model

TELL: Technology-Enhanced Language Learning

TESOL: Teaching English to Speakers of Other Languages

UCALM: Universal Computer-Assisted Language Learning Model

UNAM: University of Namibia

VLE: Virtual Learning Environment

VPN: Virtual Private Network

VoIP: Voice over Internet Protocol

VR: Virtual Reality

XML: Extensible Markup Language

ZPD: Zone of Proximal Development

CHAPTER ONE

INTRODUCTION AND BACKGROUND OF THE STUDY

1.1 INTRODUCTION

The present study investigated the role of Computer-Assisted Language Learning (CALL) in higher education in Namibia, with a particular focus on how CALL is designed, experienced, and sustained within institutional teaching and learning environments. The study examined students' attitudes and perceptions toward CALL, identified the instructional and technological characteristics that best support language learning, explored challenges that hinder effective CALL delivery, and analysed mitigation strategies capable of informing a coherent framework for CALL integration. In addition, the study explored how technology-driven approaches, including emerging applications of Artificial Intelligence (AI), can contribute to improving English language proficiency and supporting teaching and learning across undergraduate programmes.

A systemic approach was adopted to examine how pedagogical design, institutional structures, and technological conditions collectively influence CALL. CALL was examined as a systemic educational practice shaped by institutional conditions, digital infrastructure, lecturer capacity, learner readiness, and assessment practices. This systems-oriented focus directly informed the development of the Universal Computer-Assisted Language Learning Model (UCALM) presented in Chapter Eight, which synthesises the study's empirical findings into a structured, scalable framework for sustainable CALL implementation.

The study was theoretically framed by four complementary theories that guided the research design, analysis, and interpretation of findings. The Technology Acceptance Model (TAM) (Davis, 1986) informed the examination of students' and lecturers' perceptions of CALL usability and

usefulness. The Diffusion of Innovation Theory (DOI) (Rogers, 1962) provided insight into patterns of CALL adoption and institutional uptake. Assessment Theory, particularly formative assessment and feedback models (Stiggins, 1991; Black & Wiliam, 1998; Shepard, 2000), guided the analysis of digital assessment and feedback practices. Social Learning Theory (SLT) (Bandura, 1977) framed CALL as a socially mediated learning environment in which interaction, observation, and collaboration support language development. Together, these theoretical perspectives underpin UCALM's eight pillars, particularly those concerned with pedagogical alignment, learner engagement, assessment, and institutional sustainability.

Empirical data were collected from second-year undergraduate students majoring in English at the University of Namibia (UNAM) and the Namibia University of Science and Technology (NUST) during the 2023–2024 academic period, alongside data from language lecturers involved in CALL-supported instruction. English has served as the official language of government and education in Namibia since independence in 1990 (Buschfeld & Kautzsch, 2017; Stell, 2021). The adoption of English was intended to foster national unity, facilitate international engagement, and expand access to global education and economic participation (Narro, 2022). As a result, English language proficiency functions as a foundational academic requirement in higher education, positioning CALL as a strategically significant component of institutional language support.

Participation in contemporary higher education increasingly depends on learners' familiarity with CALL environments used to deliver English language instruction in both physical and virtual settings. CALL tools support the development of the four core language skills, listening, speaking, reading, and writing, while also enabling flexible access, learner autonomy, and multimodal engagement (Lin et al., 2023). Entry into Namibian universities requires a minimum 'C' symbol

in English at secondary school level (Kangira, 2022); however, higher education demands substantially higher levels of academic language competence. This transition highlights the need for structured, pedagogically coherent CALL environments rather than fragmented or tool-driven adoption.

Historically, language teaching relied on textbook-based and classroom-centred approaches. The proliferation of digital technologies has transformed these practices, giving rise to CALL as a central field within applied linguistics and educational technology (Haleem et al., 2022). CALL involves the use of digital devices, networked platforms, multimedia resources, and online communication tools to support second language acquisition and language instruction (Pennycook, 2021). Research suggests that traditional instructional approaches alone are no longer sufficient for effective language learning in digitally mediated academic contexts (Richards & Rodgers, 2014). Interactive, technology-supported learning environments are increasingly necessary to support engagement, feedback, and sustained language development (Ghory & Ghafory, 2021; Ahmadi, 2018).

Despite its potential, CALL integration in higher education often remains uneven, particularly in contexts characterised by infrastructural constraints, variable digital literacy, and limited instructional design support. In Namibia, access to mobile devices and institutional computer facilities has expanded opportunities for CALL (Shaambeni, 2019), yet challenges persist in achieving pedagogical coherence, scalability, and institutional alignment. These challenges provided the empirical and conceptual basis for the development of UCALM.

In response to these challenges, this study proposes the Universal Computer-Assisted Language Learning Model (UCALM), alongside a structured CALL teaching and training pathway designed

for progressive implementation from undergraduate to postgraduate levels. UCALM represents the culmination of the study by translating empirical findings into an eight-pillar, learner-centred framework that integrates infrastructure, digital literacy, curriculum alignment, instructional design, technology platforms, assessment and feedback, inclusive learner support, and continuous institutional improvement. Introduced in Chapter Eight and revisited in the concluding chapters, UCALM provides a practical lens through which the study's findings are interpreted and applied, ensuring that CALL is conceptualised as a technological intervention and a sustainable institutional ecosystem within higher education.

1.2 BACKGROUND OF THE STUDY

In contemporary global education, integrating technology into teaching and learning processes has become an important focus for enhancing learning outcomes (Alenezi et al., 2023). Among the various domains of educational technology, Computer-Assisted Language Learning (CALL) has gained prominence for its potential to revolutionise language education. CALL involves the use of computers and digital tools to facilitate the teaching and acquisition of languages, offering learners interactive and personalised experiences that traditional methods may not provide (Bibauw et al., 2019; Chun, 2016; Levy & Stockwell, 2013). This technological approach to language education is particularly relevant in the context of higher education, where students are expected to develop advanced language skills that are essential for academic success and professional development.

In Africa, CALL represents both a promising innovation and a challenging situation (Allard & Williams, 2020). The continent's diverse linguistic landscape necessitates a tailored approach to language education that respects cultural and linguistic identities while promoting proficiency in widely spoken languages such as English and French (Ojong & Addo, 2024; Roman, 2024).

However, the implementation of CALL in Africa is often hindered by infrastructural limitations, such as inconsistent internet connectivity, lack of access to digital devices, and insufficient training for educators on how to effectively integrate technology into language teaching (Katushemererwe & Nerbonne, 2015; Lin et al., 2023). Despite these challenges, successful instances of CALL being used to enhance language learning in African higher education institutions, particularly in countries like South Africa, Kenya, and Nigeria, demonstrate its potential to bridge educational gaps and support CALL (Kaliisa & Picard, 2017; Mampane et al., 2018; UNESCO, 202).

Namibia is a country characterised by its linguistic diversity, presenting a unique context for the application of Computer-Assisted Language Learning (CALL). According to the 2023 Namibia Population and Housing Census Main Report, although English is the sole official language and the medium of instruction in education and government, it is spoken at home by only 2.7% of the population (Namibia Statistics Agency, 2024). The linguistic landscape is dominated by indigenous languages, with Oshiwambo being the most commonly spoken, accounting for 48.2% of households. Other widely spoken languages include Khoekhoegowab (11.0%), Otjiherero (7.9%), Rukwangali (7.0%), and Silozi (3.2%). Afrikaans, spoken by 10.2% of households, remains one of the most widely understood national languages, while the white population predominantly speaks either Afrikaans or German, reflecting the country's colonial history.

Based on the 2023 census, Namibia is home to over 20 languages, closely tied to specific ethnic groups, and many consist of dialectal variations within broader language families. This linguistic richness represents both a cultural asset and a challenge for educational and technological systems, especially in the development of inclusive and representative CALL tools.

Among the most prominent language groups in Namibia is the Oshiwambo language, which comprises mutually intelligible dialects such as OshiKwanyama, OshiNdonga, OshiKwaluudhi, OshiMbalantu, OshiNgandjera, OshiKwambi, Oshikolonkadhi and OshiMbadja. It is important to clarify that these are the dialects (languages), while the names of the ethnic groups who speak them are Aakwanyama, Aandonga, Aakwaluudhi, Aambalantu, Aangandjera, Aakwambi, and Aambadja.

Other independently recognised languages include Rukwangali and Silozi, both Bantu languages with established orthographies used in formal education and religious practices. Additional Bantu languages; Thimbukushu, Shiyeyi, Rumanyo, Chikuhane, Chifwe, and Chinyemba, vary in their degree of documentation, with some having developed literacy materials, while others remain less formalised. These are widely used in education, media, and community life. The Otjiherero language group, including Ovaherero and Ovambanderu, is another Bantu language with a standardised orthography and cultural prominence. These languages belong to the Bantu language family, which is a subgroup of the larger Niger-Congo language family, widely spoken across sub-Saharan Africa and characterised by features such as noun class systems and agglutinative grammar.

Khoekhoegowab, spoken by the Nama and Damara communities, is a well-established language that features click sounds similar to those found in other Khoisan languages, but it is not mutually intelligible with them. It has a standardised written form and is used in literacy programmes and formal education. Khoekhoegowab is unique for its use of click consonants, a defining feature that sets it apart from most other languages globally. It has four primary click types (dental, lateral,

alveolar, and palatal), each with various accompanying articulations such as voicing or nasalisation, resulting in over 20 distinct click sounds.

Notably, Namibia is also home to several San (Khoisan) languages, such as Ju|'hoansi, !Kung, ||Anikhwe, !Xung, !Gami-!nûn, !Khara-khoin, ||Khau-!gôan, and |Hai-|Khauan, are characterised by their complex phonetic inventories and distinctive use of click consonants. These languages are traditionally oral and face challenges of endangerment and lack of standard orthographies, which significantly limits their integration into formal education, media, and technology-based learning environments.

This multilingual environment creates disparities in learners' English proficiency and cognitive linguistic frameworks, which can hinder uniform access to CALL tools designed primarily for monolingual or global English-speaking contexts. According to Palacios-Hidalgo (2025), the lack of culturally and linguistically inclusive CALL materials often leads to marginalisation of learners whose first languages are not represented, thereby affecting engagement and learning outcomes. Moreover, the integration of generative AI technologies into CALL platforms raises concerns about language bias, as these tools often favour dominant languages and struggle to accommodate less widely spoken tongues (Albeihi & Rice, 2025). This can result in epistemic injustice, where the knowledge systems and linguistic identities of minority language speakers are undervalued or overlooked, thereby reinforcing educational inequalities (Helm et al., 2024). To address these challenges, there is a critical need for CALL solutions that are locally contextualised, linguistically inclusive, and capable of supporting multilingual learners in Namibia's higher education system.

Given Namibia's historical and socio-economic background, where access to quality education and resources has been unequal (Ithindi, 2019), the adoption of CALL in these institutions represents

a strategic initiative to enhance language education and bridge gaps in learning outcomes (Schmid, 2017; Salsabilla & Zayn, 2023). The importance of English as the primary medium of instruction and a critical skill for academic and professional communication in Namibia further consolidates the need for effective language learning strategies. However, despite the recognised potential of CALL, its implementation in Namibian higher education institutions has been limited (Ithindi, 2019; Salom, 2023; Hamakali & Josua, 2023; Mufeti, 2020).

Therefore, this study examines the attitudes, effectiveness, challenges, and opportunities associated with CALL in the Namibian higher education context. The study explored the attitudes and perceptions of Namibian higher education students towards CALL, evaluated the effectiveness of CALL in supporting language learning, identified factors impeding CALL delivery, and examined integration challenges and opportunities.

1.3 INSTRUCTIONAL DESIGN AND TECHNOLOGY AS A FOUNDATION FOR SYSTEMIC CALL INTEGRATION

The study is situated within the interdisciplinary field of Computer-Assisted Language Learning (CALL) and Instructional Design and Technology (IDT), situated within the broader domain of Higher Education Studies. Within this field, instructional design and technology refers to the deliberate structuring of learning experiences so that educational goals, learning activities, digital tools, assessment practices, and learner support systems function coherently. It involves clarifying what learners are expected to achieve, organising content into meaningful sequences, segmenting learning materials into manageable units, and embedding opportunities for practice, feedback, and reflection. Through this process, learning environments are intentionally designed to support engagement, reduce cognitive overload, and promote sustained learning.

IDT encompasses the systematic planning, development, implementation, and evaluation of learning processes and resources to improve educational outcomes (Reiser & Dempsey, 2018). It draws on foundational theories from education, cognitive science, communication, and information and communication technologies to create effective, learner-centred environments. In higher education, IDT has become increasingly central to institutional digital transformation, supporting universities in adopting, adapting, and pedagogically integrating emerging learning technologies in ways that align with curriculum goals and learner needs (Molenda, 2015; Bates, 2019).

Examining Computer-Assisted Language Learning through this lens enables an integrated exploration of both pedagogical practice and technological adoption. CALL extends beyond the use of digital tools as supplementary resources; it requires intentional alignment between language learning objectives, instructional activities, digital platforms, and assessment strategies. CALL environments must therefore be designed to guide learners progressively through language input, interaction, practice, and feedback, while remaining responsive to contextual realities such as learner diversity, access conditions, and institutional capacity (Chapelle, 2001; Levy & Stockwell, 2013). An instructional design perspective provides a structured way of examining how CALL can be embedded coherently within university curricula and teaching practices rather than implemented in fragmented or ad hoc ways.

At the national level, Namibia's Science, Technology, and Innovation (STI) strategy recognises higher education institutions as independent yet critical actors in building digital learning and innovation capacity. Universities are mandated to develop institutional ICT policies while contributing to national policy coordination to ensure alignment across the education system. Their

responsibilities include defining ICT literacy benchmarks, supporting the development of the digital workforce, and advancing both pre-service and in-service teacher training (Ministry of Higher Education, Technology and Innovation, 2020). These policy expectations position higher education institutions as key sites for pedagogically grounded technology integration rather than mere adopters of digital tools.

Within this context, scholars emphasise that ICT-enhanced learning systems must reflect local infrastructure conditions, pedagogical priorities, and cultural realities if they are to be effective and sustainable (Arinto, 2016; Czerniewicz, 2020). Previous Namibian studies similarly highlight persistent challenges, including digital skills gaps, uneven infrastructure, and unequal access to learning technologies, all of which constrain the scalability and effectiveness of CALL initiatives, particularly in under-resourced institutional contexts (Boer, 2021).

Instructional design and technology offers research-based approaches for addressing these systemic challenges by focusing on coherent learning architectures, inclusive access, and iterative improvement. Through careful sequencing of learning activities, intentional use of digital tools, and continuous evaluation informed by learner feedback and performance data, IDT supports the development of learning environments that are both contextually responsive and pedagogically robust (Morrison et al., 2019). Building on these principles, this study proposes the Universal CALL Model (UCALM) as a framework grounded in instructional design thinking that addresses infrastructure, digital literacy, curriculum alignment, pedagogical design, assessment, inclusivity, and institutional sustainability. Positioning the study within Instructional Design and Technology therefore enables a comprehensive and contextualised examination of CALL's potential to enhance language learning in higher education.

1.4 STATEMENT OF THE PROBLEM

In order for a student to be admitted to study at most universities in the Namibian education system, they are required to have obtained a minimum C symbol or better in English language at Matric; that is Grade 11 and 12. Failure to obtain a good grade in English has militated access to higher education for many Namibian students, who have found themselves sitting at home while they supplement to upgrade from a lower symbol to the required minimum C or a better grade. After obtaining a better grade, English proficiency has remained a challenge even when they finally transition to tertiary education. These proficiency challenges in English language usage in the Namibian high school education system are generally reflected by the low pass rates in the Grade 12 final examination. In the recent years, 2018, 2019, 2020 and 2021, there has been a decline in the pass rate of the English language in Namibia owing to the lack of proficiency (Nghuulikwa, 2023). For example, in 2019 only 23.3% of the learners who sat for the Namibian Senior Secondary School (NSSCO) obtained a grade C or better (Domingo, 2024). Although the remainder of the learners passed subjects other than the English language with good grades, they become redundant and are obliged to re-register for high school until they obtain a better grade. This suggests that the low rate of proficiency in the English language is a negative contributing factor for the low pass rate.

It can be argued that if the problem of proficiency in all four key areas of English skills is identified early enough, the use of CALL could be implemented to alleviate such problems. CALL can be used to address challenges of speaking, reading, writing and listening skills in English. For example, learners in Namibia struggle with the listening segment of their grade 12 examination. This result in them losing marks that contribute to their final grade. Similar challenges are

encountered in the other three remaining skills. CALL has been observed to address such challenges (Beatty, 2013).

The use of CALL in higher education has gained popularity worldwide, but research on its effectiveness and implementation in the Namibian context is still developing. A study by Gumban (2024) has shown that CALL can enhance language learning outcomes. The effectiveness of CALL in Namibia can be influenced by factors including learners' attitudes towards technology, the quality of instructional design, and the level of teacher training (Nchindo, 2019). Additionally, the unique characteristics of the Namibian higher education system, such as a multilingual student population and limited technological infrastructure in some areas, may pose challenges to the successful integration of CALL.

Shingoya (2024) examined the potential of online language resources and tools for higher education students in Namibia. It was found that the lack of infrastructure and access to technology in some areas of Namibia may limit the effectiveness of digital language learning resources. Smit and Gachago (2021) explored the opportunities and barriers of digital technologies in Namibian higher education and found that the implementation of technology in education is influenced by various factors such as access, attitudes, and digital literacy (Kaisara & Bwalya, 2021).

Despite this rich linguistic backdrop and the potential of CALL to address the persistent English language proficiency challenges in Namibian education, there remains a noticeable research gap. While previous studies have explored digital education tools and general challenges in higher education, limited attention has been given to the practical implementation, uptake, and effectiveness of CALL specifically for English language learning among university students. There is a lack of detailed investigation into how CALL is being used to support the four core

language skills: listening, speaking, reading, and writing: among second-year undergraduate students majoring in English at the University of Namibia (UNAM) and those enrolled in the Bachelor of English and Linguistics at the Namibia University of Science and Technology (NUST). Furthermore, existing research has not sufficiently addressed how the country's multilingual context, combined with unequal access to digital infrastructure, shapes students' engagement with CALL platforms. This study, therefore, aims to bridge this gap by providing an in-depth exploration of CALL's role, reach, and relevance in Namibia's higher education landscape.

Despite the perceived potential benefits of CALL, there is a gap in the literature on the use of CALL in the delivery of lessons for second-year undergraduate students studying English as their Major at UNAM and Bachelor of English and Linguistics at NUST in Namibia between 2023/2024. Specifically, it is not clear how CALL is currently being used, and whether there are any specific types of CALL software or tools that are commonly used.

Thus, this study aims to fill the research gap by investigating the current state of CALL implementation in Namibia's higher education institutions and evaluating its effectiveness in supporting language learning. It also seeks to examine the attitudes and perceptions of students and instructors toward CALL and to identify the challenges and opportunities associated with its integration in multilingual, resource-variable educational settings. Based on the findings, the study aims to propose a context-sensitive CALL model specifically developed to enhance English language learning in Namibian universities. This model will consider the linguistic diversity, technological infrastructure, and pedagogical needs unique to the Namibian higher education landscape. It is envisioned that the outcomes of this study provide valuable guidance for educators,

policymakers, and curriculum developers, enabling more informed and effective decisions about the integration and expansion of CALL in language education across Namibia's tertiary institutions.

1.5 RESEARCH QUESTIONS

The main research question of the study is to investigate the significance of the use of CALL in the Namibian higher education context. The following constitute the specific research questions:

1. What are the attitudes and perceptions of Namibia's Higher Education students towards CALL?
2. What are the factors and characteristics identified by users of CALL that best support their language learning?
3. What are the factors that impede the delivery of Computer-Assisted Language Learning (CALL)?
4. What are the mitigation strategies leading to the development of a model to support the delivery of Computer-Assisted Language Learning (CALL) in the context of higher education?

1.6 SIGNIFICANCE OF THE RESEARCH

CALL is an area that is still developing in Namibia. This means that CALL is a field of Linguistics that presents opportunities for conducting research in Namibia. This study may contribute to the understanding and development of CALL in the context of the Namibian Higher Education. English departments at Namibian institutions may have the opportunity to contribute to the development of the Namibian CALL studies.

1.7 DELIMITATION OF THE RESEARCH

The delimitations of this research define the boundaries within which the study was conducted, focusing on the specific choices made by the researcher that shape the scope and depth of the investigation. These delimitations are intentional decisions aimed at managing the research process effectively while keeping it aligned with the study's primary objectives (Theofanidis & Fountouki, 2018).

The study was limited to two higher education institutions in Namibia: The University of Namibia (UNAM) and the Namibia University of Science and Technology (NUST). This choice was made to represent diverse but manageable case studies within the Namibian higher education system. These two institutions were selected because they are among the largest and most established universities in the country, offering a wide range of programmes and a relatively high level of access to technology and CALL resources. However, this delimitation means that the findings may not fully capture the perspectives of students and lecturers in smaller colleges, vocational institutions, or rural educational settings, where access to technology may differ significantly.

Another key delimitation was the focus on second-year undergraduate students majoring in English or linguistics and lecturers from English departments at UNAM and NUST. The selection of this specific group of students and faculty was intended to concentrate on individuals who are directly involved in language learning and teaching, making them the most relevant population for a study on CALL. This focus enabled a more in-depth exploration of CALL's perceived effectiveness and challenges within the field of language education. However, it also means that the study's findings are not necessarily generalisable to other disciplines, such as the sciences or social sciences, where the nature and implementation of CALL might differ.

The study was further delimited by its emphasis on specific CALL tools and instructional design methods that are already in use within the Namibian higher education context. Rather than attempting to evaluate every available CALL tool, the study focused on widely adopted platforms such as Learning Management Systems (LMS) like Moodle and Microsoft Teams. These tools were selected based on their established presence in the participating institutions and were familiar to both students and lecturers. As such, the researcher did not impose external tools but instead aligned the study with the technological environments already experienced by the participants. This approach ensured that the data collected reflected authentic user experiences rather than hypothetical interactions with unfamiliar or experimental tools. Consequently, the study did not include less commonly used or emerging CALL platforms such as virtual reality (VR) tools like VR Language Labs, which may offer additional features or pose unique challenges beyond the scope of this research.

The study primarily utilised a quantitative survey approach, complemented by limited qualitative data gathered through purposive sampling. This approach was chosen to efficiently collect data from a larger sample and to quantify the attitudes and perceptions of students and lecturers toward CALL. The choice to focus predominantly on quantitative data reflects a deliberate delimitation that prioritises breadth over depth, aiming to identify general trends rather than explore nuanced personal experiences. However, this delimitation introduces a key limitation: by relying primarily on a single data collection tool, the survey, the study restricts the depth of understanding of participants' lived experiences with CALL. The structured nature of survey responses may overlook contextual factors, emotional nuances, and individual variations that could have been uncovered through more extensive qualitative methods such as interviews or focus groups.

Consequently, while the findings are statistically valid, they may not fully capture the complexity of how CALL is implemented and experienced across diverse educational contexts.

The study was also temporally delimited to a specific academic period, with data collected at a single point in time. This cross-sectional approach, while efficient and manageable within the research timeframe, limits the ability to observe changes in perceptions or practices over time. Therefore, the findings represent a snapshot of attitudes and experiences with CALL within Namibian higher education during that period and may not reflect how these perceptions evolve as technology and pedagogical practices in CALL continue to develop.

1.8 LIMITATIONS OF THE STUDY

The limitations of this study reflect both methodological constraints and contextual factors that may have influenced the findings. The study relied on self-reported data collected through questionnaires from students and lecturers, which may introduce response biases, such as social desirability bias, where participants provide responses that they believe are expected or favorable. Additionally, while the sample size was carefully determined using stratified random sampling for students and purposive sampling for lecturers, the results may not be fully generalisable to all higher education institutions in Namibia due to the focus on only two universities: the University of Namibia (UNAM) and the Namibia University of Science and Technology (NUST). Another limitation is the cross-sectional nature of the study, as data was collected at a single point in time. This approach restricts the ability to observe changes in attitudes or experiences over time, which might have provided the understanding of evolving perceptions of Computer-Assisted Language Learning (CALL).

Moreover, the study encountered technological limitations, as access to computers and reliable internet varied among participants, potentially impacting their engagement with CALL and influencing their responses. As CALL is a rapidly evolving field, with new tools and technologies continually emerging, the study's findings may have limited applicability as CALL tools and digital learning environments continue to develop. Future research could address these limitations by incorporating longitudinal data, expanding the sample to include other Namibian institutions, and employing mixed method approaches that combine surveys with in-depth interviews to capture a more comprehensive view of the factors influencing CALL adoption and effectiveness in language learning.

1.9 PERCEIVED STRENGTHS OF THE STUDY

The perceived strengths of this study on Computer-Assisted Language Learning (CALL) in Namibian higher education are grounded in its ability to address a significant research gap, its contextual relevance, and its potential to inform future CALL implementations. The primary purpose of this study was to build on the limited existing literature in Namibia, where CALL is still a developing area of research. Through reviewing what previous scholars have researched both within Namibia and internationally, this study identifies a clear gap in the local CALL literature, which it seeks to bridge by providing focused findings specific to the Namibian higher education context.

Namibia is a country with a relatively small population and only two major public universities (University of Namibia (UNAM) and Namibia University of Science and Technology (NUST)) alongside a few private institutions, presents unique opportunities and challenges for CALL integration. The limited number of higher education institutions and a nascent digital infrastructure suggest that CALL is underutilised and underexplored in this context. This study's targeted focus

on CALL in Namibia provides an opportunity to explore how digital language learning can be effectively implemented in this environment, offering a foundation for further research and development. Investigating CALL within this context, the study helps lay the groundwork for more expansive applications and adaptations of CALL in Namibian and other similar educational systems.

Another strength lies in the study's focus on identifying and analysing both student and lecturer perspectives. CALL's effectiveness depends not only on the students' engagement with digital tools but also on the educators' familiarity and comfort with implementing these technologies in their teaching. Gathering data from both groups allows for a comprehensive understanding of CALL's strengths and limitations, making the findings more balanced and actionable. This dual perspective enriches the study by considering how both groups perceive and interact with CALL, which is essential for creating effective strategies to support its integration.

Conducting a convergent parallel mixed-methods design study that combines quantitative and qualitative data, the research strengthens the reliability and depth of its findings. Quantitative data provides statistical evidence on the effectiveness and acceptance of CALL tools, while the qualitative data offers context and depth, revealing the nuances of participants' experiences and perceptions. These mixed methods approach thoroughly explores CALL's role in language education in Namibia, supporting a well-rounded analysis that contributes to theoretical knowledge and practical recommendations.

The study's actionable recommendations, developed based on the findings, significantly contribute to the field. Providing practical strategies for implementing CALL and developing a framework tailored to Namibia's educational institutions of higher education, the study goes beyond merely

describing the current state of CALL. Instead, it presents a pathway for future improvements, guiding institutions, educators, and policymakers in effectively integrating CALL into their language programmes.

1.10 OPERATIONAL DEFINITIONS

In this study, operational definitions clarify the specific meanings of key terms and concepts as they are applied within the study context (De Bock et al., 2024; Sinclair, 2024). These definitions are essential to ensure that readers and stakeholders interpret the terminology consistently and precisely. The study aims to minimise ambiguity and provide a solid foundation for understanding how various concepts such as Computer-Assisted Language Learning (CALL), language proficiency and digital literacy, are measured and evaluated by establishing clear operational definitions.

- **Computer-Assisted Language Learning (CALL)**

CALL refers to the use of computer-based resources, applications, and tools to support language teaching and learning (Maulana, 2024; Patahuddin et al., 2024). In this study, CALL includes software, Learning Management Systems (LMS), interactive language learning applications (e.g., Duolingo, FluentU), and other digital tools that assist in language acquisition, practice, and assessment (Ayotunde et al., 2023). CALL encompasses both asynchronous and synchronous activities aimed at enhancing language skills.

- **Language Proficiency**

Language proficiency is defined as the ability to communicate effectively in a language across the four key skill areas: speaking, listening, reading, and writing (Olson, 2024). In this study,

proficiency levels are assessed through self-reported measures by students and lecturers, who rate the perceived impact of CALL on enhancing these specific language skills.

- **Digital Literacy**

Digital literacy refers to the ability to use, understand, and interact with digital tools and technologies effectively (Susanty, 2024; Dai, 2024). In this study, digital literacy is particularly focused on students' and lecturers' competencies in using CALL tools, LMS platforms, and other computer-based resources for language learning and instruction. Higher digital literacy is assumed to correlate with a greater ability to engage with CALL effectively.

- **Learning Management System (LMS)**

LMS in this study refers to the digital platforms (e.g., Moodle, MS Teams, Google Classroom) used by students and lecturers to learn, teach, organise, access, and manage course materials, assignments, and communication (Akhmedova & Rahmatova, 2024; Axmedova, 2024). LMS platforms facilitate the implementation of CALL by enabling structured, technology-mediated language instruction and interaction.

- **Student Engagement**

Student engagement is defined as the level of active participation, involvement, and interest demonstrated by students in their language learning activities (Zepke, 2024; Ajabnoor & Fatima, 2024). In the context of CALL, engagement includes how frequently students interact with digital tools, their motivation to learn through CALL resources, and their enthusiasm for participating in technology-enhanced language activities.

- **Instructional Design for CALL**

Instructional Design and Technology refers to the systematic process of applying learning and instructional theory, along with technological tools and strategies, to design, develop, implement, and evaluate learning experiences that improve educational effectiveness and learner outcomes (Hautemo & Van der Merwe, 2021). It encompasses both the methodology of instructional planning and the integration of digital technologies in educational settings (Reiser & Dempsey, 2018).

- **Perceived Effectiveness**

Perceived effectiveness is defined as students' and lecturers' subjective evaluations of how beneficial CALL tools and resources are in improving language learning outcomes (Bang et al., 2020). In this study, perceived effectiveness is measured through survey responses indicating participants' views on CALL's impact on language skill acquisition, engagement, and learning motivation.

- **Access to Technology**

Access to technology refers to the availability and reliability of necessary digital devices, internet connectivity, and software required to engage with CALL tools (Gonzales, 2016). In the context of Namibian higher education, this includes whether students and lecturers have consistent access to computers, stable internet connections, and up-to-date software to effectively participate in CALL activities.

- **Barriers to CALL**

Barriers to CALL are defined as any obstacles or challenges that hinder the effective implementation or use of CALL in language learning (Park & Son, 2022; Chen, 2023). In this study, barriers may include socio-economic factors, limited digital literacy, lack of institutional support, unreliable electricity, and restricted access to necessary technology.

- **CALL Framework**

The CALL Framework refers to a proposed structure designed to guide the effective integration of Computer-Assisted Language Learning (CALL) within the Namibian higher education context (Bibauw et al., 2019; Read & Madera, 2020). This framework outlines recommended practices, resources, and institutional support systems necessary for successful CALL implementation. It addresses strategies to overcome identified barriers and maximise the benefits of CALL, with the goal of enhancing language learning outcomes for students in a digitally supported environment. The Universal Computer-Assisted-Language Learning Model) (UCALM) is proposed as a framework for enhancing learning.

1.11 ORGANISATION OF THE THESIS

This section provides an overview of the study, outlining the key areas of focus and research questions addressed in each chapter. The study is organised into nine chapters as follows:

Chapter One: Introduction

The introduction chapter provides a background to the study, situating the context of CALL within the Namibian higher education system, where English is the medium of instruction post-independence. It outlines the research questions, and significance of the study, revealing Namibia's socio-economic conditions and its implications for the adoption of technology-based language learning. This chapter introduces key theoretical frameworks, including the Technology

Acceptance Model (TAM), Social Learning Theory (SLT), and Diffusion of Innovation Theory (DOIT), which guide the study's analysis. Additionally, the chapter presents the study's limitations and an outline of the research methodology.

Chapter Two: Literature Review

This chapter reviews global and local literature on CALL and its applications in higher education. It provides an in-depth discussion of CALL's benefits, challenges, and relevance in language learning, particularly within developing countries. Through an examination of CALL's interactive features, such as multimedia learning and real-time feedback, the literature review highlights factors that influence CALL's effectiveness, such as infrastructure, teacher training, and student engagement. The review identifies gaps in the literature, particularly a lack of empirical studies on CALL in Namibia and frames these gaps within the study's objectives to underscore the importance of the research.

Chapter Three: Research Methodology

Chapter three describes the research design and methodology, detailing the convergent parallel mixed-methods design approach used to collect and analyse data. It explains the selection of two Namibian higher education institutions, the UNAM and the NUST, as study sites. Sampling methods, including stratified random sampling for students and purposive sampling for lecturers, are described, as are data collection tools, such as semi-structured questionnaires. The chapter outlines both quantitative and qualitative data analysis methods, specifying how each data type contributes to addressing the research objectives. Ethical considerations are also discussed.

Chapter Four: Analysis of Attitudes and Perceptions Towards CALL

This chapter addresses the first research question, exploring the attitudes and perceptions of Namibian higher education students toward CALL. Through survey response findings, the chapter provides perspectives on students' views of the value, effectiveness, and comfort level with CALL tools. It examines factors influencing their engagement with CALL, including previous exposure to technology and the perceived relevance of CALL in language acquisition.

Chapter Five: Factors and Characteristics Identified by the Users of CALL that Best Support their Language Learning

Chapter five addresses the second research question by exploring the specific factors and characteristics of CALL tools that students and lecturers find most effective in supporting language learning. Through qualitative and quantitative data analysis, the chapter identifies key features such as interactivity, multimedia content, personalised learning paths, real-time feedback, and accessibility that contribute to enhanced engagement and skill acquisition. Students indicated tools that promote listening comprehension, vocabulary building, and pronunciation practice, while lecturers emphasised structured feedback and progress tracking as essential components. The chapter provides a user-CENTRED perspective on the attributes of CALL that best facilitate language development, offering a perspective on how these tools can be used effectively with learners' preferences and pedagogical goals.

Chapter Six: Factors Impeding CALL Delivery

This chapter addresses the third research question by examining the factors that hinder the successful delivery of CALL in Namibian higher education. It investigates challenges such as limited digital infrastructure, socio-economic disparities, and digital literacy gaps. Drawing from

the Technology Acceptance Model (TAM) and Social Learning Theory (SLT), the chapter explores how these barriers impact student and lecturer engagement with CALL.

Chapter Seven: Mitigation Strategies for Enhancing the Delivery of CALL

This chapter focuses on the fourth research question, identifying strategies to overcome CALL-related challenges and proposing a framework for CALL integration tailored to the Namibian context. The chapter presents strategies such as expanded digital infrastructure, improved training programmes, and partnerships with technology providers to reduce costs and expand access. The proposed CALL Model in chapter 8 is designed to be implemented in phases, starting with pilot programmes

Chapter Eight: Proposed Model for CALL Integration in Higher Education

Chapter Eight presents the culminating outcome of the study: a Logical Framework and the Universal CALL Model (UCALM) designed as a framework to guide the effective integration of Computer-Assisted Language Learning (CALL) within Namibian higher education. Grounded in the findings of Chapters 4 to 7, this chapter introduces a structured, multi-phase model that addresses the pedagogical, infrastructural, and institutional needs of CALL implementation. The Logical Framework outlines the objectives, indicators, means of verification, and assumptions linked to each of the four research questions, offering a results-based management approach to CALL integration. Building on this, the Universal CALL Model (UCALM) is presented with eight interlinked pillars. The chapter further proposes an academic course titled Principles and Practical Application of Computer-Assisted Language Learning (PPA-CALL), with a detailed syllabus aimed at equipping students and lecturers with the theoretical and practical competencies to navigate and implement CALL effectively.

Chapter Nine: Summary of Findings, Conclusions and Recommendations

Chapter nine synthesises the key findings of the study, offering a comprehensive conclusion based on the responses to all four research questions. It integrates the perspectives of students and lecturers on their attitudes toward CALL, the features of CALL tools that best support language learning, the barriers impeding its effective implementation, and the mitigation strategies proposed. The chapter reaffirms that while there is broad support for CALL and recognition of its pedagogical value, challenges such as inadequate infrastructure, limited access to technology, and insufficient training continue to undermine its potential. Based on these findings, the chapter presents a series of practical and contextually relevant recommendations for higher education institutions in Namibia. These include strengthening digital infrastructure, expanding training opportunities for both students and lecturers, embedding CALL into curriculum design, and ensuring consistent monitoring and evaluation. The chapter concludes by reaffirming the need for a holistic, inclusive, and sustainable approach to CALL integration in order to enhance language learning outcomes in Namibian higher education.

1.12 SUMMARY

Chapter one provided a comprehensive introduction to the integration of CALL within the context of higher education in Namibia, focusing on the UNAM and the NUST. It explored the importance of CALL as a technological approach to language education, emphasising its relevance in enhancing the teaching and learning English, in Namibian higher education institutions. The chapter began by discussing the growing role of technology in global education, particularly in language learning. CALL is presented as a critical tool that offers interactive and personalised

learning experiences, which traditional methods may lack. In the African context, CALL was discussed as both promising and challenging, with infrastructure limitations and cultural diversity impacting its implementation. Namibia, with its linguistic diversity, is identified as a unique case where English, the official language, is spoken as a home language by only a small fraction of the population, thus stressing the need for effective language education strategies like CALL. The main purpose of the study was to evaluate the attitudes, effectiveness, challenges, and opportunities associated with CALL in Namibian higher education. It specifically focuses on second-year undergraduate students studying with English as their Major at UNAM and Bachelor of English and Linguistics at NUST. The study addresses the gap in English proficiency among Namibian students, a challenge reflected in the low pass rates in the Grade 12 final examinations. The chapter also identified the problem of English proficiency among Namibian students, particularly at the tertiary level, as a significant barrier to academic success. The low pass rates in the Grade 12 English examinations show the need for effective language learning interventions. This chapter sets the stage for an in-depth investigation into the implementation and effectiveness of CALL in Namibian higher education, aiming to provide clarity that could lead to improved language education outcomes in the country. The next chapter reviews literature related to the study of CALL

.

CHAPTER TWO

LITERATURE REVIEW AND THEORETICAL FRAMEWORK

2.1 INTRODUCTION

This chapter reviews literature on the use of Computer-Assisted-Language Learning (CALL) in variety of contexts and provides perspectives into the tenets of the theoretical frameworks within which the study is couched. The literature discusses modern methods applied in the teaching and learning of language with the assistance of digital devices such as cameras, computers and the internet. The review responds to the main research objective and the specific objectives of the study.

CALL has been recognised as a useful tool to enhance language learning outcomes by providing learners with opportunities to practice listening, speaking, reading, and writing skills in an interactive, learner-CENTRED, and engaging environment. Despite the growing popularity of CALL worldwide, there is a lack of research on its implementation and effectiveness in the Namibian context of higher education.

CALL has become increasingly popular in higher education as a tool to support language teaching and learning. Despite its widespread use, it is important to examine the attitudes and perceptions of students towards CALL, as well as its effectiveness in promoting language acquisition. This literature review aims to explore current research on CALL in higher education, focusing on its effectiveness, challenges to implementation, integration, and intervention strategies.

The review also includes examining students' attitudes and perceptions towards CALL, evaluating its effectiveness in promoting language acquisition, identifying barriers to its implementation, exploring opportunities for integration into higher education, assessing its effectiveness as an

online assessment tool, and identifying intervention strategies to support its delivery. The chapter also explains the major explications of the four theories that this study is couched in: the Technology Acceptance Model (TAM), Diffusion of Innovation Theory (DOIT), Assessment Theory (AT), and Social Learning Theory (SLT). The review is organised in the order of the following four research questions:

The literature review was guided and organised under the following four research questions:

1. What are the attitudes and perceptions of Namibian Higher education students towards CALL?
2. What are the factors and characteristics identified by users of CALL that best support their language learning?
3. What are the factors that impede the delivery of CALL?
4. What are the mitigation strategies that lead to the development of a model supporting the delivery of Computer-Assisted-Language Learning (CALL) in the context of higher education?

The review below aims to provide an understanding of the current state of research on CALL in the context of higher education, identifying gaps in the literature and areas for future research. In exploring the attitudes and perceptions of students, as well as the effectiveness and challenges of CALL, this review provides a comprehensive understanding of the potential of CALL in supporting language learning in higher education.

2.2 THE HISTORY AND EVOLUTION OF CALL

The use of technology in language learning can be traced back to the 1950s, when researchers and educators began to experiment with the use of computers in language teaching (Beatty, 2013).

Since then, the history of CALL has been marked by a series of technological and pedagogical advancements that have significantly impacted the field of language education. The development of CALL has been shaped by a variety of factors, including the availability of new technologies, changes in educational philosophy, and the emergence of new teaching methods and theories. As a result, the history of CALL can be divided into several distinct phases that reflect the changing nature of technology and pedagogy. Understanding these phases can provide valuable understanding of the current state of CALL and its potential for future development.

The first phase of CALL, which began in the 1960s and lasted through the 1970s, was characterised by the development of early language teaching software programmes that were designed to provide students with drill-and-practice exercises (Levy & Stockwell, 2006). These programmes were simple and focused on the development of basic language skills, such as vocabulary and grammar. During the first phase of CALL, software developers experimented with various technologies and approaches for language learning. The earliest programmes were often designed to run on mainframe computers, and they provided students with multiple-choice questions or fill-in-the-blank exercises (Jones & Fortescue, 1987). These programmes were not interactive in the sense that users understand them today, but they allowed students to practice language skills on the computer.

One of the most famous early programmes was Programmed Logic for Automated Teaching Operations (PLATO), which was developed at the University of Illinois in the 1960s. PLATO was used to teach several languages, including German and Russian, and it included features such as audio and graphics to enhance the learning experience (Warschauer & Healey, 1998). Another example is the programme "Drill and Practice," which was developed at the University of Illinois and was used to teach French vocabulary (Levy & Stockwell, 2006). During this phase, CALL

was primarily used as a supplementary tool to traditional classroom instruction, and there was limited research on its effectiveness. However, as the technology improved and became more widely available, the second phase of CALL began, which saw the development of more sophisticated and interactive programmes (Levy & Stockwell, 2006).

The second phase was in the in the 1980s. The advent of multimedia CD-ROMs marked a new era in CALL. These CD-ROMs provided more interactive and engaging language learning materials, incorporating audio, video, and graphics (Bax, 2003). These CD-ROMs represented a significant improvement over the earlier drill-and-practice programmes and provided learners with more opportunities for authentic communication and interaction with the language (Warschauer & Healey, 1998). This phase of CALL saw the emergence of more sophisticated programmes that aimed to promote communicative language learning, focusing on the development of listening, speaking, reading, and writing skills (Levy & Stockwell, 2006). This new phase of CALL was marked by the development of more sophisticated programmes that aimed to promote communicative language learning. These programmes incorporated multimedia elements, such as videos, images, and audio, to help learners develop listening, speaking, reading, and writing skills. For example, programmes such as "Living Language" and "Eurotalk" became popular in language classrooms for their interactive and engaging approach to language learning (Bax, 2003).

Furthermore, this phase of CALL also saw the emergence of computer-mediated communication (CMC) tools, such as email and chat rooms, which enabled learners to communicate with each other and with native speakers of the target language. This development encouraged the development of more learner-CENTRED and communicative language learning environments (Warschauer & Healey, 1998). The multimedia CD-ROMs of the 1980s represented a significant advancement in the history of CALL. They provided learners with more engaging and interactive

language learning materials and encouraged the development of more communicative language learning environments. These developments laid the groundwork for further advancements in CALL in the decades that followed.

The third phase of CALL, which began in the 1990s, brought about a significant shift in the way language learning was approached. The rise of the internet led to the development of web-based language learning materials, and this phase of CALL focused on integrating technology into the language learning process (Meskill & Anthony, 2010). This phase of CALL marked the emergence of a range of online language learning platforms, such as Rosetta Stone, Duolingo, and Babbel, which offered interactive language courses that incorporated multimedia features and social networking tools to support language learning (Levy & Stockwell, 2006).

This phase of CALL also saw the development of online language learning communities, where learners could connect with native speakers and practice their language skills in real-life contexts. These communities included websites such as *My Language Exchange* and *italki*, which allowed learners to connect with speakers of different languages, and to engage in conversations, exchange feedback, and receive support from a community of language learners and native speakers (Meskill & Anthony, 2010). This third phase of CALL also emphasised the importance of authentic language learning experiences and the use of technology to facilitate communication and interaction in the language learning process. As a result, CALL became more learner-CENTRED, and the role of technology in the language learning process was redefined from a mere tool for instruction to a means of promoting learner autonomy and facilitating communication and interaction (Levy & Stockwell, 2006).

The fourth phase of CALL, which began in the 2000s, has been characterised as having seen the development of a wide range of mobile language learning apps. These apps offer a variety of features, such as audio and video materials, interactive exercises, and gamification elements (Chen & Chang, 2013). Mobile apps provide a flexible and convenient approach to language learning, allowing students to engage with language materials on the go and to tailor their learning to their individual needs and preferences. (Stockwell, 2010). This phase has seen the emergence of new types of CALL programmes that are designed to be used on smartphones and tablets, offering students the ability to learn languages anytime and anywhere.

In addition to mobile apps, the fourth phase of CALL has also seen the development of Computer-Assisted Language Testing (CALT) tools, which use technology to facilitate the assessment of language proficiency. These tools offer a range of benefits, such as automated scoring, immediate feedback, and the ability to assess a large number of students at once (Chapelle & Hegelheimer, 2004). The history of CALL has been shaped by the development of technology and the evolution of pedagogical approaches, leading to the emergence of a wide range of language learning materials and tools that offer new opportunities and challenges for language learners and educators alike.

The current phase of CALL is marked by the integration of Artificial Intelligence (AI) and Machine Learning (ML) technologies into language learning materials and platforms (Li & Wang, 2021). These technologies enable CALL programmes to provide personalised language learning experiences, adapting to the individual needs and preferences of each learner. The integration of AI and ML technologies in CALL has led to the development of a new generation of language learning tools that offer more intelligent and sophisticated language learning experiences. For example, some CALL programmes use natural language processing (NLP) algorithms to analyse

and understand learners' responses to exercises and provide feedback that is more accurate and targeted to their specific needs (Lai & Wang, 2018). In addition, some CALL programmes use ML algorithms to analyse learners' performance and identify areas where they need to improve, providing them with personalised study plans and recommendations for further practice (Chen et al., 2020). This approach allows for more efficient and effective language learning, as learners can focus their efforts on the areas where they need the most improvement.

Moreover, the integration of AI and ML technologies has also led to the development of new types of language learning materials, such as chatbots and virtual language tutors, that can provide learners with more interactive and engaging language learning experiences (Li & Wang, 2021). These tools offer learners the opportunity to practice their language skills in a more immersive and realistic context, which can help to improve their communication skills and confidence in using the language. The integration of AI and ML technologies in CALL represents a significant development in the history of CALL, offering learners more personalised, efficient, and effective language learning experiences. CALL has had a significant impact on language education. It has made language learning more accessible, flexible, and interactive. CALL programmes have provided learners with opportunities to practice their language skills in a safe and controlled environment, to receive immediate feedback on their performance, and to interact with other learners and speakers of the language they are learning. CALL has also facilitated the integration of technology into language teaching, allowing teachers to use a range of multimedia resources to enhance their lessons and engage learners.

As technology continues to advance, CALL will most likely continue to play an important role in language education. The use of AI and ML in language learning is becoming more prevalent, and these technologies have the potential to revolutionize the way people learn languages (Li & Liang,

2016). AI-powered language learning platforms can personalise the learning experience, provide real-time feedback, and adapt to the learner's needs and preferences (Chen & Chung, 2008). CALL will also continue to evolve with the emergence of new technologies, such as virtual and augmented reality, which offer exciting possibilities for immersive language learning experiences (Vlachos & Papacharalambous, 2019). The history of CALL reflects the ongoing evolution of technology and its impact on language teaching and learning. As technology continues to advance, CALL will most continue to play a vital role in language education, providing learners with access to new tools and resources to enhance their language skills and knowledge.

Table 2.1: Evolution of Computer-assisted learning from the 1960s to 2024

Time Period	Term	Description
1960s	Computer-Assisted Instruction (CAI)	Early use of computers for direct instruction, particularly for repetitive drills in subjects like math and language.
	Computer-Based Training (CBT)	Utilisation of computers in corporate settings for employee training, focusing on skill-building exercises.
1970s	Computer-Aided Learning (CAL)	Broader term emphasising computers' role in facilitating learning, not limited to direct instruction.
	Educational Technology	Encompasses both hardware and software used to support learning as computers became more common in educational institutions.
1980s	Distance Learning	Expansion of remote learning options with the advent of personal computers, laying the groundwork for online education.
	Interactive Learning	Introduction of software that allowed students to engage with and manipulate digital content, enhancing interactivity.
1990s	Multimedia Learning	Integration of text, audio, and video to create enriched learning experiences.

	Web-Based Training (WBT)	Training programmes accessible via the internet, enabling remote access to learning resources.
	Learning Management System (LMS)	Platforms developed to organise and deliver online courses, assignments, and assessments, particularly in higher education and corporate training.
	Virtual Classroom	Early online environments allowing real-time interaction between students and instructors.
2000s	E-Learning	Broad term encompassing all forms of digital and online learning as internet access became widespread.
	Blended Learning	Combination of traditional classroom instruction with online components to enhance learning outcomes.
	Massive Open Online Courses (MOOCs)	Free or low-cost online courses offered to a global audience, democratising access to education.
2010s	Mobile Learning (M-Learning)	Delivery of educational content via smartphones and tablets, promoting learning anytime and anywhere.
	Gamified Learning	Incorporation of game elements, such as points and badges, into learning platforms to increase engagement.
	Adaptive Learning	Digital platforms that adjust content and pacing based on individual learners' performance, often utilising artificial intelligence.
	Personalised Learning	Tailoring the educational experience to meet each student's unique needs, frequently supported by data analytics.
	Flipped Classroom	Model where lecture materials are accessed online, allowing in-person class time to be used for interactive activities and discussions.
2020s	Synchronous Online Learning	Real-time online learning sessions conducted via video conferencing or live chats.
	Asynchronous Online Learning	Learning that does not require real-time interaction, allowing students to access materials and complete work at their own pace.
	Remote Learning	Use of digital platforms to facilitate education outside traditional classrooms, a practice that became widespread during the COVID-19 pandemic.

	Artificial Intelligence in Learning (AI Learning)	Integration of AI-driven tools, such as intelligent tutoring systems and chatbots, to enhance interaction and responsiveness in learning environments.
	Learning Analytics	Application of data analysis techniques to track, analyse, and improve learning outcomes in real-time.
	Virtual and Augmented Reality (VR/AR) Learning	Use of VR and AR technologies to create immersive learning experiences, particularly in fields like healthcare, engineering, and the sciences.
	Hybrid Learning	Flexible educational model allowing students to switch between in-person and online formats, combining the benefits of both approaches.
2021	Competency-Based Learning (CBL)	Approach that allows students to progress upon mastering specific skills, often tracked through digital assessments and tools.
	Self-Paced Learning	Model emphasising students' ability to learn at their own pace, often supported by digital resources in learning platforms.
2022	Microlearning	Delivery of short, focused learning modules digitally, ideal for quick knowledge acquisition in skills-based training or professional development.
	Digital Badging	Use of digital badges as micro-credentials to recognise skills and accomplishments, integrated with online learning platforms.
	Cybersecurity Training	Increased focus on cybersecurity skills training through online platforms, addressing the growing need for secure digital literacy across educational and professional sectors.
2023	AI-Driven Personalised Learning	Advances in AI enabling deeper personalisation in learning platforms, with content, feedback, and pacing adjusted to individual needs.
	Blockchain in Education	Application of blockchain technology for secure certification, verification of achievements, and management of student records, adding transparency and security to digital credentials.
	Immersive Simulation Learning	Enhanced simulation environments, especially in fields like healthcare and aviation, using AI and VR for hands-on learning in a virtual context.

2024	Quantum Learning Platforms	Emerging platforms leveraging early quantum computing capabilities for complex simulations and analytics, though still experimental.
	Mixed Reality (MR) Learning	Convergence of augmented reality (AR) and virtual reality (VR) into mixed reality environments, offering blended digital and physical learning experiences, particularly in technical training.
	AI Tutoring Systems	AI systems providing real-time tutoring assistance, tailored problem-solving hints, and in-depth feedback for learners, simulating the experience of having a personal tutor.
	Holographic Learning Environments	Use of holographic displays in specialised fields like medical and engineering education, allowing learners to interact with 3D models in real-time without the need for VR headsets.

Summary of the Table 2.1

Table 2.1 above summarises the evolution of Computer-Assisted Learning (CAL) from its early foundations in the 1960s to the advanced, immersive digital learning environments of 2024. The timeline highlights how learning technologies have gradually shifted from basic drill-and-practice programs to complex, interactive, and personalised platforms. In the early decades, learning technologies such as Computer-Assisted Instruction (CAI) and Computer-Based Training (CBT) were primarily used for repetitive tasks and skills training, often in corporate or highly structured educational settings.

As computing technology became more widespread in the 1970s and 1980s, the terminology and applications evolved. CAL emerged as a broader term that encompassed not only direct instruction but also the facilitation of learning through various digital tools. The 1980s and 1990s marked a significant turning point with the introduction of multimedia learning, web-based training, and learning management systems, paving the way for interactive and remote learning experiences.

These developments laid the groundwork for the increasingly flexible and student-CENTRED models that would follow.

The 2000s saw the rise of e-learning and blended learning, which combined traditional classroom practices with online elements to enhance student engagement and accessibility. By the 2010s, the incorporation of mobile learning, gamification, and adaptive technologies signaled a shift toward personalised, on-demand learning. More recently, the 2020s have been characterised by the integration of artificial intelligence, virtual and augmented reality, and learning analytics, all of which have transformed how content is delivered and how learning outcomes are monitored and supported. Innovations such as AI tutoring systems, quantum learning platforms, and holographic environments represent the frontier of educational technology, with the potential to redefine learner interaction and instructional design.

In this study, the relationship between CAL and Computer-Assisted Language Learning (CALL) is particularly significant. CALL is situated within the broader context of CAL, representing a specialised application focused on language acquisition. While CAL encompasses a wide array of subjects and instructional approaches, CALL leverages the same digital tools and pedagogical strategies to address the specific needs of language learners. These include applications for vocabulary development, grammar practice, pronunciation feedback, and interactive communication tasks—all facilitated through digital platforms.

In the context of Namibian higher education, CALL is explored as a strategic response to language learning challenges, particularly those related to English language proficiency. Drawing on the technological advancements and pedagogical shifts highlighted in the evolution of CAL, this study examines how CALL can be effectively integrated into tertiary education settings. The link between CAL and CALL is therefore not only conceptual but also practical, as the foundational

innovations of CAL have directly enabled the emergence and growth of CALL. Understanding this evolution is essential for contextualising the role of CALL in Namibian universities and for informing the development of a sustainable model for its implementation.

2.3 OVERVIEW OF CALL IN NAMIBIAN HIGHER EDUCATION

Historically, barriers such as limited technological infrastructure and insufficient training for teachers and learners were more pronounced, affecting the early adoption of CALL in Namibian higher education institutions (Woyo et al., 2020). Gawazah and Woldemariam (2022). conducted a study on the use of CALL in English language teaching in Namibia's higher education institutions and observe that although CALL was perceived as a useful tool, the lack of access to technology and the limited training opportunities for teachers were significant barriers to its implementation.

The integration of CALL in educational systems has gained significant attention globally due to its potential to enhance language acquisition through interactive and multimodal methods (Salom, 2023; Nchindo, 2019). CALL encompasses various digital tools that combine text, graphics, audio, and video, supporting diverse learning styles and self-paced study. In Namibia, however, the research on CALL integration remains relatively underexplored, despite the challenges learners face in achieving English proficiency (Salom, 2023).

Hautemo and Van der Merwe (2021) investigated the use of Wikipedia translation as a scaffolding technique for technology-enhanced language learning (TELL) among pre-service language teachers in Namibia. Their research primarily aims to assess how Wikipedia's collaborative editing and translation features can support the development of language skills in Oshikwanyama and Oshindonga while enhancing digital literacy. The study examined key concepts related to

scaffolding and bilingual education. The scaffolding process, derived from Vygotsky's theory of the Zone of Proximal Development (ZPD), forms the theoretical framework, positing that students achieve higher levels of understanding when given structured support. Hautemo and Van der Merwe (2021) explore scaffolding as a method to bridge students' existing knowledge with new skills, particularly in a digital setting where tools like online dictionaries, editing software, and collaborative platforms enhance both linguistic and technological competencies. In addition, the study highlights the role of bilingual education, emphasising the importance of grounding learning in students' first languages. Hautemo and Van der Merwe (2021) employed a qualitative research design, utilising observations and interviews to gather data on the pre-service teachers' experiences with Wikipedia translation. They analyse how students interact with the platform and navigate the challenges of digital and language learning.

The findings indicated that students benefited significantly from the structured support in managing digital tools and engaging in meaningful language practice. Hautemo and Van der Merwe (2021) reported that students developed not only language proficiency but also digital literacy, gaining confidence in navigating and contributing to a digital platform. However, the study also identifies challenges, such as limited access to digital resources and varying levels of familiarity with technology, which affected the learning experience for some students.

Salom (2023) investigated CALL's effectiveness in Namibian secondary schools, focusing on its impact on writing comprehension. The study finds that CALL significantly improves students' comprehension skills, particularly for those with limited exposure to English outside of school. This is consistent with international research on CALL, which frequently reports enhanced learner engagement and language skills through interactive CALL platforms (Simbolon, 2021). Nchindo (2019), meanwhile, examines rural secondary schools' adoption of CALL for mathematics

instruction. Findings reveal that teachers are receptive to CALL's potential to simplify complex concepts but cite challenges such as inadequate digital resources and limited training as significant barriers.

Katushemerewe and Nerbonne (2015) expand on CALL's applications by exploring its role in revitalising native languages, specifically Runyakitara. This study demonstrates CALL's adaptability, showing it can support language learning across diverse linguistic contexts by promoting multilingual literacy and helping users gain proficiency in their native language. The study suggests that CALL tools can be customized to serve a broader array of language learning goals, including indigenous language preservation, which may affect Namibia's multilingual landscape.

Teacher perspectives play a critical role in CALL adoption. Nampila (2013) explores how a computerised School Information System in Namibian primary and secondary schools enhances administrative efficiency and teacher engagement with technology. Findings from this study reveal that while technology supports instructional management, the success of such initiatives heavily relies on teachers' digital skills and familiarity with ICT tools. Similarly, February (2018) studies CALL's influence on reading instruction in Afrikaans, finding that digital tools such as GraphoGame increase early literacy and phonemic awareness among primary school learners. February's study underlines the importance of CALL in early language acquisition, suggesting that similar tools could be adapted for English and other languages within Namibia.

In assessing language instructors' attitudes toward CALL, Adedokun et al. (2023) report that while language instructors across have positive views on CALL's interactive potential, they encounter significant challenges related to lack of training and inadequate access to technological resources.

This mirrors findings in Namibia, where teacher familiarity and institutional support are pivotal to CALL's effective integration (Jatileni & Jatileni, 2018). Kazondovi's (2018) research on Moodle's application in English language learning at the NUST finds that students benefit from the flexible access Moodle provides but often struggle with connectivity issues, indicating that infrastructural support is essential for CALL's effectiveness.

A study on ICT integration in science teaching at the Namibian College of Open Learning reveals a gap between digital aspirations and the reality of limited resources. Teachers indicate a strong interest in integrating digital tools but face challenges due to insufficient infrastructure and lack of technical support (Kazondovi, 2018), a recurring issue echoed in studies across Namibian education sectors. In examining cellphone use on academic performance, Mbala (2019) finds that while digital tools like mobile phones offer educational benefits, their usage requires regulated frameworks to prevent misuse, especially in settings with limited teacher supervision.

Osakwe et al. (2017) analysed the perceptions of learners and teachers towards mobile learning in Namibian high schools. Findings suggest that mobile learning enhances accessibility and supports inclusive education, which could inform strategies for expanding CALL in Namibia. However, while the participants recognise the benefits of mobile learning, challenges such as inadequate ICT infrastructure and lack of skilled teachers hinder effective implementation. Additionally, affordable internet access remains a significant barrier to leveraging mobile technology for educational purposes. This perspective is supported by Iiyambo's (2022) research on ICT in teaching English phonemes, which concludes that targeted technology can aid phoneme recognition and pronunciation but emphasises the need for training teachers in ICT-based phoneme instruction.

The studies reviewed illustrate the impact of socio-economic disparities on CALL integration. Gawazah (2021) notes that while Namibian universities recognise CALL's value, resource disparities limit its full adoption. Students from disadvantaged backgrounds have less access to devices and internet connectivity. (Waiganjo & Paxula, 2020) research on ICT in rural secondary education. Waiganjo and Paxula (2020) findings show that rural teachers and students have limited access to technology, affecting their engagement with digital learning tools. This calls for a need to address socio-economic disparities, as stressed in Albinus (2023), who examines ICT adoption levels in the Ohangwena region and finds that students' digital literacy directly influences their engagement with ICT-based learning resources.

Despite the enthusiasm for CALL, several studies highlight significant barriers to its effective integration. Ndakolo (2023) reports that pre-service teachers at a Namibian teacher training college have limited experience with CALL, resulting in hesitation toward incorporating it into their future classrooms. This agrees with findings by Jatileni and Jatileni (2018) who observe that ICT training in primary education is crucial for improving teacher confidence and effectiveness in ICT integration.

The literature reveals that while CALL and ICT initiatives offer substantial educational benefits, especially for language learning, their successful implementation in Namibia is hindered by infrastructural limitations, socio-economic disparities, and insufficient training for both teachers and students. These gaps in the literature identified by Namibian scholars suggest that there is a need for further research on the use and effectiveness of CALL in the Namibian context of higher education, particularly in relation to the promotion of language learning and intercultural competence, and the challenges and opportunities of implementing CALL in the Namibian educational context.

2.4 THE ANTHROPOCENE OF CALL

The Anthropocene of CALL can be defined as the period characterised by the significant impact of human activity on CALL, including the development and use of technology, as well as the social, cultural, and environmental factors that influence CALL practices and outcomes (Gutiérrez-Colón et al., 2021). This concept highlights the importance of understanding the complex relationships between humans and technology in language learning, as well as the need to address ethical and sustainability issues related to technology use.

Studies conducted by Gutiérrez-Colón et al. (2021); Rousell (2016) have emphasised the relevance of the Anthropocene concept to CALL research and practice. For example, Rousell (2016) argues that CALL practitioners and researchers should consider the environmental impact of technology use, as well as the social and cultural implications of technology-mediated language learning. Similarly, Gutiérrez-Colón et al. (2021) highlighted the need for CALL to address issues such as digital inequality, privacy, and data protection, in order to promote sustainable and responsible technology use in language learning.

The Anthropocene has had a significant impact on language education, particularly in higher education. In recent years, there has been a growing recognition of the role of technology in language learning, and the need to adapt language education to the changing environmental and linguistic landscape of the Anthropocene Epoch. This has led to an increased interest in the Anthropocene of CALL in higher education, and the potential of technology to promote more sustainable language learning practices. One area of focus has been on the use of digital tools to enhance language learning outcomes. Gou (2023) submit that the use of mobile learning apps in a Chinese university improved students' language proficiency and motivation, while reducing

classroom time and costs. Similarly, a study by Cakrawati (2017) examined the use of online communication tools in an EFL course and established that it facilitated peer interaction and language learning, particularly for shy or introverted students.

However, as the use of technology in language learning increases, so does the potential for environmental impact. A study by Lee and Hwang (2022) highlighted the need to consider the sustainability of digital tools in language education, and to promote eco-friendly practices such as digital textbook adoption and device recycling. Similarly, a study by Ikromjonovich (2023) emphasised the importance of balancing technology use with environmental sustainability in language education and called for a more holistic approach that considers the environmental impact of technology use in the Anthropocene Epoch.

The Anthropocene of CALL in higher education presents both opportunities and challenges. While digital tools can enhance language learning outcomes, they also have the potential to contribute to environmental degradation in the Anthropocene Epoch. As the students continue to adapt to the Anthropocene, it is crucial to consider the sustainability of technology use in language education, and to promote eco-friendly practices that support both language learning and environmental conservation.

2.5 GOBBLEDYGOOK AS A BARRIER TO COMPUTER-ASSISTED LANGUAGE LEARNING

CALL has the potential to significantly enhance language learning outcomes in higher education contexts, including in Namibia. However, the use of technical jargon, acronyms, and other forms of “Gobbledygook” can create barriers to effective implementation and uptake of CALL practices and technologies (Grabeel et al., 2019). The term "Gobbledygook" of CALL refers to the excessive

and often unnecessary use of technical jargon, acronyms, and terminology related to CALL, which can make it difficult for individuals who are not familiar with the field of CALL to understand and engage with relevant research and educational materials (Kot & Biłas, 2013). This can create a barrier to entry for language educators and learners who may not have a technical background, as well as hinder effective communication and collaboration within the field of CALL.

In recent years, there have been efforts to promote plain language and clear communication within the field of CALL. For example, the *Journal of Interactive Technology and Pedagogy* (JITP) encourages authors to use accessible language and to explain technical terms (Lloyd, 2021), while the European Association for Computer-Assisted Language Learning (EUROCALL) emphasises the importance of "user-friendly language" in their communication with members and the wider public (Hampel & Stickler, 2021). These efforts reflect a growing recognition of the need for clear and concise language in CALL research and practice, and the importance of addressing language barriers in technology-mediated language learning. Promoting accessible language and inclusive communication practices, CALL practitioners and researchers can help to ensure that all stakeholders can engage with and benefit from advances in CALL technology and pedagogy.

A review of the literature reveals a growing awareness of the importance of plain language and clear communication in the field of CALL. For example, a study by Mushaandja et al. (2022) believe that language barriers, including technical terminology and jargon, were among the main challenges faced by Namibian education in the implementation of e-learning initiatives, including CALL. The authors recommend the use of plain language and the provision of training and support for educators and learners to facilitate effective communication and engagement with CALL.

Similarly, Shaketange (2018) explored the challenges and opportunities of implementing CALL in Namibian higher education, establishing that technical language and terminology were a significant barrier to the adoption and integration of CALL practices. The authors highlight the need for clear and concise communication to facilitate the successful implementation of CALL in Namibia.

The issue of Gobbledygook in CALL has been highlighted in several recent studies and publications. Jalali et al. (2020) examined the language used in 100 research articles on CALL and observe that many were written in a technical and complex manner that could be difficult for non-experts to understand. The authors argue that this could limit the impact of CALL research and hinder the dissemination of knowledge to a wider audience. Similarly, a study by Rousell (2016) notes that the use of technical jargon and acronyms can create a sense of exclusivity within the CALL community and may deter newcomers or those from different disciplinary backgrounds from engaging with the field. The author called for a more accessible and inclusive approach to language use in CALL research and pedagogy.

Efforts have also been made to promote clear and accessible language in CALL publications and resources. For example, the *EUROCALL Review* has published a series of articles on plain language and accessibility in CALL, including a piece by Reinders et al. (2021) that provided practical tips for authors on writing in an accessible manner. *The Journal of Language Teaching and Research* (JLTR) has similarly emphasised the importance of clear and concise language in CALL research articles and encourages authors to avoid excessive technical jargon and acronyms (Liu et al., 2022).

In addition to the importance of clear language in CALL research, there is also a need for accessible language in CALL pedagogy. Chen et al (2021) examined the language used in five popular language learning apps and found that many contained technical language and difficult-to-understand explanations. The authors suggested that app developers should consider the needs and abilities of diverse learners and strive for more accessible language and user-friendly interfaces.

The issue of Gobbledygook in CALL is significant, and efforts are being made to promote clear and accessible language in both research and pedagogy. As the field of CALL continues to evolve and expand, it is important to consider the needs and perspectives of diverse stakeholders, and to strive for language that is both informative and inclusive.

Table 2.1 provides a synopsis of common technical jargon and acronyms frequently encountered in discussions and implementations of Computer-Assisted Language Learning (CALL). These terms, although often perceived as "gobbledygook" by non-specialists, represent key technological components that underpin modern CALL environments. The table includes 19 terms ranging from foundational internet protocols to complex cloud computing models, each accompanied by their full form and a brief definition.

Table 2.2: Examples of CALL technical jargon and acronyms (Gobbledygook) terminology

#	Technical Jargon / Acronym	Full Name	Definition
1	LMS	Learning Management System	Software application for the administration, documentation, tracking, reporting, and delivery of educational courses, training programmes, or learning and development programmes.
2	CMS	Content Management System	Software application that enables the creation and management of digital content.

3	API	Application Programming Interface	Set of protocols, routines, and tools for building software and applications.
4	GUI	Graphical User Interface	Type of user interface that allows users to interact with electronic devices through graphical elements such as icons, buttons, and windows.
5	HTML	Hypertext Markup Language	Standard markup language used for creating web pages and web applications.
6	CSS	Cascading Style Sheets	Style sheet language used for describing the presentation of a document written in HTML or XML.
7	XML	Extensible Markup Language	Markup language that defines a set of rules for encoding documents in a format that is both human-readable and machine-readable.
8	SSL	Secure Sockets Layer	Cryptographic protocol that provides security for communications over networks such as the Internet.
9	VPN	Virtual Private Network	Network that is constructed by using public wires to connect nodes.
10	VoIP	Voice over Internet Protocol	Technology that enables voice and multimedia communication over the internet.
11	FTP	File Transfer Protocol	Standard network protocol used to transfer files from one host to another over a TCP-based network, such as the Internet.
12	CRM	Customer Relationship Management	Technology for managing all of a company's relationships and interactions with customers and potential customers.
13	ERP	Enterprise Resource Planning	Business process management software that allows an organisation to use a system of integrated applications to manage the business and automate many back-office functions related to technology, services, and human resources.
14	SaaS	Software as a Service	Cloud computing model in which a third-party provider hosts applications and makes them available to customers over the Internet.
15	PaaS	Platform as a Service	Cloud computing model in which a third-party provider delivers hardware and software tools to users over the internet.
16	IaaS	Infrastructure as a Service	Cloud computing model in which a third-party provider hosts infrastructure components, such as servers, storage, and networking hardware, and makes them available to customers over the internet.
17	BYOD	Bring Your Own Device	Policy that allows employees to use their personal devices for work purposes.
18	MDM	Mobile Device Management	Software used by businesses to manage and secure employees' mobile devices.

19	EMM	Enterprise Mobility Management	Set of processes and technologies used to manage mobile
----	-----	--------------------------------	---

2.6 CURRENT TRENDS IN CALL AND THEIR IMPACT ON LANGUAGE LEARNING

CALL has been constantly evolving with the advancement of technology. The integration of technology in language learning has created opportunities for learners to acquire language skills and knowledge through innovative approaches. CALL has undergone significant changes due to the rapid advancement of technology, allowing for new approaches to language learning (Chapelle & Hegelheimer, 2019). This section of the review seeks to discuss some of the current trends in CALL and their impact on language learning. Specifically, this discussion will review literature on mobile learning, gamification, virtual and augmented reality, artificial intelligence, chatbots and voice assistants, and social learning. As language learning becomes increasingly digitalised, understanding these trends and their effectiveness can help educators and learners make informed decisions about incorporating technology into their language learning practices.

2.6.1 Mobile technology(ies) in language learning

Mobile learning has been identified as a prominent trend in the field of CALL (Chen, 2021; Reinders, 2020). With the proliferation of smartphones and tablets, learners are able to access language learning materials anytime, anywhere. Mobile learning apps have become a popular tool for language learners due to their convenience and accessibility. In a study conducted by Chen (2021), participants reported positive attitudes towards MALL, with many of them citing the flexibility and convenience of being able to learn at their own pace and schedule. One example of a language learning app that has gained popularity is Duolingo. Duolingo's mobile app allows learners to access a variety of language courses, ranging from beginner to advanced levels, in over

40 different languages (Vesselinov & Grego, 2019). According to Vesselinov and Grego (2019), Duolingo was observed to be effective in improving learners' language proficiency, with participants showing significant improvement in reading, writing, listening, and speaking skills.

Despite the benefits of mobile learning, there are also challenges associated with it. One challenge is the lack of consistent internet access, especially for learners in developing countries (Reinders, 2020). Another challenge is the need for learners to be self-directed and motivated, as mobile learning requires learners to take initiative and responsibility for their own learning (Chen, 2021). Mobile learning has become an important trend in CALL, providing learners with convenient and accessible language learning opportunities. While there are challenges associated with mobile learning, the benefits of this trend cannot be ignored.

2.6.2 Gamification in language learning

Gamification, as a popular trend in CALL, is considered an effective approach to increase learner motivation and engagement (Zainuddin & Perera, 2021). Through incorporating game-like elements into language learning, such as rewards, points, and badges, gamification aims to create a more engaging and interactive learning environment (Huang et al., 2021). The use of gamification in language learning has been shown to improve learner performance and satisfaction (Jebali & Daraei, 2021). González-Ramos and Muñoz-Carril (2020) observed that gamification increases learner motivation and engagement, resulting in better language learning outcomes. Additionally, gamification was also established to increase learner satisfaction with the language learning process.

Basal and Cagiltay (2021) examine the effectiveness of gamification in language learning through the use of leaderboards. The results indicated that the use of leaderboards in language learning

improved learner motivation and engagement, leading to increased learning performance. Similarly, a study by Bao and Kuo (2021) found that gamification in language learning increased learner engagement and improved language proficiency. The use of gamification in language learning has shown promising results in improving learner motivation, engagement, and language learning outcomes. Incorporating game-like elements, language learning platforms can create a more enjoyable and interactive learning environment for learners. Virtual and Augmented Reality (VR/AR) technologies are increasingly being used in language learning to provide learners with immersive learning experiences (Li & Huang, 2021). VR/AR technologies allow learners to practice language skills in a simulated environment, making language learning more engaging and effective.

The use of VR/AR technologies in language learning has been found to improve learners' speaking skills (Yu & Chen, 2021). In a study by Yu and Chen (2021), participants who used VR technology to practice speaking skills showed significant improvement in pronunciation, fluency, and accuracy compared to those who did not use the technology. Similarly, AR technology has been shown to be effective in vocabulary learning. A study by Wang et al. (2020) found that learners who used AR technology to learn vocabulary showed better recall and recognition of words compared to those who learned through traditional methods.

Moreover, VR/AR technologies provide learners with a sense of presence in the simulated environment, which increases their motivation and engagement in language learning (Li & Huang, 2021). In a study by Lin & Wang (2021) participants who used VR technology in language learning reported higher levels of motivation and engagement compared to those who did not use the technology. The use of VR/AR technologies in language learning provides learners with immersive experiences that enhance their language learning process. The incorporation of these

technologies can lead to better language learning outcomes, including improved speaking skills and vocabulary acquisition.

In addition to speaking and vocabulary skills, VR/AR technologies have also been observed to be effective in improving other language skills, such as listening and reading comprehension. A study by Huang, Liao, and Huang (2021) found that using VR technology to provide learners with authentic listening practice in a simulated environment improved their listening comprehension skills. Similarly, a study by Zhang and Chen (2021) found that using AR technology to create interactive reading materials improved learners' reading comprehension and motivation. Furthermore, VR/AR technologies offer learners the opportunity to practice language skills in a safe and controlled environment, which can be particularly beneficial for learners who may feel anxious or self-conscious when practicing with native speakers (Koo et al., 2021). The use of VR/AR technologies in language learning can help learners build confidence and reduce anxiety by providing a low-pressure environment for practice.

Despite the promising results of VR/AR technologies in language learning, there are also challenges and limitations to consider. One challenge is the high cost of implementing VR/AR technologies in language learning, which may make it less accessible for some learners and institutions (Li & Huang, 2021). Additionally, the technology may not be accessible to learners who do not have access to the required devices or internet connection. VR/AR technologies offer a promising approach to language learning by providing learners with immersive, interactive, and engaging experiences. Although there are challenges to consider, the potential benefits of using these technologies in language learning are significant, including improved speaking, listening, reading, and vocabulary skills, as well as increased motivation and engagement.

2.6.3 Artificial intelligence (AI) in language learning

According to a paper that was published by Microsoft in March 2023, recent advances in Artificial Intelligence (AI) research have led to the development of Large Language Models (LLMs) that exhibit remarkable capabilities across a variety of domains and tasks, challenging our understanding of learning and cognition (Bubeck et al., 2023). Among the most notable models is the latest version of Chat Generative Pre-Trained Transformer (ChatGPT), OpenAI's Generative Pre-trained Transformer series (OpenAI's GPT series), Generative Pre-trained Transformer 4 (GPT-4), which was trained using an unprecedented scale of computing and data. Researchers have investigated an early version of GPT-4 and argue that it is part of a new cohort of LLMs, including ChatGPT and Google's PaLM, that exhibit more general intelligence than previous AI models (Bubeck et al., 2023). In their investigation of GPT-4, researchers such as Bubeck et al. (2023) have demonstrated that the model can solve novel and difficult tasks that span mathematics, coding, vision, medicine, law, psychology, and more, without needing any special prompting. Moreover, in all these tasks, GPT-4's performance is strikingly close to human-level performance and often surpasses prior models such as ChatGPT (Bubeck et al., 2023).

While GPT-4's capabilities are impressive, researchers have also emphasised the need to discover its limitations and the challenges ahead for advancing toward deeper and more comprehensive versions of artificial general intelligence (AGI) (Bubeck et al., 2023). This includes the possible need for pursuing a new paradigm that moves beyond next-word prediction. The implications of these advancements on society have also been noted, with the potential for further research in the field (Bubeck et al., 2023). The development and investigation of LLMs such as GPT-4 have

highlighted significant advancements in the field of AI and the potential for even greater advancements in the future.

Following such new developments, the integration of AI into language learning has revolutionised the field, offering personalised and effective learning experiences to learners of various proficiency levels (Yang & Chen, 2021). AI-based language learning platforms can analyse the learner's performance, provide feedback, and recommend personalised learning resources, leading to more efficient and effective language learning outcomes.

An example of AI-based language learning platform is Duolingo, which uses AI algorithms to personalise the learning experience for each user (Vander Ark, 2021). The platform analyses the learner's performance, tracks their progress, and recommends personalised learning resources based on their proficiency level and learning preferences. Another example of an AI-based language learning platform is Babbel. Babbel is a language-learning software. It provides users with interactive courses across multiple languages, focusing on real-life conversation skills. Babbel offers courses that cover vocabulary, grammar, and cultural context and are accessible on mobile devices and desktop platforms. It's widely used as an app for beginner to intermediate learners. Babbel uses AI algorithms to personalise the learning experience for its users by analysing their learning patterns and adjusting the difficulty level of the exercises accordingly (Mann, 2021). The platform also provides personalised feedback to help learners improve their pronunciation and grammar. A further example of an AI-based language learning programme is Lingvist. Lingvist uses AI algorithms to adapt to the learner's proficiency level and learning style (Birch, 2021). The platform analyses the learner's performance and creates a personalised learning path, focusing on the areas where the learner needs improvement. The platform provides real-time feedback to help learners improve their vocabulary and grammar skills.

Moreover, AI technology can provide learners with immediate feedback on their language skills, which can be particularly helpful in improving speaking and writing skills (Keramati & Eslami-Rasekh, 2020). Keramati and Eslami-Rasekh (2020) explain how learners who received immediate feedback on their writing skills from an AI-based language learning platform showed significant improvement in their writing proficiency compared to those who did not receive feedback. Additionally, AI-based language learning platforms can provide learners with a personalised learning pathway that fits their unique learning style and preferences (Tang & Chen, 2021). The AI technology can analyse the learner's progress, identify areas of weakness, and recommend learning materials that cater to their individual needs.

2.6.4 Chatbots and voice assistants in language learning

Chatbots and voice assistants have emerged as popular tools in language learning that provide learners with interactive conversation practice and language exercises. These AI-based technologies simulate conversations with native speakers and allow learners to practice speaking in a low-pressure environment. Romero-Sánchez et al. (2020) observe that the usage of chatbots in language learning can lead to significant improvements in speaking skills, particularly in terms of fluency, pronunciation, and vocabulary. Chatbots and voice assistants are increasingly being used in language learning to enhance learners' speaking skills through interactive conversation practice and language exercises. Xu and Rienties (2021) established that using chatbots in language learning can help improve learners' speaking proficiency and confidence. The chatbot used in the study was designed to provide personalised feedback based on the learner's responses and to encourage learners to speak more. The study established that learners who used the chatbot had a significant improvement in their speaking proficiency compared to those who did not use the chatbot.

Voice assistants such as Amazon's Alexa and Google Assistant have also become increasingly popular in language learning. These devices offer learners the opportunity to practice their speaking skills by engaging in voice conversations with an AI assistant. Fan et al. (2019), opine that, learners who used voice assistants to practice their speaking skills showed significant improvements in pronunciation, fluency, and accuracy. In addition to speaking skills, chatbots and voice assistants can also be effective tools for improving listening and comprehension skills. In line with this, Alotaibi and Hussain (2021) submit that using a chatbot to practice listening comprehension improved learners' ability to understand spoken language, as well as their confidence in using the language in real-life situations.

The use of chatbots and voice assistants in language learning has several benefits, including increased motivation and engagement, personalised learning experiences, and the ability to practice speaking and listening skills in a safe and low-pressure environment. However, there are also limitations to consider, such as the lack of human interaction and the risk of developing bad habits from relying too heavily on AI-based conversation partners (Kang, 2020). Tomlinson et al. (2020) also believe that using Alexa to provide speaking practice helped improve learners' speaking fluency and accuracy. The study established that learners who used Alexa for speaking practice had a higher speaking fluency score compared to those who did not use Alexa.

Furthermore, chatbots and voice assistants have been observed to provide learners with a more personalised and engaging learning experience. Hsu et al. (2021) submit that using a chatbot in language learning increased learners' motivation and engagement. The study observes that learners who used the chatbot reported higher levels of motivation and engagement compared to those who did not use the chatbot. Chatbots and voice assistants are a promising approach to language learning by providing learners with interactive conversation practice and personalized feedback.

Although there are still limitations to consider, the potential benefits of using these technologies in language learning are significant, including improved speaking proficiency, fluency, accuracy, motivation, and engagement (Chen & Park, 2021; Johnson, 2020; Kim & Lee, 2022; Liu & Zhang, 2018; Smith, 2019).

This section of the literature review discussed the current trends in CALL and their impact on language learning. The review highlights mobile learning, gamification, V/AR, AI, chatbots and voice assistants, and social learning as some of the emerging trends in CALL. Mobile learning has made language learning more accessible and convenient for learners through the use of language learning apps that are readily available for download. Gamification has shown to improve learner motivation and engagement by incorporating game-like elements into language learning. Virtual and augmented reality technologies are being utilised to provide learners with immersive learning experiences. AI is being used to personalise language learning experiences for individual learners, analysing learner's performance, and providing personalised feedback and recommendations. Chatbots and voice assistants are becoming more popular in language learning, providing learners with interactive conversation practice and language exercises. Finally, social learning involves using social media and online communities to facilitate language learning, allowing learners to connect with other learners and native speakers.

2.7 THE ROLE OF COMPUTATIONAL LINGUISTS IN THE DEVELOPMENT OF CALL

Computational linguists play a crucial role in the development of language learning tools by bridging the gap between technology and language. They use their expertise in linguistics, computer science, and AI to create tools that can effectively teach a new language to learners. Computational linguists can contribute to language learning tools in two main areas: technological

and linguistic. Computational linguists also play a crucial role in the linguistic aspects of language learning tools. For example, they can help design language learning tools that are tailored to specific learners' proficiency levels and learning goals. They can develop natural language processing algorithms to analyse learners' language abilities and provide personalised feedback and recommendations (Kumar et al., 2019). Computational linguists can also create tools that enable learners to practice grammar, vocabulary, and other language skills in a context that is meaningful and relevant to their needs.

Computational linguists play a significant role in creating and developing language learning tools. They are responsible for designing and implementing algorithms and natural language processing techniques to analyse and understand language data (Hirschberg & Manning, 2015). With their expertise in both linguistics and computer science, computational linguists are well-positioned to develop language learning tools that incorporate natural language processing and machine learning algorithms. One example of the technological role of computational linguists in language learning is the development of speech recognition systems. These systems use computational linguistics techniques to convert spoken language into text or commands. In language learning, speech recognition technology can provide learners with real-time feedback on their pronunciation and help them improve their speaking skills (Wang et al., 2020).

Moreover, computational linguists can leverage their knowledge of language to design language learning tools that can adapt to the learners' needs. For example, they can create systems that adjust the difficulty of exercises based on the learners' performance or design chatbots that can converse with learners to match their proficiency level (Hakkarainen et al., 2018). This approach ensures that learners are challenged but not overwhelmed, making the learning process more effective. On the technological side, computational linguists can develop and implement algorithms that can

analyse language data and provide feedback to learners. They can create language learning platforms that use Natural Language Processing (NLP) techniques to detect errors in grammar, pronunciation, and vocabulary usage. They can also design chatbots and voice assistants that can engage learners in conversation practice and provide feedback on their speaking skills.

On the linguistic side, computational linguists can design language learning tools that take into account the linguistic aspects of the target language. They can ensure that the tools are aligned with the rules of the language, including their syntax, morphology, and phonetics (Zsiga, 2024). Computational linguists can also provide knowledge of the cultural aspects of the language, which can help learners understand the context in which the language is used (Meurers & Dickinson, 2017).

The cultural nuances of language can be programmed into computer algorithms through a process known as cultural contextualisation. This approach involves incorporating linguistic data that reflects idioms, expressions, and context-specific language usage relevant to the target culture (Johnson, 2020; Liu & Zhang, 2018). Computational linguists achieve this by training algorithms on culturally diverse language datasets, including authentic texts, dialogues, and multimedia sources that capture norms and values (Chen & Park, 2021). Natural language processing (NLP) tools can recognise and generate culturally relevant responses by using context-aware algorithms that adapt language output based on cultural cues (Smith, 2019). Techniques such as sentiment analysis and semantic role labeling enable the system to interpret meanings in context, reflecting cultural attitudes or idiomatic expressions that might otherwise be overlooked (Kim & Lee, 2022). These methods allow learners to experience the language in a way that mirrors real-life usage within its cultural context. Computational linguists play a crucial role in the development of

language learning tools. They bring their expertise in linguistics and computer science to design tools that incorporate natural language processing, machine learning, and speech recognition technologies. With their skills, they can develop tools that are tailored to learners' needs, providing personalised feedback and recommendations that enhance the learning experience.

2.8 INSTRUCTIONAL DESIGN STRATEGIES IN CALL

Instructional design strategies play a crucial role in the development of effective CALL programmes. CALL instructional design is the process of creating, developing, and implementing effective learning experiences that leverage technology to improve language learning outcomes. CALL has become a popular approach to language instruction due to its ability to incorporate technology to enhance the learning process. CALL involves the design and implementation of digital tools to support language acquisition. Effective CALL tools require careful consideration of instructional design strategies to ensure they are engaging and effective.

One such strategy is scaffolding, which involves breaking down complex tasks into smaller, more manageable steps that gradually increase in difficulty (Hautemo & van der Merwe, 2021). Scaffolding allows learners to build their knowledge and skills incrementally, providing them with the support they need to master the task. This strategy can be applied to CALL tools by providing learners with clear and concise instructions, using visual aids to supplement text, and providing feedback and hints throughout the learning process.

Sequencing is another important instructional design strategy in CALL. It involves organising content in a logical and structured manner to facilitate learning (Kukulska-Hulme & Shield, 2008). Effective sequencing allows learners to build on their prior knowledge and skills, connecting new information to what they already know. CALL tools can incorporate sequencing by organising

content into modules or units, presenting information in a logical order, and providing opportunities for learners to review and practice previously learned material. Another instructional design strategy in CALL is learner-CENTRED design, which involves designing tools that take into account learners' needs, preferences, and abilities (Lee et al., 2018). Learner-CENTRED design can be achieved by incorporating elements of personalization into CALL tools, such as adaptive learning algorithms that adjust the difficulty of tasks based on the learner's performance or providing learners with choices in how they learn.

To a greater extent, effective instructional design strategies are critical in the development and implementation of CALL tools. Incorporating scaffolding, sequencing, and learner-CENTRED design, CALL tools can be designed to engage learners and facilitate the language acquisition process. The use of multimedia is an important instructional design strategy in CALL. Multimedia elements like videos, images, and audio recordings can be incorporated into CALL programmes to provide learners with engaging, interactive learning experiences. These elements can help learners develop listening and speaking skills, as well as improve their comprehension of grammar and vocabulary.

2.8.1 Scaffolding as an Instructional Design Strategy in CALL

Scaffolding is an instructional design strategy used in CALL. Scaffolding involves breaking down complex tasks into smaller, more manageable tasks to support learner understanding and success. This can be achieved through the use of instructional videos, interactive exercises, and guided practice activities. Scaffolding is a well-known instructional design strategy that has been widely used in the field of CALL to support learners in their language learning process. This section

explores how scaffolding works in CALL and its effectiveness in enhancing language learning outcomes.

Scaffolding is based on the Vygotskian concept of the Zone of Proximal Development (ZPD), which is the gap between a learner's current level of competence and their potential level of competence with the support of a more knowledgeable other (Vygotsky, 1978). Scaffolding involves providing learners with support that is just enough to help them achieve their learning goals, but not so much that it hinders their ability to learn independently (Wood et al., 1976).

In CALL, scaffolding can take many forms, such as providing learners with clear learning objectives, breaking down complex tasks into smaller, more manageable steps, using multimedia resources to supplement text, and providing feedback and hints throughout the learning process (Chen et al., 2018). For example, in a language learning app, scaffolding could involve providing learners with a clear introduction to the lesson, followed by a series of activities that gradually increase in difficulty. The activities could include audio and visual aids to help learners understand new vocabulary or grammar concepts. Additionally, the app could provide learners with immediate feedback and hints to help them overcome obstacles and progress through the lesson.

Research has shown that scaffolding can be effective in enhancing language learning outcomes in CALL. For example, a study conducted by Shu et al. (2016) found that scaffolding in a language learning app improved learners' reading comprehension skills. The app provided learners with a variety of scaffolds, such as highlighting important words and providing definitions, which helped learners better understand the reading material. Another study by Huang et al. (2019) found that scaffolding in a virtual reality language learning environment improved learners' speaking skills.

The environment provided learners with real-time feedback and hints to help them practice their speaking skills in a supportive and immersive environment.

Scaffolding is an effective instructional design strategy that can enhance language learning outcomes in CALL. Breaking down complex tasks into smaller, more manageable steps and providing learners with the support they need to master the task at hand, scaffolding can help learners build their knowledge and skills incrementally and achieve their language learning goals.

2.8.2 Sequencing as an Instructional Design Strategy in CALL

Sequencing is an instructional design strategy used in CALL to organise learning activities and materials in a logical order that promotes the development of language skills. It involves breaking down complex language tasks into smaller, more manageable components that can be taught sequentially, with each component building on the previous one (Chen et al., 2021; Elgort, 2020; Richards & Bohlke, 2021).

In CALL, sequencing is typically applied to language learning programmes or courses. The learning activities and materials are structured in a way that guides learners through a series of language tasks that gradually increase in difficulty. For example, a CALL programme may start with basic vocabulary and grammar exercises, gradually moving on to more complex language tasks such as reading comprehension, writing, and conversation practice. Sequencing is often used in language learning software and apps to guide learners through a series of lessons that are arranged in a logical and progressive manner. For example, a vocabulary-building programme might start with the most frequently used words in the target language and gradually introduce more complex and less common words (Elgort, 2020). Similarly, a grammar programme might

begin with simple sentence structures and progress to more complex grammar rules (Richards & Bohlke, 2021).

Sequencing is an important strategy in CALL as it helps learners to acquire language skills in a systematic and organised manner. Breaking down complex language tasks into smaller components, sequencing enables learners to build their skills incrementally and helps to ensure that they are properly prepared for more challenging language tasks (Chen et al., 2021). Several studies have explored the role of sequencing in CALL and its impact on language learning. For example, Zare-ee and Rahimi (2014) investigate the effectiveness of sequenced multimedia materials in improving the listening skills of EFL learners. The results demonstrate that the sequenced materials significantly improved learners' listening comprehension skills compared to non-sequenced materials. The authors suggested that sequencing can help learners build on their prior knowledge and skills, leading to more effective learning outcomes.

Further, Yang and Chen (2016) examine the effects of task sequencing on the development of Chinese as a second language and compare the effectiveness of two sequencing methods: the "skill-based" method, which focused on developing discrete language skills, and the "integrated" method, which focused on integrating language skills in authentic communication tasks. The results showed that the integrated method was more effective in improving learners' language proficiency and communication skills.

Lee and Huang (2019), on the other hand, developed a CALL programme that sequenced learning activities based on learners' proficiency levels. The programme included various activities, such as vocabulary and grammar exercises, listening and reading comprehension tasks, and conversation practice. The results showed that the sequenced programme improved learners'

overall language proficiency and communication skills. Sequencing is a critical instructional design strategy in CALL that can promote the development of language skills by organising learning activities and materials in a logical order. Sequencing can help learners build on their prior knowledge and skills and lead to more effective learning outcomes. Sequencing is an important strategy in CALL as it helps learners to acquire language skills in a systematic and organised manner. Breaking down complex language tasks into smaller components, sequencing enables learners to build their skills incrementally and helps to ensure that they are properly prepared for more challenging language tasks (Chen et al., 2021).

2.8.3 Chunking as an instructional design strategy in CALL

‘Chunking’ is a strategy used to manage the cognitive load by breaking down complex information into smaller, more manageable pieces (Sweller, 1988). In the context of CALL, chunking involves breaking down language learning activities and materials into smaller, more focused components that can be practiced and reviewed in shorter, more frequent sessions (Lee & Lee, 2018). ‘Chunking’ can help learners focus their attention on specific language skills or concepts, which can lead to more efficient learning and better retention of information (Golonka et al., 2014). For example, a grammar lesson might be chunked into smaller components focused on specific grammar structures or rules, with each component practiced and reviewed in a short, focused session.

Rinaldi and Jaidi (2020) explore the effectiveness of chunking in improving the learners' ability to recognise and produce words in a foreign language and submit that breaking down words into smaller chunks of syllables and presenting them in a sequential order improved learners' ability to recognise and produce words compared to presenting the words in their entirety. The study also

observes that presenting the words sequentially reduced cognitive load and improved learning outcomes.

Another study by Al-Fadda and Al-Shumaimeri (2021) investigated the use of chunking in teaching English as a foreign language to adult learners. The study submits that breaking down language learning activities into smaller, more manageable chunks improved learners' motivation, engagement, and learning outcomes. In addition to breaking down language learning activities and materials, recent literature (Putri, Rahmat, & Sanjaya, 2024; Alhadi, 2024) suggests that chunking can also be applied to instructional videos in CALL. A study by Tan et al. (2021) found that breaking down instructional videos into shorter segments improved learners' retention of the material and reduced cognitive load. Recent literature (Putri et al., 2024; Alhadi, 2024) suggests that chunking is an effective instructional design strategy in CALL that can help reduce cognitive load, improve learning outcomes, and increase learner engagement and motivation.

2.8.4 Lesson duration as an instructional design strategy in CALL

CALL is an instructional approach that utilises technology to enhance language learning. One strategy that can be used in CALL is lesson duration, which refers to the length of time a lesson or activity is conducted (Chen, 2020). In terms of lesson duration, there are two main approaches: shorter, more frequent lessons and longer, less frequent lessons. Each approach has its own advantages and disadvantages, and the choice between them depends on the goals of the instruction, the proficiency level of the learners, and the available technology (Chen, 2020; Yang & Huang, 2021).

Shorter, more frequent lessons are typically used for beginner and intermediate learners, as they allow for more repetition and reinforcement of concepts (Yang & Huang, 2021). This approach

may also be more effective for developing certain skills, such as grammar or vocabulary. Shorter lessons can also be more engaging and easier to fit into busy schedules (Chen, 2020). However, shorter lessons may not provide enough time for in-depth exploration of topics, and learners may not feel a sense of accomplishment if they don't see progress quickly (Yang & Huang, 2021).

On the other hand, longer, less frequent lessons are better suited for advanced learners who need more time to process complex concepts or engage in critical thinking (Chen, 2020). This approach allows learners to delve deeper into topics and apply what they've learned in a more comprehensive manner. Longer lessons may also be better for certain types of activities, such as project-based learning or peer collaboration (Yang & Huang, 2021). However, longer lessons may be less engaging and may require more commitment from learners (Chen, 2020). Ultimately, the choice of lesson duration as an instructional strategy in CALL depends on a variety of factors and should be tailored to meet the needs of the learners and the goals of the instruction (Chen, 2020; Yang & Huang, 2021).

Lesson duration is a critical consideration in designing CALL sessions, as it influences engagement, retention, and skill acquisition. Research suggests that shorter, more frequent lessons benefit beginner and intermediate learners, particularly in reinforcing grammar and vocabulary skills through repetition and ease of scheduling (Yang & Huang, 2021; Chen, 2020). Conversely, longer, less frequent lessons may better support advanced learners who require time for processing complex concepts and engaging in critical thinking (Chen, 2020).

In light of these findings, analysing the relationship between lesson duration and learning outcomes at various proficiency levels could provide valuable understanding. Adjusting lesson

length to align with learners' needs and instructional goals may enhance the effectiveness of CALL in diverse learning contexts.

2.8.5 Active learning as an instructional design strategy in CALL

Active learning is an instructional approach that engages learners in the learning process through activities that require them to think critically, analyse, and apply what they have learned. In CALL, active learning can be achieved through a variety of methods. One common method of active learning in CALL is the use of interactive multimedia materials, such as online simulations, virtual reality environments, and interactive videos (Wang & Vásquez, 2020). These materials can provide learners with opportunities to engage in authentic language use, practice language skills in context, and receive immediate feedback on their performance.

Another method of active learning in CALL is through collaborative learning activities, such as online discussions, peer feedback, and group projects (Wang & Vásquez, 2020). These activities can promote learner interaction and collaboration, develop critical thinking skills, and enhance language skills such as communication and negotiation. Game-based learning is another approach to active learning in CALL. Games can provide a fun and engaging learning environment that motivates learners to engage in language learning activities (Bai, Pan, & Hirumi, 2021). Games can also offer learners opportunities to practice language skills in a context that simulates real-life situations.

Flipped learning, which involves learners watching or reading instructional materials before class and using class time for hands-on activities, can also be an effective method of active learning in CALL (Liu & Chen, 2021). Flipped learning can provide learners with opportunities to apply what they have learned in a supportive environment, receive feedback from peers and instructors, and

engage in collaborative problem-solving. Active learning in CALL can thus, take many forms, but the goal is to engage learners in the learning process and promote critical thinking, collaboration, and communication. Providing opportunities for learners to actively engage with language in a variety of contexts, CALL can help learners develop the language skills they need to communicate effectively in the real world.

2.8.6 Rehearsal and long-term retention

Rehearsal is an important cognitive process in memory retention, particularly in the context of language learning in CALL. Rehearsal refers to the conscious or unconscious repetition of information to aid in its retention in memory (Lewis et al., 2024). In CALL, there are several ways in which rehearsal can be used to promote long-term memory retention. One way to use rehearsal in CALL is through spaced repetition. Spaced repetition is a learning technique that involves presenting learners with information at increasing intervals over time (Roediger & Karpicke, 2006). This technique allows learners to rehearse information repeatedly over a period of time, which has been shown to enhance long-term memory retention (Karpicke & Roediger, 2008). CALL applications, such as flashcard apps, can utilise spaced repetition to present learners with vocabulary or grammar items at increasing intervals to promote long-term retention.

Another way to use rehearsal in CALL is through the use of audio and video recordings. Learners can listen to and watch recordings of themselves or others speaking the language, which allows for repeated exposure to the language and the opportunity to practice pronunciation and intonation (Jenkins & Haynes, 2019). This repeated exposure can aid in the retention of language structures and vocabulary items.

CALL applications can also utilise rehearsal in the form of interactive drills and exercises that require learners to practice language skills such as grammar and vocabulary. These drills and exercises can provide learners with immediate feedback on their performance, which can aid in the rehearsal and retention of language skills (Fotaris & Mastoras, 2020). The use of rehearsal in CALL can be an effective way to promote long-term memory retention in language learning. Providing learners with opportunities to rehearse information through spaced repetition, recordings, and interactive drills, CALL applications can aid in the development and retention of language skills.

Effective instructional design strategies play a crucial role in enhancing language learning experiences and outcomes in CALL. Utilising techniques such as scaffolding, sequencing, chunking, lesson duration, active learning, rehearsal, and long-term retention, educators and designers can optimise the learning process and promote the acquisition and retention of language skills. Scaffolding can help learners to gradually develop their skills and knowledge by providing structured support and guidance (Hautemo & van der Merwe, 2022). Sequencing, on the other hand, can help to organise learning activities in a structured manner, making them more engaging and motivating for learners. ‘Chunking’ can help learners to manage and process information more effectively by breaking it down into more manageable segments, while lesson duration can impact the frequency and intensity of learning experiences.

Active learning strategies, such as interactive exercises and simulations, can engage learners and enhance their motivation and self-efficacy in language acquisition. Rehearsal and long-term retention strategies, such as regular review sessions and spaced repetition, can reinforce learners' language skills over time and promote long-term memory retention. The use of effective instructional design strategies in CALL can help to optimise language learning experiences and

outcomes for learners. Incorporating these strategies into their teaching and design practices, educators and designers can enhance the effectiveness and efficiency of language learning in digital contexts.

2.8.7 Institutional Models for CALL Integration

The successful integration of CALL in higher education is contingent upon the adoption of effective institutional models that provide the necessary infrastructure, support, and strategic alignment. Three prominent models have been identified: centralised CALL centres, curriculum-integrated CALL, and blended learning support systems.

Centralised CALL centres are dedicated facilities equipped with technological resources and staffed by specialists to support language learning initiatives. These centres offer students access to specialised software, multimedia materials, and expert guidance, fostering a conducive environment for self-directed and collaborative learning. The establishment of centralised CALL centres reflects an institutional commitment to language education and provides a hub for innovation and research in CALL methodologies (Baichoo et al., 2021).

Curriculum-integrated CALL involves embedding CALL activities and resources directly into the language curriculum, ensuring that technology-enhanced learning is an integral component of course design and delivery. This model promotes seamless integration of digital tools with pedagogical objectives, facilitating contextualised and meaningful use of technology in language instruction. It also encourages faculty development and collaboration, as instructors work to align technological resources with learning outcomes (Wang, 2023).

Blended learning support systems combine traditional face-to-face instruction with online learning components, offering a flexible and scalable approach to language education. This model leverages the strengths of both modalities, providing opportunities for synchronous and asynchronous interactions, personalised learning experiences, and access to a diverse array of digital resources. Blended learning has gained traction as a sustainable solution in higher education, addressing challenges related to access, engagement, and resource allocation (Mena, 2024). The selection and implementation of these models should be informed by institutional goals, available resources, and the specific needs of the learner population. A strategic and context-sensitive approach to CALL integration can enhance the quality and effectiveness of language education in higher education settings.

2.8.8 Natural Language Processing and Neural Machine Translation Tools

The advent of Natural Language Processing (NLP) and Neural Machine Translation (NMT) tools has significantly transformed the landscape of language learning and instruction. These technologies offer powerful capabilities for real-time translation, language analysis, and personalised feedback, thereby augmenting the efficacy of CALL environments.

Natural Language Processing (NLP) encompasses a range of computational techniques that enable the analysis and generation of human language. Tools such as Grammarly and ChatGPT utilize NLP algorithms to provide instant feedback on grammar, style, and coherence, facilitating the development of writing skills and linguistic accuracy. The integration of NLP tools into CALL platforms supports autonomous learning and offers learners immediate, context-specific assistance (Jang et al., 2023).

Neural Machine Translation (NMT) represents a paradigm shift in translation technology, employing deep learning models to produce more accurate and fluent translations. Unlike traditional phrase-based translation systems, NMT models consider entire sentences, capturing contextual nuances and improving translation quality. Applications like Google Translate have incorporated NMT to enhance their performance, enabling learners to access and comprehend texts in multiple languages more effectively (Sutskever et al., 2014). These tools play a crucial role in promoting language diversity and supporting self-directed learning, especially in multilingual contexts like Namibia. Their inclusion in CALL frameworks ensures that learners can bridge linguistic gaps and access educational content in their preferred languages, thereby fostering inclusivity and enhancing learning outcomes.

2.8.9 Open-Source CALL Platforms and Language Localisation

The integration of open-source software into Computer-Assisted Language Learning (CALL) presents a valuable opportunity to expand access, promote linguistic inclusion, and ensure cultural relevance in higher education. In multilingual settings such as Namibia, where more than 20 languages are spoken, commercially developed CALL tools often lack the adaptability required to meet the local language needs of learners. Open-source CALL platforms, by contrast, provide opportunities for greater customisation and localisation, making them a powerful tool for advancing language education and supporting Indigenous languages.

Open-source CALL platforms are digital learning applications built with publicly accessible source code, which can be freely modified, redistributed, and adapted to meet specific educational goals (Wang & Vásquez, 2022). These platforms support pedagogical flexibility and can be tailored to linguistic and cultural contexts. Examples include Moodle, Aikuma, WeSay,

LibreLingo, Tux Typing, and Audacity. Such platforms allow educators to incorporate Indigenous content, translate interfaces into local languages, and embed culturally familiar elements. Moodle, in particular, has been widely adopted in Namibian higher education institutions due to its flexible integration capabilities and community support (Fuchs & Snyder, 2021).

Open-source platforms also contribute to the goals of sustainable and inclusive education by reducing costs associated with software licensing and enabling local ownership of instructional content (Ndhlovu & Hurst, 2022). These platforms support collaboration between developers, educators, and linguistic communities in the creation of CALL resources that reflect local knowledge and values. For example, WeSay has been employed in various African contexts to document endangered languages and produce culturally responsive literacy materials (Bird et al., 2014).

Language localisation, in the context of CALL, refers to the adaptation of digital learning content and interfaces to reflect the linguistic, cultural, and social realities of learners (Cárdenas-Claros & Gruba, 2020). This includes translation of text, modification of images and sounds to represent local contexts, and incorporation of traditional idioms, proverbs, and speech patterns. In Namibia, such practices allow learners to engage with content that resonates with their everyday life, thereby enhancing cognitive engagement and improving learning outcomes.

Localisation within CALL also supports learner identity development and cultural affirmation, especially in post-colonial education systems where Indigenous languages have historically been underrepresented. Instruction delivered in the learner's mother tongue has been shown to support better academic performance, language retention, and self-confidence (UNESCO, 2022;

Bamgbose, 2011). As such, localisation is not merely a technical enhancement but a strategic pedagogical approach that fosters educational equity and linguistic justice.

In order to appreciate the potential of open-source CALL platforms and localisation practices, educational institutions should invest in training for localisation processes, promote interdisciplinary collaboration among teachers, linguists, and software developers, and ensure that language education policies provide support for Indigenous language integration. These initiatives are essential for CALL to serve as a meaningful tool for language development, cultural preservation, and inclusive education in Namibia.

2.9 ATTITUDES AND PERCEPTIONS TOWARDS CALL

Research on attitudes and perceptions towards CALL in Namibia's higher education institutions is still developing. However, Hlas et al. (2017) established that both students and teachers had positive attitudes towards CALL, with students perceiving it as a fun and engaging way to learn English, while teachers viewed it as a useful tool to support their teaching. Similarly, Kahihu (2018) found that students and teachers had positive attitudes towards the use of CALL in teaching isiXhosa, with students perceiving it as an effective tool to practice listening and speaking skills, while teachers viewed it as a useful tool to enhance their teaching.

Research has shown that the attitudes and perceptions of higher education students towards CALL can be influenced by a variety of factors (Abdaljaleel et al., 2024; Staddon, 2023; Al-Emran et al., 2016; Chaka & Govender, 2017). Govender and Rajendran (2020) observe that students' previous experience with technology was a key predictor of their attitudes towards CALL. Specifically, students who were more familiar with technology tended to have more positive attitudes towards CALL and were more likely to use it for language learning. Another factor that can influence

students' attitudes towards CALL is the students' level of proficiency in the language being studied. A study by Kangira and Kaundu (2019) submits that students with higher levels of proficiency tended to have more positive attitudes towards CALL, as they were better able to navigate and use the technology to support their learning.

Cultural background can also play a role in shaping students' attitudes towards CALL (Levy & Stockwell, 2013). For example, a study by Zhou and Nunan (2015) explain how Chinese students were more likely to view CALL as a useful tool for grammar practice, while Australian students were more likely to see it as a tool for developing speaking skills. Zhou and Nunan (2015) arrived at these findings by examining cultural influences on students' attitudes toward CALL. Through surveys and interviews, they compared Chinese and Australian students' perceptions and found that cultural expectations about language learning shaped how students viewed CALL's utility. Chinese students valued CALL primarily for grammar practice, aligning with a traditional focus on grammatical accuracy in Chinese educational settings. In contrast, Australian students, who often prioritise communicative language skills, viewed CALL as a beneficial tool for enhancing speaking abilities.

A study by Alvarez-Marinelli et al. (2016) found that students appreciated the interactive and engaging nature of CALL and felt that it allowed for greater flexibility and personalisation in the learning process. Similarly, a study by Govender and Rajendran (2020) observes that students appreciate the convenience and accessibility of CALL, as it allowed them to study at their own pace and in their own time.

However, some students may also have concerns or reservations over the use of technology in language learning. They may worry about the reliability of the technology or feel that it is not a

substitute for face-to-face interaction with teachers and peers (Gerlach, 2014). Additionally, some students may face barriers to accessing and using technology due to issues such as cost, internet connectivity, or lack of technological expertise (Erlangga, 2022). While there is no one-size-fits-all answer to the question of students' attitudes towards CALL, it is clear that technology is playing an increasingly important role in language learning, and that many students are open to using CALL to enhance their learning experiences (Shadiev & Yang, 2020). As technology continues to evolve and become more ubiquitous in education, it will be important to continue exploring and understanding students' attitudes towards CALL, in order to optimise its use and ensure that it meets the needs and preferences of all learners (Selwyn, 2021).

2.10 FACTORS AND CHARACTERISTICS IDENTIFIED BY USERS OF CALL

Research on the factors and characteristics of CALL in Namibian higher education is still developing (Hore, 2013). However, several studies have been conducted in other African countries that provide evidence of its potential benefits and limitations. Oyelere and Adekunle (2020); Hore (2023) conducted a study on the factors of CALL in English language teaching in Nigeria and submit that CALL can have positive effects on language learning outcomes, such as improving learners' pronunciation, vocabulary, and grammar skills. Similarly, Adesope, et al. (2017) conducted a meta-analysis of research on the factors of CALL in sub-Saharan Africa and established that CALL can have a significant positive effect on language learning outcomes (Katushemererwe & Nerbonne, 2015).

CALL has gained popularity in the field of language teaching in higher education institutions worldwide. It has been suggested that CALL has the potential to enhance language learning,

particularly in terms of promoting student motivation, providing authentic learning environments, and personalised learning experiences (Levy & Stockwell, 2006). This literature review examines the factors and characteristics of CALL in supporting language learning in higher education, drawing on empirical studies and theoretical perspectives. Several studies have reported positive outcomes of using CALL to support language learning (Ware & Hellmich, 2014; Enayati & Gilakjani, 2020; Rachmawati, 2016; Hamakali & Josua, 2023; Mbukusa, 2018). Li and Li (2021) investigated the effectiveness of using a mobile app to support vocabulary learning in a Chinese as a foreign language (CFL) classroom. The results showed that the use of the mobile app improved the students' vocabulary acquisition and retention. Similarly, a study by Khoiriyah et al. (2020) examined the use of a web-based English language learning platform and observed that it enhanced the students' language proficiency and motivation. Additionally, Alzahrani (2020) investigated the effectiveness of using WhatsApp as a tool for supporting writing skills in English as a foreign language (EFL). The results indicated that the use of WhatsApp enhanced the students' writing skills and increased their motivation.

However, some studies have reported mixed results. For example, a study by Guichon and McLornan (2017) examined the effectiveness of using a Virtual Learning Environment (VLE) to support language learning in French as a second language (FSL) in a Canadian university. The results demonstrate that, while the use of the VLE improved the students' listening and reading skills, it did not significantly enhance their writing and speaking skills.

Moreover, some other studies have also highlighted the challenges and limitations of using CALL in language learning. For example, Li and Li (2021) note that the use of technology can lead to distractions and requires a certain level of technological proficiency, which can be a barrier for some students. Additionally, some studies have pointed out that the effectiveness of CALL is

highly dependent on the quality of the software and the design of the learning activities (Lee & Huang, 2018; Caws & Heift, 2016).

CALL has been shown to have a positive impact on language learning outcomes. A meta-analysis by Zhao, Zhang, and Liu (2021) established that CALL interventions improved students' overall language proficiency, particularly in speaking and listening skills. In the same vein, a study by Wang and Chen (2020) observed that using a CALL system to learn English grammar led to significant improvements in learners' grammar knowledge and overall language proficiency.

Moreover, CALL has been shown to be particularly effective in providing personalised language learning experiences. According to Warschauer and Healey (1998), CALL allows for adaptive learning, whereby the system can tailor materials and tasks to meet individual learners' needs and abilities. This approach has been shown to promote student motivation and engagement, leading to improved learning outcomes (Fang, 2019). Additionally, CALL has the potential to provide authentic learning environments, allowing learners to practice language skills in context. For example, Hsu and Wang (2019) found that using an online simulation game in a CALL context improved learners' motivation and engagement in language learning, as well as their language proficiency. Moreover, online communication tools such as video conferencing and chat platforms have been used effectively to provide learners with opportunities to practice language skills with native speakers (Lamy & Hampel, 2017).

The literature suggests that CALL can be an effective tool for supporting language learning in higher education. CALL interventions have been shown to improve learners' overall language proficiency, particularly in speaking and listening skills. Moreover, CALL can provide personalised learning experiences and authentic learning environments, which promote student

motivation and engagement. However, there is still a need for further research to investigate the specific aspects of CALL that are most effective in language learning, as well as to explore the potential of emerging technologies in CALL. The effectiveness of CALL in higher education can be reviewed under three categories: Benefits, Challenges, and Limitations and future Directions. These three categories are reviewed below.

2.10.1 Benefits of CALL in Higher Education

CALL has been found to have numerous benefits for language learning outcomes in Higher Education. Some of the benefits are discussed below.

2.10.1.1 Improved language proficiency

Numerous studies have established that CALL effectively enhances students' language proficiency across various language skills, including grammar, vocabulary, listening, speaking, reading, and writing (Warschauer & Healey, 1998; Kim & Kwon, 2012; Lee & Lee, 2019; Wang & Li, 2020). For example, mobile-based CALL applications have proven beneficial in improving grammar and vocabulary among Chinese EFL learners (Wang & Li, 2020), while studies focused on Korean EFL learners highlight improvements in listening, speaking, and writing skills (Kim & Kwon, 2012; Lee & Lee, 2019).

These results indicate that CALL can be a versatile tool in language education, supporting different aspects of language learning. However, the effectiveness of CALL may vary based on learner characteristics and the target language. Some studies report that learners with limited language proficiency or digital literacy may experience less benefit from CALL, suggesting that successful implementation requires an understanding of the learners' needs and digital capacities (Ducate &

Lomicka, 2009; Lai & Kuo, 2015; Lee & Lee, 2019). Therefore, language educators should carefully consider these factors when incorporating CALL into their instructional strategies.

2.10.1.2 Increases students' motivation and engagement in language learning

Motivation and engagement are important factors in language learning, and CALL has been found to have a positive impact on both. The use of interactive and gamified elements in CALL has been observed to be particularly effective in increasing motivation and engagement. Liu and Chen (2015) examine the use of a mobile gamification system in English language learning for undergraduate students in Taiwan and submit that the use of the system significantly improved students' motivation and achievements in English learning, as well as their attitudes toward using technology in language learning. Liu and Chen attributed these improvements to the game-like elements of the system, which included rewards, levels, and competition.

Similarly, Chen et al.'s (2019) study on the use of a CALL platform with interactive exercises for Chinese language learning among college students in Taiwan established that the use of the platform significantly improved students' engagement and satisfaction with learning Chinese. Chen et al. note that the interactive nature of the exercises, which included quizzes, videos, and games, contributed to the students' increased engagement and motivation. Other studies have also established that CALL can increase motivation and engagement in language learning. For example, Chen and Chang (2015) argue that the use of a CALL programme with online chat rooms and forums increased students' motivation and engagement in learning English. Similarly, Lee and Lee (2019) believe that the use of a mobile CALL application improved students' motivation and interest in learning English. These studies suggest that the use of CALL can have a positive impact on students' motivation and engagement in language learning, particularly when interactive and gamified elements are incorporated.

2.10.1.3 More opportunities for self-directed learning

CALL enhances language learning by promoting self-directed learning, immediate feedback, and collaboration (Chapelle, 2001; Warschauer & Healey, 1998). With a wide array of online resources and multimedia, CALL allows students to explore language materials at their own pace and interests, providing authentic, contextualised experiences. Interactive exercises and automated feedback on CALL platforms boost engagement and satisfaction, as noted in a study by Chen et al. (2019), while collaborative activities improve peer interaction and conversational skills crucial for real-world communication.

2.10.1.4 Enhanced intercultural communication skills

CALL has been recognised as a potential tool to enhance students' intercultural communication skills (Bourne & Von Kanel, 2019). CALL can provide exposure to different cultures and languages through online resources and communication tools, including online discussion forums and virtual exchange programmes (Cukor-Avila & Bunch, 2019). CALL can also facilitate cross-cultural collaboration and communication through online projects and discussions, enabling learners to engage with peers from different cultural backgrounds and practice their language skills in authentic settings (Lee & Lee, 2019). Moreover, CALL can foster learners' cultural awareness and sensitivity by exposing them to different perspectives and practices through authentic cultural materials and resources (Sung, Chang, & Lee, 2016). CALL can also provide opportunities for learners to reflect on their own cultural identities and biases and develop their intercultural competence (Liu & Hansen, 2018). In particular, mobile CALL applications have been observed to facilitate intercultural learning by enabling learners to access authentic cultural materials and resources anytime and anywhere (Zhu et al., 2018). CALL has the potential to enhance learners'

intercultural communication skills through exposure to different cultures and languages, cross-cultural collaboration, and the development of intercultural competence.

2.10.1.5 Cost-effective and flexible

CALL can be a cost-effective and flexible way of delivering language learning instruction, particularly for students who have limited access to traditional classroom settings (Heift & Schulze, 2007). Additionally, the use of mobile-based CALL applications can provide students with flexible learning opportunities that can be accessed anytime and anywhere (Wang & Li, 2020). CALL has been observed to have numerous benefits for language learning outcomes in Higher Education. The use of CALL can improve students' language proficiency, motivation, engagement, and intercultural communication skills, while also providing more opportunities for self-directed learning, feedback, and collaboration. Additionally, CALL can be a cost-effective and flexible way of delivering language learning instruction. However, further research is needed to better understand how to effectively integrate CALL into language learning curricula and to develop innovative CALL tools and methods that can meet the diverse needs of students. Furthermore, CALL can also provide a range of features and resources that can support language learning, such as online dictionaries, grammar guides, and interactive exercises (Herron & Yoon, 2013). This can allow students to work at their own pace and according to their individual needs and interests. The use of multimedia resources, such as videos and podcasts, can also provide students with opportunities to practice listening and speaking skills in authentic contexts (Lee & Lee, 2019). The use of CALL can offer a cost-effective and flexible way of delivering language instruction, while also providing students with a range of resources and features that can support their learning needs and preferences.

2.10.2 Challenges and Limitations of CALL in Higher Education

Although CALL has many benefits for language learning outcomes in Higher Education, there are also some challenges and limitations that need to be considered. These challenges are discussed below.

2.10.2.1 Digital literacy

Mustafa and Adam (2024) have found that CALL can be less effective for certain types of learners, particularly those with lower levels of digital literacy (Lee & Lee, 2019). These learners may struggle with the technical aspects of using CALL software and devices, which can affect their learning experience. Digital literacy is a critical aspect of effective CALL in higher education. As technology becomes an increasingly integral part of language learning, students with lower levels of digital literacy may be at a disadvantage in using CALL software and devices. Several studies have highlighted the importance of digital literacy for CALL. For example, Lee and Lee (2019) found that lower digital literacy learners had difficulty in using CALL software and devices, which affected their learning outcomes. Similarly, Lin (2018) reports that students' digital literacy skills are crucial in determining the effectiveness of CALL in enhancing their language learning outcomes.

Digital literacy encompasses a range of skills related to the use of digital technologies, including computer hardware and software, internet and online resources, and social media. In the context of CALL, it involves the ability to navigate and use language learning software and digital resources effectively. Students with lower levels of digital literacy may struggle with the technical aspects of using CALL software and devices, which can affect their learning experience. Moreover, digital literacy can also affect the way in which students engage with CALL. For

example, higher digital literacy students may be more comfortable with the collaborative and interactive features of CALL, while lower digital literacy students may be more comfortable with traditional forms of language learning (Lee & Lee, 2019). This highlights the need for CALL programmes to be designed in a way that accommodates the diverse digital literacy levels of students.

To address the issue of digital literacy in CALL, several strategies can be employed. First, instructors can provide technical support and training to students to help them develop their digital literacy skills (Lin, 2018). This can include tutorials on using CALL software, guidance on navigating digital resources, and training on effective use of online communication tools. The instructors can use a scaffolded approach to teaching CALL, which involves providing step-by-step instruction and support to students with lower levels of digital literacy (Warschauer, 1996). This can help to build students' confidence and skills in using CALL software and devices.

It is important for instructors to be aware of the potential digital divide that exists among students in terms of digital literacy (Bax, 2003). Taking steps to address this divide, such as providing access to technology resources and training, instructors can ensure that all students have equal opportunities to benefit from CALL in their language learning. Digital literacy is a critical aspect of effective CALL in higher education. Students with lower levels of digital literacy may struggle with the technical aspects of using CALL software and devices, which can affect their learning experience. However, by employing strategies such as technical support, scaffolded instruction, and addressing the digital divide, instructors can ensure that all students have equal opportunities to benefit from CALL in their language learning.

2.10.2.2 Technical issues

Technical issues and limitations with CALL software and devices can also affect the quality of the learning experience (Heift & Schulze, 2007). For example, poor internet connectivity, software glitches, and outdated hardware can all impact the effectiveness of CALL (Heift & Schulze, 2007). Technical issues and limitations with CALL software and devices can significantly impact the quality of the learning experience in higher education. Technical difficulties can lead to frustration and decreased motivation among students and can also interfere with the timely delivery of course content. Furthermore, not all CALL software and devices are created equal. Some programmes may be more user-friendly or effective than others, and some may be designed for specific types of language learners or language skills. It is important for instructors to carefully evaluate different CALL programmes and devices before selecting them for their courses (Stockwell, 2010). Another technical issue is the availability of technology and devices for students. In some cases, students may not have access to the necessary devices or internet connectivity to effectively participate in CALL activities.

This can be a particular challenge for students from lower-income backgrounds or those in remote areas with limited access to technology (Fotouhi & Bagheri, 2016). Technical issues and limitations can present significant challenges to the effective use of CALL in higher education. It is important for instructors to be aware of these potential issues and to work with their IT departments to ensure that they are using high-quality software and devices and that technical support is available when needed. Additionally, instructors should consider the availability of technology for their students and work to ensure that all students have access to the necessary tools for successful participation in CALL activities (Lee & Lee, 2019).

2.10.2.3 Student preferences

Some students may prefer traditional teaching methods and may find CALL to be less engaging or effective (Stockwell, 2010). This can be particularly true for students who are accustomed to more interactive and collaborative forms of learning. Student preferences can play a critical role in the effectiveness of CALL in higher education. While many studies have demonstrated the benefits of CALL in language learning, some students may prefer traditional teaching methods and find CALL to be less engaging or effective (Zhang & Kenny, 2016). This preference for traditional methods may be more pronounced among students who are used to more interactive and collaborative forms of learning. One potential reason for this preference is the lack of face-to-face interaction that is inherent in many CALL activities. Language learners may feel more comfortable practicing their skills with a teacher or other students in person, where they can receive immediate feedback and interact in a more natural way (Nikolov & Mihaljević Djigunović, 2011).

Additionally, some students may find it difficult to stay motivated when working alone on a computer, without the social support and accountability that comes with traditional classroom settings (Blin & Jalkanen, 2010). However, it is important to note that not all students prefer traditional teaching methods. In fact, many students may actually prefer the flexibility and convenience that CALL provides, as it allows them to learn at their own pace and on their own schedule (Chen, 2017). Furthermore, CALL can provide students with more opportunities for self-directed learning, feedback, and collaboration (Chapelle, 2001). It's important for instructors to be aware of these potential preferences and to work to create a balanced approach that incorporates both traditional teaching methods and CALL activities. By doing so, instructors can help ensure that all students are able to learn effectively and achieve their language learning goals.

2.10.2.4 Lack of personal interaction

Lack of personal interaction is a challenge in the use of CALL. CALL has been observed to lack the personal interaction and social context of traditional classroom settings, which can be important for language learning (Blin & Jalkanen, 2010). CALL can provide limited opportunities for face-to-face communication and interaction with peers and instructors, which can limit the development of conversational and interpersonal skills. While CALL can offer a flexible and self-paced learning environment, the lack of personal interaction is often cited as a limitation (Blin & Jalkanen, 2010). Without face-to-face communication, students may miss out on opportunities to practice conversational and interpersonal skills that are essential for language learning. Additionally, CALL may limit the development of social and cultural awareness that is important for effective communication in a diverse world (Lan & Wang, 2021).

Furthermore, CALL has the potential to lead to a lack of motivation and engagement among students, who may feel isolated and disconnected from their peers and instructors (Lai & Kuo, 2015). However, some scholars argue that CALL can be designed to incorporate social and interactive features, such as online forums and virtual classrooms, in order to enhance personal interaction and communication (Blake, 2013). Studies have shown that integrating such features can increase students' motivation, engagement, and communication skills (Lai & Kuo, 2015; Thorne & Payne, 2005). Moreover, CALL can provide opportunities for learners to interact with speakers of the target language outside of the classroom through online language exchanges and virtual communities (Lan & Wang, 2021). The chief argument here is that, while CALL may have limitations in terms of personal interaction and social context, its potential benefits in terms of flexibility, self-paced learning, and opportunities for online collaboration and interaction should not be overlooked. The effective integration of CALL in language courses should consider a

balance between personal interaction and technology-mediated communication, so as to provide students with a well-rounded learning experience.

2.10.2.5 Limited language proficiency

Limited language proficiency is another limitation. CALL may also be less effective for learners with limited language proficiency. While CALL has been shown to have many benefits, learners with limited language proficiency may find it challenging to fully engage with CALL software due to the complexity of language structures and vocabulary used (Ducate & Lomicka, 2009). Such learners may require more individualised and scaffolded instruction. Limited language proficiency is an important factor to consider when implementing CALL in language education. CALL often involves interactive activities that require learners to understand and produce language at a relatively high level, which can be difficult for those who are still in the process of acquiring basic language skills. One solution to this challenge is to provide more individualised and scaffolded instruction for these learners. This may involve using CALL in conjunction with other teaching methods, such as one-on-one tutoring or small group instruction, to provide additional support and guidance (Lai & Kuo, 2015). In addition, CALL software can be designed with varying levels of difficulty and complexity to cater to different language proficiency levels (Ducate & Lomicka, 2009). This can help to ensure that learners with limited language proficiency are not excluded from the benefits of CALL and are able to engage in meaningful language learning activities. While CALL has the potential to enhance language learning outcomes for many students, it is important to consider the needs of learners with limited language proficiency and to provide appropriate support and scaffolding to help them fully engage with the technology.

Despite the challenges and limitations of CALL, it remains an important tool for language learning in higher education. However, it is important to address these challenges and limitations in order

to fully realise the benefits of CALL. This may involve developing innovative CALL tools and methods that can meet the diverse needs of learners, providing adequate technical support and training, and integrating CALL into a more comprehensive language learning curriculum that balances the benefits of technology with the importance of personal interaction and context.

2.10.3 Directions for CALL in Higher Education

In recent years, CALL has become an increasingly popular approach in higher education. However, while CALL has been shown to offer many potential benefits for language learning, it also presents several challenges and limitations. Here, the study reviews some of the recent literature on future directions for CALL in higher education, focusing on key areas of development and improvement. To address the challenges and limitations of CALL in higher education, it is important to continue researching and developing innovative CALL tools and methods that can meet the diverse needs and preferences of students. For example, incorporating game-based learning, adaptive learning, and artificial intelligence into CALL can provide more personalised and engaging learning experiences (Kukulska-Hulme et al., 2018). It is also important to provide adequate training and support for both students and instructors in using CALL effectively (Healey & Warschauer, 2010). These future directions are discussed below.

2.10.3.1 Innovative CALL tools and methods

In recent years, researchers have been exploring innovative CALL tools and methods that can meet students' diverse needs and preferences. Therefore, to meet the diverse needs and preferences of students, researchers have explored incorporating game-based learning, adaptive learning, and artificial intelligence into CALL. For example, Kukulska-Hulme et al. (2018) observes that incorporating game-based elements into a CALL platform can enhance students' engagement and

motivation in language learning. Similarly, adaptive learning systems that provide personalised feedback and content have been shown to improve students' learning outcomes (Wang et al., 2019). Additionally, the use of natural language processing and machine learning algorithms can help provide more accurate and efficient assessment and feedback for students (Han & Zheng, 2019). Another approach that has gained traction in recent years is adaptive learning, which involves the use of algorithms to provide personalised feedback and content to learners.

Wang et al. (2019) submit that adaptive learning systems can improve students' learning outcomes, as they are able to focus on areas that they need to improve on. Providing personalised feedback and content, adaptive learning systems can help learners learn more efficiently and effectively. In addition to game-based learning and adaptive learning, researchers have also explored the use of artificial intelligence (AI) in CALL. One application of AI in CALL is the use of natural language processing (NLP) to provide more accurate and efficient assessment and feedback for learners. Han and Zheng (2019) found that NLP algorithms can help provide more accurate and efficient assessment and feedback for learners, which can help them improve their language proficiency. Incorporating innovative CALL tools and methods such as game-based learning, adaptive learning, and AI can help meet the diverse needs and preferences of students, enhance their engagement and motivation, and improve their learning outcomes. However, more research is needed to fully understand the potential benefits and limitations of these approaches and to develop effective implementation strategies for using them in higher education contexts.

In order to support the effective implementation of these tools, adequate training and support is necessary for both students and instructors. As noted by Healey and Warschauer (2010), instructors should be provided with training on how to use CALL effectively, as well as on how to integrate it into their teaching practices. Additionally, students should be provided with support and

guidance on how to use these tools, so they can effectively navigate and utilise the various features available to them. Providing adequate training and support, instructors and students can maximise the potential benefits of these innovative CALL tools and methods.

2.10.3.2 Integration with Traditional Classroom Settings

Integrating CALL with traditional classroom settings is important to ensure that students are able to benefit from the advantages of both methods. Researchers have explored various approaches to effectively integrate CALL with classroom settings. For example, incorporating online collaborative projects and discussions has been found to be an effective way to promote language learning and enhance intercultural communication skills (Lee & Lee, 2019). Similarly, the use of blended learning approaches that combine online and face-to-face instruction has been found to enhance students' engagement, motivation, and learning outcomes (Bibauw et al., 2019). Moreover, ensuring that CALL tools and resources are accessible and usable for all students, including those with limited access to technology or with disabilities, is crucial in order to provide an equitable learning experience (Bibauw et al., 2019). As technology continues to advance, higher education institutions need to explore new ways to incorporate technology into language learning continuously. The integration of emerging technologies, such as virtual reality, augmented reality, and artificial intelligence, can provide new opportunities for language learners to enhance their language skills (Salimi, 2024).

Moreover, the development of mobile-based CALL applications and the use of social media platforms can provide students with flexible and convenient learning opportunities (Wang & Li, 2020). It is important to continue researching and developing innovative CALL tools and methods that can meet the diverse needs and preferences of students, while also providing adequate training and support for both students and instructors in using CALL effectively (Healey & Warschauer,

2010). Integrating CALL with traditional classroom settings can offer students a more comprehensive and effective language learning experience.

One area that holds significant promise for integration is language translation and interpretation, which has traditionally been taught through face-to-face instruction and practical simulations. CALL can enhance these practices by incorporating advanced technologies such as Natural Language Processing (NLP), machine learning (ML), and deep learning (DL) to support real-time translation and interpretation training. Tools like Google Translate and AI-driven translation apps can be leveraged not just for practice, but also for developing learners' understanding of linguistic structures and cross-linguistic equivalence (Hutchinson & Zhu, 2023; Jain et al., 2021).

Furthermore, the use of computational linguistics and corpus linguistics within CALL environments allows students to analyse large language datasets, observe usage patterns, and refine their translation accuracy based on authentic linguistic input (Leech, 2016; McEnery & Hardie, 2012). These technologies bridge the gap between theory and practice, making translation training more interactive, data-driven, and aligned with industry demands.

2.10.3.3 Incorporating Game-Based Learning, Adaptive Learning, and Artificial Intelligence into CALL

One potential direction for CALL is the incorporation of game-based learning, adaptive learning, and AI. According to Kukulska-Hulme et al. (2018), game-based learning can provide an immersive and engaging learning experience that can motivate students to learn. Adaptive learning, on the other hand, can personalise the learning experience to meet the individual needs and preferences of each student. Incorporating AI into CALL, instructors can also provide immediate feedback to students, which can enhance their learning and promote self-reflection. The

integration of AI into CALL can also provide new opportunities for language learners. Lee and Lim (2021) developed an AI-based CALL system that provided learners with immediate feedback on their pronunciation. The system used machine learning algorithms to analyse learners' speech and provide feedback on their accuracy, fluency, and intonation. The results of the study showed that the AI-based CALL system was effective in improving learners' pronunciation skills.

Several studies have explored the potential of integrating game-based learning, adaptive learning, and AI into CALL. In a study by Han and Cho (2021), the authors developed a game-based CALL programme that aimed to enhance learners' grammar skills. The programme incorporated a storyline, characters, and challenges to create an engaging and immersive learning experience. The results of the study showed that the game-based programme was effective in improving learners' grammar skills and their motivation to learn. Similarly, adaptive learning has been found to be effective in enhancing language learning outcomes. Jin and Zhang (2020) developed an adaptive CALL system that provided learners with personalised feedback and learning materials based on their individual learning needs. The results of the study demonstrated that the adaptive CALL system was effective in improving learners' vocabulary knowledge and their self-regulated learning skills. Moreover, the use of AI in CALL can also provide perspectives into learners' learning behaviours and preferences. Joo and Park (2021) developed an AI-based CALL system that analysed learners' interactions with the system to identify their learning behaviours and preferences. The system used machine learning algorithms to predict learners' learning styles and provide personalised learning recommendations. The results of the study showed that the AI-based CALL system was effective in providing personalised learning support to learners.

Despite the potential benefits of integrating game-based learning, adaptive learning, and AI into CALL, there are also some challenges to be addressed. One challenge is the development and

implementation of effective and user-friendly CALL systems. In this regard, Chen and Chen (2020) identified the need for user-CENTRED design principles in the development of game-based CALL systems. The study emphasised the importance of considering learners' needs, preferences, and feedback in the design of game-based CALL systems. Another challenge is the need for adequate training and support for instructors and learners in using game-based, adaptive, and AI-based CALL systems. Yang and Liu (2021) emphasise the importance of providing training and support to instructors in using adaptive CALL systems effectively. They suggest that instructors need to be familiar with the principles and strategies of adaptive learning and be able to use the system to provide personalised feedback and support to learners.

The integration of game-based learning, adaptive learning, and AI into CALL has the potential to enhance language learning outcomes and provide new opportunities for language learners. However, there are also some challenges to be addressed, including the development of effective and user-friendly CALL systems and the need for adequate training and support for instructors and learners. Further research is needed to explore the potential of integrating game-based learning, adaptive learning, and AI into CALL and to identify effective strategies for implementing these approaches in language learning contexts.

2.10.3.4 Providing Adequate Training and Support for Students and Instructors

Another crucial direction for CALL in higher education is providing adequate training and support for both students and instructors. As noted by Healey and Warschauer (2010), while many students are comfortable with using technology, they may not necessarily know how to use it effectively for language learning. Therefore, it is important to provide training on how to use CALL tools effectively. Instructors also need training on how to design and deliver effective CALL lessons that meet the needs and preferences of their students.

As higher education continues to evolve, CALL will likely play an increasingly important role in language learning. However, to ensure its effectiveness, it is important to continue researching and developing innovative CALL tools and methods, provide training and support for effective use, and integrate CALL with traditional classroom settings in ways that meet the diverse needs of students and instructors. CALL has the potential to enhance language learning in higher education, but there are still challenges and limitations that need to be addressed. Incorporating game-based learning, adaptive learning, and AI into CALL can provide more personalised and engaging learning experiences, while providing adequate training and support for students and instructors can ensure effective implementation of CALL. It is important for higher education institutions to continuously explore new directions for CALL to meet the diverse needs and preferences of students in language learning.

Furthermore, effective training and support are important to ensure that students have equitable access to CALL tools and resources. As noted by Son and Kim (2018), ensuring accessibility for all students, including those with disabilities or limited access to technology, is crucial in providing an equitable learning experience. To provide adequate training and support for students and instructors, various approaches have been explored. For example, teacher training programmes can include workshops or courses on how to design and deliver effective CALL lessons (Hsu, Ching, & Grabowski, 2017). Similarly, student training programmes can include tutorials or training sessions on how to use CALL tools effectively (Li & Zhu, 2019). Providing ongoing support through online forums or help desks can also be beneficial in addressing any issues or questions that arise (Sivapalan & Lai, 2018). Moreover, providing training and support for both instructors and students is not only beneficial for the effective use of CALL tools but also for the development of digital literacy skills. As noted by Warschauer and Matuchniak (2010), CALL can

be a tool for developing critical digital literacy skills such as evaluating online sources, collaborating online, and creating digital content.

Providing adequate training and support for students and instructors is crucial for the effective use of CALL tools and resources in language learning. Effective training programmes and ongoing support can ensure equitable access and provide opportunities for the development of digital literacy skills. The effective integration of CALL into the higher education system in Namibia faces a number of challenges and limitations. Notably, the lack of reliable and affordable internet connectivity, particularly in rural areas, presents a significant barrier to the access and use of online CALL resources by both students and teachers (UNESCO, 2019). The high cost of electronic devices and software also impedes the integration of CALL, particularly for students from low-income backgrounds (Saka, 2020). Additionally, the limited availability of computer labs and other resources in many Namibian institutions presents a challenge to the effective implementation of CALL (UNAM, n.d.). Moreover, insufficient funding for adequate technology infrastructure and support for students and teachers further complicates the integration of CALL into language learning.

Furthermore, the language diversity in Namibia, with over 20 languages spoken in the country, presents a significant challenge in developing CALL resources that cater to the needs of all language learners (Kashihakumwa et al., 2018). Although CALL resources have been developed for English language learning, there is a dearth of research on the use of CALL for teaching other languages in the Namibian context. Additionally, despite the growing interest in integrating CALL into language learning in Namibia, there is a lack of empirical research on the effectiveness of CALL in improving language learning outcomes in Namibian higher education (Saka, 2020). To

address this research gap, future studies could explore the impact of CALL on language proficiency, student engagement, and motivation.

Moreover, while the Namibian Ministry of Education, Arts, and Culture has endorsed the use of Information and Communication Technology (ICT) in education, research on how CALL can be integrated into the national curriculum effectively is scarce. As noted by UNAM (n.d.), investigating the extent to which CALL is being used to support the teaching and learning of different subjects in the Namibian national curriculum could offer valuable understanding of the integration of CALL into higher education in Namibia. Additionally, while the success of the integration of CALL depends heavily on the knowledge and skills of language teachers, research on the role of teacher training in preparing teachers to use CALL effectively in Namibia is limited, highlighting a gap in the existing literature.

2.10.4 Communicative Competence and Its Relevance to CALL in Namibian Higher Education

An understanding of how CALL supports effective language learning requires an exploration of the concept of communicative competence. This section examines the theoretical foundations of communicative competence and explains how its four core components align with the key language skills that CALL is designed to enhance in the Namibian higher education context.

The conceptual framework of communicative competence, first conceptualised by Noam Chomsky (1965) and later expanded by Dell Hymes (1972), provides a critical lens for understanding language proficiency beyond grammatical accuracy. Chomsky focused on linguistic competence, referring to the knowledge of language structure and rules. In contrast, Hymes introduced a broader view, asserting that successful communication also depends on knowing how

and when to use language appropriately in social contexts. This view was refined by Canale and Swain (1980), who outlined four essential components of communicative competence: linguistic competence, sociolinguistic competence, discourse competence, and strategic competence. These components remain fundamental in the evaluation and design of CALL programmes, which aim to address the multifaceted nature of language proficiency through technology-enhanced learning environments.

In the Namibian higher education context, where students navigate complex linguistic and cultural dynamics, the integration of these four components is crucial for effective language instruction. Linguistic competence, involving grammar, vocabulary, and pronunciation, is supported in CALL through interactive grammar tutorials, digital flashcards, and pronunciation training software powered by artificial intelligence (Marzban & Sadighi, 2023). Sociolinguistic competence, or the ability to use language appropriately across different social settings, is developed through CALL tools that include role-playing simulations, context-based dialogues, and culturally responsive content (Buss & Caws, 2020). Discourse competence, which enables the construction of coherent and meaningful communication, is facilitated through CALL writing platforms, peer review modules, and extended reading tasks (Yanguas, 2020). Strategic competence, which allows learners to manage communication breakdowns, is enhanced through features such as adaptive feedback, speech recognition systems, and interactive conversation scenarios (Alghamdi & Shah, 2022).

These theoretical components align closely with findings from the current study, which shows that students consider speaking and listening to be the most essential language skills for academic and professional success. CALL applications that focus on speech interaction, such as virtual dialogue practice and listening comprehension activities, directly respond to these learner priorities. The

use of real-time conversation tools, pronunciation scoring, and listening modules embedded in modern CALL systems offers a targeted approach to skill development in these high-importance areas (Alonso & Beaven, 2021). Meanwhile, foundational skills like reading and writing are supported through annotated reading platforms, writing prompts, grammar-checking software, and feedback mechanisms that reinforce formal language accuracy (Stockwell, 2022).

Positioning this study within the framework of communicative competence highlights the holistic value of CALL when applied intentionally. Rather than supporting isolated language skills, CALL—when informed by this framework, promotes balanced and integrated language development. This is especially relevant in multilingual societies like Namibia, where learners must not only acquire grammatical knowledge but also navigate diverse social and communicative contexts. Despite its relevance, communicative competence remains underrepresented in much of the CALL literature in Namibia. This study addresses this theoretical gap by aligning CALL research with the comprehensive components of communicative competence, thus offering a more nuanced understanding of students' learning needs and the technological tools designed to support them.

While the integration of CALL into language education programmes is recognised as crucial for successful implementation, research on the challenges and opportunities associated with integrating CALL into teacher training programmes in Namibia remains scarce. Thus, further studies are needed to examine the effectiveness of teacher training programmes in equipping language teachers with the necessary skills and knowledge to effectively integrate CALL into language learning. This research gap underscores the need for a more comprehensive understanding of the training needs of language teachers in relation to CALL integration in Namibia's higher education system.

Another research gap identified in this literature review is the lack of studies on the integration of CALL into the Namibian national curriculum. Although the Ministry of Education, Arts, and Culture in Namibia supports the integration of ICT into education, limited research exists on the effective integration of CALL into the national curriculum (UNAM, n.d.). Therefore, further studies are required to explore how CALL can be integrated into the Namibian national curriculum. There is a need to investigate the potential of mobile-assisted language learning (MALL) in Namibian higher education, considering the growing use of mobile devices in the country. However, research on the use of MALL in Namibia is limited, with a research gap in exploring the effectiveness of MALL in improving language proficiency and student engagement (Saka, 2020). Therefore, further research is necessary to explore the potential of MALL in the Namibian context.

2.11 BARRIERS THAT IMPEDE THE DELIVERY OF CALL

CALL has gained popularity in recent years due to its potential to enhance language learning outcomes. However, the implementation of CALL is not without challenges. There are various factors that can impede the delivery of CALL, which can hinder the effectiveness of language learning. Some of these factors include technological barriers, lack of teacher training and support, and inadequate funding. This section of the literature review will discuss these factors in detail, highlighting the impact they can have on the successful implementation of CALL in higher education.

2.11.1 Technological barriers in the delivery of CALL

The integration of technology into language learning in higher education is essential for enhancing student engagement, motivation, and learning outcomes. However, the effective implementation

of CALL can be impeded by various technological barriers. One of the main technological barriers to CALL in higher education is a lack of adequate hardware or software. Hubbard (2019) notes that the use of CALL can be limited by inadequate technology infrastructure, such as outdated computers or slow internet connections. Without proper hardware and software, the effectiveness of CALL can be compromised, and learners may not be able to access and benefit from CALL resources.

In addition, outdated equipment can also be a barrier. For example, CALL software may be incompatible with older operating systems, limiting its use by some students or instructors. This is particularly problematic in higher education institutions where students may bring their own devices with different operating systems. Furthermore, CALL software can be complex and difficult to use, especially for teachers with limited technology experience. Levy and Stockwell (2006) note that CALL software can be overwhelming for instructors who are not tech-savvy, which can lead to frustration and decreased motivation to use CALL resources. This can result in a reluctance to adopt new technologies and may hinder the integration of CALL into language learning programmes.

Moreover, the lack of technical support can also be a significant barrier, as students and instructors may not be able to resolve technical issues on their own. This can lead to frustration and a lack of confidence in using CALL resources. Technological barriers can hinder the effective implementation of CALL in higher education institutions. Addressing these barriers through appropriate technology infrastructure, ongoing technical support, and training for instructors can help to overcome these challenges and maximise the potential benefits of CALL for language learners in higher education.

2.11.2 Lack of training and support

The integration of technology in education has become increasingly important in the past few decades. In particular, CALL has become a widely used method for language teaching and learning. However, one of the challenges associated with the effective implementation of CALL is the lack of training and support for teachers. According to Hubbard (2019), teachers may lack the necessary training and support to effectively use CALL in their classrooms. This can result in frustration and a lack of confidence in using technology, which can lead to underutilization of CALL resources. Teachers who do not feel comfortable using technology may avoid it altogether, which can result in missed opportunities for student learning. Research has shown that teacher training and support are crucial factors in the successful integration of technology in education (Bingimlas, 2009; Chen & Lin, 2013). Teachers who receive training and support are more likely to feel confident in using technology and to effectively integrate it into their teaching practices.

Moreover, a lack of training and support can also lead to inadequate use of CALL resources. Teachers may only use basic features of technology and fail to explore more advanced features that could enhance student learning. They may also be unable to troubleshoot technical issues, which can lead to frustration and a loss of instructional time. Therefore, it is important for schools and educational institutions to provide adequate training and support for teachers in the use of technology, especially for CALL. This can be achieved through workshops, training sessions, online resources, and ongoing support from technology specialists. Providing teachers with the necessary training and support, schools can ensure that they are effectively integrating technology into their teaching practices, and ultimately, enhancing student learning outcomes.

2.11.3 Limited access to technology

Access to technology is a crucial factor in the successful implementation of CALL. Limited access to technology can be a significant barrier to the delivery of CALL, especially in contexts where resources are scarce. Warschauer and Matuchniak (2010) argue that access to technology is a significant issue in CALL implementation. They suggest that limited access to technology can result in a digital divide, where some learners have access to technology while others do not. This can lead to inequality in education and a lack of equal opportunities for all learners. Learners in contexts with limited access to technology may not have access to computers or mobile devices, or internet connectivity may be limited, making it difficult to access online resources. This can make it challenging for teachers to integrate CALL into their teaching practices and for learners to engage with technology-based activities. Furthermore, limited access to technology can result in a lack of familiarity with technology, which can result in a lack of confidence in using technology for educational purposes. This can be particularly challenging for learners who may have limited exposure to technology outside of the classroom. Research has shown that access to technology is essential for effective CALL implementation (Bax, 2003; Warschauer & Matuchniak, 2010). Moreover, the availability of technology can have a significant impact on the quality of language learning. Studies have shown that learners who have access to technology-based resources and activities have better language learning outcomes (Stockwell, 2010; Levy & Stockwell, 2006). Therefore, it is important for schools and educational institutions to provide access to technology and ensure that all learners have equal opportunities to engage with technology-based activities. This can be achieved through providing computer labs, mobile devices, and internet connectivity in schools or providing learners with access to technology outside of the classroom. As such, limited access to technology is a significant barrier to the delivery of CALL, especially in contexts

where resources are scarce. It is important to address this issue and ensure that all learners have equal access to technology-based resources and activities to enhance language learning outcomes.

2.11.4 Cost and availability of software and hardware

The cost and availability of hardware and software are crucial factors in the successful implementation of CALL in higher education (O’Flynn et al., 2024). Limited budgets and lack of availability of software and hardware can be significant barriers to the integration of CALL in language learning. The high cost of technology can limit the availability of technology in educational institutions, resulting in restricted access to technology-based resources and activities for language learners (O’Flynn et al., 2024). Furthermore, the availability of software can also be a significant issue. Educational institutions may not have access to the necessary software to implement CALL effectively, limiting the ability of teachers to create and deliver technology-based activities and materials, resulting in restricted opportunities for learners to engage with technology in the classroom (Blin & Jalkanen, 2010). The cost of technology can also be a barrier for learners outside of the classroom.

Many students may not have access to the necessary hardware and software to engage with technology-based language learning resources outside of the classroom, resulting in limited exposure to technology-based resources, which can restrict language learning opportunities (Hockly, 2018). To address these issues, it is crucial to provide educational institutions with access to affordable hardware and software (Blin & Jalkanen, 2010). This can be achieved through funding or grants for educational institutions to purchase necessary equipment and software. Open-source software can also provide a cost-effective alternative to expensive proprietary software (Hockly, 2018). Moreover, it is important to ensure that students have access to technology-based

resources and activities outside of the classroom. This can be achieved through providing students with access to computers, mobile devices, and internet connectivity, either through educational institutions or through community resources such as libraries and community centres (O’Flynn et al., 2024). The cost and availability of hardware and software can be significant barriers to the implementation of CALL in higher education. It is crucial to address these issues and provide educational institutions and students with access to affordable technology-based resources and activities to enhance language learning opportunities.

2.11.5 Pedagogical Barriers and Resistance to Change

The integration of CALL in higher education may be hindered by pedagogical barriers and resistance to change (Şahin et al., 2024). Teachers may have concerns over the effectiveness of technology in language learning or may lack understanding of how to integrate CALL into their teaching, resulting in reluctance to adopt CALL in the classroom (Şahin et al., 2024). Moreover, some teachers may be resistant to change and prefer traditional teaching methods over technology-based approaches, resulting in limited adoption of CALL in language learning (Chen & Wang, 2019). This resistance to change can be attributed to a variety of factors, including a lack of familiarity with technology, a lack of training and support, and a preference for traditional teaching methods (Chen & Wang, 2019). To overcome these barriers, it is essential to provide teachers with training and support to effectively integrate CALL into their teaching (Şahin et al., 2024).

Professional development programmes can provide teachers with the necessary knowledge and skills to implement technology-based approaches effectively. Additionally, providing teachers with opportunities to collaborate and share best practices can also promote the integration of CALL in language learning (Chen & Wang, 2019). Moreover, it is crucial to address teachers' concerns

over the effectiveness of technology in language learning (Şahin et al., 2024). This can be achieved through research and evaluation of technology-based approaches in language learning, providing evidence of the effectiveness of CALL for language learning outcomes. In view of this, pedagogical barriers and resistance to change can be significant barriers to the integration of CALL in higher education. Providing teachers with training and support, opportunities for collaboration and sharing of best practices, and addressing concerns over the effectiveness of technology can promote the effective integration of CALL in language learning.

2.11.6 Maintenance and upkeep of CALL resources

Maintaining and keeping up with CALL resources is a crucial factor in the successful implementation of CALL in higher education (Chen, Peng, & Tsai, 2019). CALL resources, including hardware and software, require regular maintenance and updates to remain functional and effective. However, schools and teachers may lack the necessary resources and expertise to maintain and update their CALL equipment and software, leading to issues with functionality and usability (Chen, Peng, & Tsai, 2019). Moreover, the lack of technical support and assistance can also be a significant issue. Teachers and learners may encounter technical issues with their CALL equipment and software, which they may not be able to resolve on their own. In such cases, technical support and assistance from IT professionals may be necessary, but schools and teachers may not have access to such resources (Sun & Chen, 2019).

To address these issues, it is crucial to provide educational institutions with sufficient resources and technical support to maintain and update their CALL equipment and software (Chen, Peng, & Tsai, 2019). This can be achieved through providing regular training and professional development opportunities to teachers to enhance their technical skills and knowledge. Additionally, schools

can establish partnerships with IT companies or organisations to provide technical support and assistance to teachers and learners (Sun & Chen, 2019). The maintenance and upkeep of CALL resources can be a significant challenge in higher education. It is essential to provide schools and teachers with sufficient resources and technical support to ensure the smooth functioning and usability of CALL equipment and software.

2.11.7 Integration with curriculum and assessment

The integration of CALL into language learning in higher education can be impeded by a lack of alignment with the curriculum and assessment practices (Fareh & Allahyar, 2021). Teachers may struggle to align CALL activities with the learning outcomes and assessment criteria of their courses, leading to difficulties in integrating technology effectively. This can result in CALL being used in isolation, without a clear connection to the wider curriculum and assessment practices. To effectively integrate CALL into language learning, teachers need to ensure that CALL activities are aligned with the learning outcomes and assessment criteria of their courses (Fareh & Allahyar, 2021). This requires a clear understanding of how CALL can support the achievement of learning outcomes and the assessment of learners' progress.

Furthermore, teachers need to develop assessment strategies that take into account the use of technology in language learning, including the assessment of digital literacy skills (Jin & Kim, 2018). In addition, it is essential to provide teachers with ongoing professional development opportunities to enhance their understanding of how to integrate CALL into their teaching and assessment practices (Fareh & Allahyar, 2021). This can include training in the use of digital tools and resources, as well as guidance on how to align CALL activities with the curriculum and assessment practices of their courses. The integration of CALL into language learning in higher

education can be impeded by a lack of alignment with the curriculum and assessment practices. To address this issue, teachers need to ensure that CALL activities are aligned with the learning outcomes and assessment criteria of their courses and to develop assessment strategies that take into account the use of technology in language learning.

2.11.8 Internet connectivity and bandwidth limitations

In the context of higher education, slow or unreliable internet connectivity can hinder the effective delivery of CALL, particularly in areas with limited infrastructure (Benson et al., 2013). This can result in learners being unable to access online resources or participate in online activities. Bandwidth limitations can also impact the quality of audio and video content, making it challenging for teachers to deliver high-quality, multimedia-rich CALL activities (Levy & Hubbard, 2005). Furthermore, the digital divide can exacerbate the issue of internet connectivity and bandwidth limitations in higher education. Students from lower socio-economic backgrounds may not have access to reliable internet connectivity or the necessary devices to participate fully in technology-mediated learning (Shelton et al., 2017). This can create inequalities in access to education, particularly in the context of remote or online learning.

To address the issue of internet connectivity and bandwidth limitations, higher education institutions need to invest in infrastructure and equipment to provide reliable and high-speed internet connectivity for all learners (Benson et al., 2013). In addition, teachers need to be aware of the limitations of the technology and adapt their CALL activities accordingly (Levy & Hubbard, 2005). This can include using lower-bandwidth media formats or providing alternative activities for learners who cannot access online resources. Slow or unreliable internet connectivity and bandwidth limitations can be significant barriers to the effective delivery of CALL in higher

education. To address these issues, institutions need to invest in infrastructure and equipment, and teachers need to be aware of the limitations of the technology and adapt their CALL activities accordingly.

2.11.9 Student motivation and engagement

In recent studies, student motivation and engagement have been identified as significant barriers to the effective implementation of CALL in higher education (Chen & Li, 2021; Jung & Lee, 2020). Learners may not see the relevance of using technology in language learning or may perceive traditional teaching methods as more effective. To address this issue, teachers can incorporate a variety of engaging CALL activities that cater to different learning styles and preferences (Jung & Lee, 2020). Moreover, teachers can provide clear explanations of the benefits of using CALL and how it can support their language learning goals (Chen & Li, 2021). Additionally, creating a positive learning environment that encourages learner autonomy and fosters collaborative learning can also increase student motivation and engagement with CALL resources (Jung & Lee, 2020).

Furthermore, the design and usability of CALL resources can also influence student motivation and engagement (Hubbard, 2019). Teachers should ensure that CALL resources are user-friendly, visually appealing, and interactive to increase learner engagement. Additionally, CALL resources should align with learners' needs and interests and provide opportunities for meaningful language practice (Chen & Li, 2021). Student motivation and engagement are critical factors to consider when implementing CALL in higher education. Teachers can address this barrier by incorporating a variety of engaging CALL activities, providing clear explanations of the benefits of using CALL,

creating a positive learning environment, and ensuring that CALL resources are designed to be user-friendly, visually appealing, and aligned with learners' needs and interests.

2.11.10 Issues with data privacy and security

In the context of higher education, data privacy and security are significant concerns regarding the use of technology in language learning (Barnard & Campbell, 2021; García-Peñalvo et al., 2020). Teachers and educational institutions must ensure that they comply with data privacy laws and regulations, particularly in the collection, storage, and processing of personal and sensitive data. Furthermore, learners' privacy must be protected when using online resources, including their browsing history and personal information (Chen & Li, 2021). Another concern is the risk of cyber-attacks and unauthorised access to educational systems and learner data (Kılıç, 2021). Teachers and educational institutions must implement robust security measures to protect learners' personal data and prevent breaches of confidentiality. This can include measures such as password protection, data encryption, and firewalls, as well as regular software updates and security audits (García-Peñalvo et al., 2020).

To address these concerns, teachers and educational institutions can provide clear information and guidance on data privacy and security to both learners and staff (Barnard & Campbell, 2021). They can also use secure and reputable online platforms and resources that comply with data privacy regulations and provide clear data protection policies (Kılıç, 2021). Additionally, they can implement training programmes and workshops to educate learners and staff on safe online practices and data protection measures (Chen & Li, 2021). Data privacy and security are significant concerns when using technology in language learning in higher education. Teachers and educational institutions must comply with data privacy regulations, protect learners' personal data,

and implement robust security measures to prevent cyber-attacks and unauthorized access. Providing clear information and guidance, using secure online platforms, and implementing training programmes can help address these concerns.

Research in the area of CALL has identified several factors that can impede its effective implementation in higher education. However, there is a need for further research in this area to address current gaps in knowledge and to better understand the challenges faced by educators and learners. One potential research gap is the lack of studies on the specific challenges and opportunities for implementing CALL in the context of Namibian higher education. While there have been some studies on the use of technology in education in Namibia (Shilunga, 2016; Karamata, 2019), there is a need for more research that focuses specifically on the implementation of CALL and the unique challenges and opportunities that exist in this context.

Additionally, while several studies have examined the impact of teacher training and support on the effective implementation of CALL (Warschauer & Matuchniak, 2010; Chen & Li, 2021), there is a need for more research on the most effective ways to provide training and support to teachers in the context of Namibian higher education. Furthermore, the impact of data privacy and security concerns on the effective implementation of CALL in the Namibian context also requires further investigation. While studies have identified these concerns as potential barriers to the use of online resources in language learning (Hubbard, 2019), more research is needed to understand how these concerns specifically affect the implementation of CALL in Namibian higher education. Addressing these research gaps can inform the development of effective strategies for implementing CALL in Namibian higher education and can contribute to the broader understanding of the factors that impede the effective delivery of CALL.

Moreover, factors directly related to language learning itself—particularly those emerging from the intersection of linguistics and artificial intelligence—require deeper exploration in CALL research. Although Natural Language Processing (NLP) has been briefly acknowledged in the literature, its specific applications in machine translation (MT) have not been fully examined in the Namibian context. Tools such as Google Translate, DeepL, and other AI-driven platforms have demonstrated global utility in breaking down language barriers and supporting individualised, multilingual learning (Albeih & Rice, 2025). These tools can play a significant role in Namibia, where students navigate between home languages and English, the medium of instruction. Equally important are issues of language localisation and contextualisation, which affect how AI systems adapt to lesser-resourced languages. Most NLP technologies are trained on dominant world languages, often marginalising African languages in both functionality and representation. As CALL is increasingly shaped by computational linguistics, these limitations highlight the need for models that incorporate context-sensitive localisation strategies, ensuring that language technologies are both relevant and equitable. Addressing these concerns positions CALL to help in bridging the pedagogical gap and act as a key player in the broader discourse on AI, language justice, and educational inclusion.

2.12 MITIGATION STRATEGIES AND THE DEVELOPMENT OF A CALL MODEL

CALL is an innovative approach to language teaching and learning that is gaining popularity across the globe. However, there is still a gap in research on its implementation and effectiveness, as well as the intervention strategies that can be used to support its delivery. This section of the literature review discusses the available literature on intervention strategies to support the delivery of CALL, focusing on its implementation in higher education contexts.

2.12.1 Teacher training and professional development as an intervention strategy

Teacher training and professional development programmes have been identified in the literature as essential intervention strategies to support the delivery of CALL (Chen & Wang, 2016; Cui & Liu, 2020; Warschauer, 1996). Teachers require training to be able to use CALL tools and software and integrate them effectively into their teaching methods (Chen & Wang, 2016; Cui & Liu, 2020). Teachers need to have a good understanding of how CALL works, the types of CALL tools available, and how to select the appropriate CALL tools for their specific teaching objectives (Hsu & Wang, 2016). In addition to training on the technical aspects of CALL, teachers also need to be aware of the benefits and limitations of CALL (Chen & Wang, 2016; Warschauer, 1996). They should be trained on how to evaluate the effectiveness of CALL and how to use data collected from CALL activities to improve their teaching practice (Cui & Liu, 2020).

Studies have shown that teachers who receive training on the use of CALL tools and software report higher levels of confidence in their ability to use CALL effectively in the classroom (Hsu & Wang, 2016). This increased confidence translates into more frequent use of CALL tools and software, which in turn leads to better student outcomes in language learning (Cui & Liu, 2020). Furthermore, professional development programmes that focus on CALL can also help to foster a culture of innovation and experimentation in language teaching. Teachers who are exposed to new and innovative teaching practices are more likely to adopt them in their own teaching, leading to a more dynamic and effective learning environment for students (Chen & Wang, 2016).

Teacher training and professional development programmes are critical intervention strategies to support the delivery of CALL. Teachers require training not only on the technical aspects of CALL but also on the benefits and limitations of using CALL in language teaching, how to evaluate its

effectiveness, and how to integrate CALL tools and software effectively into their teaching methods. Professional development programmes that focus on CALL can also foster a culture of innovation and experimentation in language teaching, leading to more dynamic and effective learning environments for students.

2.12.2 Learner training as an intervention strategy

Learner training has been identified as an important intervention strategy to support the delivery of CALL. According to Liaw and Huang (2013) learner training refers to the process of preparing students to use CALL tools and software effectively. This includes training students on how to use the software, how to manage their own learning using these tools, and how to evaluate their own progress. The literature suggests that learner training can lead to better learner engagement, motivation, and autonomy (Levy & Stockwell, 2006).

One approach to learner training is to incorporate it into the curriculum. This can be done by dedicating a portion of classroom time to training students on how to use CALL tools and software effectively. For example, Burston (2013) describes a case study in which learners in a Japanese university were provided with training in using Moodle, an open-source learning management system. The training was integrated into the curriculum, and students were provided with a set of tasks that they could complete using Moodle. The results of the study demonstrate that students who received training in using Moodle were more engaged in their learning and had a better understanding of the course material.

Another approach to learner training is to provide learners with access to training resources outside of the classroom. Liaw and Huang (2013) suggest that learners can be provided with online training modules that they can complete at their own pace. These modules can cover topics such as how to

use specific CALL tools and software, how to manage their own learning, and how to evaluate their progress. In addition to providing training on the technical aspects of CALL, it is also important to provide learners with training on the benefits and limitations of CALL. According to Chik et al. (2018) learners need to be aware of the potential benefits and limitations of CALL, as well as how to use it effectively to improve their language skills. For example, learners need to be aware that CALL tools and software can be useful for improving their listening and speaking skills but may not be as effective for developing their writing skills. The literature suggests that learner training can be an effective intervention strategy to support the delivery of CALL. Providing learners with training on how to use CALL tools and software effectively, as well as how to manage their own learning using these tools, learners can become more engaged, motivated, and autonomous in their language learning.

2.12.3 Technical support as an intervention strategy

Several studies in the literature have emphasised the importance of technical support as a key intervention strategy in the delivery of CALL. One of the primary benefits of technical support is its ability to alleviate the anxiety and frustration that learners and teachers may experience when using CALL tools and software. For example, Levy (1997) suggests that technical support can help to reduce anxiety and increase confidence among learners and teachers, thereby improving their overall learning experience.

In addition, technical support can help to ensure that the technology used in CALL is functioning correctly. Technical glitches and other issues can disrupt the learning process and negatively impact the learning outcomes. As noted by Beatty (2003) the successful implementation of CALL depends largely on the reliability of the technology used, and technical support can help to

minimise any issues that may arise during its use. Furthermore, technical support can troubleshoot any problems that may arise during the use of CALL tools and software. Al-Jarf and Al-Shehri (2012) argue that technical support is necessary in providing prompt assistance to learners and teachers who encounter difficulties during the learning process. This can help to ensure that the learning process is not disrupted and that learners can continue with their studies.

Technical support can be crucial in providing immediate assistance to learners and teachers who encounter problems with the use of CALL tools and software. In a study conducted by Rastogi and Rastogi (2014) technical support was found to be essential in providing immediate assistance to learners who encountered problems with the use of CALL tools and software, thereby minimising the impact on their learning outcomes. Technical support is an essential intervention strategy in the delivery of CALL. It can help to ensure that the technology used in CALL is functioning correctly, troubleshoot any problems that may arise during its use, and provide prompt assistance to learners and teachers who encounter difficulties. Therefore, institutions should provide adequate technical support to learners and teachers who use CALL tools and software to ensure the successful implementation of CALL.

2.12.4 Access to technology as an intervention strategy

Access to technology remains a crucial intervention strategy that can support the delivery of CALL. Recent studies continue to highlight the importance of access to technology in facilitating effective CALL implementation. For example, Gutiérrez-Colón, Martín-Blas, and Martínez-Arbelaiz (2021) found that access to technology was essential in facilitating the use of digital tools in language teaching. The study highlighted the significance of ensuring that both teachers and learners have access to appropriate hardware and software tools to enhance CALL effectiveness.

Furthermore, a study by Kabilan and Abdul Razak (2018) emphasised the importance of providing learners with access to mobile devices to support CALL implementation. The study found that the use of mobile devices significantly enhanced learners' motivation and engagement in language learning, especially among younger learners. The authors recommended that institutions should consider providing learners with mobile devices as part of their CALL programme. In addition, the provision of internet access is crucial for effective CALL implementation. A study by Zhu and Cao (2019) found that internet access played a significant role in enhancing learners' language proficiency through CALL. The study revealed that learners who had access to the internet exhibited better performance in language proficiency tests compared to those who did not have access to the internet. The access to technology is a crucial intervention strategy that can support the delivery of CALL. Ensuring that both teachers and learners have access to appropriate hardware and software tools, mobile devices, and internet access can significantly enhance the effectiveness of CALL implementation. Therefore, institutions should prioritise providing adequate access to technology as part of their CALL programme.

2.12.5 Curriculum design as an intervention strategy

Curriculum design is a crucial intervention strategy for effective delivery of CALL. CALL can be integrated into the curriculum in a way that aligns with the learning objectives, teaching methods, and the needs of learners and teachers. According to Warschauer and Healey (1998), integrating CALL into the curriculum can help to provide learners with opportunities to practice language skills and develop autonomy in their learning. CALL can also enable teachers to personalise learning, provide feedback, and evaluate learners' progress more effectively. Recent studies have highlighted the significance of curriculum design in supporting the delivery of CALL. Kessler and Bikowski (2020) argue that CALL should be integrated into the curriculum to enhance language

learning outcomes. Curriculum design should take into account the learning objectives, teaching methods, and the availability of technology to create an effective CALL programme.

Moreover, CALL integration into the curriculum should also take into account the needs of learners and teachers. As noted by Fauziati and Ahmadi (2019), curriculum design should consider the learning styles and preferences of learners, as well as the teaching experience and training of teachers. This can help to create a CALL programme that is tailored to the needs of learners and teachers, thereby increasing its effectiveness. In addition, curriculum design should also consider the use of authentic materials and tasks in CALL programmes. As highlighted by Warschauer and Healey (2017), CALL programmes that integrate authentic materials and tasks can help to increase learner motivation and engagement, as well as improve language learning outcomes.

The literature suggests that curriculum design for CALL should take into account the availability of technology and the needs of learners and teachers. Czaja and Blair (2005) suggest that the use of CALL should be based on the needs of learners and the requirements of the curriculum. Therefore, curriculum designers should consider how CALL can complement or supplement existing teaching methods and materials. Moreover, curriculum design should consider the different types of CALL tools and software available and their potential impact on learning outcomes. Sykes and Reinhardt (2013), submit that integrating CALL into the curriculum could lead to significant improvements in learners' language skills, provided that the CALL tools and software were well-designed and integrated effectively into the curriculum.

Furthermore, curriculum design for CALL should consider the potential benefits and limitations of CALL. As noted by Egbert et al. (2005), integrating CALL into the curriculum can be beneficial in terms of providing learners with opportunities to practice language skills, engage with authentic

materials, and develop autonomy in their learning. However, the effectiveness of CALL may be limited by factors such as access to technology, learner motivation, and technical difficulties. Effective curriculum design is an essential intervention strategy that can support the delivery of CALL. Curriculum design should take into account the availability of technology, the needs of learners and teachers, and the potential benefits and limitations of CALL. Integrating CALL into the curriculum effectively, teachers can provide learners with opportunities to practice language skills, engage with authentic materials, and develop autonomy in their learning.

The literature suggests that intervention strategies such as teacher training and professional development, learner training, technical support, access to technology, and curriculum design can support the delivery of CALL in higher education contexts. These intervention strategies can help to improve the effectiveness of CALL, reduce frustration and anxiety among learners and teachers, and increase their confidence in using this innovative approach to language teaching and learning. Future research should focus on the development and evaluation of these intervention strategies to support the delivery of CALL in higher education contexts.

2.13 RESEARCH GAPS

Education is one of the deciding factors for poverty alleviation and economic growth. ICTs have been identified as a potential enabler for an increased access and quality of education in Namibia. The Namibian Higher Education is a growing area that contribute to the development of the Nation. According to Johns (2018) CALL is still a developing area of study in the Namibian context of Higher Education setting. The study identified several research gaps as summarised below.

Studies have investigated the effectiveness of CALL programmes in improving language skills in different contexts, but there is a lack of research on the use of such programmes in the Namibian

context. Given the growing importance of English as a medium of instruction and communication in higher education in Namibia, it is important to examine the potential of CALL programmes in enhancing English language proficiency among university students in the country. Possible sources for this research gap could include studies on the effectiveness of CALL in other African contexts, such as South Africa or Kenya.

While there is some evidence that Namibian teachers and students are generally positive towards the use of technology in education, there is a need to investigate their attitudes towards CALL specifically. This research gap could explore the perceptions of both teachers and students towards the use of CALL in language learning, including their beliefs about its effectiveness, their level of comfort with using technology in the classroom, and any potential challenges or limitations they perceive with this approach. Possible sources for this research gap could include studies on the attitudes of university students and teachers towards CALL in other African contexts or in other disciplines.

Namibia is a culturally diverse country with multiple languages spoken, and this diversity could have implications for the use and effectiveness of CALL in language learning. For example, some students may prefer to learn in their mother tongue, while others may be more comfortable with English. Additionally, there may be differences in the availability and access to technology across different regions or socio-economic groups. Exploring the impact of socio-cultural factors on the use and effectiveness of CALL in Namibian higher education could help to identify potential barriers or opportunities for this approach. Possible sources for this research gap could include studies on the role of culture in language learning or the impact of socio-economic factors on access to technology in other African countries.

Teachers play a key role in implementing CALL programmes and supporting students in their use, but there may be challenges in terms of their skills and confidence with technology. This research gap could explore the role of teacher training and support in promoting the use of CALL in Namibian higher education, including the types of training and support that are most effective, and any barriers or challenges to providing this training. Possible sources for this research gap could include studies on the impact of teacher training on the use of technology in education in other African contexts or in other disciplines.

2.14 THEORETICAL FRAMEWORKS

This part of the study discusses the theoretical frameworks within which the current study is couched. The theories are the Technology Acceptance Model (TAM) (Davis, 1986), Diffusion of Innovation Theory (DOIT) (Rogers, 1962), Assessment Theory (Stiggins, 1991; Black & Wiliam, 1998; Shepard, 2000), and Social Learning Theory (Bandura, 1977) and they are discussed in detail below.

2.14.1 Technology Acceptance Model (TAM)

The Technology Acceptance Model (TAM) was first proposed by Fred Davis in 1986 as part of his PhD dissertation at the Sloan School of Management at the Massachusetts Institute of Technology (MIT). The original model was later refined and expanded by Davis and his colleagues in subsequent studies. Davis's original dissertation introduced the basic concepts of TAM, which posit that perceived usefulness and perceived ease of use are the two primary factors that determine a user's intention to adopt a new technology. In subsequent studies, Davis further developed and tested the model, demonstrating its predictive power for a wide range of technologies and user groups. Since its introduction, TAM has become one of the most widely cited and applied theories

in the field of information systems research, with numerous studies using the model to investigate user acceptance and adoption of various technologies, including CALL.

TAM is a widely used theory in the field of technology acceptance, and it has been applied to various domains, including education. The model is based on two key tenets: Perceived Usefulness (PU) and Perceived Ease of Use (PEOU) (Davis, 1989). PU refers to the degree to which a technology is perceived as being useful in accomplishing a particular task, while PEOU to the degree to which a technology is perceived as easy to use (Davis, 1989). TAM is a theoretical framework that has been developed to explain how users perceive and accept new technology.

The core of the TAM is the assumption that users' intention to use a technology is determined by their perception of two key factors: perceived usefulness and PEOU. PU refers to the extent to which a user believes that a technology will enhance their performance or productivity. The TAM posits that these two factors have a direct impact on users' attitude towards using a technology, which in turn affects their intention to use the technology. The model also suggests that external factors, such as social influence and facilitating conditions, can indirectly influence users' intention to use a technology by affecting their perception of usefulness and ease of use.

In the context of education and CALL in Africa, the TAM has been used to investigate factors that affect students' acceptance and use of technology. For example, a study conducted by Mutanga et al. (2017) used the TAM to examine the acceptance of e-learning in Namibia's tertiary institutions. The study found that PU and PEOU significantly influenced students' intention to use e-learning. Similarly, Ndlovu et al. (2018) used the TAM to investigate the acceptance of mobile learning for English language learning in Namibia. The study established that PU and PEOU significantly influenced students' intention to use mobile learning.

In addition to Namibia, the TAM has also been applied in other African countries. For example, a study conducted by Adeoye et. al, (2019) used the TAM to examine the factors that influence the use of e-learning among students in Nigeria. The study found that PU, PEOU, and attitude towards e-learning significantly influenced students' intention to use e-learning. Similarly, a study conducted by Adelokun and Akinbobola (2019) used the TAM to investigate the factors that affect the adoption of mobile learning among students in Nigeria. The study argues that PU, PEOU, and social influence significantly influenced students' intention to use mobile learning.

TAM has also been used to investigate the acceptance and use of technology in language learning contexts. For example, a study conducted by Al-Sharafi and Ayub (2014) used the TAM to investigate the acceptance of CALL among English language teachers in Yemen. The study established that PEOU, PU, and attitude towards using CALL were significant predictors of teachers' intention to use CALL. Similarly, a study conducted by Mohammadi et. al, (2017) used the TAM to investigate the acceptance of a language learning software programme among Iranian EFL learners. The study observes that PU and PEOU significantly influenced students' intention to use the software programme.

TAM has been applied to evaluate the attitudes and perceptions of students towards CALL in various contexts. A study conducted by Gao et. al, (2013) used TAM to investigate the factors that influence Chinese students' adoption of CALL for English language learning. The study submits that PU and PEOU significantly influenced students' attitudes towards CALL. Another study conducted by Al-Azawei et al. (2016) applied TAM to evaluate students' attitudes towards using mobile devices for language learning. The findings indicated that students' PU and PEOU significantly predicted their intention to use mobile devices for language learning.

TAM has proven to be a useful framework for understanding the acceptance and use of technology, including CALL, in various contexts. The model provides a theoretical basis for identifying and measuring factors that influence users' acceptance and use of technology and can help to inform the design and implementation of technology-based interventions. In the Namibian higher education context, TAM can be used to evaluate the attitudes and perceptions of students towards CALL. For example, researchers can use TAM to measure the PU and PEOU of CALL among Namibian students. Understanding the factors that influence students' attitudes towards CALL, educational stakeholders can design interventions and strategies that promote the adoption of CALL for language learning. TAM is a useful theory to evaluate the attitudes and perceptions of Namibian higher education students towards CALL. The model's key tenets, PU and PEOU, can be used to measure the degree to which students perceive CALL as useful and easy to use for language learning.

2.14.1.1 Application of the Technology Acceptance Model (TAM) in this study

- **Perceived Usefulness (PU):**

This refers to the degree to which a user believes that a particular technology will enhance their performance in a particular task. In the case of CALL, perceived usefulness would refer to the extent to which Namibian higher education students believe that CALL can enhance their language learning performance.

- **Perceived Ease of Use (PEOU):**

This refers to the degree to which a user believes that a particular technology is easy to use. In the case of CALL, perceived ease of use would refer to the extent to which Namibian

higher education students believe that CALL is user-friendly and easy to navigate for language learning purposes.

The TAM suggests that the more useful and easy to use a technology is perceived to be, the more likely it is that users will adopt and use it. In the context of CALL in Namibian higher education, the TAM can be used to evaluate the attitudes and perceptions of students towards CALL by measuring the perceived usefulness and ease of use of CALL for language learning.

Table 2.2 below summarises the key constructs of the Technology Acceptance Model (TAM) and their relevance to the Namibian context. It outlines how factors such as perceived usefulness, perceived ease of use, social influence, facilitating conditions, and user characteristics impact the adoption of CALL among language teachers and learners. The table links each construct to local conditions, showing that technology uptake in Namibian higher education depends on the benefits and usability of CALL tools and on institutional support, peer influence, and individual digital readiness.

Table 2.3: Summary of the Technology Acceptance Model (TAM)

Constructs	Definition	Application to study context
Perceived usefulness (PU)	The degree to which a person believes that a particular technology will enhance their performance or productivity, and that its use is beneficial to them (Davis, 1989).	Language teachers in Namibia may perceive CALL as useful if it enhances language learning through the use of interactive multimedia resources and online communication tools (Mungunda & Mughogho, 2019).
Perceived ease of use (PEOU)	The degree to which a person believes that a particular technology is effortless to use and learn, and that its use requires minimal mental and physical effort (Davis, 1989).	Language teachers and learners in Namibia may adopt CALL technology if it is perceived as easy to use and learn and does not require extensive technical skills or knowledge (Kamwanyah & Fourie, 2018).

Social influence	The extent to which individuals are influenced by peers, colleagues, and superiors in their attitudes and behaviors towards a particular technology (Venkatesh et al., 2003).	The attitudes and behaviors of colleagues and superiors can influence the adoption of CALL technology by language teachers in Namibia (Mungunda & Mughogho, 2019).
Facilitating conditions	The availability of resources, infrastructure, and technical support that facilitate the use of a particular technology (Venkatesh et al., 2003).	The availability of resources and technical support is important for the adoption of CALL technology by language teachers and learners in Namibia (Kamwanyah & Fourie, 2018).
User characteristics	Individual differences in personality traits, knowledge, skills, and experience that affect the adoption and use of a particular technology (Venkatesh et al., 2003).	The adoption and use of CALL technology in Namibia may be influenced by individual differences in technical skills, experience with technology, and teaching preferences (Nakazato, 2021).

The TAM posits that the perceived usefulness and perceived ease of use of a technology are the primary determinants of users' attitudes and intentions towards using the technology. External factors such as social influence, facilitating conditions, and user characteristics also influence users' attitudes and behaviours towards technology adoption and use. In considering these factors, researchers and practitioners can better understand and predict the acceptance and use of technology in various contexts, including education and CALL.

2.14.2 Diffusion of Innovation Theory (DOIT)

The Diffusion of Innovation Theory (DOIT) was originally proposed by Everett Rogers in 1962. The theory has been further developed and expanded upon by many other researchers, including Michael Morris, Geoffrey Moore, and Clayton Christensen. The DOIT is a well-established theory that explains how new ideas, products, or technologies are adopted and diffused through a social system (Rogers, 1962). In the context of CALL, DOIT has been applied to understand the factors

that influence the adoption and use of technology in language learning among Namibian higher education students and educators.

The DOIT posits that the adoption of a new technology, such as CALL, is influenced by five key tenets: relative advantage, compatibility, complexity, trialability, and observability. Relative advantage refers to the perceived superiority of the new technology over the existing ones. Compatibility refers to the degree to which the new technology is perceived as consistent with the values, norms, and practices of the adopters. Complexity refers to the degree to which the new technology is perceived as difficult to use and understand. Trialability refers to the ability of adopters to experiment with the new technology before making a full commitment. Observability refers to the degree to which the outcomes of using the new technology are visible and measurable to others.

In the context of CALL in Namibian higher education, the DOIT can be applied to evaluate the factors that impede the delivery of CALL, such as the perceived complexity of the technology, lack of compatibility with existing teaching methods, and limited opportunities for trialability. The theory can also be used to identify the integration challenges and opportunities of CALL into the Namibian higher education system by examining factors such as the compatibility of CALL with the existing social and cultural norms, the availability of communication channels to promote the adoption of CALL, and the observability of the outcomes of using CALL.

A study by Mouton and Schafer (2017) applied the DOIT to evaluate the adoption of e-learning at the University of Namibia. The study established that factors such as the perceived complexity of the technology and lack of compatibility with traditional teaching methods were significant barriers to the adoption of e-learning. Another study by Tjirimuje and Muganda (2019) used the

theory to evaluate the factors that influence the adoption of mobile learning in Namibian higher education. The study found that factors such as compatibility with existing teaching practices and the availability of communication channels were key factors in promoting the adoption of mobile learning.

Kamwangamalu and Mutelo (2019) explore the adoption and use of Moodle, an open-source learning management system, among Namibian language teachers. The study observes that DOIT was a useful framework for understanding the factors that influenced the adoption and use of Moodle among teachers, including relative advantage, compatibility, complexity, trialability, and observability. The study recommended that efforts be made to increase teachers' awareness of Moodle's potential benefits and ease of use to encourage greater adoption and use of the technology in language teaching.

Meanwhile, study by Nakanene and Namasasu (2016) investigate the adoption and use of digital resources for language learning among Namibian university students. The study used DOIT as a framework for analysing the factors that influenced the adoption and use of digital resources among students, including the characteristics of the innovation, the adopter, and the social system. The study argues that the most important factors that influenced students' adoption and use of digital resources were relative advantage, compatibility, and observability.

The application of DOIT in the Namibian context suggests that the theory can be a useful framework for understanding the adoption and use of technology in language learning among students and educators in higher education contexts. Considering the factors that influence adoption and use, such as relative advantage, compatibility, complexity, trialability, and observability, educators and policymakers can design effective strategies to promote the adoption

and use of technology in language teaching and learning. Therefore, the DOIT is a useful framework to evaluate the factors that impede the delivery of CALL and the integration challenges and opportunities of CALL into the Namibian higher education system.

2.14.2.1 Application of Diffusion of Innovation Theory in this study

The DOIT can be used to evaluate the factors that impede the delivery of CALL and the integration challenges and opportunities of CALL into the Namibian higher education system. The theory has five key tenets that can be applied to the study of CALL in Namibian higher education:

- **Relative advantage:** The degree to which CALL is perceived as better than traditional language learning methods. This can be evaluated by comparing the effectiveness of CALL to traditional methods in supporting language learning in Namibian higher education.
- **Compatibility:** The degree to which CALL is perceived as consistent with the values, needs, and experiences of potential adopters in the Namibian higher education system. This can be evaluated by examining how well CALL aligns with the goals and needs of language learners and instructors in Namibian higher education.
- **Complexity:** The degree to which CALL is perceived as difficult to understand and use. This can be evaluated by assessing the ease of use and user-friendliness of CALL in the Namibian higher education context.
- **Trialability:** The degree to which CALL can be experimented with on a limited basis. This can be evaluated by examining the availability and accessibility of CALL resources for language learning in Namibian higher education.

- **Observability:** The degree to which the results of using CALL for language learning are visible and communicated to others. This can be evaluated by assessing the visibility of CALL use and its impact on language learning outcomes in the Namibian higher education context.

Applying these tenets of the DOIT, the study can identify the specific factors that impede the delivery of CALL in Namibian higher education, such as the perceived complexity of using CALL and the lack of trialability opportunities. Additionally, the study can also identify the integration challenges and opportunities of CALL into the Namibian higher education system, such as the need for increased compatibility between CALL and the needs of language learners and instructors in Namibian higher education.

Table 2.3 presents the key tenets of the Diffusion of Innovation Theory (DOIT) and applies them to the Namibian higher education context. It explains how perceived advantages, teaching practices, and accessibility shape the adoption of CALL.

Table 2.4: Summary of the Diffusion of Innovation Theory (DOIT)

DOIT Key Tenet	Definition	Application to study context
Relative Advantage	Perceived superiority of the new technology over existing ones	CALL technology can enhance language learning through the use of interactive multimedia resources and online communication tools, providing students with authentic materials and cultural perspectives that are not available in traditional textbooks (Ndeyapo & Boakye, 2019).
Compatibility	Degree to which the new technology is consistent with the values, norms, and practices of the adopters	Language teachers in Namibia may have different teaching styles and preferences that influence their adoption of CALL. Teachers who value student-CENTRED and interactive learning may be more willing to adopt CALL

		technology that promotes these principles (Muyenga, 2015).
Complexity	Degree to which the new technology is perceived as difficult to use and understand	The adoption of CALL technology in Namibia requires appropriate training and support to address the complexity of the technology, which may be hindered by inadequate training and support, lack of technical infrastructure, and language barriers (Mavhunga & Fourie, 2018).
Trialability	Ability of adopters to experiment with the new technology before making a full commitment	The availability of affordable and accessible CALL technology in Namibia is important for increasing its trialability, as language teachers and learners may have limited access to technology and resources (Ndeyapo & Boakye, 2019).
Observability	Degree to which the outcomes of using the new technology are visible and measurable to others	Evaluation and dissemination of the outcomes of using CALL technology in Namibia can increase its observability and promote its adoption, with observable outcomes including improvements in language proficiency, learner engagement, and teacher performance (Mavhunga & Fourie, 2018).

2.14.3 Assessment Theory (AT)

Assessment Theory (AT) has been developed by a range of scholars in the field of education and assessment, including Stiggins (1991), Black and Wiliam (1998), and Shepard (2000). The theory emphasises the importance of aligning assessment with learning outcomes, using multiple forms of assessment, providing feedback to learners, and involving learners in the assessment process. AT is a critical component of educational practice in Namibia and Africa, where assessments are used to monitor and evaluate learners' progress and educational outcomes. A review of the theoretical literature reveals that AT in Namibia and Africa is influenced by a range of factors, including historical, cultural, and socio-economic factors, as well as the global trends in assessment.

Historically, assessment practices in Namibia and Africa have been influenced by colonial legacies, which have created educational systems that are often insensitive to local contexts and cultures. This has resulted in the widespread use of standardised tests, which are often criticised for being culturally biased and not reflective of local knowledge and practices (Chilisa, 2018). However, there have been efforts to decolonise assessment practices in Namibia and Africa by incorporating local knowledge and practices into assessment processes (Mukeredzi & Nleya, 2019).

Cultural factors also play a significant role in AT in Namibia and Africa. Many African cultures value communalism and cooperation, and as such, individualistic assessment practices, such as standardised testing, may not accurately reflect learners' abilities and knowledge (Moyo & Madesa, 2019). This has led to the development of alternative assessment practices that emphasise collaboration and group work, such as portfolio assessment and project-based learning.

Socio-economic factors, such as poverty and inequality, also influence AT in Namibia and Africa. Learners from disadvantaged backgrounds often face challenges that can affect their performance in assessments, such as lack of access to educational resources and support (Chimombo, 2016). This has led to the development of equity-focused assessment practices, such as differentiated instruction and formative assessment, which aim to support learners' individual needs and provide them with opportunities to succeed (Chilisa, 2018).

2.14.3.1 Application of the Assessment Theory to this study

AT is a crucial framework that can be applied to evaluate the effectiveness of CALL as an online assessment tool in Namibian higher education. The theory emphasises that assessment should be aligned with learning outcomes and objectives and should incorporate multiple forms of

assessment to measure student learning. The following tenets of the AT can be applied to evaluate the effectiveness of CALL as an online assessment tool in Namibian higher education:

- **Alignment with learning outcomes:** AT emphasises that assessment should be aligned with learning outcomes and objectives. In the context of CALL, this means that assessment activities should be designed to measure specific language learning outcomes, such as grammar, vocabulary, listening, and speaking skills.
- **Use of multiple forms of assessment:** AT suggests that multiple forms of assessment should be used to measure student learning. In the context of CALL, this can be achieved by designing various types of assessments, including formative and summative assessments. For example, formative assessments can be used to provide ongoing feedback and support to students, while summative assessments can be used to evaluate student learning at the end of a course or module.
- **Authenticity:** AT emphasises that assessments should be authentic and relevant to the real-world contexts in which students will use the language. In the context of CALL, this can be achieved by designing assessments that simulate real-world language use situations, such as role plays, simulations, and authentic texts.
- **Feedback and self-assessment:** AT suggests that feedback and self-assessment should be incorporated into the assessment process to support student learning. In the context of CALL, this can be achieved by providing immediate feedback to students on their performance and by encouraging students to reflect on their learning through self-assessment activities.

The AT can be applied to evaluate the effectiveness of CALL as an online assessment tool in Namibian higher education. Linking CALL assessments with learning outcomes, using multiple forms of assessment, incorporating authenticity, and providing feedback and self-assessment opportunities, CALL can support the assessment of language learning outcomes in Namibian higher education.

Table 2.4 outlines the core constructs of Assessment Theory (AT) and how they apply in the Namibia education context. It explains that good assessments should be valid, reliable, fair, clear, and based on real-life tasks. In the Namibian context, these ideas help make sure assessments match the goals of the curriculum, treat all students fairly, and prepare them for real situations. This supports better learning and fair outcomes for all students.

Table 2.5: Summary of the Assessment Theory (AT)

Constructs	Definitions	Application to study context
Validity	"Validity refers to the degree to which evidence and theory support the interpretations of test scores entailed by proposed uses of tests." (American Educational Research Association, American Psychological Association, & National Council on Measurement in Education, 2014, p. 11)	In Namibia, assessment validity ensures that assessments align with the national curriculum and educational objectives, providing an accurate representation of learners' knowledge and skills.
Reliability	"Reliability is the degree to which test scores are free from errors of measurement and, as such, are consistent over time and across raters." (American Educational Research Association, American Psychological Association, & National Council on Measurement in Education, 2014, p. 14)	Reliability in Namibia refers to the consistency of assessments over time, ensuring that learners' scores are not affected by external factors, such as test administration or scoring.
Authenticity	"Authenticity is the degree to which assessment tasks and contexts are faithful to the situations and problems encountered in real life or in the practice of a	In Namibia, assessments that reflect real-world tasks, such as practical skills, are essential to ensure that learners are prepared for the workforce

	discipline." (Pellegrino, Chudowsky, & Glaser, 2001, p. 301)	and can apply their knowledge to real-life situations.
Fairness	"Fairness refers to the degree to which the assessment instruments are unbiased and are administered under standardized conditions that afford all students an equal opportunity to demonstrate what they know and can do." (Popham, 2010, p. 4)	In Namibia, fairness ensures that assessments do not disadvantage any learners based on their background, language, or cultural differences, ensuring an equal opportunity for all learners to succeed.
Transparency	"Transparency refers to the degree to which the assessment process, results, and interpretations are open, accessible, and comprehensible to stakeholders." (American Educational Research Association, American Psychological Association, & National Council on Measurement in Education, 2014, p. 17)	In Namibia, transparency ensures that assessments are accessible to all stakeholders, providing clear and understandable information about learners' performance, supporting informed decision-making, and promoting accountability.

2.14.4 Social Learning Theory (SLT)

Social Learning Theory (SLT), developed by psychologist Albert Bandura in 1977, posits that learning occurs through observation, imitation, and feedback. The theory suggests that individuals can learn new behaviours by observing others and the consequences of their actions. In the context of CALL in Namibia's higher education, this theory can be used to evaluate intervention strategies to support the effective delivery of CALL.

SLT is a theoretical framework that emphasises the role of social interactions and observational learning in shaping behaviour and development. In Namibia and Africa, SLT has been applied in a variety of contexts, including education, health, and community development. A review of the theoretical literature reveals that SLT in Namibia and Africa is influenced by cultural, social, and economic factors, as well as the global trends in social learning.

Cultural factors play a significant role in SLT in Namibia and Africa. Many African cultures emphasise communalism and collectivism, and as such, social interactions and group learning are highly valued (Okeke-Uzodike & Chikoko, 2015). SLT is often used in educational settings to promote cooperative learning and peer tutoring, which are consistent with cultural values and practices (Mufune, 2019).

Social factors, such as poverty and inequality, also influence SLT in Namibia and Africa. In communities with limited resources and opportunities, social learning can be a means of empowerment and community development (Okeke-Uzodike & Chikoko, 2015). SLT has been applied in community development programmes to promote social cohesion, leadership, and entrepreneurship (Mufune, 2019). Economic factors also play a role in SLT in Namibia and Africa. The shift towards a knowledge-based economy has led to an increased emphasis on education and training, and SLT has been used to promote the acquisition of skills and knowledge (Okeke-Uzodike & Chikoko, 2015). SLT is often used in vocational and technical education to promote experiential learning and on-the-job training (Mufune, 2019).

Global trends in social learning have also influenced SLT in Namibia and Africa. The use of technology in social learning, such as online communities and social media, has become increasingly popular in Namibia and Africa, particularly in the context of distance education (Okeke-Uzodike & Chikoko, 2015). SLT has been used to design and evaluate online learning environments that promote collaboration, interaction, and engagement (Mufune, 2019). The use of technology in social learning is an emerging trend in Namibia and Africa, with SLT being used to design and evaluate online learning environments.

2.14.4.1 Application of the Social Learning Theory to this study

The tenets of the SLT and their application in the Namibian context of higher education intervention include:

- **Modelling:** Learning can occur through the observation and imitation of others. In the context of CALL, this suggests that educators can model effective use of CALL for language learning, which students can then imitate and apply in their own learning. For example, educators can model the use of online language resources or provide video demonstrations of how to use a particular language learning app.
- **Feedback:** Feedback is an essential component of learning. It allows students to understand how well they are performing and to make adjustments to improve their learning. In the context of CALL, feedback can be provided through technology-mediated channels such as automated feedback, online quizzes, or discussion forums. For example, students can receive automated feedback on their grammar and vocabulary use in language learning apps or participate in online discussions to receive peer feedback on their language skills.
- **Reinforcement:** Positive reinforcement can encourage learning and behavior change. In the context of CALL, this can include rewarding students for their use of technology or providing positive feedback on their progress in language learning. For example, educators can provide digital badges or certificates for students who complete certain language learning activities or demonstrate improvement in their language skills.
- **Self-efficacy:** SLT emphasises the importance of self-efficacy, or the belief in one's ability to perform a particular task. In the context of CALL, educators can promote

self-efficacy by providing students with opportunities to practice and apply their language skills using technology. For example, educators can design technology-mediated language learning activities that gradually increase in difficulty to build students' confidence and sense of competence.

- **Social Interaction:** Social interaction and collaboration can facilitate learning. In the context of CALL, this can include opportunities for students to work together on technology-mediated tasks or to engage in online discussions about language learning. For example, students can participate in online language exchange programmes or collaborate on digital storytelling projects to practice their language skills in a social context.

In summary, SLT can guide the development of intervention strategies to support the effective delivery of CALL in Namibian higher education. Focusing on modelling, feedback, reinforcement, self-efficacy, and social interaction, educators can promote effective use of technology for language learning and support student success.

Table 2.5 summarises the main tenets of the Social Learning Theory (SLT) and their relevance to the Namibian education context. It explains how observational learning, modelling, reinforcement, and self-efficacy contribute to positive learning behaviours. The table shows that these constructs support active engagement, peer learning, and the development of learner confidence.

Table 2.6: Summary of the Social Learning Theory (SLT)

Constructs	Definitions	Application to study context
Observational learning	The process of acquiring new knowledge, skills, and behaviours by observing others (Bandura, 1977).	In Namibia, observational learning can be used to promote cross-cultural communication and understanding, as students observe and learn from peers

		with different backgrounds and perspectives (Rothmann & Coetzee, 2013).
Modeling	The process of demonstrating a behaviour or skill that can be observed and imitated by others (Bandura, 1977).	In Namibia, modelling can be used to promote positive behaviors and attitudes towards learning, as students observe and learn from positive role models such as teachers and peers (Daire, 2014).
Reinforcement	The use of rewards or punishments to increase or decrease the likelihood of a behaviour or skill being demonstrated (Bandura, 1977).	In Namibia, reinforcement can be used to encourage students to engage in desired behaviours such as active participation and collaboration, through positive feedback and recognition (Kotzé & Jacobs, 2010).
Self-efficacy	The belief in one's ability to successfully perform a behaviour or skill (Bandura, 1977).	In Namibia, the development of self-efficacy can be fostered through supportive learning environments, where students are given opportunities to practice and succeed in their learning goals (Gibbons & Stacey, 2006).

2.15 THEORETICAL INTEGRATION AND ALIGNMENT WITH RESEARCH QUESTIONS

This study employs four complementary theoretical frameworks: the Technology Acceptance Model (TAM), the Diffusion of Innovation Theory (DOIT), Assessment Theory (AT), and Social Learning Theory (SLT). Together, these frameworks provide a robust conceptual foundation for investigating the implementation and effectiveness of Computer-Assisted Language Learning (CALL) in Namibian higher education. Each theory interacts with the others and contributes uniquely to the research objectives, providing understanding of different dimensions of CALL adoption, use, and impact.

Research Question 1 explored the attitudes and perceptions of Namibia's higher education students towards CALL. This question is addressed primarily through the Technology Acceptance Model

and Social Learning Theory. The Technology Acceptance Model explains how students' perceptions of the usefulness and ease of use of CALL influence their intention to adopt the technology. These internal perceptions are shaped by external factors such as prior experience with technology and available support. Social Learning Theory complements this perspective by explaining how learners' behaviours and attitudes are influenced through observation, modelling, feedback, and interaction. In CALL environments, peer influence and instructor modelling are crucial in encouraging student engagement with technology. These two theories together provide a framework for understanding both the cognitive and social dimensions of student attitudes toward CALL.

Research Question 2 investigated the factors and characteristics identified by users of CALL that best support their language learning. This question is addressed by Assessment Theory and Social Learning Theory. Assessment Theory provides a foundation for evaluating whether CALL tools are aligned with learning outcomes, support varied forms of assessment, and promote authenticity and feedback. Social Learning Theory reinforces the importance of self-efficacy, collaborative learning, and the role of feedback in promoting language development. CALL tools that incorporate real-world tasks, peer interaction, and opportunities for self-assessment reflect the principles of these two theories and support effective language learning.

Research Question 3 examined the factors that impede the delivery of CALL. This is addressed through the Diffusion of Innovation Theory and the Technology Acceptance Model. The Diffusion of Innovation Theory focuses on systemic and contextual factors, such as the perceived complexity of CALL, its compatibility with existing teaching methods, and the observability of outcomes. The

Technology Acceptance Model complements this by examining user-specific barriers, particularly related to the perceived difficulty or limited perceived benefit of CALL. Together, these theories explain both institutional and individual challenges to successful CALL delivery.

Research Question 4 aimed to identify mitigation strategies leading to the development of a framework to support CALL in higher education. All four theoretical frameworks converge in addressing this question. The Technology Acceptance Model highlights the importance of enhancing the perceived usefulness and ease of use of CALL tools. The Diffusion of Innovation Theory introduces strategies for increasing trialability and observability and ensuring compatibility with users' needs. Assessment Theory ensures that any framework developed is pedagogically sound, valid, reliable, and fair. Social Learning Theory guides the creation of a supportive learning environment through modelling, feedback, and collaborative engagement. Together, these frameworks support the development of a locally relevant and pedagogically informed CALL model suited to the Namibian higher education context.

The interdependence of these theories arises from their complementary focus areas. While the Technology Acceptance Model and the Diffusion of Innovation Theory are primarily concerned with technology adoption and user attitudes, Assessment Theory and Social Learning Theory focus on the learning processes and outcomes that CALL aims to enhance. For example, perceived ease of use, as described in the Technology Acceptance Model, may be reinforced by effective modelling and feedback as outlined in Social Learning Theory. Similarly, the fairness and authenticity of CALL assessments discussed in Assessment Theory support the broader compatibility and observability aspects presented in the Diffusion of Innovation Theory.

The theoretical gap addressed by this study exists in the limited integration of these four theoretical perspectives in existing research. Most previous studies have applied them in isolation, thereby failing to capture the multifaceted nature of CALL implementation in multilingual and under-resourced higher education contexts such as Namibia. This study addresses that gap by synthesising the Technology Acceptance Model, the Diffusion of Innovation Theory, Assessment Theory, and Social Learning Theory to inform the development of a comprehensive and context-sensitive CALL framework.

2.16 SUMMARY

This literature review provided an evaluation of the current state of research on CALL in the context of higher education. The review has explored the attitudes and perceptions of students towards CALL, evaluated its effectiveness in promoting language acquisition, identified factors that impede its delivery, and assessed its potential as an online assessment tool. The review has also discussed opportunities for integrating CALL into the higher education system and identified intervention strategies to support its delivery. The discussions in this review suggest that CALL has the potential to enhance language learning outcomes by providing learners with opportunities to practice listening, speaking, reading, and writing skills in an interactive, learner-CENTRED, and engaging environment. However, the review also highlights the challenges of integrating CALL into the higher education system, including technical issues, lack of training and support for educators, and resistance to change.

The theoretical frameworks applied to this study, which are the Technology Acceptance Model (TAM), Diffusion of Innovation Theory, Assessment Theory, and Social Learning Theory, provide a solid foundation for understanding the factors that influence the adoption and implementation of

CALL in the context of higher education. In short, this literature review provides a comprehensive understanding of the potential of CALL in supporting language learning in higher education. It identified gaps in the literature and areas for future research, including the need for more research on the effectiveness of CALL in the Namibian context of higher education. The review also highlights the importance of providing training and support for educators to effectively integrate CALL into their teaching practices and the need for more intervention strategies to support its delivery. This review has important implications for educators, policymakers, and researchers interested in promoting language learning outcomes in higher education. Understanding the potential of CALL, its challenges and opportunities for integration, and its effectiveness as an online assessment tool, can assist in developing effective and sustainable interventions that enhance language learning outcomes in higher education. The next chapter discusses the research methodology that was applied to the study.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 INTRODUCTION

This chapter discusses the research methodology employed to investigate the integration and effectiveness of Computer-Assisted Language Learning (CALL) in Namibian higher education institutions. The study sought to explore six key objectives, including examining the attitudes and perceptions of students and lecturers towards CALL, evaluating the effectiveness of CALL in supporting language acquisition, identifying the barriers that hinder CALL delivery, exploring integration challenges, and ultimately proposing a contextual CALL framework for Namibian universities.

The purpose of this chapter is to provide a detailed explanation of the research design, methodology, and procedures undertaken to generate valid, reliable, and trustworthy findings. It begins by describing the research design and philosophical paradigm that underpinned the study, followed by a presentation of the study setting, population, and sampling strategies used. The chapter then elaborates on the research instruments and data collection procedures, including the piloting process, and details the processes used to analyse both quantitative and qualitative data. Particular attention is given to the measures implemented to ensure the validity and reliability of the quantitative data and the trustworthiness of the qualitative findings. Furthermore, ethical considerations relevant to the study are addressed, alongside the methodological limitations encountered.

The convergent parallel mixed-methods approach adopted in this study was selected to ensure methodological triangulation and enhance the depth and breadth of the findings. This approach

allowed the researcher to explore the topic holistically by combining numerical trends with contextual narratives from participants. The mixed-methods strategy is particularly suitable for CALL-related research, where both measurable outcomes (student proficiency) and subjective experiences (motivation, access, perceptions) must be considered (Creswell & Plano Clark, 2018). Thus, this chapter provides a comprehensive blueprint for how data was systematically gathered, analyzed, and interpreted to address the research objectives and answer the central research questions.

3.2 RESEARCH DESIGN

This study adopted a convergent parallel mixed-methods research design, where quantitative and qualitative data were collected concurrently, analysed separately, and later merged for interpretation (Creswell, 2014). The design combined both quantitative and qualitative approaches to comprehensively explore the effectiveness, perceptions, barriers, and proposed interventions related to Computer-Assisted Language Learning (CALL) in Namibian higher education. The choice of a mixed-methods design was motivated by the need to gain both breadth and depth of understanding regarding the implementation and integration of CALL tools in language education at the University of Namibia (UNAM) and the Namibia University of Science and Technology (NUST).

According to Creswell and Plano Clark (2018), mixed-methods research is appropriate when a single method is insufficient to fully address the complexity of a research problem. In this study, quantitative data offered measurable findings on CALL usage, user confidence, and perceived effectiveness, while qualitative data provided rich, contextualised descriptions of lived experiences, challenges, and expectations among students and lecturers. Through integrating both

forms of data, the study ensured methodological triangulation, which enhanced the validity and credibility of the results.

3.2.1 Quantitative Design

The quantitative component of the study aimed to collect numerical and generalisable data on students' and lecturers' use of CALL tools, their perceived usefulness, levels of access, and impact on language skill development. This was achieved through the administration of structured questionnaires, which included closed-ended questions measured on Likert scales. The questionnaires were distributed to both students and lecturers to ensure consistency and comparability across groups.

Quantitative data provided measurable findings into CALL-related variables such as confidence in digital language learning, frequency of tool usage, familiarity with Learning Management Systems (LMS), and the perceived impact of CALL on specific language skills (reading, writing, listening, speaking). These findings were essential in identifying patterns and establishing correlations, which informed the development of the CALL framework. The quantitative data were analysed using descriptive and inferential statistics to determine central tendencies, variation, and relationships between key variables.

3.2.2 Qualitative Design

In parallel, the qualitative component of the study was designed to provide perspectives into participants' personal experiences with CALL. This was accomplished through a semi-structured questionnaire with lecturers and open-ended questions embedded within the student surveys. The qualitative strand explored themes such as instructional challenges, perceptions of CALL integration, institutional support, and recommendations for enhancing CALL in higher education.

Qualitative data added context to the numerical findings by capturing the complexity of individual and institutional engagement with CALL. It enabled the researcher to interpret participants' experiences, and why they held certain views or encountered specific barriers. Responses were analysed thematically using coding techniques to identify recurring themes, anomalies and meanings that complemented the quantitative trends.

3.2.3 Convergent Parallel Mixed-Methods Design

The study employed a convergent parallel mixed-methods design (Creswell & Plano Clark, 2018), where both quantitative and qualitative data were collected concurrently, analysed separately, and then merged during the interpretation phase. This design was suited to examining the perceptions of students and lecturers while ensuring that both numerical trends and narrative evidence were equally represented in the findings. The rationale for using this model stemmed from the complexity of the research problem, which required methodological triangulation to enhance the credibility and validity of the results. Using data from both strands, the study was able to present a comprehensive view of CALL implementation, capturing outcomes, the contexts, challenges, and enablers that shape those outcomes.

3.2.4 Research Design Flow Chart

Figure 3.1 illustrates the research design process adopted in this study, which follows a convergent parallel mixed-methods approach. It visually represents the concurrent and independent collection of both quantitative and qualitative data. On one side of the diagram, the quantitative strand involves the design and administration of structured questionnaires to students and lecturers, with subsequent statistical analysis using descriptive methods. On the opposite side, the qualitative strand includes semi-structured questionnaire and open-ended responses, which are thematically

analysed to capture students' and lecturers' perspectives. Both sets of data are then merged during the interpretation phase, where the researcher integrates findings to identify patterns, triangulate results, and generate comprehensive conclusions. This unified process supports the development of the CALL logical framework and model that inform the study's recommendations and outcomes.

Convergent Parallel Mixed Methods Design (Creswell & Plano Clark, 2015, p. 392)

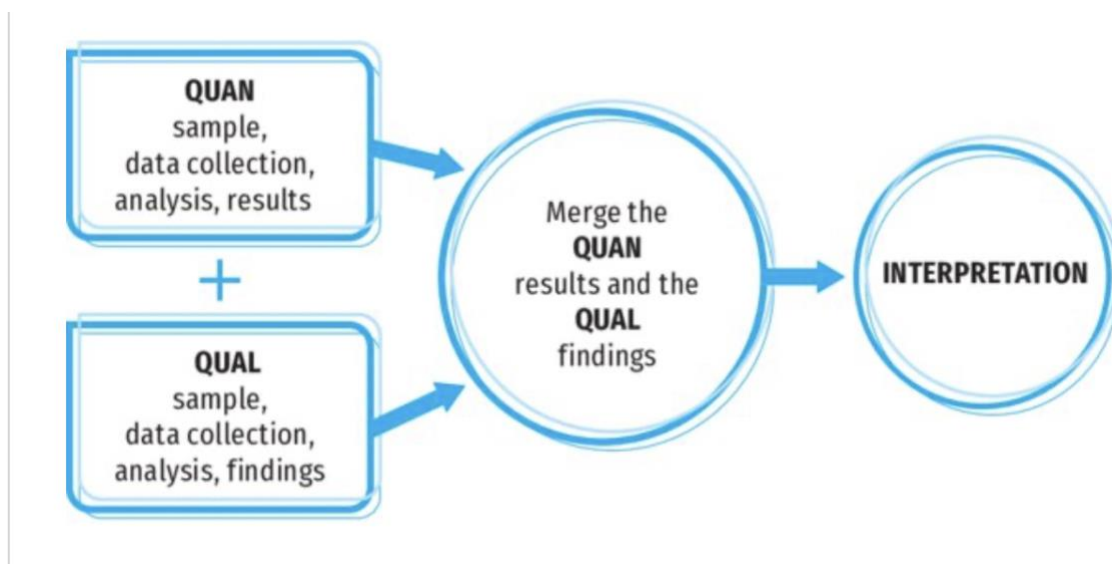


Figure 3.1: Research Design Flow Chart

3.3 RESEARCH PARADIGM

This study was guided by the pragmatic research paradigm, which supports the use of mixed methods to understand complex educational phenomena such as the integration of Computer-Assisted Language Learning (CALL) in higher education. Pragmatism, as a philosophical worldview, focuses on the research problem and uses all available approaches to understand it (Creswell & Creswell, 2018). It enables researchers to move beyond the rigid distinctions between

positivism and interpretivism, offering the flexibility to combine quantitative and qualitative data in ways that are best suited to address specific research questions.

The pragmatic paradigm was selected because it aligns with the study's overarching aim to examine the attitudes, effectiveness, barriers, and strategies related to CALL usage among students and lecturers in Namibia's higher education context. Pragmatism allowed the researcher to employ a mixed methods data collection for depth and context. This dual focus provided a fuller understanding of how CALL is implemented and perceived in real-world educational settings.

Pragmatists believe that knowledge is gained through both objective measures and subjective interpretations, which is highly relevant for CALL research. In the Namibian context, CALL implementation is influenced not only by measurable factors such as access to devices or frequency of use but also by subjective experiences such as motivation, cultural attitudes, and institutional support. Therefore, adopting a pragmatic paradigm enabled the researcher to explore both the technical and human aspects of CALL delivery, thus supporting a comprehensive analysis of the research problem.

This philosophical position also acknowledges that no single method is sufficient to capture all facets of a phenomenon. Instead, the emphasis is placed on what works in practice to solve real educational challenges. This is consistent with the study's applied nature and its ultimate goal of informing policy, instructional practices, and the development of a contextually relevant CALL framework for Namibian higher education institutions.

3.4 AXIOLOGY AND RESEARCHER POSITIONALITY

Axiology in research refers to the study of values and the role they play in the research process, particularly in shaping what is considered worthwhile or important to investigate (Saunders, Lewis, & Thornhill, 2019). In this study, axiology is reflected in the emphasis on inclusive, equitable, and context-sensitive approaches to language learning through CALL. The research values learners' diverse linguistic backgrounds and seeks to promote language equity and access to quality education in Namibia through technological innovation. This value informed the formulation of research questions, the selection of participants, and the interpretation of findings, ensuring that the research responds to the educational goals of fairness, inclusion, and empowerment.

Researcher positionality refers to the researcher's stance in relation to the research context, participants, and knowledge construction (Holmes, 2020). The principal investigator occupies a dual positionality as both an academic and a practitioner within the Namibian higher education system. This insider status provided privileged access to institutional contexts and participant groups, enabling engagement with the lived realities of students and lecturers navigating CALL environments. Such a position also necessitates ongoing reflexivity to recognise how personal experiences and professional roles may influence interpretation and engagement with the data.

However, the researcher remained critically aware of the potential biases and influences that such familiarity could impose. Strategies such as methodological triangulation, member checking, and reflective journaling were employed to enhance the credibility and confirmability of the findings (Creswell & Plano Clark, 2018). The mixed-methods convergent parallel design was purposefully

chosen to allow for both objective measurement and subjective interpretation, reflecting a balanced epistemological stance.

Therefore, transparently acknowledging these positional biases, the study upholds the ethical and philosophical integrity of the research process, ensuring that the voices of participants are authentically represented and the findings are responsibly situated within their social and cultural context.

3.5 STUDY SETTING

The study was conducted at two major public higher education institutions in Namibia: The University of Namibia (UNAM) and the Namibia University of Science and Technology (NUST). These institutions were purposively selected due to their significant roles in shaping the country's tertiary education landscape and their progressive efforts in integrating digital tools into teaching and learning. Both universities offer English language-related programmes, making them suitable settings for investigating the implementation and perception of Computer-Assisted Language Learning (CALL).

The University of Namibia (UNAM) Main Campus, situated in Windhoek, is the country's largest university with a diverse student body. It provides a wide range of academic programmes, including a strong focus on English and linguistics through its Faculty of Education and Faculty of Humanities and Social Sciences. As the largest higher education institution in Namibia, UNAM's involvement in the study offers understanding of the CALL implementation within a large, public university setting with varied levels of access to technology and digital literacy.

Geographically, the UNAM Main Campus is located at 22.5609° S, 17.0658° E, providing central access for students and lecturers from across the country. This location represents both urban and semi-urban learner experiences and showcases how CALL is adopted in relatively resource-concentrated settings within Namibia.

The Namibia University of Science and Technology (NUST) Main Campus, also located in Windhoek, focuses more heavily on applied sciences, including information technology, communication, and engineering. NUST has integrated various forms of educational technology into its pedagogy and is actively involved in promoting e-learning, digital literacy, and the use of Learning Management Systems (LMS). Its academic departments also include English and communication modules, which are critical for the integration of CALL. NUST's location is 22.5598° S, 17.0833° E, within the central Windhoek education corridor.

The inclusion of both UNAM and NUST allowed for a broader exploration of the research questions across different institutional cultures, technological capacities, and student populations. The two campuses differ slightly in focus, size, and technological orientation, which provided comparative experiences into how CALL is adopted, perceived, and supported across varied higher education environments in Namibia.

The selection of these two institutions enabled the study to obtain a rich, contextual understanding of the current state and potential of CALL in Namibian higher education, reflecting both the strengths and the constraints that institutions and learners encounter in implementing such technologies.

3.6 POPULATION AND SAMPLING

This section details the target population and the sampling methods used to select participants for both the quantitative and qualitative components of the study. The selection strategies were guided by the research questions, the convergent parallel mixed-methods design, and the need to ensure data credibility and relevance in addressing the effectiveness of Computer-Assisted Language Learning (CALL) in Namibian higher education.

3.6.1 Target Population

The target population for this study comprised two primary groups drawn from two public higher education institutions in Namibia: The University of Namibia (UNAM) and the Namibia University of Science and Technology (NUST).

1. Second-year undergraduate students enrolled in English, English and Linguistics, or Communication Studies programmes at UNAM and NUST.
2. English language lecturers at both institutions, specifically those teaching English-related modules and demonstrating familiarity with digital or computer-assisted instructional tools.

According to institutional data, the combined population of second-year students enrolled in relevant language-related programmes across the two institutions in the academic year 2023 was approximately 448 students: 344 from UNAM and 104 from NUST. This group was purposively chosen as they had acquired sufficient exposure to both traditional and digital instructional approaches, including CALL-related resources. Their engagement at this academic stage represents a balanced viewpoint between introductory and more advanced interactions with CALL

platforms, making them suitable for assessing both the perceived effectiveness and practical use of CALL in language education.

The lecturer population included those from the English, Linguistics, and Communication Studies departments. These individuals were selected based on their active involvement in teaching and their experience with digital learning environments. The total number of lecturers meeting the inclusion criteria was approximately 30, with 18 from UNAM and 12 from NUST. Their contributions were critical in understanding the institutional conditions, pedagogical strategies, and infrastructural readiness that influence the integration of CALL into higher education teaching practice.

3.6.2 Sampling Methods

In line with the convergent parallel mixed-methods design and to address both breadth and depth of understanding, this study employed two sampling techniques:

- Stratified random sampling for the student participants (quantitative strand)
- Purposive sampling for the lecturer participants (qualitative strand)

Stratified Random Sampling (Students)

Stratified random sampling was used to ensure that student participants were proportionally and representatively drawn from both UNAM and NUST. The total student population across both universities was first divided into two strata based on institutional affiliation. Within each stratum, participants were randomly selected using class lists to ensure impartiality and reduce selection bias.

A sample size of 207 students was drawn from a population of approximately 448 second-year students (344 from UNAM and 104 from NUST). The selection ensured that institutional diversity, gender balance, and academic programmes were fairly represented. The response rate was high, with 177 fully completed questionnaires, yielding a response rate of 85.5%, which supports the reliability and generalisability of the findings.

Stratified sampling was crucial in this study to compare institutional perspectives and assess how contextual differences between UNAM and NUST influenced CALL adoption and student experiences.

Purposive Sampling (Lecturers)

Purposive sampling was employed for selecting English language lecturers due to the need for expert, experience-rich cases that could provide in-depth qualitative knowledge on the implementation and perceptions of CALL.

A total of 30 lecturers were invited to participate in the questionnaire survey, with 28 ultimately taking part (18 from UNAM and 12 from NUST). These lecturers were selected based on specific inclusion criteria:

- Current or recent involvement in teaching English or communication courses,
- Demonstrated use or familiarity with CALL tools or platforms,
- Willingness to participate in in-depth qualitative inquiry.

This approach allowed the study to deliberately include individuals most knowledgeable about the phenomenon under investigation, ensuring data relevance and depth.

Saturation in Qualitative Data

In qualitative research, data saturation is used to determine when enough data has been collected to fully explore the research problem (Guest, Bunce, & Johnson, 2006). In this study, saturation was achieved after approximately 26 completed questionnaires (13 per institution), as no new themes were emerging beyond that point. However, data collection continued until the agreed 28 responses were completed to honour participant engagement and strengthen data robustness.

Purposive sampling with saturation allowed the study to achieve depth and nuance, supporting rich thematic analysis while maintaining methodological integrity.

3.7 RESEARCH INSTRUMENTS

This section outlines the instruments used for data collection in both the quantitative and qualitative strands of the study. Given the study's convergent parallel mixed-methods approach, a questionnaire was employed for the student survey, while a similar questionnaire was used for lecturers. These tools were designed and validated to gather reliable and relevant data to address the research objectives.

3.7.1 Questionnaire for Students

The student questionnaire was designed to capture students' perceptions, attitudes, and experiences related to the use of Computer-Assisted Language Learning (CALL) in their academic environments. The structure of the questionnaire consisted of closed-ended questions measured on a 5-point Likert scale ranging from *Strongly Agree* to *Strongly Disagree*, as well as *True/False* and frequency-based items.

The questionnaire addressed the following thematic areas:

- Knowledge and understanding of CALL.
- Frequency and types of CALL tools used.
- Attitudes towards CALL.
- Perceived benefits and limitations of CALL.
- Confidence and competence in using CALL for language learning.
- Barriers to accessing or using CALL.
- Recommendations for improvement.

Instrument Design and Validation

The questionnaire items were adapted and developed from established instruments used in similar CALL studies (Egbert, Paulus & Nakamichi, 2002; Stockwell, 2012), ensuring theoretical grounding and content validity. Expert validation was conducted by three specialists in educational technology and language education who reviewed the instrument for clarity, relevance, and alignment with the study objectives. Revisions were made based on their feedback to improve item wording, structure, and sequence.

The instrument was pilot tested with a small group of students ($n = 10$) prior to full-scale data collection. The feedback from the pilot allowed for refinement in phrasing and response options to ensure better comprehension and improved response reliability. Reliability of the final instrument was confirmed using Cronbach's alpha, which yielded a value above 0.80, indicating acceptable internal consistency.

3.7.2 Questionnaire for Lecturers

A semi-structured questionnaire was developed for lecturers to explore their views, experiences, and instructional practices regarding CALL. The semi structured questionnaire was essential for

capturing information on the pedagogical rationale, challenges, and recommendations from the perspective of language teaching professionals.

The questionnaire included open-ended questions grouped under the following themes:

- Understanding of CALL and its role in language education.
- Instructional design and integration of CALL tools.
- Effectiveness of CALL in enhancing student engagement and outcomes.
- Barriers to successful implementation of CALL.
- Strategies for improving CALL delivery and integration.
- Perspectives on institutional support and training needs.
- Suggestions for a framework to support CALL in the Namibian context.

The semi-structured format allowed for flexibility, enabling participants to elaborate on their experiences while ensuring consistency in data collection across interviews.

3.7.3 Theoretical Grounding of Instruments

Both instruments were grounded in the theoretical frameworks guiding the study; Technology Acceptance Model (TAM) and Social Learning Theory (SLT). The student questionnaire incorporated items that reflected TAM constructs such as perceived usefulness, ease of use, and attitudes towards technology, while questions for lecturers were designed to explore how SLT principles such as collaborative learning, observation, and peer engagement were integrated into CALL instruction.

This theoretical anchoring ensured that the instruments were not only empirically sound but also capable of linking findings to broader pedagogical and technological discourses in CALL literature.

3.8 PILOT STUDY

A pilot study was conducted to test the clarity, reliability, and feasibility of the research instruments before full-scale data collection commenced. The pilot was crucial in ensuring that the instruments were appropriately structured, contextually relevant, and comprehensible to the target respondents, students and lecturers from Namibian higher education institutions.

3.8.1 Purpose of the Pilot Study

The main objectives of the pilot were to:

- Assess the clarity and wording of questionnaire items.
- Evaluate the reliability and internal consistency of the questionnaire scale.
- Test the technical functionality of the data collection tools (Survey Monkey, Tableau).
- Estimate the time required to complete the questionnaires.
- Identify potential barriers to data collection, such as ambiguous items, skipped questions, or technical issues.

This process helped refine both instruments and data collection protocols, improving the quality and efficiency of the research process.

3.8.2 Pilot Participants

The pilot was conducted with a small, purposively selected sample:

- 10 second-year students (5 from UNAM and 5 from NUST).
- 3 language lecturers, one from each institution and one external expert.

These participants were excluded from the main study to avoid duplication or bias. They were briefed on the purpose of the pilot and gave informed consent.

3.8.3 Procedures and Feedback

The student questionnaire was administered electronically via Survey Monkey to simulate the actual data collection conditions. Participants were encouraged to provide open feedback on:

- Question phrasing,
- Navigation and flow of the survey,
- Any technical challenges encountered.

Key findings from the pilot included:

- Some questions in the student questionnaire were perceived as ambiguous or repetitive, which were then reworded or merged.
- Technical issues related to mobile display formatting in the online form were resolved by optimising the survey layout.
- The average time to complete the student questionnaire was reduced from 25 minutes to 15 minutes after revision.

3.8.4 Revisions and Finalisation

Based on the feedback:

- Ambiguous questions were revised for clarity.

- Overlapping items were eliminated to reduce response fatigue.
- The Likert scale labels were revised to include more neutral and balanced language.
- Questions were adjusted to allow better coverage of the research objectives while maintaining open-endedness.

The final versions of the instruments, validated by expert review and pilot testing, were then adopted for the main study. This pre-testing phase enhanced the credibility, reliability, and usability of the tools and contributed significantly to the methodological rigour of the study.

3.9 DATA COLLECTION PROCEDURES

This section outlines the procedures followed during the data collection phase, ensuring alignment with the research design, ethical protocols, and institutional guidelines. Data was collected from both students and lecturers across two Namibian public higher education institutions: the University of Namibia (UNAM) and the Namibia University of Science and Technology (NUST).

3.9.1 Preparation for Data Collection

Before commencing data collection, ethical clearance was obtained from the relevant research ethics committees at both UNAM and NUST. Permission letters were submitted to departmental heads to gain access to lecturers and students within the English and Linguistics departments. Consent forms and participant information sheets were prepared and distributed, ensuring that all participants were fully informed of their rights and the purpose of the study.

All research instruments were finalised following the pilot study and expert review.

3.9.2 Student Data Collection

The student questionnaire link was distributed via institutional student email lists, WhatsApp class groups, and in collaboration with course lecturers. Participation was voluntary and anonymous. Clear instructions were provided, and assistance was available for students who required technical support.

Data was collected over a four-week period, and weekly reminders were sent to increase participation. Students were given a window of 15–20 minutes to complete the survey, and their responses were automatically compiled using Survey Monkey and Tableau data analysis tools and then collected into a protected Excel database.

3.9.3 Lecturer Data Collection

A structured questionnaire was developed and administered to academic staff at the University of Namibia (UNAM) and the Namibia University of Science and Technology (NUST) to facilitate the collection of both qualitative and quantitative data. The questionnaire was designed to include both closed-ended questions for statistical analysis and open-ended items to capture more nuanced perspectives and experiences regarding the implementation and integration of Computer-Assisted Language Learning (CALL) in higher education language instruction.

The questionnaire was distributed digitally through official faculty and departmental communication channels, including institutional email lists managed by the Faculties of Education and Humanities at both UNAM and NUST. This method ensured that the questionnaire reached a targeted group of potential participants who met the inclusion criteria. Eligible participants were lecturers currently involved in language teaching, with at least basic familiarity with CALL tools or instructional methods. Initial contact included an invitation letter outlining the purpose of the

study, ethical considerations (including anonymity and confidentiality), and instructions for completing the questionnaire. Follow-up reminders were issued to encourage participation and maximise the response rate.

3.9.4 Use of Digital Tools (SurveyMonkey and Tableau)

In this study, data collection was conducted using SurveyMonkey, an online survey platform that facilitated the design and distribution of structured questionnaires to participants from the University of Namibia and Namibia University of Science and Technology. SurveyMonkey enabled efficient digital distribution of the questionnaires, ensuring anonymity, accessibility, and automated response recording. Once the data were collected, they were exported and analysed using Tableau, a powerful data visualisation tool that allowed for the transformation of raw data into dynamic infographics and interactive dashboards. Tableau's capabilities were instrumental in generating visual patterns, identifying trends, and presenting the findings in a clear and compelling format suitable for both academic and policy audiences.

- SurveyMonkey: <https://www.surveymonkey.com>
- Tableau: <https://www.tableau.com>

3.10 MAPPING OF RESEARCH QUESTIONS TO INSTRUMENT ITEMS

This section presents the alignment between the research questions, corresponding questionnaire items, and the thematic sections in the findings chapters. This process enhanced the content validity of the instruments by demonstrating that all core areas of inquiry were appropriately represented. The mapping also illustrates how both the students' and lecturers' responses were utilised to address each research objective, as further elaborated in the analysis chapters. The tables

below present the alignment between research questions, relevant sections in the findings chapters, and specific questionnaire items that informed the analysis.

Table 3.1: Instrument Mapping Table for Research Question 1

What are the attitudes and perceptions of Namibia’s Higher Education students towards CALL?

Section in Chapter 4	Instrument Question	Objective Link
4.4.1 Students’ Views on Effectiveness of CALL	Q5: How do you perceive the use of computers as effective tools for language learning?	To assess students’ attitudes toward the effectiveness of CALL
4.4.2 Students’ Knowledge of the Definition of CALL	Q6: CALL definition – True/False	To measure understanding of what CALL entails
4.4.3 Students’ Self-Evaluation of Computer Skills	Q7: How would you rate your computer proficiency?	To evaluate students’ confidence and competence in using technology for CALL
4.4.4 Frequency of CALL Tool Use	Q8: How frequently do you use language learning and interaction tools in your studies?	To determine actual student engagement with CALL tools
4.4.5 Competence in Digital Text Management	Q9: How competent are you in managing and creating digital texts?	To assess technical skills related to CALL
4.4.6 Confidence in Using CALL	Q10: How confident do you feel about using CALL for language learning?	To measure willingness and readiness to use CALL
4.4.7 Perceived Benefits of CALL	Q11: What benefits do you perceive CALL brings to language learning?	To explore the perceived value of CALL in enhancing language learning
4.4.8 Importance of CALL Integration	Q21: How would you rate the importance of integrating CALL into the Namibian higher education system?	To understand the perceived relevance of CALL in institutional contexts
4.4.9 Overall Attitude toward CALL Adoption	Q18: Do you think that computers are effective tools that can be used to teach language?	To capture students’ general beliefs about CALL’s role in language education
4.4.10 Perceived Benefits in Depth	Q19: What are the benefits of using CALL for language learning? (Multiple benefits listed)	To identify specific advantages students associate with CALL
4.4.11 Intention to Use CALL	Q22: What factors influence your intention to use CALL for language learning?	To examine motivational and contextual influences on CALL adoption

4.4.12 Influence of External Factors	Q24: How do external factors, like social influence and perceived ability to use technology, affect your decision to use CALL?	To explore how social and technological influences shape CALL perceptions
--------------------------------------	---	---

Table 3.2: Instrument Mapping Table for Research Question 2

What are the factors influencing the adoption and implementation of CALL among higher education students and lecturers in Namibia?

Section in Chapter 5	Instrument Question	Objective Link
5.2.1 Perceived Usefulness of CALL	Q5 (Students): How do you perceive the use of computers as effective tools for language learning?	To assess belief in CALL's usefulness as a key adoption factor
5.2.2 General Acceptance of CALL Tools	Q18 (Students): Do you think that computers are effective tools that can be used to teach language?	To gauge overall acceptance of CALL as a legitimate instructional method
5.2.3 Benefits Perceived by Students	Q11, Q19 (Students): What benefits do you perceive CALL brings to language learning? / Multiple benefits listed	To identify motivating factors and perceived advantages that influence CALL use
5.2.4 Institutional Integration Relevance	Q21 (Students): How would you rate the importance of integrating CALL into the Namibian higher education system?	To determine institutional alignment and support for CALL implementation
5.2.5 Factors Affecting Intention to Use	Q22 (Students): What factors influence your intention to use CALL for language learning?	To explore individual and contextual factors influencing CALL adoption
5.2.6 Access to Devices and Internet	Q23 (Students): How would you describe your access to resources such as computers?	To assess availability of essential tools required for effective CALL implementation
5.2.7 Role of Social Influence and Perception	Q24 (Students): How do external factors, like social influence and perceived ability to use technology, affect your decision to use CALL?	To investigate how external and social elements influence CALL adoption decisions
5.2.8 Lecturer Training and Institutional Support	Q13 (Lecturers): How much do you agree: "There is adequate support from the institution to deliver CALL in language teaching"?	To evaluate perceived institutional readiness and infrastructure for CALL
5.2.9 Socio-Economic Factors	Q15 (Both): To what extent do you think the socio-economic background of students affects their access to and utilisation of CALL tools?	To assess socio-economic barriers that influence CALL implementation

5.2.10 Attitudes Towards CALL in Higher Education	Q16 (Lecturers): How would you rate the importance of integrating CALL into the Namibian higher education system?	To identify institutional value placed on CALL by educators
5.2.11 Personal and External Influencers	Q17, Q18 (Lecturers): What factors influence your intention to use CALL? / How do external factors affect your decision to use CALL?	To explore lecturer-specific adoption drivers

Table 3.3: Instrument Mapping Table for Research Question 3

What are the barriers to the delivery of CALL in Namibian higher education institutions?

Section in Chapter 6	Instrument Question	Objective Link
6.2 Socio-Economic Barriers (Student View)	Q20 (Students): To what extent do you think the socio-economic background of students affects their access to and utilisation of CALL tools?	To assess economic disparities that hinder CALL access and engagement
6.2.1 Access to Devices and Technology	Q23 (Students): How would you describe your access to resources such as computers?	To understand physical access barriers to devices essential for CALL participation
6.2.2 Inconsistent or Costly Internet Access	Q20, Q23 (Students)	To examine internet-related barriers stemming from economic conditions
6.2.3 Lack of Dedicated Study Environments	Q20 (Students)	To understand environmental constraints (home or study spaces) related to CALL use
6.2.4 Dependence on External Support	Q23 (Students)	To explore reliance on others for access to CALL tools
6.2.5 Financial Constraints and Resource Allocation	Q20 (Students)	To investigate affordability barriers affecting CALL access
6.3 Suggestions for Improving Integration	Q30, Q31 (Students): How do you think CALL can be better integrated? / What support is necessary from your institution?	To identify proposed institutional actions to mitigate barriers
6.4 Socio-Economic Impact (Lecturer View)	Q15 (Lecturers): To what extent do you think the socio-economic background of students affects their access to CALL?	To validate economic barriers from an educator's perspective

6.5.1 Lack of Technology and Infrastructure	Q25 (Lecturers): In your opinion, what are the factors that impede the delivery of CALL in language teaching?	To identify system-level hardware and infrastructure issues
6.5.2 Technical Issues	Q25 (Lecturers)	To highlight frequent disruptions due to system failures and compatibility problems
6.5.3 Training and Confidence Gaps	Q26 (Lecturers): What type of support do you think is necessary for the successful implementation of CALL strategies?	To identify training needs and confidence levels impeding implementation
6.5.4 Curriculum Alignment	Q25 (Lecturers)	To evaluate whether CALL tools align well with course outcomes and teaching strategies
6.5.5 Student Engagement and Differentiation	Q25, Q21 (Lecturers): What are the factors that impede delivery? / Have you noticed differences in engagement with CALL vs. traditional methods?	To assess how CALL is received across varied student abilities and contexts

Table 3.4: Instrument Mapping Table for Research Question 4

What mitigation strategies and framework can enhance the integration of CALL in Namibian higher education institutions?

Section in Chapter 7	Instrument Question	Objective Link
7.2.1 Perceived Benefits for Improved Integration	Q30 (Students): How do you think CALL can be better integrated into the curriculum at your institution?	To gather student-generated strategies for CALL integration
	Q28 (Students): Can you describe any positive experiences you have had while using CALL in your higher education studies?	To identify existing strengths as a foundation for improvement
7.2.2 Institutional Support and Access to Resources	Q31 (Students): What support do you think is necessary from your institution to facilitate the effective use of CALL?	To examine institutional roles and responsibilities in enabling CALL
	Q23 (Students): How would you describe your access to resources such as computers?	To link support needs to resource access gaps
7.2.3 Increased Access to Technology	Q30, Q31 (Students)	To highlight hardware, connectivity, and infrastructure

		gaps that institutions need to address
7.2.4 Training and Individualised Guidance	Q31 (Students)	To establish the need for user orientation and technical training
	Q19 (Students): What are the benefits of using CALL for language learning?	To align training with perceived value and outcomes
7.2.5 Collaborative Learning and Support	Q27 (Students): Share your thoughts on the role of CALL in promoting collaborative language learning experiences	To propose peer-supported or group-based strategies
7.3.1–7.3.7 Collaborative Practice & Engagement	Q27, Q28 (Students)	To identify student engagement benefits that inform the model
	Q8 (Students): How frequently do you use language learning and interaction tools in your studies?	To connect engagement levels to effectiveness of collaborative approaches
7.3.8 Enhanced Engagement (Lecturer View)	Q21 (Lecturers): Have you noticed any differences in student engagement and learning outcomes when using CALL?	To validate student perspectives and guide design of engaging CALL components
	Q24 (Lecturers): Can you describe any positive experiences you have had while using CALL to deliver lessons?	To identify best practices and lessons learned from successful implementations
7.3.9 Immediate Feedback and Progress Tracking	Q21 (Lecturers)	To include feedback mechanisms in the proposed model
	Q11 (Students): What benefits do you perceive CALL brings to language learning?	To justify design elements with student motivation and achievement data
7.3.10 Flexibility and Accessibility	Q31 (Students)	To recommend adaptable solutions accessible beyond traditional settings
	Q18 (Lecturers): How do external factors like social influence and perceived ability to use technology affect CALL adoption?	To inform framework adaptability to individual and social conditions
Proposed CALL Model (UCALM)	Synthesised from all above	To provide a holistic and evidence-based model that responds to identified needs and promotes sustainable CALL use

3.11 ETHICAL PROCEDURES DURING DATA COLLECTION

Ethical considerations are foundational to educational research and serve to protect the rights, dignity, and well-being of participants (Creswell & Creswell, 2018). In alignment with internationally recognised ethical standards, such as the Belmont Report (National Commission, 1979), and guidelines provided by educational research bodies (BERA, 2018), this study adhered to key ethical principles that ensured respect, confidentiality, and fairness throughout the data collection process.

In this study on the implementation and barriers of Computer-Assisted Language Learning (CALL) in Namibian higher education, ethical practices were central to the design and execution of the research instruments. Below is an explanation of how these principles were applied.

3.11.1 UNAM and NUST Ethical Approval Process

The standard ethical clearance application procedures were followed at UNAM. At the research proposal stage, the candidate submitted the proposal to the appointed supervisor for review. The candidate was then invited to present the proposal before a faculty-level panel. Questions and deliberations were made, and the candidate responded to these questions with explanations, which included explaining chapters one, two, and three. The candidate then incorporated the suggested comments and returned the proposal to the supervisor, who was tasked with escalating the proposal to a departmental committee. After the successful defense, the supervisor returned to the candidate with an approval verdict from that committee. For this particular study, the verdict was delivered as follows: "The Research Proposal was Approved," and a resolution number SHSD-SHDB/22/07/64 was granted. At this point, the candidate was required to go to the UNAM research website (<https://research.unam.edu.na/research-excellence/>) to apply for an ethical clearance

certificate, where the DEC would review the application before approval. The candidate was required to submit the research proposal, an executive summary of no more than three pages for a Ph.D. study, research instruments, and an Academic Curriculum Vitae (CV). After the review process, the Departmental Ethics Committee (DEC) either approved or requested the candidate to revise and resubmit, in the case of this study, an approval was granted.

Ethical permission was also obtained from NUST to study both students and lecturers following the presentation of ethical approval letters from UNAM. The researcher first sought approval from the Registrar to conduct research with students, submitting a formal written request that outlined the study's objectives, methodology, and the involvement of student participants. Simultaneously, permission was requested from the Human Resources department to engage lecturers in the research. After both the Registrar and Human Resources granted permission, formal ethical approval letters were issued and presented to each relevant department. These approvals ensured that the study complied with UNAM and NUST ethical guidelines, and the research was allowed to proceed with students and lecturers only after all necessary permissions were in place.

3.11.2 Informed Consent

Informed consent is a cornerstone of ethical research, requiring that participants are fully informed about the nature, purpose, risks, and benefits of the study before participation (Babbie, 2021). In this study, all participants were presented with a clear description of the study objectives and procedures.

Students' informed consent was integrated into the online questionnaire introduction, which clarified that completing and submitting the form signified voluntary participation. No personal identifiers were collected to preserve anonymity.

Lecturers' questionnaires were distributed through official faculty and departmental communication channels at the University of Namibia (UNAM) and the Namibia University of Science and Technology (NUST). The message included a detailed information sheet and a consent section, ensuring that participation was based on an understanding of the study's aims.

3.11.3 Voluntary Participation

Voluntary participants ensures that individuals participate without coercion or undue influence (Resnik, 2018). All participants were informed that their involvement was entirely optional, and that they could withdraw at any point without explanation or penalty. This was clearly stated in both the questionnaire and accompanying communication. No incentives were offered, avoiding any pressure or inducement to participate.

3.11.4 Privacy and Confidentiality

Protecting the confidentiality of participants is essential, particularly in research involving human subjects (Flick, 2018). In this study, no identifying data (such as names or student numbers) were collected from students. Open-ended responses were coded and analysed anonymously.

Lecturer responses, although collected through institutional channels, were anonymised during analysis. Data were presented in aggregated or coded form, ensuring that no individual could be identified from the findings.

3.11.5 Anonymity and Data Anonymisation

Anonymity helps maintain participant trust and encourages honest responses (Wiles et al., 2008). In the case of students, complete anonymity was achieved through online, non-traceable questionnaire responses. For lecturers, any potentially identifying information in qualitative

responses (department names or specific teaching contexts) was removed during transcription and analysis.

3.11.6 Secure Data Handling

In accordance with data protection principles outlined in General Data Protection Regulation (GDPR) and institutional research policies, all data were securely stored on a password-protected drive accessible only to the researcher. Backup files were encrypted and stored on a secure cloud service. These practices ensured compliance with ethical standards for data security (Saunders, Lewis, & Thornhill, 2019).

3.11.7 Transparency and Communication

Clear, transparent communication was maintained with participants throughout the study. For lecturers, initial contact via faculty email provided detailed information on the study purpose, expectations, and contact details of the researcher. Follow-up communication was offered for any questions or clarifications. This approach is recommended in participatory research settings to foster trust and clarity (Israel & Hay, 2006).

3.11.8 Language and Cultural Sensitivity

All materials, including the questionnaires, were administered in English, the official language of instruction at both institutions. This ensured that all participants could comfortably engage with the content. Consideration was also given to cultural sensitivity, particularly in the phrasing of questions relating to socio-economic background and access to resources.

3.12 DATA ANALYSIS

This section describes the procedures and techniques employed to analyse the data collected through both quantitative and qualitative approaches. The use of a mixed-methods framework required parallel data analysis techniques that allowed for both statistical examination and thematic exploration of the research findings.

3.12.1 Quantitative Data Analysis

Quantitative data, primarily gathered from student questionnaires, was analysed using descriptive statistics. After exporting the Survey Monkey responses into Tableau and Microsoft Excel.

The analysis included:

- **Descriptive statistics:** To calculate frequencies, percentages, means, standard deviations, and mode scores across all items related to students' attitudes, perceptions, familiarity with CALL tools, and ratings of language skills.

The quantitative data was also used to generate graphs and tables that visually represented trends in student responses across key variables, allowing for more intuitive interpretation.

3.12.2 Qualitative Data Analysis

Qualitative data derived from the semi-structured with lecturers were analysed using thematic analysis, guided by Braun and Clarke's (2006) six-step framework:

1. Familiarisation with the data through transcription and repeated reading.
2. Initial coding by identifying segments of text that related to key themes.
3. Searching for themes through grouping codes into potential categories.

4. Reviewing themes for coherence and consistency across the dataset.
5. Defining and naming themes to capture their essence and relation to the research questions.
6. Producing the final report by organising themes around the study's objectives.

The coding was conducted manually using Microsoft Word and Excel, while color-coding and comments were used to track emerging themes and sub-themes. The process was iterative, with multiple readings and validations to ensure consistency and depth in the analysis.

3.12.3 Integration of Quantitative and Qualitative Findings

This section presents an integrated synthesis of the study's quantitative and qualitative findings, consistent with the principles of a convergent parallel mixed-methods design. Its purpose is to provide a holistic understanding of the perceptions, contextual challenges, and pedagogical dynamics that shape the use of Computer-Assisted Language Learning (CALL) in Namibian higher education.

While preceding sections reported quantitative data results from students and qualitative themes from lecturers separately, the following joint display table consolidates both data strands to illustrate points of convergence and divergence across the four research questions.

This joint display enhances the validity and reliability of the study by facilitating triangulation, allowing for cross-validation of patterns and generating better understanding into CALL's practical implementation and instructional relevance.

Table 3.5: Framework for Joint Display of Convergent Analysis

Research Question	Quantitative Survey Findings (Students)	Qualitative Themes (Lecturers)	Interpretation / Convergence
RQ1: What are the attitudes and perceptions of Namibia's Higher Education students towards CALL?	81% of students reported positive attitudes toward CALL; 73% believed CALL improved their English proficiency; 78% preferred blended formats	Lecturers observed enhanced student motivation, greater engagement, and curiosity toward technology, among students	High convergence. Both datasets reflect a shared belief in the value of CALL. Slight divergence exists regarding equitable access across all settings.
RQ2: What are the factors and characteristics identified by users of CALL that best support their language learning?	Students valued multimedia content (videos, audio), mobile compatibility, interactive quizzes, self-paced learning, and instant feedback mechanisms	Lecturers highlighted learner autonomy, adaptive platforms, scaffolded instruction, and the value of continuous formative assessment	Strong convergence. Both groups emphasised the importance of interactive, learner-CENTRED features in enhancing language proficiency and engagement.
RQ3: What are the factors that impede the delivery of CALL?	66% cited unreliable internet; 59% lacked personal devices; 61% mentioned high data costs	Lecturers reported gaps in institutional ICT policies, insufficient training, poor infrastructure, and socio-economic inequality in access	Clear convergence. Both groups identified systemic, infrastructural, and affordability barriers. Lecturers added emphasis on policy-level and institutional support shortcomings.
RQ4: What are the mitigation strategies leading to the development of a framework to support CALL delivery?	74% endorsed hybrid learning models; mobile-optimised content was preferred; students requested flexible access to learning tools	Lecturers advocated for professional development, increased bandwidth, curriculum integration, and localised content design	Strong convergence. Consensus exists around the need for blended learning, responsive policy, and better resourcing. Students favored mobile solutions; lecturers stressed strategic institutional investment.

Table 3.6: Summary of the Quantitative and Qualitative Convergent Mixed Methods Design

Component	Quantitative Strand	Qualitative Strand
Purpose	To measure trends, attitudes, proficiency, and access levels numerically.	To explore personal experiences, perceptions, and contextual factors in depth.
Data Collection Instruments	Structured survey questionnaire (e.g., Likert scales, closed-ended questions).	Semi-structured open-ended questionnaire.
Sample	Large number of students and lecturers selected through stratified random sampling.	Smaller, purposively selected group of participants from both UNAM and NUST.
Data Type	Numeric data (frequencies, percentages, mean scores).	Textual data (quotes, themes, narratives).
Analysis Techniques	Descriptive statistics (e.g., Tableau analysis).	Thematic analysis or coding using NVivo or manual methods.
Timing	Collected simultaneously with qualitative data.	Collected simultaneously with quantitative data.
Integration Point	At interpretation phase, results from both strands are merged and interpreted.	At interpretation phase, results from both strands are merged and interpreted.
Outcome	Generates generalisable findings across the population.	Provides depth and context to explain quantitative results.
Value Added	Shows the scope and distribution of CALL and AI adoption.	Explains why and how students and lecturers experience CALL in specific ways.
Example Focus Areas	Access to devices, attitudes towards CALL, frequency of tool use, proficiency levels.	Perceived challenges, teaching strategies, learner autonomy, support structures.

Table 3.6 above presents a comparison between the quantitative and qualitative strands of the study. The quantitative strand focused on measuring trends, attitudes, proficiency, and access levels numerically through structured survey questionnaires, targeting the stratified random sample of students and lecturers. In contrast, the qualitative strand evaluated personal experiences, perceptions, and contextual factors using a open ended questions with a smaller, purposively selected participant group from both UNAM and NUST. While the quantitative data were numeric and analysed using descriptive statistics, the qualitative data were textual and examined through thematic analysis and coding. Both strands were collected simultaneously and integrated at the

interpretation phase providing complementary analysis. The quantitative component offered generalisable findings about CALL and AI adoption, whereas the qualitative component provided context and depth, explaining why and how students and lecturers experienced CALL in specific ways.

3.13 VALIDITY AND RELIABILITY

Ensuring validity and reliability is critical in quantitative research to guarantee that the findings accurately reflect the concepts under investigation and are consistent across measurements.

Validity refers to the extent to which the instrument measures what it intends to measure (Creswell & Creswell, 2018). To enhance content validity, the questionnaire items were developed based on an extensive literature review on CALL, language learning, and digital education tools in higher education. The initial draft of the questionnaire was reviewed by three experts in educational technology and language instruction from the University of Namibia and the Namibia University of Science and Technology. Their feedback informed revisions to ensure clarity, relevance, and alignment with research objectives.

Construct validity was supported by designing each questionnaire item to correspond with a specific construct related to CALL (perceived usefulness, confidence in using CALL tools, frequency of CALL use). Items were grouped according to thematic relevance, and internal consistency was measured using Cronbach's alpha. Values exceeding 0.7 indicated acceptable reliability levels for each scale (Tavakol & Dennick, 2011).

Reliability, defined as the consistency and stability of the instrument over time, was addressed through a pilot study (Section 3.6) conducted with 15 students. The feedback confirmed that the

items yielded consistent and interpretable responses. Furthermore, Likert-type scales were used consistently across the survey to minimise measurement error.

3.14 TRUSTWORTHINESS

In qualitative research, trustworthiness is achieved through credibility, transferability, dependability, and confirmability (Lincoln & Guba, 1985). These criteria were applied to ensure rigor in analysing and interpreting the data.

- Credibility was established through prolonged engagement with the data, member checking, and triangulation. This process ensured that their responses were accurately captured and interpreted.
- Transferability refers to the applicability of findings to other contexts. Rich, thick descriptions of the study setting, participants, and procedures allow readers to determine whether the findings are transferable to similar educational environments.
- Dependability was enhanced by documenting the research process thoroughly, including how data were collected, analysed, and interpreted. A detailed audit trail was kept, coding decisions and thematic development stages.
- Confirmability was achieved by minimising researcher bias through reflective journaling and peer debriefing.

Together, these strategies ensured that the qualitative component of the study upheld the highest standards of methodological integrity and supported meaningful interpretation of lecturers' experiences with CALL.

3.15 LIMITATIONS OF THE METHODOLOGY

While the study was carefully designed to ensure methodological accuracy, some limitations are acknowledged. Although a convergent parallel mixed-methods design provided a comprehensive understanding of CALL in Namibian higher education, the integration of data may have been influenced by the timing and sequencing of data collection. Quantitative and qualitative data were collected sequentially, which may have led to subtle shifts in focus between phases.

Self-reported data from both students and lecturers may be subject to social desirability bias, especially in responses related to computer competence and CALL usage. To minimise this, anonymity was assured, and neutral language was used in all survey instruments.

The study was conducted in two institutions, which may limit the generalisability of the findings across all Namibian universities or other educational settings. However, the inclusion of both a traditional and a technical university enhances the representativeness of the sample for the public higher education sector.

Language barriers may have affected the richness of qualitative responses, particularly among students for whom English is a second or third language. Although efforts were made to explain the questions clearly, some nuances may have been lost in translation or misinterpreted. Despite these limitations, the methodological framework adopted ensured the collection of reliable, valid, and meaningful data to answer the research questions and meet the study's objectives.

3.16 SUMMARY

This chapter provided a comprehensive account of the methodological approach adopted to explore the integration, barriers, and pedagogical potential of Computer-Assisted Language

Learning (CALL) in Namibian higher education. The chapter began by revisiting the research questions and justifying the adoption of a convergent parallel mixed-methods design, grounded in the pragmatic paradigm. This paradigm enabled the study to balance quantitative data (student perceptions, access patterns, and CALL engagement levels) with qualitative perspectives (lecturers' and students' narratives, challenges, and suggested improvements), thus achieving a fuller understanding of the CALL environment in Namibia.

The study context was defined by two major institutions: the University of Namibia (UNAM) and the Namibia University of Science and Technology (NUST). The target population included both undergraduate language students and lecturers involved in language instruction. Sampling strategies were explained in detail, with stratified random sampling applied to select students based on demographic characteristics and academic background, and purposive sampling used to recruit lecturers based on their experience with CALL and language teaching.

The chapter discussed research instruments; namely structured questionnaires for both students and lecturers, consisting of closed and open-ended items designed to collect both measurable data and explanatory responses. The instruments underwent piloting and refinement to improve clarity and relevance. A structured mapping of the questionnaire items to the research objectives was conducted to ensure consistency and content validity, supporting both the reliability and depth of data collection. The data collection procedures were outlined, including the modes of questionnaire administration through departmental communication channels and digital platforms. Ethical practices were rigorously followed at each step, including informed consent, voluntary participation, anonymity, and data security in line with institutional and international research ethics standards.

The chapter further explained the data analysis techniques, which included descriptive statistical analysis for quantitative data and thematic coding for qualitative data. Consideration was given to validity, reliability, and trustworthiness, with methodological transparency and consistency applied throughout the research process. The chapter acknowledged potential limitations, such as access constraints, non-responses, and contextual variability, while ensuring that measures were in place to mitigate their impact.

The next chapter presents the findings related to the first objective of the study: to examine the attitudes and perceptions of higher education students in Namibia towards CALL. The chapter draws on quantitative data from the student questionnaire to explore students' views on the effectiveness, benefits, and usability of CALL tools. The analysis also incorporates descriptive statistics to highlight patterns in students' responses and provides an understanding of their familiarity with, and confidence in using, CALL in their language learning experiences.

CHAPTER FOUR

ATTITUDES AND PERCEPTIONS OF STUDENTS AND LECTURERS TOWARDS COMPUTER- ASSISTED LANGUAGE LEARNING (CALL)

RESEARCH QUESTION 1

4.1 INTRODUCTION

This chapter addresses the first research question of the study, which is to examine the attitudes and perceptions of higher education students and lecturers in Namibia toward the use of Computer-Assisted Language Learning (CALL). Understanding these attitudes is essential for identifying the motivational, technical, and institutional factors that influence CALL uptake and use in higher education. The chapter analyses both quantitative and qualitative data to assess how CALL is viewed in terms of its usefulness, relevance, ease of use, and impact on teaching and learning outcomes.

Research Question 1:

What are the attitudes and perceptions of higher education students and lecturers towards the use of CALL in Namibia?

To address this research question, the chapter is guided by the following sub-objectives derived directly from the data:

For Students:

- To examine students' perceptions of the effectiveness of CALL in enhancing language learning.

- To assess students' understanding of CALL and their confidence in using CALL tools.
- To evaluate students' self-reported digital competence and frequency of CALL usage.
- To explore the perceived benefits and challenges students associate with CALL.
- To analyse students' views on their ability to manage and create digital texts as part of CALL.

For Lecturers:

- To determine lecturers' understanding of CALL and their self-assessed computer proficiency.
- To assess lecturers' familiarity with Learning Management Systems (LMS) and their preferred CALL tools.
- To explore lecturers' instructional design strategies when using CALL.
- To evaluate lecturers' perceptions of institutional support for CALL integration in teaching.

4.2 RESPONSE RATE FOR QUESTIONNAIRES

The study population comprised two key groups: second-year undergraduate English majors from the UNAM and the NUST, as well as lecturers from their respective units that offer the Bachelor of Arts in English degrees. This comprehensive sample was designed to capture both the student experience and the pedagogical perspective on the use of CALL technologies.

Table 4.1 Response Rate Statistics

Group	Total Population (N)	Sample Size (S)	Respondents (R)	Response Rate (%)
Students				
UNAM (Second-year English Majors)	344	159	134	84.3%

NUST (Second-year English & Linguistics)	104	48	43	90%
Lecturers				
UNAM (English Lecturers)	18	18	17	94%
NUST (English Lecturers)	12	12	11	92%
Total	478	207 + 30 = 237	186 + 28 =	Students, 85.5% Lecturers, 95%

Table 4.1 presents the response rate statistics for both students and lecturers involved in the study, indicating the total population, sample size, number of respondents, and response rates for each group across the two institutions: the UNAM and the NUST.

4.2.1 Student Response Rates

The student population is divided into two groups: second-year English majors from University of Namibia (UNAM) and second-year students enrolled in English and Linguistics at Namibia University of Science and Technology (NUST). The total population of students was 448, with 344 from UNAM and 104 from NUST. Using a stratified random sampling approach, 207 students were selected for the sample of 159 from UNAM and 48 from NUST. Out of this sample, 134 students from UNAM and 43 students from NUST (177 out of 207) completed the questionnaire, representing an 85.5% response rate for both institutions. This high response rate from students indicates strong interest and engagement with the research topic, suggesting that the students were either familiar with or interested in the subject of CALL. The consistency in response rates between the two institutions reflects similar levels of interest and participation across both university environments.

4.2.2 Lecturer Response Rates

A total of 30 English language lecturers were included in the study, with 18 from UNAM and 12 from NUST. All 30 lecturers were sampled, ensuring complete representation from both institutions. Of the 18 lecturers from UNAM, 17 responded, yielding a 94% response rate. Similarly, 11 out of 12 NUST lecturers completed the survey, reflecting a 92% response rate. These high response rates indicate strong participation from the lecturers, suggesting that they view CALL as an important aspect of their teaching practice or are particularly invested in sharing their perspectives on its use in language education.

4.2.3 Total Response Rates

The combined data for students and lecturers reflects a total population of 478 participants (448 students and 30 lecturers). Of the total sample of 237 participants ($\Sigma S = 207$) students and 30 ($\Sigma S = 30$) lecturers), 205 completed the questionnaires (177 students and 28 lecturers), representing a response rate of 85.5% for students and 93.3% for lecturers.

4.3 DEMOGRAPHIC INFORMATION

This section of the study presents demographic Information, which refers to statistical data describing a specific population's characteristics, such as age, gender, education level, and linguistic background. Demographic data provide context for understanding the participants' experiences and behaviors, which can significantly influence outcomes in educational research (Creswell & Creswell, 2018). In the context of this study, demographic variables are important for interpreting how different groups within Namibian higher education engage with CALL. These factors can shape the effectiveness of CALL interventions and are crucial for developing tailored strategies that address the needs of diverse learners and educators (Liaw, 2017).

4.3.1 Student Participant Institution

Figure 4.1 below illustrates the number of student participants from two institutions, UNAM and NUST, showing the distribution of 134 students from UNAM and 43 students from NUST in the study.

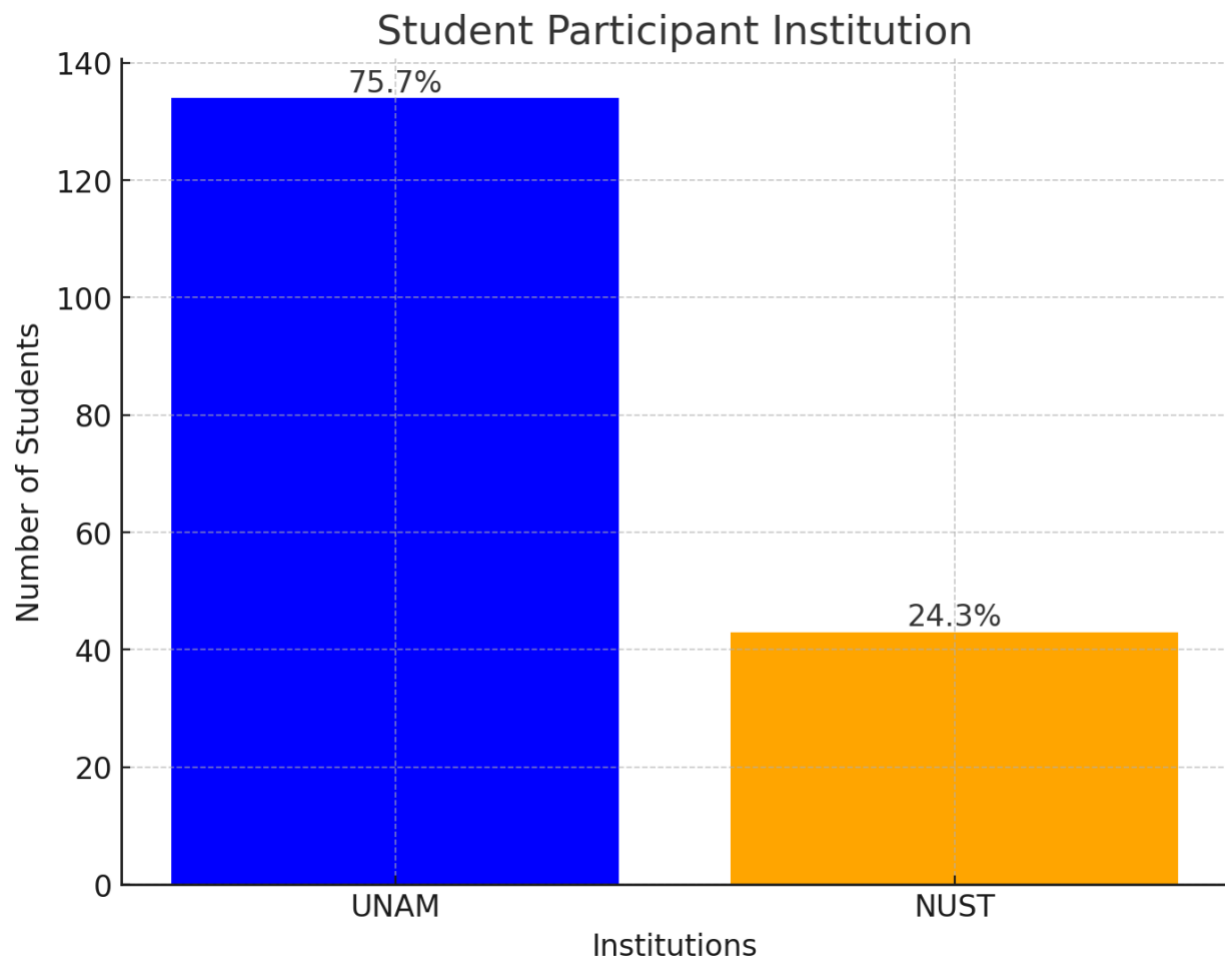


Figure 4.1: Student Participant Institution

Figure 4.1 shows the number of students who participated in the study from both the two institutions, UNAM and NUST. Out of a total of 177 participants, 134 are from UNAM, while 43 are from NUST. This graph provides a visual representation of the student distribution between

the two institutions. The data reflects the contribution of students from each institution to the study, indicating the participation levels of students from both UNAM and NUST.

4.3.2 Gender Distribution

Figure 4.2 below illustrates the gender distribution among students from both UNAM and NUST, with a total of 177 students who participated in the study. Of these, 134 students were from UNAM, while 43 were from NUST.

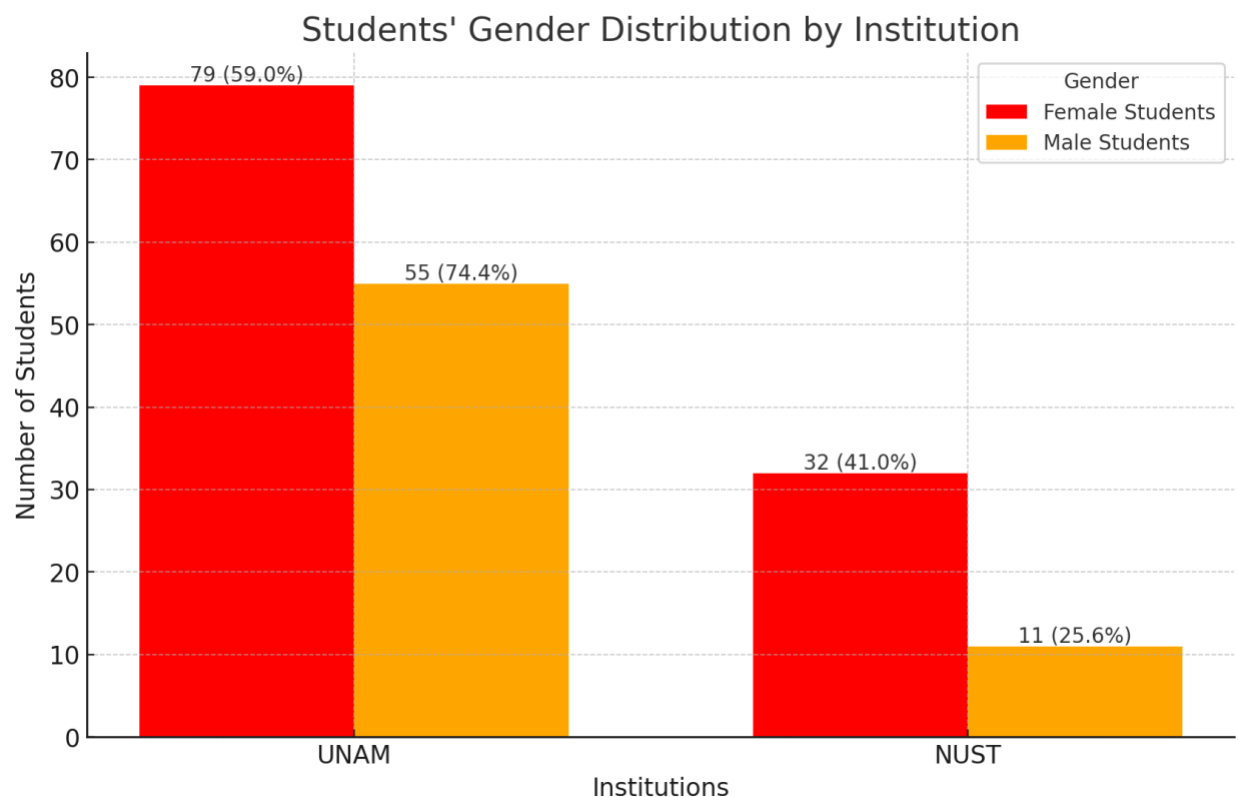


Figure 4.2: Gender Distribution

Female students at UNAM represented 59% of the participants, translating to 79 female students. Male students made up the remaining 41%, with 55 male participants. In contrast, at NUST, the gender distribution was similar. Female students constituted 74% of the student body, amounting to 32 students, while male students accounted for 25.6%, equating to 11 students.

The data reveals that UNAM has a more pronounced skew toward female students, with a similar larger female population compared to NUST. Both NUST and UNAM have a higher proportion of female students.

4.3.3 Age of Student Participants

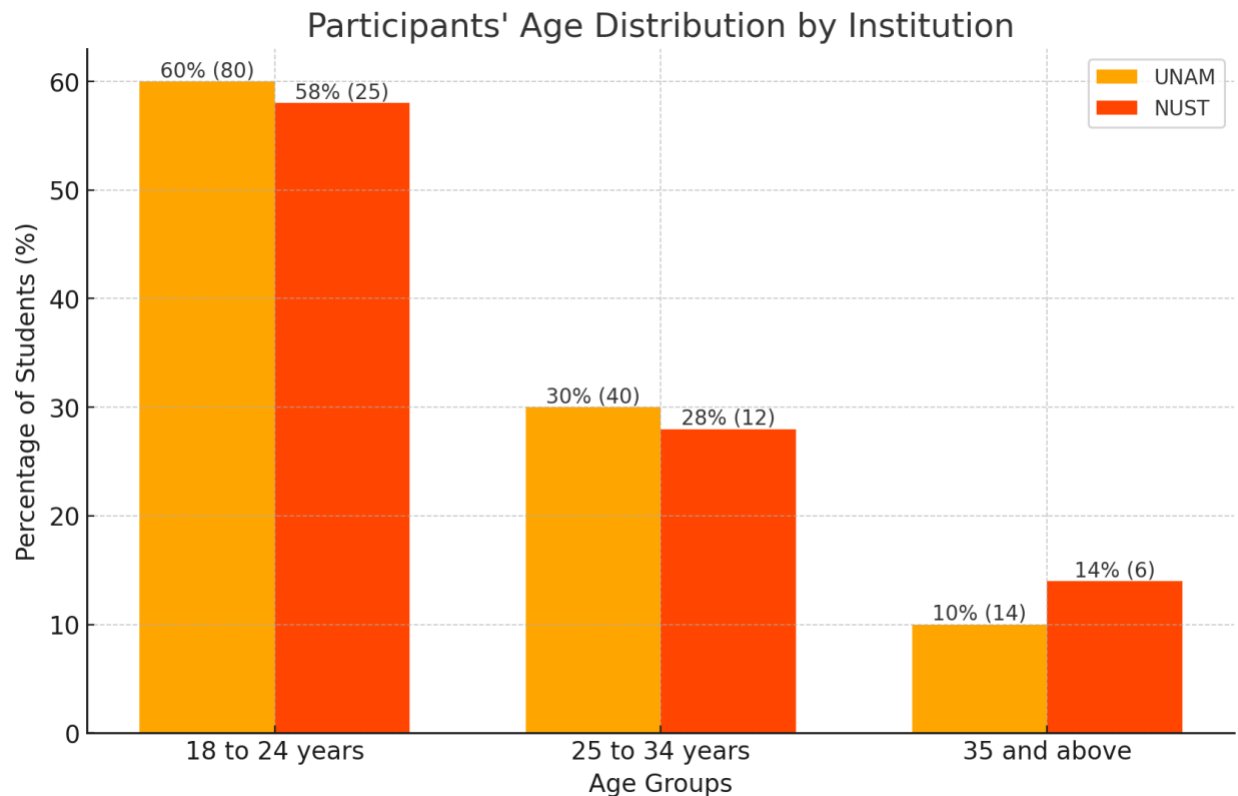


Figure 4.3: Age of Student Participants

Figure 4.3 provides the age distribution of participants from UNAM and NUST. The data shows that both institutions have a large proportion of younger students, with the majority of participants falling into the 18 to 24 years age group. At UNAM, 60% of the participants (80) students, belong to this age group. Similarly, at NUST, 58% of the participants, which accounts for 25 students, are in the same age range. This indicates that both universities have a significant presence of younger students.

In the 25 to 34 years age group, UNAM has 30% of its participants, with 40 students represented. NUST, on the other hand, has 28% of its students in this age range, amounting to 12 participants. Though the percentages are close, UNAM's larger student population means it has more students in this category.

The group of students aged 35 and above makes up the smallest portion of participants at both institutions. UNAM has 10% of its participants, or 14 students, in this age group, while NUST has 14%, with 6 students. Although NUST has a higher percentage of students in this category, the absolute number of older students remains smaller compared to UNAM due to its lower total number of participants.

4.4 ATTITUDES AND PERCEPTIONS OF STUDENTS AND LECTURERS TOWARDS CALL

The main objective of this chapter is to analyse the attitudes and perceptions of Namibian higher education students and lecturers towards CALL. The analysis focused on responses gathered from the questionnaires, examining how students and lecturers viewed and interacted with CALL in their educational experiences.

Students' questionnaire explored their perceptions of computers as effective tools for language learning. It examined how students assessed their own proficiency with computers, revealing their comfort levels with technology in educational contexts. The study also investigated how frequently students used various language learning and interaction tools, as well as their competency in managing and creating digital texts. Another important area of analysis was students' confidence in using CALL for language learning, revealing how secure they felt about integrating technology

into their studies. Finally, the perceived benefits of CALL for language learning were analysed to determine whether students believed these tools improved their language learning outcomes.

For lecturers, the analysis focused on their understanding of what constituted CALL and how proficient they rated themselves with regards to familiarity with computers and computer usage, which helped assess their readiness to incorporate technology into their teaching practices. The study also explored the levels of the lecturers' familiarity with Learning Management Systems (LMS), which are key platforms for implementing CALL in classrooms. Additionally, the tools that lecturers recommended for language teaching and interaction were analysed to understand their preferences for using digital resources in their teaching. The level of institutional support available to lecturers for using CALL was also examined, providing their views on the challenges or limitations they faced in adopting these tools in their teaching environments.

4.4.1 Students' Views on the Effectiveness of the Use of Computers in Language Learning

This section analyses the students' perceptions of computers' effectiveness as language teaching tools. In the questionnaire, students were asked, "How do you perceive the use of computers as effective tools for language learning?" The aim was to understand how students viewed the role of technology in enhancing language education. Their responses indicated whether they believed that computers facilitated language learning processes, supported skill acquisition, and offered advantages over traditional methods of instruction. This analysis was critical in gauging the general attitude toward the integration of computers in the language learning environment.

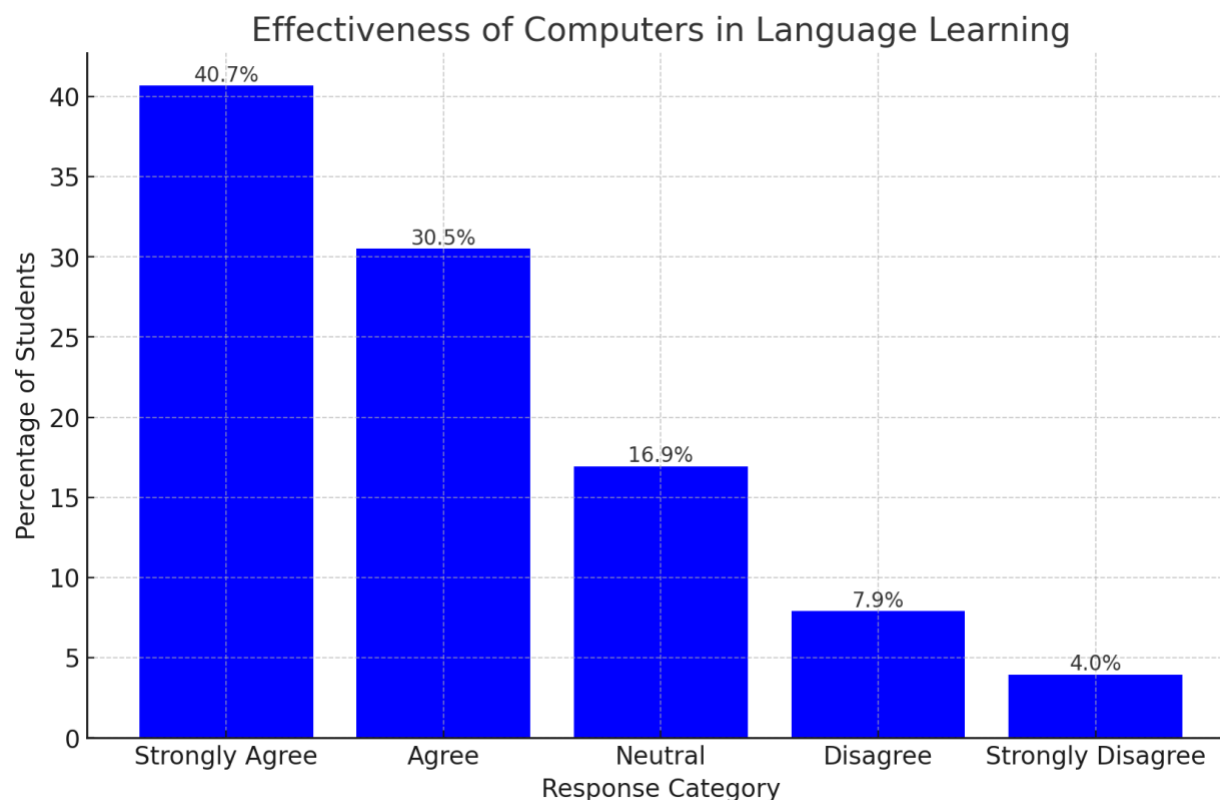


Figure 4.4: Student Responses on the Effectiveness of Computers Usage in Language Learning

The bar graph above (Figure 4.4) illustrates the frequency distribution of these responses, revealing the attitudes of students toward the incorporation of technology in language education. Participants were asked how they perceived the use of computers as effective tools for language learning. The responses were categorised into five gradations: Strongly Agree, Agree, Neutral, Disagree, and Strongly Disagree.

The results, as shown in the graph, indicate that a significant majority of participants perceive the use of computers in the context of language learning positively. The larger part respondents, 72 students (40.7%), selected 'Strongly Agree', reflecting a strong belief in the effectiveness of computers as tools for enhancing language learning. These participants likely recognise the

benefits of digital tools, such as increased interactivity, personalised learning opportunities, and access to a wider range of resources, which could make learning more engaging and flexible.

Following this, 54 students (30.5%) responded with 'Agree', further indicating a positive view towards the role of computers in language learning, albeit with slightly less conviction than those who opted for the 'Strongly Agree' option. This group of students may acknowledge certain limitations or believe that while computers are useful, their effectiveness could be context-dependent or enhanced when combined with traditional teaching methods. Together, the 'Strongly Agree' and 'Agree' responses account for 71.2% of the respondents, demonstrating a broad acceptance of technology's role in education.

A smaller portion of students, 30 participants (16.9%), remained 'Neutral', indicating an ambivalence or uncertainty regarding the effectiveness of the utilisation of computers in language learning. This group may have had limited experience with CALL tools or could perceive them as neither particularly beneficial nor harmful. Their neutrality suggests that, while they do not oppose the integration of technology, they may require more exposure to, or evidence of the effectiveness of CALL.

14 students (7.9%) responded with 'Disagree', and an even smaller group of 7 students (3.9%) opted for the 'Strongly Disagree' option. These participants represent a minority who do not believe that computers can significantly enhance language learning. Their responses suggest potential skepticism about the value of technology in educational settings, perhaps due to a preference for traditional, face-to-face teaching methods or concerns about the effectiveness of technology in fostering language acquisition. It can be assumed that these students experienced

difficulties with technology or felt that the use of computers created distractions or barriers to learning.

4.4.2 Students' Knowledge of the Definition of CALL

In this question, students were required to indicate whether they agreed with a provided definition of CALL by selecting either "True" or "False" Options. The question presented a comprehensive description of CALL, explaining that it is an approach to language teaching and learning that utilises computers and computer-based resources, such as the internet, to present, reinforce, and assess learning materials. It also emphasised that CALL typically includes interactive elements, as well as activities related to exploring and researching various applications for language instruction and acquisition.

In selecting "True," students would indicate their agreement and recognition of CALL's role as outlined in the definition, detailing its interactive, technological components and its utility in enhancing language learning. Conversely, by choosing "False," students would indicate either disagreement or an alternative understanding of what CALL entails, perhaps reflecting unfamiliarity or differing views on the role of technology in language teaching. This question was designed to assess the students' knowledge of, and attitudes toward CALL as a language learning method.

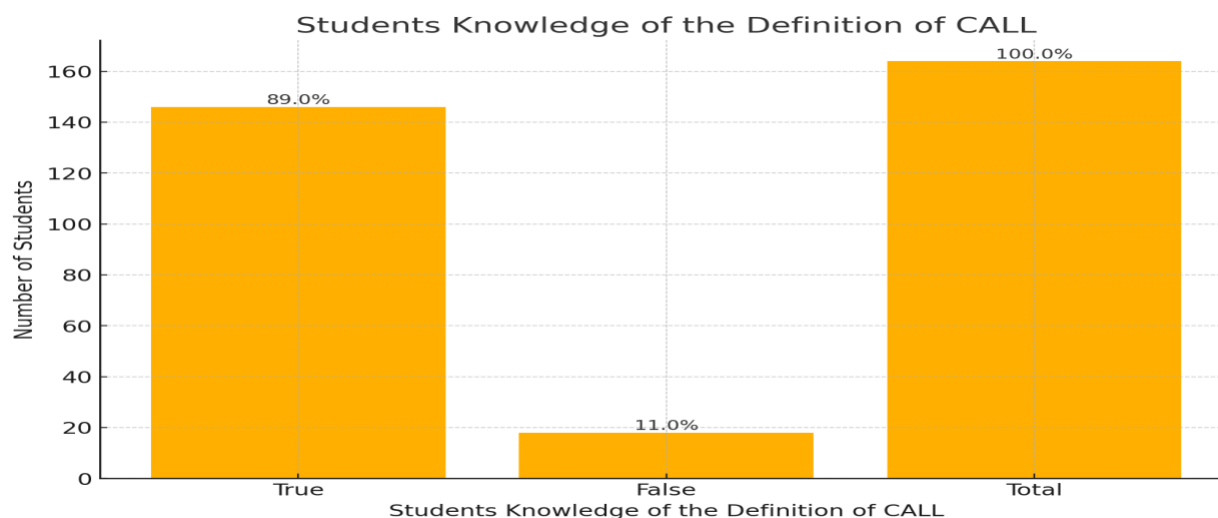


Figure 4.5: Students' Knowledge of the Definition of CALL

Students were presented with the definition of CALL to establish their knowledge of its role in language education. The results indicate that a significant majority of them, 89.0% (146), responded "True" to the provided definition. This finding suggests that most students understand and agree with both the definition of CALL, and the role of CALL as a method that leverages computer-based resources, the Internet, and interactive elements to support language learning (as encapsulated in the definition). It was observed that this high percentage reflects a strong positive perception and acceptance of CALL as a valuable tool in facilitating language acquisition.

In contrast, 11.0% (18) responded with "False," indicating that a small segment of students may have a different perspective or lack full understanding of CALL's purpose and scope. These students may not recognise the integration of technology as essential for language learning, or they may hold a preference for more traditional methods.

The results show that most students agree with the concept of CALL as stated in the definition, viewing it as an effective approach for language education. The small group of students who responded "False" may benefit from additional exposure to the principles and advantages of

CALL. Providing this group with a better understanding of CALL could help ensure that they fully appreciate the role of technology in enhancing language learning and improve their engagement with CALL-based tools.

4.4.3 Students' Self-Evaluation of Computer Skills

In this part, the focus was on how students assessed their own proficiency with computers. The questionnaire asked students to respond to the question, “How would you rate your computer proficiency?” This self-assessment shed light on students’ confidence in their ability to use computers effectively in an academic setting, particularly for language learning. Evaluating their level of comfort and competence, the study determined whether students felt adequately prepared to use digital tools, and whether a lack of proficiency might hinder the effective use of CALL in their studies.

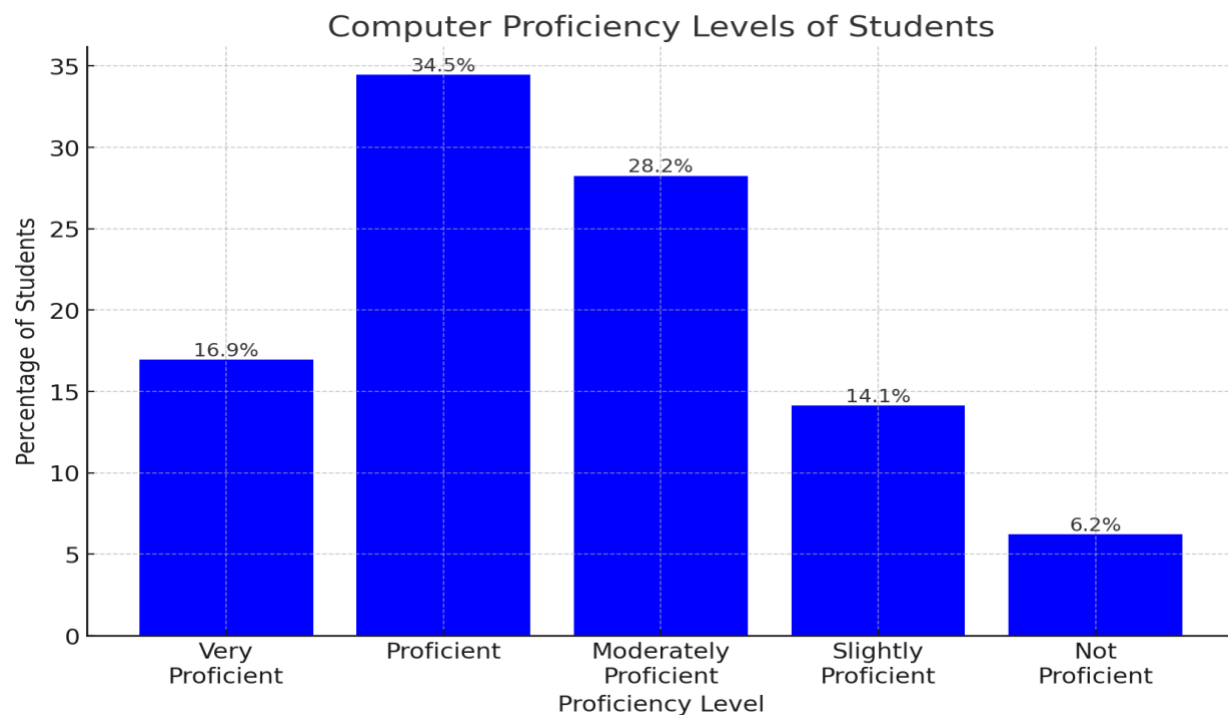


Figure 4.6: Students' Self Evaluation on Computer Proficiency

The findings reveal that 34.5% (61) of the students rated themselves as ‘Proficient’. These students likely possess the skills necessary to engage effectively with CALL tools, as they are comfortable using computers for basic tasks such as managing files, navigating software, and accessing the internet. Another significant portion, 28.2% (50) students, identified as ‘Moderately proficient’. While they can handle fundamental computer tasks, these students might face challenges with more advanced CALL platforms, possibly requiring additional support to fully utilise the potential of technology in their language learning.

A smaller group constituting 16.9% (30) of the students rated themselves as ‘Very Proficient’, indicating a high level of confidence in using computers. These students are likely to fully embrace CALL tools, utilising them effectively to enhance their language learning through digital resources and interactive platforms. On the other hand, 14.1% (25) of the students rated them as ‘Slightly Proficient’, suggesting limited comfort with technology. These students may struggle to adapt to CALL tools and could benefit from additional training or support to engage with digital learning methods. 6.2% (11) of the students rated themselves as ‘Not proficient’, indicating significant barriers to engaging with CALL, as they likely lack even basic computer skills.

4.4.4 Frequency of Students' Use of CALL Tools

This section examines the frequency of use of various language learning and interaction tools that fell under the umbrella of CALL by the students. Students were asked, “How frequently do you use language learning and interaction tools in your studies?” The question sought to explore the extent to which students engaged with digital tools for learning and interaction, such as online language programs, discussion forums, or collaboration platforms. Understanding their usage

patterns provided valuable information on how well-integrated these tools were in students' learning routines and their potential impact on language acquisition.

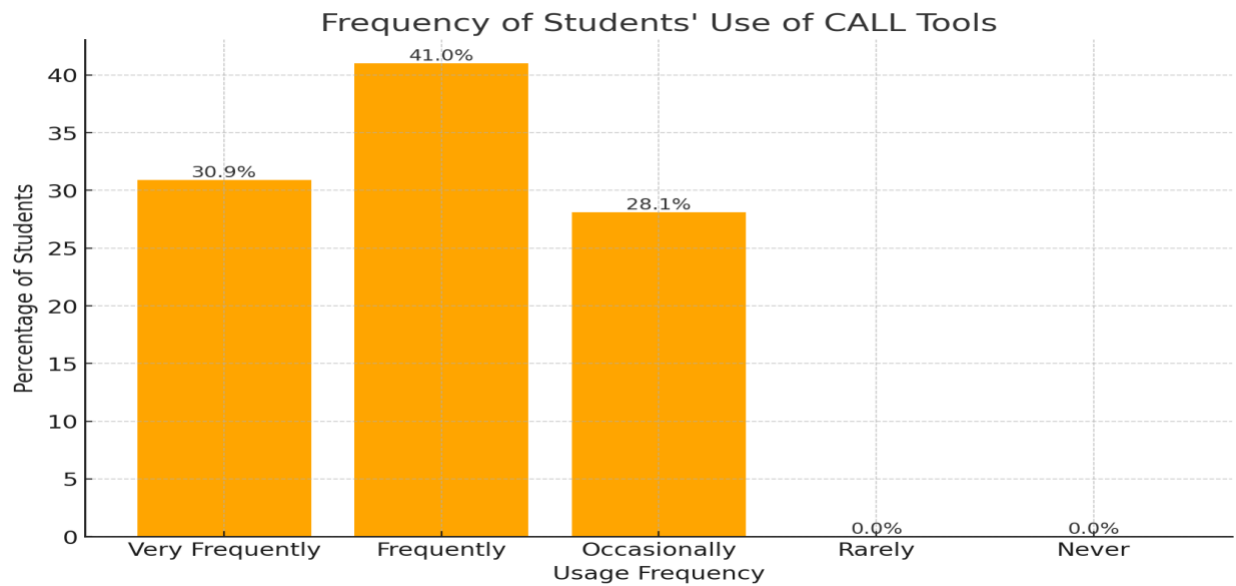


Figure 4.7: Frequency of Students' Use of CALL Tools

The data presented in Figure 4.6 indicates that the students' engagement with CALL tools varies in frequency, with most students using these tools regularly. The largest portion of respondents, 42.4% (73 students), indicated that they use CALL tools 'Frequently', meaning that they engage with digital language learning platforms several times a week. This demonstrates that for nearly half of the students, CALL tools are a core part of their learning routine. Following this, 31.9% (55 students) reported using CALL tools 'Very Frequently', suggesting daily or near-daily usage. These students are likely more dependent on digital resources for their language learning, reflecting a high degree of integration of technology into their studies.

In contrast, 29.1% (50 students) use CALL tools 'Occasionally', implying that their engagement with digital tools is sporadic, possibly only when specific tasks or assignments necessitate their use. This group may recognise the value of CALL tools but do not incorporate them as frequently

into their learning routine. There were no respondents who selected ‘Rarely’ or ‘Never’ as their response, indicating that all students surveyed, in one way or another, and to varying extents, are using CALL tools. The absence of responses in these two categories suggests that digital language learning tools are widely accepted and utilised among the student population.

4.4.5 Students' Competence in Handling and Producing Digital Texts

In this section, the study examined students' abilities to manage and create digital texts, an important aspect of CALL. The students were asked, “How competent are you in managing and creating digital texts?” This question explored students' technical skills related to producing written content in digital formats, including word processing, editing, and organising digital documents. The analysis of these responses helped determine whether students had the necessary skills to fully engage with CALL tools that required text creation and management as part of the learning process.

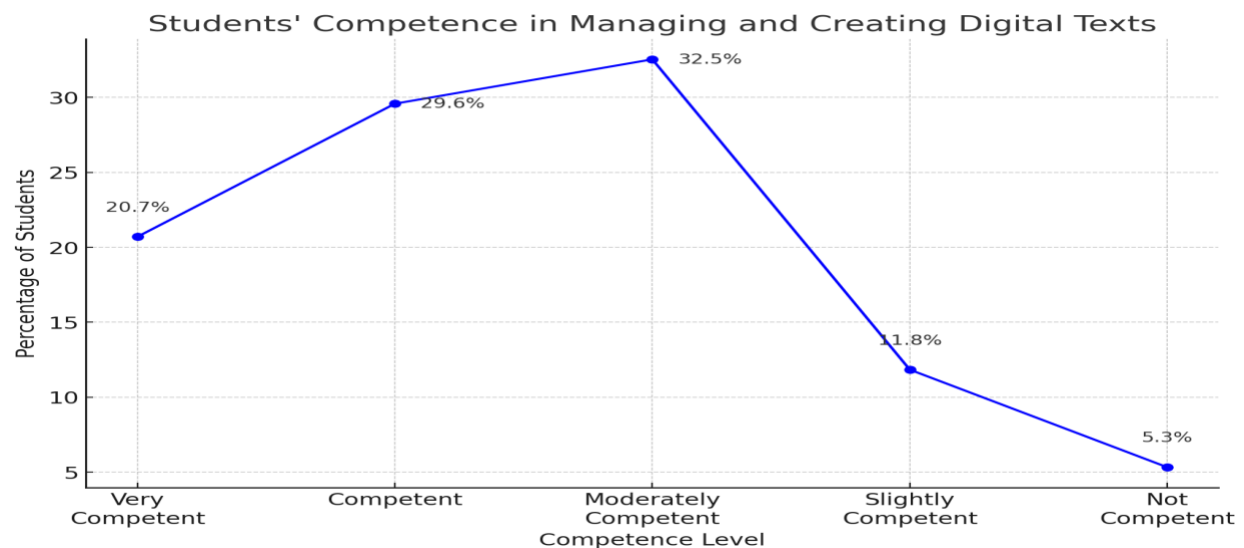


Figure 4.8: Students' Competence in Handling and Producing Digital Texts

The study findings revealed that students' competence in managing and creating digital texts varied significantly across different levels. The results show that 29.6% (50 students) rated themselves as 'Competent', indicating that nearly a third of respondents feel comfortable working with digital texts, performing tasks such as editing, organising, and formatting documents. Meanwhile, 20.7% (35 students) considered themselves 'Very Competent' in handling digital texts, suggesting that a smaller, yet significant, portion of the students feel highly skilled and proficient in managing more advanced aspects of digital text production, including formatting complex documents or handling different file types with ease.

27.8% (47 students) rated themselves as 'Moderately Competent'. These students possess basic skills but may struggle with more advanced tasks. Their competence likely reflects the ability to perform simple operations, such as creating and editing straightforward documents, while requiring more support for complex digital work. The rating 'Slightly Competent' accounted for 11.8% (20 students). This group may struggle with even basic tasks involving digital text creation and organisation, often requiring assistance. 5.3% (9 students) identified as 'Not Competent', indicating that very few of the students feel unable to manage or create digital texts effectively.

4.4.6 Students' Confidence in Implementing CALL in Their Studies

This section focused on students' confidence in using CALL as part of their language learning. The questionnaire asked, "How confident do you feel about using CALL for language learning?" The responses to this question revealed whether students felt relatively secure in their ability to effectively utilise CALL tools to enhance their learning. Confidence levels indicated how well students were adapting to the technological aspects of language learning, as well as highlighting any potential barriers they faced in fully embracing CALL methods.

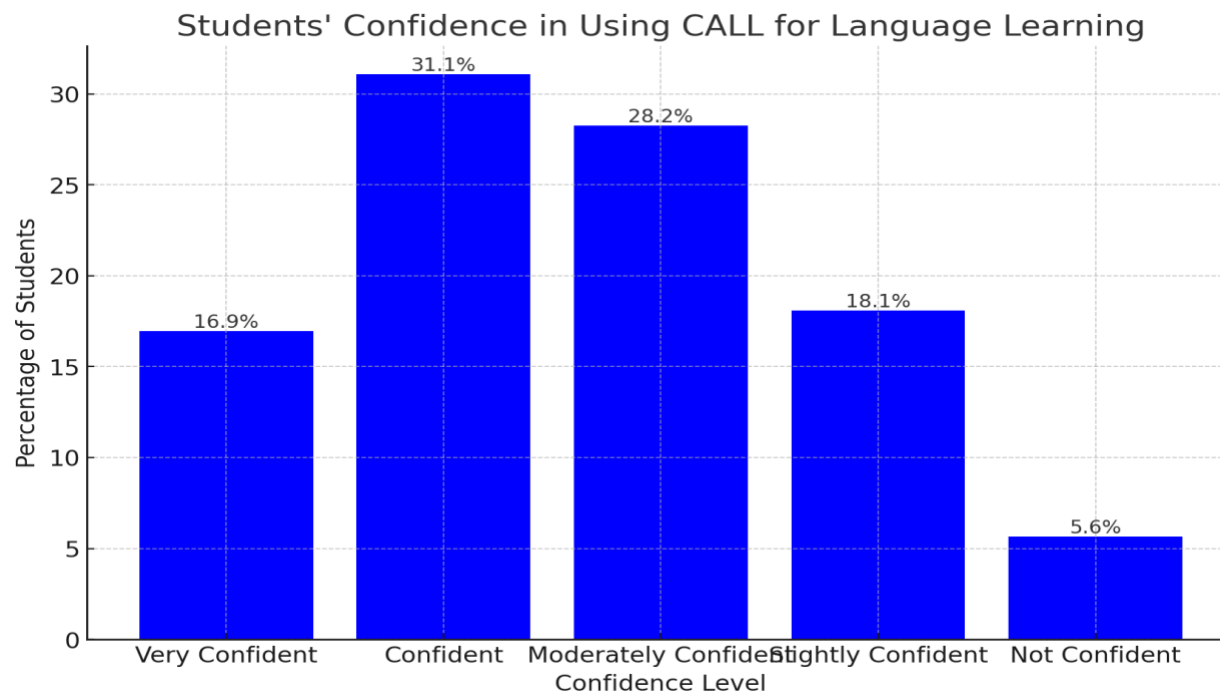


Figure 4.9: Students' Confidence in Implementing CALL

The results revealed that 31.1% (54) of participants rated themselves as ‘Confident’ in using CALL tools. This suggests that nearly one-third of the students feel secure in their ability to navigate and utilise digital platforms to support their language learning. These students are likely to engage with CALL regularly and exhibit a positive attitude towards technology-enhanced learning environments. 28.2% (49) of participants reported feeling ‘Moderately confident’. These students can use the basic features of CALL platforms, although they may encounter occasional difficulties with more advanced tasks. Their confidence level indicates that they engage with CALL but still have room for improvement. The findings further revealed that 18.1% (32 students) rated themselves as ‘Slightly confident’. This group may struggle with basic tasks when using CALL tools and possibly approach the platforms with hesitation. Their low confidence suggests that these students are not fully benefiting from the potential advantages of CALL and may require additional support or training to improve their skills. Furthermore, the results also indicated that the rating

‘Very confident’ was provided by 16.9% (30) of the student participants. These students are the most proficient in using CALL tools and are likely adept at utilising advanced features to enhance their learning experience. They demonstrate a strong adaptation to digital learning and reflect the highest level of comfort with technology. 5.6% (10 students), indicated that they were ‘Not confident’ with using CALL tools. These students likely face significant challenges in navigating digital platforms and may feel overwhelmed by the technological demands of language learning. For these students, technology may act as a barrier rather than a tool for enhancing their learning, and as such, they could benefit from targeted assistance to build their confidence and skills.

4.4.7 Students' Perceived Advantages of CALL in Language Learning

In this section of the study analysed the students' perceptions on the perceived benefits of CALL for language learning. Students were asked to respond to the question, “What benefits do you perceive CALL brings to language learning?” In analysing these responses, the study sought to understand whether students believed CALL offered tangible improvements to their learning outcomes, such as increased engagement, better language acquisition, or more personalised learning experiences. This section provides the analysis on the students’ views on the imagined value of integrating technology into their language studies.

Table 4.2: Students' Perceived Advantages of CALL

Benefits	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	Total	Mean Score	SD
Access to authentic and up-to-date language materials	51.8% (85)	29.9% (49)	12.2% (20)	4.3% (7)	1.8% (3)	164	4.26	0.95
Controlled environment with immediate feedback	43.9% (72)	33.5% (55)	13.4% (22)	6.1% (10)	3.0% (5)	164	4.09	1.03
Opportunities for interaction with learners and native speakers	39.6% (65)	37.8% (62)	12.2% (20)	7.3% (12)	3.0% (5)	164	4.04	1.06
Customizable to individual needs and preferences	29.3% (48)	40.2% (66)	20.7% (34)	6.1% (10)	3.7% (6)	164	3.85	1.10
Enhances motivation to learn	47.6% (78)	35.4% (58)	11.0% (18)	3.7% (6)	2.4% (4)	164	4.22	0.98

Table 4.2 presents findings on the students' perceptions of the benefits of CALL in enhancing their language learning experiences. The table shows the results from data gathered from a questionnaire distributed to 164 student respondents, focusing on five key benefits associated with CALL: access to authentic and up-to-date language materials, controlled environments with immediate feedback, opportunities for interaction with learners and native speakers, customisation to individual needs and preferences, and the enhancement of motivation to learn.

The results show the percentage of students who responded the gradations 'Strongly agree', 'Agree', 'Neutral', 'Disagree', or 'Strongly disagree' with each of the listed perceived benefits. For each category, the corresponding number of students is presented in brackets, alongside the

calculated mean score and standard deviation (SD). The mean score provides a measure of the sentiment towards each benefit, with higher mean scores indicating stronger positive perceptions. The standard deviation (SD) shows the variability of responses within each category, reflecting how consistent or varied student opinions are. The SD values indicate the consistency of students' perceptions regarding the benefits of CALL. For benefits such as "Access to Authentic and Up-to-Date Language Materials" and "Enhances Motivation to Learn", where the SD is less than 1 (0.95 and 0.98, respectively), the data reveals a high level of agreement among students. This means that most students rated these benefits, similarly, showing a clear consensus that these aspects of CALL are effective. The low SD values indicate that students' responses are closely clustered around the mean, reflecting strong alignment in their positive perceptions of these benefits.

For benefits such as "Customisable to Individual Needs and Preferences", where the SD is greater than 1 (1.10), there is more variability in the responses. This suggests that students had more diverse opinions about how well CALL addresses individual needs. Some students may have found CALL highly customisable, while others may not have had the same experience, resulting in a wider spread of responses. The higher SD value reflects less consensus and indicates that the benefit might be perceived differently depending on the student's specific needs or experiences.

The findings further reveal that the students generally hold positive views regarding the benefits of CALL in language learning. The analysis shows that most students agree or strongly agree with the advantages offered by CALL, particularly in areas such as access to authentic materials and enhanced motivation to learn. For example, 51.8% (85) of students 'Strongly agree', and 29.9% (49) 'Agree' that CALL provides valuable access to authentic and up-to-date language materials, resulting in a high mean score of 4.26. This strong agreement indicates that a significant majority of respondents perceive CALL as offering real-world, current language resources that enhance

their learning. Only 4.3% (7) of students ‘Disagree’ and 1.8% (3) ‘Strongly disagree’, highlighting that very few students were dissatisfied with this aspect of CALL. The low level of disagreement underscores that access to up-to-date language materials is one of the most highly appreciated benefits of CALL, reflecting its importance in supporting language learning.

Further to that, 47.6% (78) of students ‘Strongly agree’ and 35.4% (58) ‘Agree’ that CALL enhances their motivation to learn, resulting in a mean score of 4.22. This suggests that CALL tools make language learning more engaging and stimulating for most students. Only 6.1% (10) of students ‘Disagree’ or ‘Strongly disagree’, demonstrating how CALL plays a critical role in motivating students to pursue their language studies.

For the benefit of a controlled environment with immediate feedback, 43.9% (72) of students ‘Strongly agree’, and 33.5% (55) ‘Agree’, evincing a mean score of 4.09. This demonstrates that most students value the structured practice environment provided by CALL tools, which includes immediate feedback. However, 9.1% (15) of students expressed dissatisfaction with the feedback mechanisms, indicating room for improvement in this area, in order to better meet students’ expectations.

In terms of opportunities for interaction with learners and native speakers that CALL potentially provides in a bid to improve language learning, 39.6% (65) of students “‘Strongly agree’, and 37.8% (62) ‘Agree’ to such a potential, reflecting a mean score of 4.04. This demonstrates that the majority of the students appreciate the opportunities CALL offers for interaction, which can enhance their communication skills. However, 10.4% (17) of students expressed disagreement, suggesting that while CALL provides interaction opportunities, they may not always meet students' expectations for meaningful engagement.

The benefit of customisable to individual needs and preferences received the lowest mean score of 3.85. Despite this, 29.3% (48) of students ‘Strongly agree’, and 40.2% (66) ‘Agree’, indicating that more students value the customisable aspects of CALL. However, a significant number of students 24.4% (40) were ‘Neutral’ or ‘Disagree’, highlighting that the customisation features of CALL tools do not fully meet the needs of all learners. This finding suggests that further improvements could be made to allow for greater personalisation and adaptability to individual learning styles.

4.4.8 Lecturers' Understanding of CALL

This section explored the extent to which lecturers understood the concept of CALL. Lecturers were presented with the following definition of CALL for them to either agree or disagree with it by replying ‘True’ or ‘False’: “CALL is an approach to teaching and learning in which the computer and computer-based resources such as the Internet are used to present, reinforce and assess material to be learned. It usually includes a substantial interactive element. It also includes the search for and the investigation of applications in language teaching and learning.” Analysing their responses provided an understanding of whether lecturers had a clear and consistent grasp of the concept of CALL and its role in language teaching. This was important for determining whether educators were well-equipped to implement CALL tools effectively, and to assess whether any gaps in understanding may impact the use of technology in the classroom.

Lecturers' Understanding of CALL

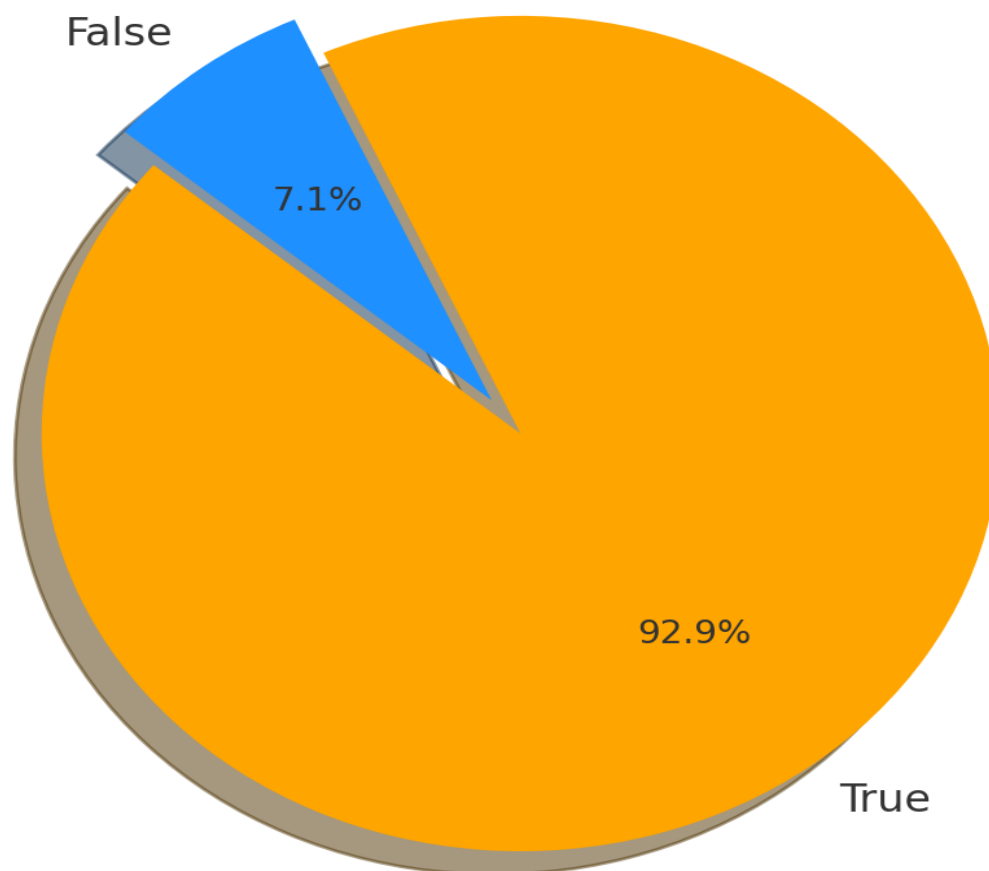


Figure 4.10: Lecturers' Understanding of CALL

Figure 4.10 presents the results from lecturers when they were presented with the definition. The purpose of the definition was to assess whether lecturers had a clear and accurate understanding of CALL and its role in language teaching. The definition explained the use of computers and digital resources to present, reinforce, and assess learning materials, along with their interactive and technological components.

The majority, 92.86% (26 lecturers), responded 'True' to the provided definition of CALL, demonstrating that most lecturers have a clear understanding of the concept. This suggests that these lecturers recognise the role of technology in language teaching and are likely equipped to implement CALL tools effectively in their classrooms. Their familiarity with the use of computers and digital resources for presenting, reinforcing, and assessing language learning materials indicates a readiness to integrate CALL into their teaching practices.

However, 7.14% (2 lecturers) responded 'False' to the definition, indicating that a small, but notable, group of the lecturers may not fully grasp the comprehensive role that CALL plays in language learning. This group may have a different interpretation of CALL or may not be fully familiar with the technological and interactive components of this approach. Their response of 'False' suggests potential gaps in understanding, which could hinder their ability to utilise CALL effectively in their teaching practices.

4.4.9 Lecturers' Self-Assessment of Computer Competence

In this part, the study evaluated how lecturers rated their own computer proficiency. The relevant questionnaire item asked, "How would you assess your computer proficiency?" The purpose of this analysis was to understand how comfortable and capable lecturers felt when using technology, particularly in relation to their role as language instructors. A lecturer's proficiency with computers could significantly impact how effectively they could integrate CALL tools into their teaching, and this section highlighted whether additional training or support was needed.

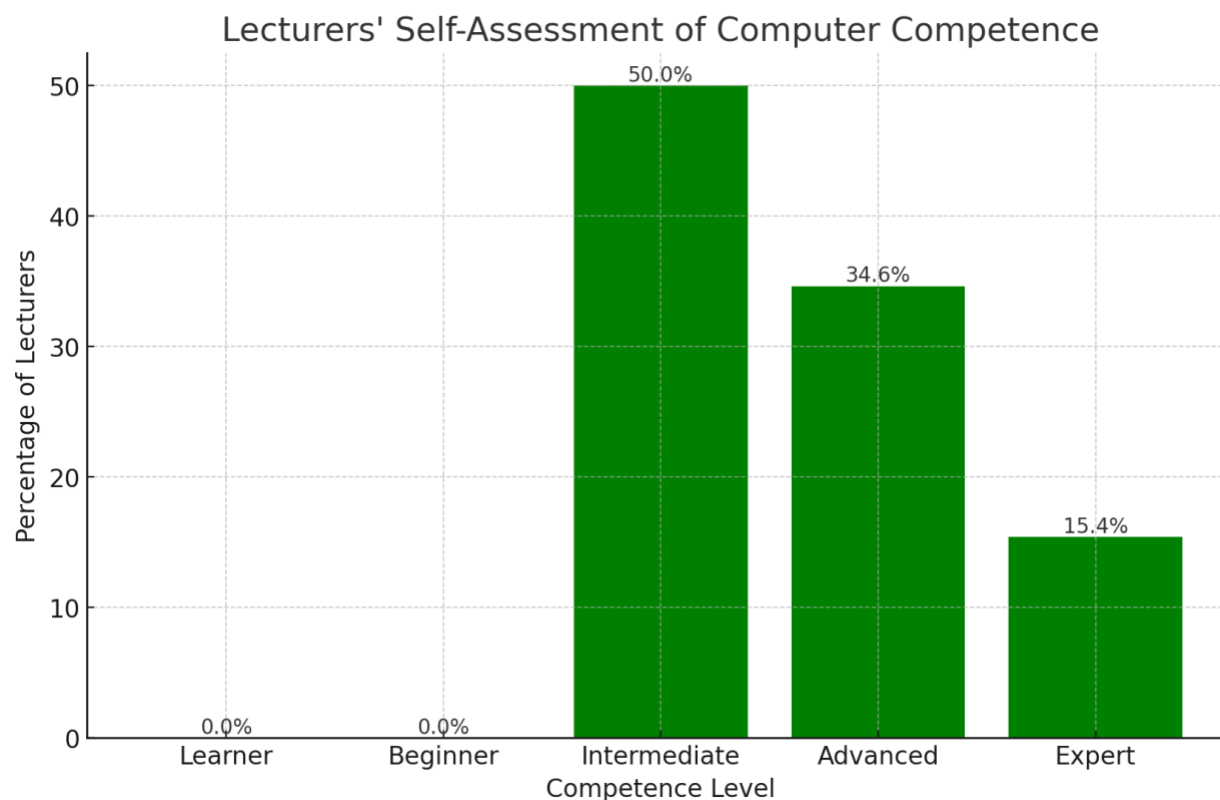


Figure 4.11: Lecturers' Self-Assessment of Computer Competence

The study findings reveal that none of the lecturers rated themselves as 'Learner' or 'Beginner', which accounts for 0% (0) in each category. This indicates that all respondents have at least a moderate level of computer competence. It was observed that the majority of lecturers, 50% (13), assessed their skills as 'Intermediate', suggesting that half of the participants perceive their computer proficiency as adequate for routine tasks, though they may not yet feel fully confident with more advanced technological applications, especially within a teaching context. The results further indicated that a substantial portion of the respondents, 34.6% (9), rated their computer proficiency as 'Advanced'. These lecturers are likely to feel confident in utilising a wide range of technological tools and may already be incorporating more sophisticated CALL tools in their teaching practices. Furthermore, the results demonstrate that 15.4% (4) of the lecturers rated themselves as 'Expert', reflecting that a smaller but significant group of educators possess high-

level computer skills. These lecturers are likely highly proficient in using advanced software and digital tools, positioning them as potential leaders in promoting and integrating technology within the language learning environment.

4.4.10 Lecturers' Familiarity with Learning Management Systems (LMS)

This section analysed lecturers' familiarity with LMS, which were essential platforms for implementing CALL in education. The questionnaire asked, “How familiar are you with Learning Management Systems (LMS)?”. The responses reflected how well lecturers understood and used LMS platforms, such as Moodle or Blackboard, to manage courses, interact with students, and deliver content. Understanding their familiarity with these systems was critical in determining the extent to which LMS was being utilised to support language learning through CALL.

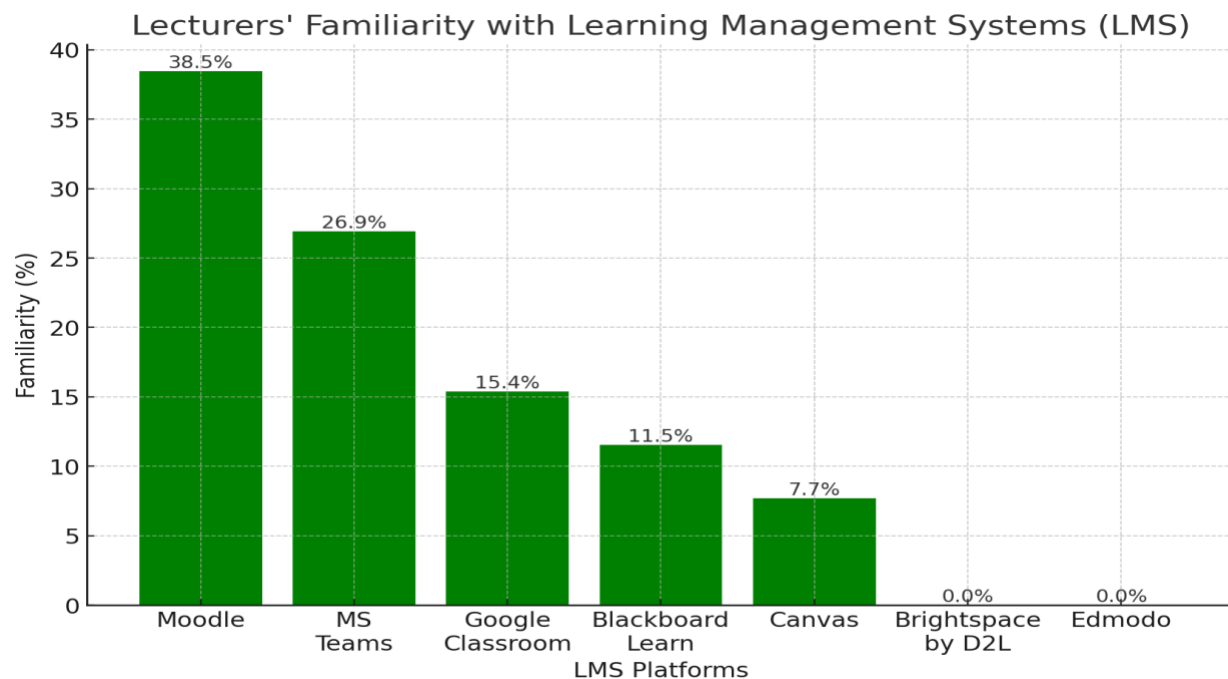


Figure 4.12: Lecturers' Familiarity with Learning Management Systems

The findings reveal that Moodle leads in familiarity, with 38.5% (10 lecturers) identifying it as a tool they are comfortable with. This substantial level of familiarity points to Moodle as a highly

accessible and likely preferred platform within the institutions. Given Moodle's prominent role, it serves as a foundational resource in CALL, reinforcing its significance in supporting digital learning initiatives. In addition to Moodle, MS Teams also reflects considerable usage, with 26.9% (7 lecturers) reporting familiarity with it. The widespread use of MS Teams demonstrates its appeal, particularly for communication and collaboration, essential features that have likely driven its adoption during recent transitions to online education.

Google Classroom, although less familiar among faculty, is known to 15.4% (4 lecturers). While it does not reach the same familiarity levels as Moodle or MS Teams, Google Classroom offers an accessible, streamlined experience and integrates seamlessly with Google's suite of tools, making it practical for lecturers who leverage these resources. In contrast, lecturers demonstrate less familiarity with Blackboard Learn and Canvas, with only 11.5% (3 lecturers) and 7.7% (2 lecturers) aware of these platforms, respectively. Despite their popularity in higher education institutions, their relatively low familiarity suggests institutional preferences for other tools. The lecturers also evince a lack of familiarity with Brightspace by D2L and Edmodo, as evidenced by a 0% familiarity rate. This lack of lecturers familiar with these tools suggests limited institutional adoption or perceived irrelevance for CALL purposes, potentially due to a mismatch with the institutional specific needs or priorities.

4.4.11 Lecturers' Preferred CALL Tools for Language Teaching

The study examined the language teaching and interaction tools that lecturers recommended for use in their courses. The questionnaire asked, "Which of the following language teaching and interaction tools do you use and recommend for your students?" Analysing these responses was critical to establishing the digital tools that lecturers considered most effective for enhancing

language learning, whether they preferred more traditional methods, or were open to innovative CALL tools. This section provided a glimpse into the lecturers' preferences and views on the most useful technology for language teaching.

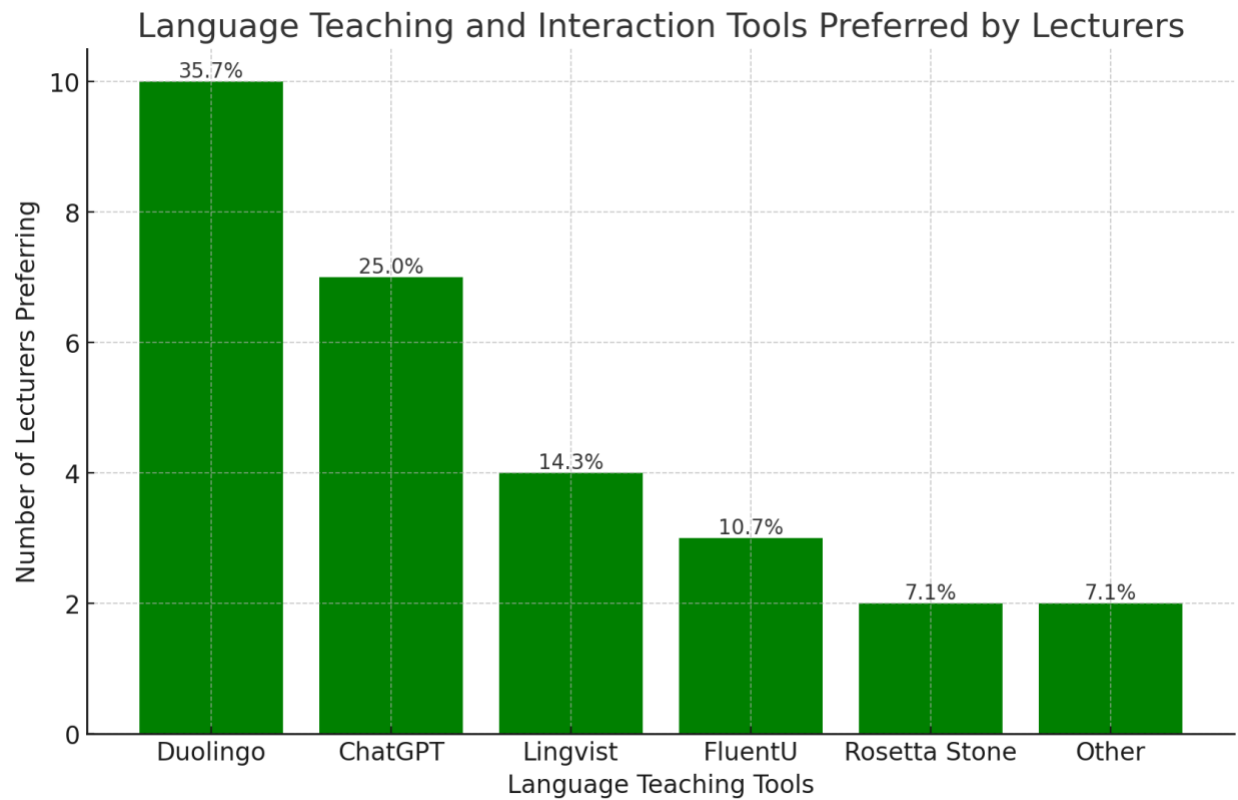


Figure 4.13: Lecturers' Preferred CALL Tools for Language Teaching

Participants were presented with the question, "Which of the following language teaching and interaction tools do you use and recommend for your students?" This question was specifically designed to test whether lectures are aware of other teaching and interaction tools besides the commonly known ones. The results indicate that Duolingo was the most recommended tool, with 35.7% (10) of the lecturers identifying it as a preferred resource for CALL. The popularity of Duolingo is likely due to its gamified structure, ease of use, and accessibility, making it particularly effective for independent student practice, especially for vocabulary acquisition and maintaining

student engagement outside of traditional classroom settings. ChatGPT was recommended by 25% (7) of the lecturers, indicating a growing interest in AI-driven tools that offer interactive and real-time conversational practice. This tool allows students to simulate real-world conversations, an invaluable feature for developing fluency and comprehension. Lecturers value ChatGPT for its capacity to provide personalised feedback and simulate meaningful language practice, catering to various language proficiency levels.

Lingvist was recommended by 14.3% (4) of the lecturers, who likely appreciate its focus on vocabulary-building and personalised learning paths. This tool's adaptive approach allows it to tailor content to each student's progress, making it an effective tool for learners seeking to expand their vocabulary in a focused and systematic manner. FluentU was recommended by 10.7% (3) of the lecturers and is particularly valued for its integration of real-world video content, which helps students immerse themselves in authentic language experiences. This tool is ideal for lecturers who prioritise the use of authentic materials to enhance listening comprehension and cultural context in language learning. Rosetta Stone was recommended by 7.1% (2) of the lecturers. While once a leading tool in language learning, the relatively low recommendation rate may reflect a shift toward more interactive and AI-driven tools.

7.1% (2) of the lecturers recommended other tools, likely reflecting niche or institution-specific platforms not listed in the questionnaire. These tools may cater to specialised language needs or provide unique learning experiences that align with specific teaching goals. The findings suggest a clear trend toward the use of innovative tools such as Duolingo and ChatGPT, which together accounted for 60.7% (17) of the total recommendations. These tools are favored for their interactive features, AI integration, and ability to engage students through gamification and real-time feedback. In contrast, traditional tools such as Rosetta Stone accounted for a smaller

proportion of recommendations, indicating a shift in preference toward more flexible, personalised, and engaging CALL resources.

4.4.12 CALL Instructional Design Methods Preferred by Lecturers

Lecturers were asked to respond to the question: "Which of the following methods of CALL instructional design do you use with your students?" The options included foundational instructional strategies like Scaffolding, Sequencing, Chunking, Lesson Duration, and Active Learning and Rehearsal for Long-Term Memory. These methods represent core approaches within CALL that educators utilise to enhance language acquisition in a structured, technology-supported environment.

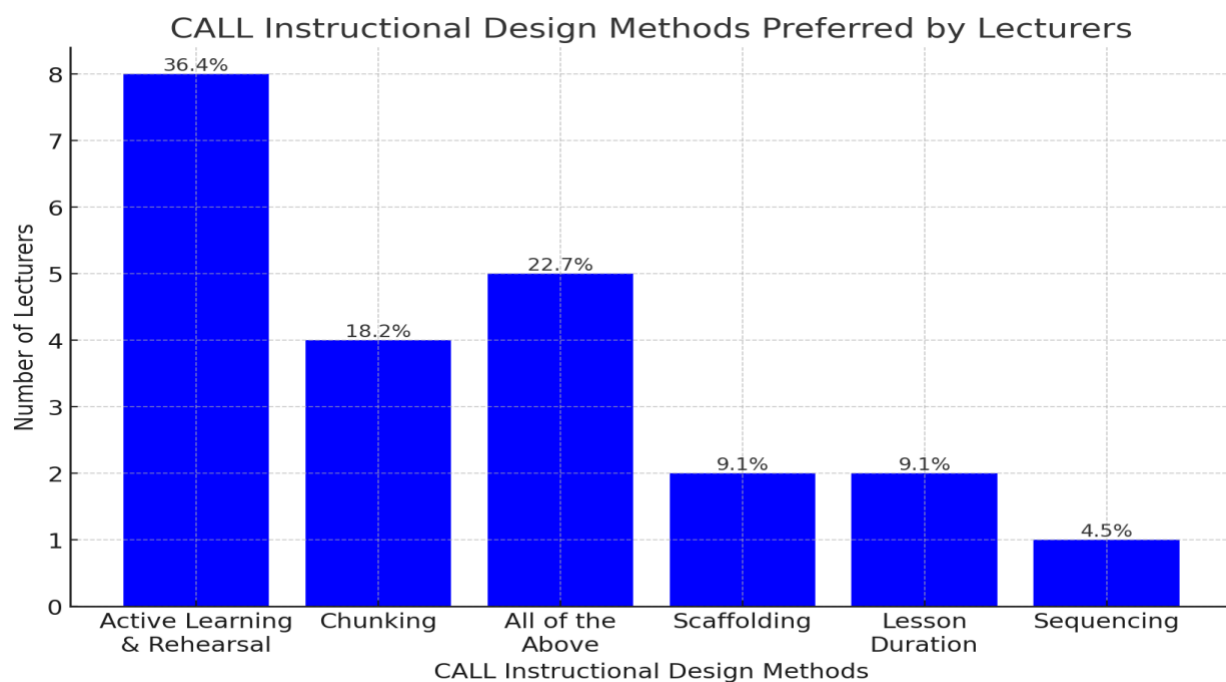


Figure 4.14: CALL Instructional Design Methods Preferred by Lecturers

The study established that lecturers prioritise certain methods of CALL instructional design over others. The findings reveal that 'Active Learning and Rehearsal for Long-Term Memory' is the most preferred approach, with 36.4% (8) of lecturers selecting it. This method, which focuses on

actively engaging students and promoting long-term retention, is highly valued. The results indicate that lecturers view student engagement and memory reinforcement as crucial to successful language learning. Further, the results also indicate that 18.2% (4) of the lecturers favored 'Chunking'. This approach, which involves breaking language content into smaller, more manageable units, helps students process and retain information more effectively, particularly for vocabulary acquisition and grammar comprehension.

The evidence also reveals that 22.7% (5) of the lecturers selected "All of the Above," indicating a preference for using a combination of instructional strategies. This suggests that most educators prefer a blended approach that allows them to adapt their teaching style to suit different student needs and learning contexts. The integration of multiple CALL methods appears to be seen as an effective way to enhance learning outcomes. The study observes that 'Scaffolding' and 'Lesson Duration' were each chosen by 9.1% (2) of the lecturers. 'Scaffolding', which provides structured support to help students gradually progress toward independent learning, and 'Lesson Duration', which focuses on maintaining student attention during optimal timeframes, are viewed as important but more supplementary techniques. The findings further reveal that only 4.5% (1) of the lecturers selected 'Sequencing', making it the least preferred method. 'Sequencing', which organises content in a logical order to help students progress through language concepts, is important for structured learning, but it appears to be less central to lecturers' instructional priorities, possibly because a number of digital tools already incorporate sequencing by default.

4.5 SUMMARY

Chapter Four provided a comprehensive analysis of the attitudes and perceptions of students and lecturers towards CALL within the context of Namibia's higher education. This chapter sought to

explore how both groups imagine the potential effectiveness, ease of use, and value of CALL in supporting language learning. The chapter addressed the research question, "What are the attitudes and perceptions of Namibian higher education students and lecturers towards CALL?". The question sought to establish the levels of acceptance, confidence, and readiness among students and lecturers in implementing CALL in their teaching and learning processes.

The chapter began with an overview of the response rates, which illustrated strong participation from both students and lecturers, indicating a high level of interest and engagement with the topic. Response rate statistics revealed that 85.5% of students and 93.3% of lecturers completed the questionnaires, reflecting a significant commitment to the study across both groups. The high response rates suggest that both students and lecturers recognise the importance of CALL in language learning, a finding that underscored the relevance of the study.

Demographic data was also presented to provide context for understanding how variables such as age, gender, and educational background might impact attitudes toward CALL. It was observed that both the UNAM and NUST had a higher proportion of female students, particularly at UNAM. Most participants were in the 18-24 age range, with smaller groups of mature students represented in the 25-34 and 35+ age brackets. This demographic profile indicated that CALL is being made use of by a predominantly younger audience, which may have implications for how technology is integrated and perceived within language learning contexts.

The chapter also investigated the attitudes and perceptions towards CALL among students and lecturers. For students, the analysis focused on their views regarding the effectiveness of computers in language learning, their self-assessment of computer proficiency, and their usage patterns with CALL tools. Students generally had positive perceptions of CALL, with the majority

of them agreeing that computers enhance language learning by providing interactive and flexible options. A significant portion of students rated themselves as proficient or moderately proficient in using computers, suggesting a readiness to adopt CALL in their studies. However, a small group indicated lower proficiency levels, hinting at a need for targeted support to help all students benefit equally from CALL resources.

Further the chapter explored how frequently students engaged with CALL tools. The findings evince that most students used these tools frequently or very frequently, with none reporting rare or non-usage. This pattern demonstrates that CALL has become an integral part of students' learning routines. However, the chapter also identified areas where improvements could be made to support more consistent engagements, especially for students who expressed neutrality about CALL's effectiveness.

Lecturers' attitudes and perceptions were also examined. The study analysed the lecturers' understanding of CALL, their self-assessed computer proficiency, familiarity with LMS, and preferences for specific CALL tools and instructional design methods. The findings revealed that most of the lecturers have a clear understanding of CALL and its role in language education, with the majority agreeing with the definition provided in the questionnaire. Additionally, lecturers displayed high levels of computer proficiency, with half rating themselves as intermediate users and others as advanced or expert. This indicates a strong foundation for the adoption of CALL in their teaching practices.

The chapter also evaluated the lecturers' familiarity with LMS platforms, which play a critical role in supporting CALL. Moodle and MS Teams emerged as the most familiar platforms, reflecting their widespread use in Namibian higher education. However, less familiarity with platforms like

Blackboard and Canvas pointed to potential areas for expanded institutional support. Preferred CALL tools among lecturers included Duolingo and ChatGPT, reflecting a preference for innovative, AI-driven platforms that offer interactivity and personalised learning experiences. More traditional tools such as Rosetta Stone were least recommended, indicating a shift toward modern, flexible tools in language education.

In addition, the chapter provided perspectives into the lecturers' preferred instructional design methods for CALL, with 'Active Learning and Rehearsal for Long-Term Memory' being the most chosen approach. This preference indicates lecturers' emphasis on strategies that promote student engagement and retention, while methods such as 'Chunking' and 'Scaffolding' were also valued for breaking down language content and supporting gradual learning progress.

The chapter concluded with a summary of students' perceived advantages of CALL in language learning, highlighting key benefits such as access to authentic language materials, increased motivation, and opportunities for interaction with native speakers and peers. These advantages were positively rated by students, indicating a consensus on the value of CALL for language learning. However, areas such as customisation to individual needs evinced more variability in responses, suggesting room for improvement in adapting CALL tools to diverse learning preferences. The next chapter examines how CALL impacts specific language skills, such as reading, writing, listening, and speaking, through both student and lecturer perspectives, and evaluates the integration of CALL in teaching practices.

CHAPTER FIVE

FACTORS AND CHARACTERISTICS IDENTIFIED BY THE USERS OF CALL THAT BEST SUPPORT THEIR LANGUAGE LEARNING

RESEARCH QUESTION 2

5.1 INTRODUCTION

This chapter addresses the second research question of the study, which seeks to explore the factors and characteristics identified by students and lecturers that best support effective language learning through Computer-Assisted Language Learning (CALL) in Namibian higher education. The focus of this chapter is to identify the tools, instructional strategies, environments, and learning modalities within CALL that contribute to improved student engagement, enhanced skill acquisition, and better learning outcomes. Understanding these supportive elements is crucial for informing the development of context-specific digital language learning models.

Research Question 2

What are the factors and characteristics identified by users of CALL that best support their language learning?

To address this question, the chapter is guided by the following sub-objectives:

For Students:

- To examine students' familiarity with and perceptions of LMS platforms as foundational CALL tools.
- To assess the perceived user-friendliness and accessibility of CALL environments.

- To identify which language skills students believe are most enhanced by CALL tools.
- To analyse students' views on the interactive features and feedback mechanisms within CALL that support their learning.

For Lecturers:

- To investigate preferred assessment strategies and how these support language learning in CALL contexts.
- To explore lecturers' perspectives on student engagement and performance using CALL compared to traditional methods.
- To understand how CALL supports diverse learning needs and inclusive practices.
- To identify limitations and challenges that may hinder CALL's effectiveness.
- To evaluate the perceived effectiveness of blended approaches combining CALL with face-to-face instruction.

5.2 STUDENTS' FAMILIARITY WITH LEARNING MANAGEMENT SYSTEMS (LMS)

In this part of the study, students were asked to respond to the question: Which of the following Learning Management Systems (LMS) are you familiar with? A LMS is a digital platform designed to support, manage, and deliver educational content and resources online. It provides a structured environment where students can access course materials, submit assignments, engage in discussions, participate in assessments, and communicate with instructors and peers. Examples of popular LMS platforms include Blackboard Learn, Canvas, Moodle, Brightspace, and Google Classroom.

In the context of CALL, an LMS is highly relevant because it serves as a foundational tool for delivering language-learning resources, activities, and assessments in an accessible, organised

manner. LMS platforms support various multimedia elements such as audio, video, and interactive exercises that are essential in language learning, allowing students to engage with content that enhances listening, reading, speaking, and writing skills. They also offer a collaborative space where students can practice language skills through real-time discussions and receive timely feedback from instructors.

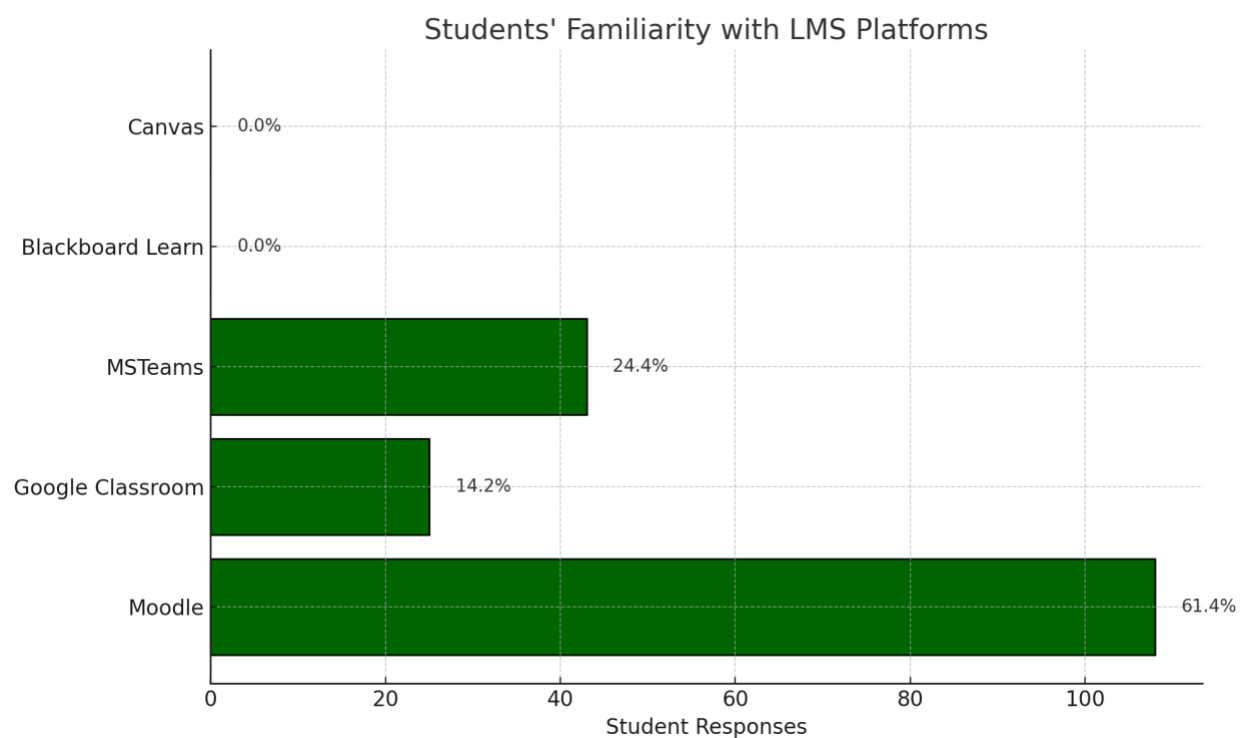


Figure 5.1: Student Familiarity with Learning Management Systems (LMS)

The findings reveal a structured and focused approach to LMS usage within the university. The data shows that the majority of students 61.4% (108) are most familiar with Moodle, indicating that it is the primary LMS at the two institutions under study. This high familiarity suggests that Moodle plays a central role in course delivery, likely serving as the main platform for assignments, lectures, and resource distribution. In addition to Moodle, Microsoft Teams (MSTeams) is

relatively well-known among students, with 24.4% (43) of them indicating familiarity with this platform. Although not as widely recognised as Moodle, MSTeams appears to serve as a complementary tool within the university's learning ecosystem. Its usage likely centres on collaboration, video meetings, and group work, providing functionality that supplements the more traditional course management features of Moodle. This dual use of Moodle and MSTeams suggests a blended approach to digital learning, where Moodle handles core course content and MSTeams facilitates interactive, synchronous, or project-based learning activities.

Students evinced limited familiarity with Google Classroom with only 14.2% (25) of them indicating that they are aware of it. This lower percentage suggests that Google Classroom is either selectively used in specific courses or departments or is only intermittently incorporated by individual faculty members. Its role appears to be minor compared to Moodle and MSTeams.

The absence of familiarity with Blackboard Learn and Canvas is notable. With 0% (0) of students reporting familiarity with these platforms, it is evident that they are either not used or not widely recognised at the two universities. This lack of exposure to Blackboard and Canvas suggests a streamlined LMS environment focused on Moodle, MSTeams, and, to a lesser extent, Google Classroom.

5.3 STUDENTS' RATINGS OF LMS USER-FRIENDLINESS

This part of the study examines the user-friendliness of the LMS platforms used by students at UNAM and NUST. The LMS used at UNAM and NUST is a digital platform designed to support and enhance educational experiences by providing students and instructors with an integrated, accessible online environment for course management and learning activities. Students were asked to respond to the question: How would you rate the user-friendliness of the Learning Management

System (LMS) software you use? This LMS facilitates various aspects of coursework, including content delivery, assignment submission, grading, and feedback. It includes features such as discussion boards, real-time messaging, and multimedia support to foster interaction and engagement between students and faculty. With tools for organising and tracking progress, the LMS serves as a central hub for academic resources, simplifying access to course materials, schedules, and announcements. Moreover, the LMS is optimised for diverse devices, allowing students to engage with their coursework from any location, which is especially valuable in fostering flexibility and accommodating different learning styles and schedules. The university's LMS aims to streamline the educational process, promote collaboration, and improve access to learning resources, supporting a more interactive and adaptable academic experience.

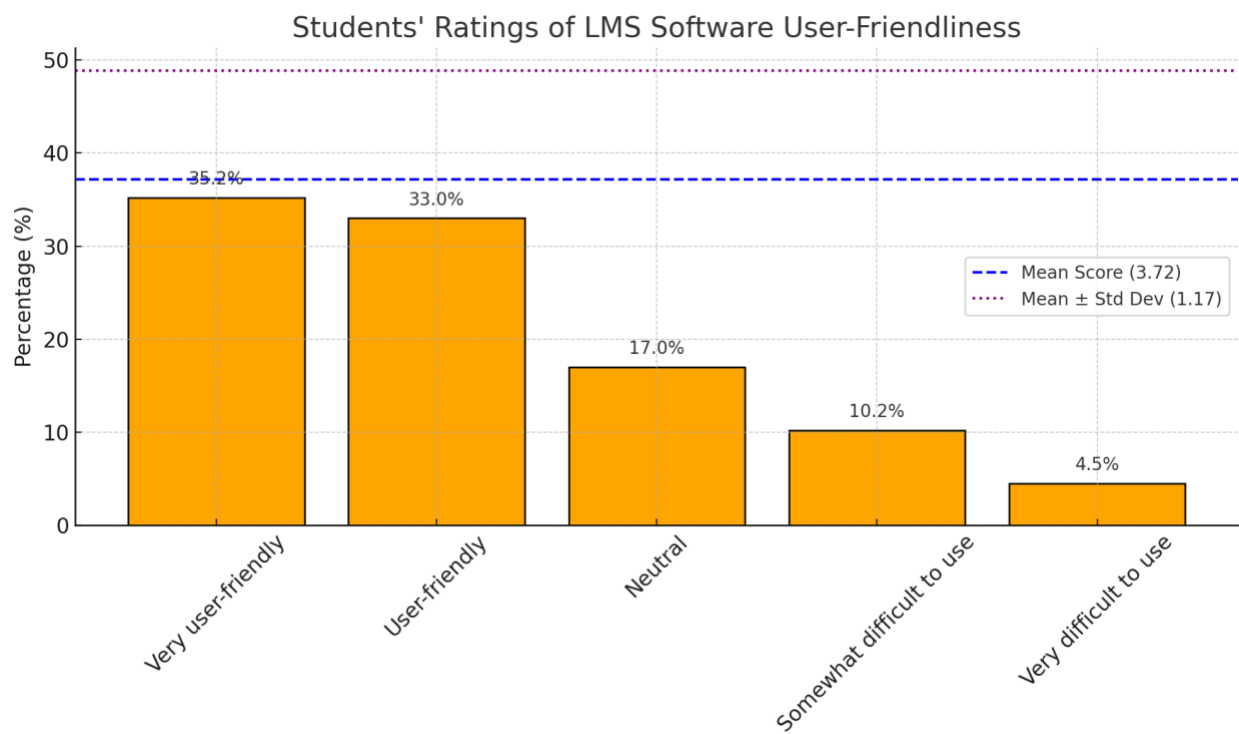


Figure 5.2: Students' ratings of LMS user-friendliness

Students were asked to rate the user-friendliness of their LMS (Moodle, Microsoft Teams), and the responses revealed a generally positive experience, with room for improvement among some users. The majority of students reported satisfaction with the software: 35.2% rated it as "Very user-friendly," while another 33.0% rated it as "User-friendly." This means that 68.2% of students found the LMS to be easy to use, suggesting that its design and functionality align well with the expectations and needs of most users.

The average rating across all responses was 3.72, indicating that, on balance, students view the LMS positively, leaning toward "User-friendly" rather than 'Neutral' or 'Difficult'. This average rating suggests that while the LMS is broadly accessible, it may not be universally ideal, as a segment of students rated their experience differently. Specifically, about 17.0% of the students rated the LMS as "Neutral", signaling that this group neither found it particularly intuitive, nor frustrating. This neutrality may reflect a middle-ground experience where certain functionalities meet basic expectations without exceeding them, potentially suggesting that while the system is serviceable, it may lack features that enhance the user experience for all students.

On the other end of the spectrum, 10.2% of students rated the LMS as "Somewhat difficult to use," and 4.5% found it "Very difficult to use." While these percentages represent a smaller portion of the respondents, they still indicate that roughly 15% of users experienced challenges significant enough to detract from their overall experience. This portion of responses could stem from various factors, such as specific usability issues, complexity in accessing particular features, or gaps in user support resources. For these students, the LMS may not align well with their preferred navigation or interaction styles, which could hinder their overall engagement with the software.

The standard deviation of 1.17 indicates moderate variability in student experiences, showing that while most students are satisfied, there is a considerable range of opinions on usability. This variation stresses that while the LMS succeeds in meeting general needs, it may not fully address the preferences or technical fluency of the entire student population. Differences in familiarity with similar software, diverse learning preferences, and potential technical skill levels might contribute to this spread in ratings.

5.4 LANGUAGE SKILLS ENHANCED BY CALL

This section focuses on the students' perceptions of which language skills are most effectively enhanced by CALL. Students were asked to identify which language skills, amongst, speaking, listening, reading, writing, or a combination of all of them, that they believe can be improved through the use of CALL tools. This question examines how students evaluate the role of CALL in improving their language abilities, showing the areas where CALL is seen as most beneficial. The responses help to establish whether CALL is perceived as supporting comprehensive language development or whether its impact is more focused on particular skills.

5.4.1 Frequency distribution for language skills

Frequency distribution for language skills is a statistical method used to display how often each rating (or level of importance) is assigned to language skills namely, Speaking, Listening, Reading, and Writing. It provides a breakdown of how many students rated each skill at various levels of importance (from "Very Important" to "Not Important"). Students were presented with the question: How do you rate the importance of the following language skills? This distribution helps identify which skills students collectively prioritise, revealing patterns in their perceived

importance. In this study, frequency distribution data is valuable for designing targeted language programmes.

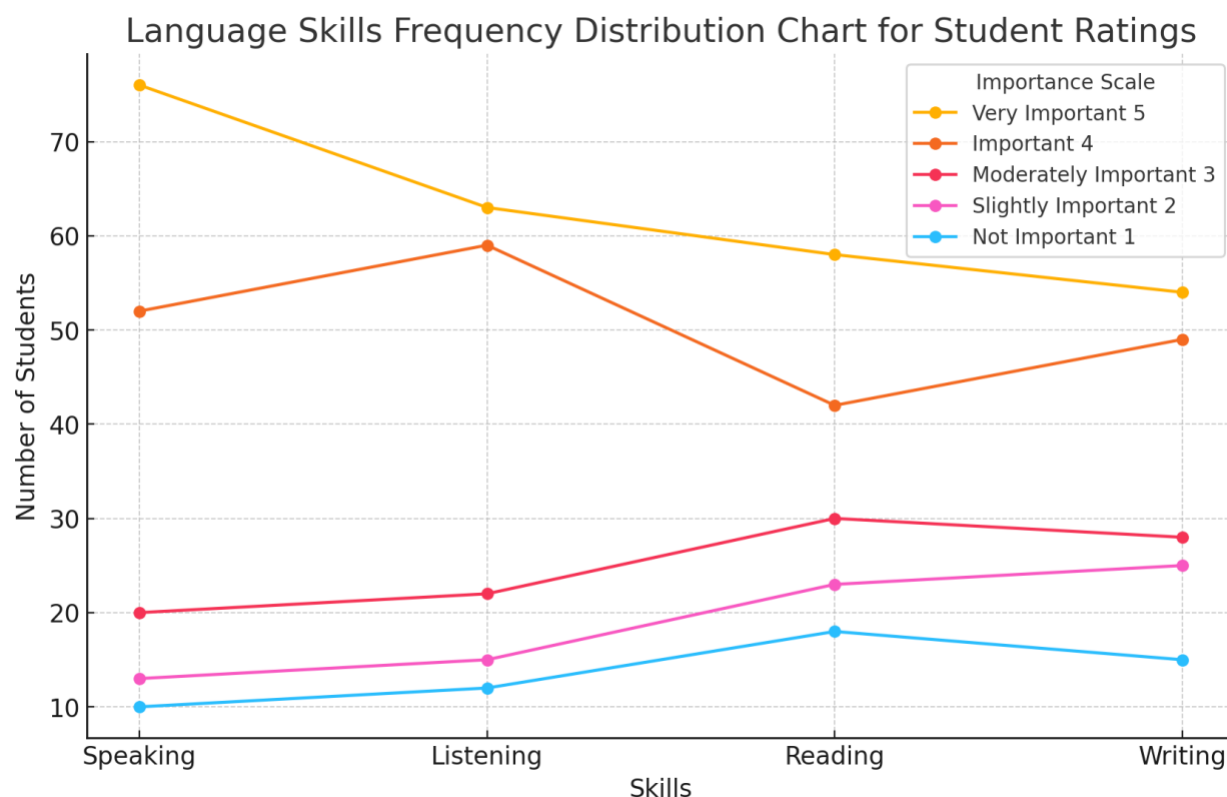


Table 5.3 Language Skills Frequency Distribution Chart for Student Ratings

The findings indicate that students assign differing levels of importance to language skills, with a pronounced focus on those essential for real-time communication. ‘Speaking’ emerged as the most valued skill, with 44.4% (76) of the students rating it as "Very Important" and 30.4% (52) rating it as "Important". Similarly, ‘Listening’ was highly rated, by 36.8% (63) of the students as "Very Important" and by 34.5% (59) of the students as "Important". These results indicate that over 70% of the students prioritise verbal and auditory skills, indicating a strong preference for competencies critical in direct interactions.

It was observed that 'Reading' and 'Writing' were rated less frequently as "Very Important," with 33.9% (58) and 31.6% (54) selecting this top rating, respectively. Additionally, 24.6% (42) rated 'Reading' as "Important," and 28.7% (49) of them did the same for 'Writing'. This frequency distribution suggests that students perceive 'Reading' and 'Writing' as less crucial in immediate interaction contexts, viewing them as supportive skills rather than primary.

Furthermore, a cumulative look at the ratings indicates a broader spread for Reading and Writing across the "Moderately Important" and "Slightly Important" categories, implying that while students value these skills, they are seen as complementary rather than essential. For example, 17.5% (30) rated 'Reading' as "Moderately Important," and 16.4% (28) rated 'Writing' similarly. This cumulative frequency supports the notion that these skills serve an ancillary role in language acquisition.

The frequency distribution shows a high number of students rating 'Speaking' and 'Listening' as "Very Important". CALL programmes can prioritise interactive speaking and listening modules that foster real-time communication skills. 'Reading' and 'Writing' have lower importance frequencies, CALL can incorporate these skills as supplementary activities, reinforcing them as supportive skills without overshadowing the primary focus on verbal and auditory learning.

5.4.2 Mean Scores for language skills as rated by students

Mean scores for language skills, as rated by students, represent the average importance assigned to each skill (such as Speaking, Listening, Reading, and Writing) based on student perceptions. In this context, higher mean scores for 'Speaking' and 'Listening' suggest that these skills are viewed as more essential for effective communication, particularly in interactive, real-time situations within a learning environment. In this context, language skills enhanced by CALL programmes,

which focus on enhancing communicative competence through interactive digital tools, CALL can be effectively tailored to emphasise high-importance skills such as speaking and listening, through exercises that simulate real-life conversations and auditory comprehension tasks. At the same time, CALL programmes can support reading and writing through structured activities that reinforce foundational language skills, allowing students to build competencies across all skill areas, in a balanced way that supports their perceived needs.

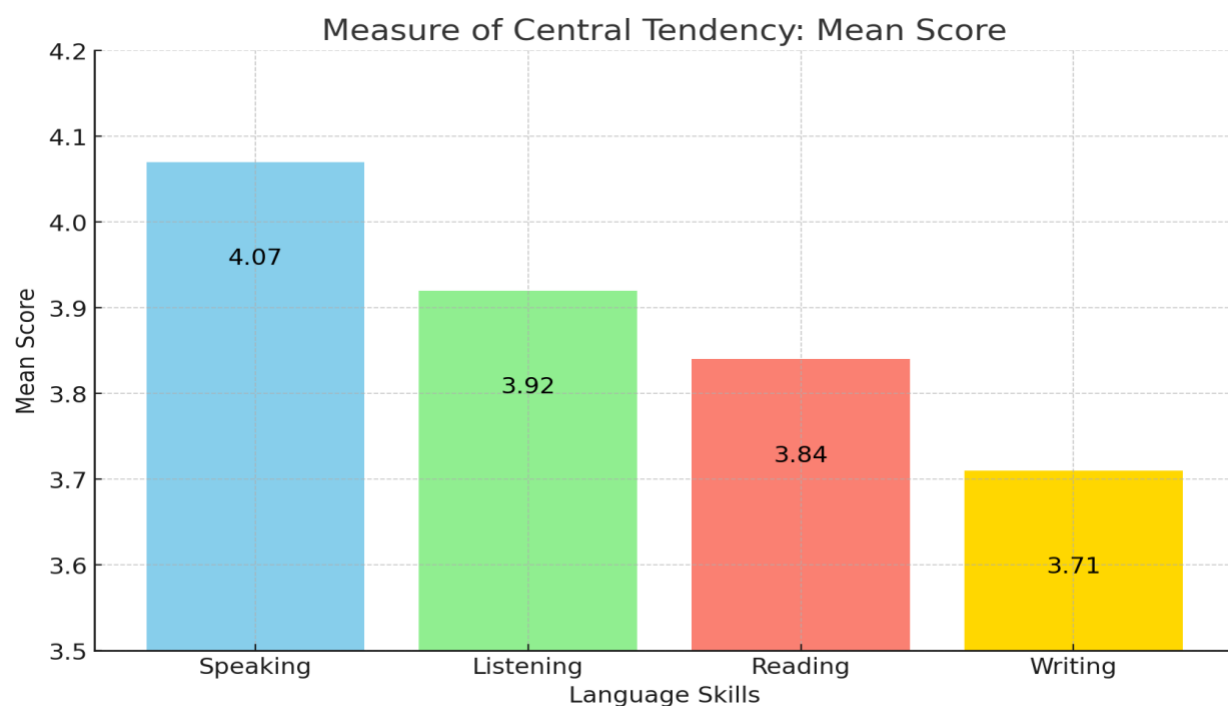


Figure 5.4: Mean Scores for language skills as rated by students

Results for the measure of central tendency for language skills as rated by students indicate that ‘Speaking’ and ‘Listening’ are perceived as the most important skills within the university context. ‘Speaking’ received the highest mean score of 4.07, suggesting that students prioritise this skill as essential for effective verbal communication and engagement in a multilingual environment. ‘Listening’ closely followed with a mean score of 3.92, reinforcing the importance that students place on comprehension and auditory skills for real-time interaction.

It was observed that ‘Reading’ and ‘Writing’ were rated slightly lower, with mean scores of 3.84 and 3.71, respectively. This pattern suggests that, while these skills are valued, they may be seen as supportive rather than primary in contexts where immediate communication is necessary. The slightly lower mean scores for ‘Reading’ and ‘Writing’ imply that students regard these skills as helpful for foundational understanding and knowledge acquisition, but not as critical for day-to-day, practical use in interactive settings.

5.5 ASSESSMENT STRATEGIES FOR EVALUATING STUDENT LEARNING

The purpose of this section is to explore the methods that lecturers prefer to use to assess their students' understanding and progress. In identifying which assessment strategies are favored, the study seeks to understand how educators approach the measurement of learning outcomes and which techniques they believe best capture student achievement and growth. This section evaluates the diversity in assessment preferences used by lecturers. Understanding these preferences can reveal how lecturers balance objective and subjective evaluation techniques, such as tests and essays versus projects and self-reflections. Participants were asked the following question: How frequently do you use the following assessment strategies in your teaching?

Table 5.1: Assessment Strategies used by lecturers

Assessment Strategy	Lecturer Responses	Percentage (%)
Traditional assessments (e.g., tests, essays)	6	23.1
Self-assessments (e.g., reflections, peer evaluations)	3	11.5
Rubric-based assessments (e.g., grading criteria for tasks)	4	15.4
Formative assessments (e.g., quizzes, check-ins)	6	23.1
Summative assessments (e.g., Final Exams, End-of-Course Projects, Standardized Tests)	7	26.9
Total	26	100%

The findings indicate that lecturers employ a range of assessment strategies to evaluate the effectiveness of CALL in supporting language acquisition, with a clear emphasis on summative, traditional, and formative assessments. Summative assessments, preferred by 26.9% (7) of lecturers, are viewed as effective for measuring cumulative language skills, such as fluency, comprehension, and vocabulary acquisition, at the end of a course. This preference suggests that lecturers place value on objective, comprehensive evaluations in assessing overall language proficiency, which aligns well with CALL's structured approach to building foundational language competencies over time.

Traditional assessments, selected by 23.1% (6) of respondents, are also widely utilised. In the context of CALL, traditional methods, such as tests and essays, allow instructors to evaluate specific language skills in grammar, vocabulary, and syntax through controlled, formal assessments. This approach is particularly compatible with CALL's emphasis on repetitive practice, structured exercises, and reinforcement of core language principles, enabling lecturers to gauge student mastery of discrete language components.

Formative assessments were chosen by 23.1% (6) of lecturers who indicated the importance of continuous monitoring and feedback in CALL environments. These assessments allow instructors to assess students' incremental progress, facilitating timely interventions and instructional adjustments as students engage with digital language-learning tools. Formative assessments, which may include quizzes, check-ins, and interactive CALL exercises, support the iterative nature of language learning, providing students with ongoing opportunities to improve through immediate feedback.

Rubric-based assessments, opted for by 15.4% (4) of lecturers, emphasise the role of transparent, criteria-driven evaluation in language learning. Rubrics offer structured criteria for assessing complex language tasks, such as writing, speaking, and pronunciation, allowing instructors to measure specific dimensions of language proficiency in a standardised manner. In a CALL context, rubrics can be applied to multimedia projects, oral presentations, and written assignments, where distinct elements like clarity, coherence, and pronunciation are essential for accurate evaluation of communicative competence.

Self-assessments, while less frequently used at 11.5% (3), indicate that lecturers see limited application for student-led evaluation in CALL. This may stem from the belief that language learners, particularly at lower proficiency levels, may lack the self-awareness to accurately assess their skills. However, the presence of self-assessment tools in CALL, such as progress trackers or vocabulary checks, suggests that these are valued as supplementary tools, encouraging self-reflection and promoting autonomous learning within a structured environment.

The findings further suggest that lecturers perceive summative, formative, and traditional assessments as most effective for evaluating language learning in CALL contexts, providing a balanced approach that includes both comprehensive evaluations and continuous feedback. Rubric-based assessments support nuanced evaluation of language skills, while self-assessments serve as auxiliary tools for student self-reflection.

5.6 COMPARISON OF STUDENT ENGAGEMENT AND OUTCOMES WITH CALL VS. TRADITIONAL METHODS

One of the key areas of interest in the study is whether CALL fosters greater student engagement and improved learning outcomes compared to traditional methods of language teaching. This

section explores lecturers' perspectives on student engagement and improved learning outcomes. Lecturers were asked “to compare the levels of student engagement and the learning outcomes they observe when using CALL tools versus traditional face-to-face teaching methods”. Responses from this question were analysed and these five themes emerged; increased engagement through interactivity, enhanced learning outcomes through feedback, supporting diverse learning needs, challenges and limitations of CALL, comparative analysis of effectiveness: blending CALL with traditional methods. This question aims to determine whether CALL is viewed as a superior, complementary, or supplementary tool for language learning, based on its impact on students' motivation, participation, and performance in language courses.

5.6.1 Increased Engagement Through Interactivity

30.8% (8) of lecturers observed that CALL tools with interactive and multimedia features significantly increase student engagement. Interactivity and multimedia content are essential elements within CALL tools, enhancing engagement by enabling active student participation through quizzes, simulations, and other engaging tasks. Multimedia content, which includes videos, audio, and visual aids, makes the learning process more dynamic and visually stimulating, adding layers of interest that are not as easily achieved within traditional classrooms. Elements such as multimedia content, and quizzes appear to make learning more appealing and immersive compared to traditional methods. However, while these tools enhance engagement for many students, some still prefer the familiarity and motivation of in-person settings. This theme discusses CALL's strength in making language learning more dynamic and visually stimulating, which can sustain student interest. Participants' P1, P3, P7, P18 and P30 responded as follows.

P1: "My students seem more engaged when using digital tools because of the interactive elements, although a few struggle when technical issues arise."

P3: "I notice a difference in participation levels with online tools; they're generally more active, though some still appreciate the familiarity of face-to-face discussions."

P7: "With multimedia content, students just seem more interested. It's harder to bring that same level of engagement into a traditional classroom."

P18: "With so many options and tools, keeping students interested feels easier. It takes a lot more planning to achieve that same level of interest in a traditional class."

P30: "Interactive quizzes keep them interested, but a few still need the kind of motivation that comes with being in a physical classroom."

26.9% (7) lecturers emphasised the impact of these interactive features on student motivation and interest. P1 noted that “students seem more engaged when using digital tools because of the interactive elements,”. Of course, P1 also acknowledges that some students occasionally experience technical challenges, which can briefly disrupt the learning flow. This comment reflects the mixed response from students, with many thriving on the interactivity of CALL, but occasionally facing technical barriers that need to be addressed for smoother learning experiences.

The adaptability of CALL tools in keeping students interested was also emphasised. For example, P3 observes that online tools lead to “a difference in participation levels” with “generally more active” student engagement, although some students still “appreciate the familiarity of face-to-face discussions.” This observation suggests that while CALL offers a novel and effective way of

sustaining engagement, it may work best as part of a blended approach, balancing digital engagement with the social and motivational benefits of in-person learning.

Additionally, P7 described how multimedia content draws students' interest, noting that "it's harder to bring that same level of engagement into a traditional classroom". This response highlights CALL's strength in creating a dynamic and visually engaging learning environment that can capture and sustain student attention effectively. The flexibility and variety offered by multimedia in CALL creates an environment that can adjust to diverse student preferences, offering tailored experiences that hold their interest over time.

Further to that, P18 highlighted the ease with which CALL tools can retain student attention, stating that "with so many options and tools, keeping students interested feels easier." However, they also mentioned that replicating this level of engagement requires significantly more effort in a traditional setting, suggesting that CALL not only enhances engagement but also offers a practical solution for lecturers seeking efficient methods to captivate students.

P30 reflected on how interactive quizzes, a common feature in CALL, actively engage students, noting that "interactive quizzes keep them interested". However, they also pointed out that "a few still need the kind of motivation that comes with being in a physical classroom," implying that for some students, face-to-face interaction is an important complement to digital engagement.

5.6.2 Enhanced Learning Outcomes Through Feedback

Another prominent theme emerging from the qualitative data is that of the role of CALL in enhancing learning outcomes by providing immediate feedback and allowing students to learn at their own pace. 23.1% (6) lecturers observed that instant feedback within CALL tools enables students to quickly identify and address their mistakes, which helps them stay on track and

reinforces their learning more effectively. Additionally, self-paced learning in CALL environments supports vocabulary retention and allows students to grasp complex grammar, as they can revisit difficult material without being bound by the constraints of a traditional classroom setting.

P8: "The instant feedback is a game-changer; students see where they need to improve right away, which keeps them on task."

P10: "Vocabulary retention has improved because students get to learn through different types of content like videos and quizzes, which make it more memorable."

P13: "I see students exploring materials at their own pace, which has improved their understanding of complex grammar. They couldn't get the same individualized attention in a large, traditional class."

P15: "The ability to repeat and review lessons has been invaluable, and it's something that's just not as easy to implement in a traditional class setting."

P19: "Tracking their own progress motivates students a lot; they like seeing their achievements. Traditional methods just don't offer the same type of feedback."

P23: "It's interesting; students tend to meet deadlines more often with online assignments. I think it's because the platform structures the tasks so clearly."

P8, P10, P13, P15, P19 and P23 responded on the value of immediate feedback, which they viewed as instrumental in promoting active learning. Participant P8 described this feature as a “game-changer,” emphasising that “students see where they need to improve right away, which keeps

them on task.” This demonstrates how timely feedback allows students to focus on areas of improvement without waiting for instructor input, thereby creating a more efficient learning environment where progress is continuous and guided by clear, immediate feedback.

Feedback in the form of multimedia tools also enhances memory retention, particularly for vocabulary, as noted by P10. According to this participant, “vocabulary retention has improved because students get to learn through different types of content like videos and quizzes, which make it more memorable.” This comment underscores the importance of varied content formats, which cater to different learning styles and make language concepts “stick” more effectively than they might in a traditional setting.

Self-paced learning is another feature that lecturers found advantageous for students’ understanding of complex material. P13 observed that students “explore materials at their own pace,” which has enhanced their grasp of “complex grammar.” The participant pointed out that students are unlikely to receive the same level of individualised attention in larger, traditional classroom environments, where fixed schedules limit the time available for personalised support. This flexibility allows students to spend additional time on challenging areas, ensuring they build a solid foundation before progressing.

The repetitive and reviewable nature of CALL content also benefits students, as expressed by P15, who stated that “the ability to repeat and review lessons has been invaluable,” a feature that “isn’t as easy to implement in a traditional class setting.” This statement emphasises CALL’s advantage in supporting long-term retention, as students can revisit lessons as often as necessary to reinforce their understanding. The possibility to review materials at will provides students with opportunities to solidify their knowledge, ultimately enhancing their learning outcomes.

P19 added that students feel motivated by tracking their own progress within CALL platforms, observing that “they like seeing their achievements,” which traditional methods “just don’t offer.” The ability to monitor progress in real time provides students with a sense of accomplishment and drives further engagement, indicating that CALL can foster a more self-motivated learning approach. This tracking feature adds an additional layer of feedback, enabling students to see their cumulative progress and stay engaged with the material.

P23 noted an increase in student compliance with assignment deadlines in the CALL environment, remarking that “students tend to meet deadlines more often with online assignments” due to the clear structure that the platform provides. This observation suggests that CALL’s organised presentation of tasks encourages students to stay on schedule and complete assignments promptly, supporting a more structured approach to self-directed learning.

5.6.3 Supporting Diverse Learning Needs

The theme of supporting diverse learning needs emerged as a crucial benefit of CALL, with 34.6% (9) lecturers emphasising how its flexibility caters to varied student profiles and learning styles. CALL’s adaptable structure allows students to learn at their own pace, which is advantageous for students who may need extra time, such as those who struggle with certain language skills or are less confident in traditional settings. Additionally, CALL environments seem to encourage engagement from shy students or those with disabilities, who might find it challenging to participate fully in face-to-face classrooms. This capacity to accommodate individual preferences makes CALL an inclusive and effective approach for diverse learners. Participants responded to the theme by providing the following responses:

P2: "It's amazing to see how some students really flourish with the option to work at their own pace. It's improved outcomes for those who need that extra practice."

P6: "Listening and pronunciation skills are improving thanks to these tools, though in-person classes still offer more natural opportunities for spontaneous speaking practice."

P14: "Interestingly, shy students seem to engage more online. The digital environment might make them feel more comfortable participating."

P20: "The self-paced format is great for students who need more time, but some of the faster learners sometimes feel a little held back."

P21: "Engagement levels vary depending on the student's comfort with technology. Those who are less tech-savvy often struggle and need more support."

P26: "Some students are more comfortable asking questions in a digital setting. The anonymity seems to make them feel freer to clarify doubts."

34.6% (9) of lecturers observed that students needing additional practice and time to master concepts benefit from the self-paced structure of CALL. P2 highlighted this, noting, "It's amazing to see how some students really flourish with the option to work at their own pace," which has "improved outcomes for those who need that extra practice." This comment reflects how CALL's flexibility can enable slower-paced learners to engage meaningfully without feeling rushed, fostering a deeper understanding that may be difficult to achieve in a fast-paced traditional classroom setting.

Another advantage of CALL is its impact on specific language skills, such as listening and pronunciation. P6 remarked that “listening and pronunciation skills are improving thanks to these tools,” which provide targeted practice opportunities. This feedback suggests that CALL allows for focused development of particular skills that may not receive as much individual attention in larger, traditional classrooms. However, this participant also noted that in-person settings still offer more natural contexts for spontaneous speaking practice, pointing to a complementary relationship between CALL and traditional methods.

The theme of inclusivity in CALL is further supported by observations of increased participation among students who are typically less engaged in traditional settings. P14 noted that “shy students seem to engage more online,” speculating that “the digital environment might make them feel more comfortable participating.” This observation highlights how CALL’s structured, less visible environment can reduce social anxiety, enabling students who are less comfortable speaking in front of peers to participate more actively and build confidence in their language skills.

Self-paced learning in CALL also allows students to engage according to their comfort and skills levels, although it can present challenges for faster learners. P20 observed that “the self-paced format is great for students who need more time,” though it may occasionally “hold back” more advanced learners who are ready to progress faster. This feedback underscores the importance of flexibility within CALL, allowing learners to control their pace while recognising that tailored guidance might be necessary for higher-performing students to keep them engaged.

Technology comfort levels also play a role in students’ CALL experiences, as noted by P21. This participant explained that “engagement levels vary depending on the student’s comfort with technology,” with “less tech-savvy” students sometimes needing additional support. This feedback

highlights an essential consideration for CALL implementation: while the technology-driven nature of CALL can facilitate engagement and learning, some students may need extra assistance to navigate these platforms confidently, ensuring an equitable learning experience.

P26 pointed out another layer of inclusivity, sharing that some students feel more comfortable asking questions in digital settings where “anonymity seems to make them feel freer to clarify doubts.” This increased willingness to seek clarification may lead to a deeper understanding of the material, as students can address uncertainties without the fear of judgment. CALL thus not only supports varied learning speeds but also fosters a sense of safety and accessibility that encourages active participation.

5.6.4 Challenges and Limitations of CALL

While CALL provides notable benefits in language learning, 26.9% (7) lecturers identified a range of challenges and limitations that need to be addressed to optimise its effectiveness. These limitations include technical issues, reduced opportunities for spontaneous interaction, and challenges in maintaining student discipline. CALL’s dependence on technology means that even minor glitches can disrupt the learning experience, impacting the flow of lessons and student engagement. Additionally, the lack of face-to-face interaction may hinder organic discussions and collaborative learning, which are often easier to facilitate in traditional classroom settings. Some students also face difficulties with the self-discipline required for online learning, underscoring the importance of structured support and reliable technology in maximising the advantages of CALL. Participants responded with the following:

P5: "Individual engagement definitely seems higher with tech-based methods, but it's sometimes harder to facilitate effective group work compared to in-person sessions."

P11: "The autonomy is beneficial, but some students have trouble staying disciplined without the immediate presence of a teacher to guide them."

P12: "For open discussions and spontaneous exchange of ideas, traditional methods still have the upper hand. But when it comes to individualized practice, tech-based methods excel."

P16: "Engagement seems higher with the interactive tasks, though occasional technical glitches can throw off the flow."

P22: "The range of resources available online has definitely boosted learning outcomes for my students. They have so much more to explore than we could cover in a traditional classroom."

P24: "Online learning increases student autonomy, but I've noticed there's less student-to-student interaction compared to face-to-face sessions."

The respondents discussed the limitations of CALL in fostering collaborative learning. P5 observed that while "individual engagement definitely seems higher with tech-based methods," effective group work can be "harder to facilitate" than in face-to-face sessions. This demonstrates one of CALL's main challenges: while it enhances individual learning through personalised, self-directed tasks, it may fall short in supporting group interactions, which are crucial for building communication skills and teamwork in language learning. This limitation suggests that instructors may need to integrate structured group activities within CALL or use a blended approach to address this gap.

The issue of student self-discipline in CALL environments was also a recurrent theme among lecturers. P11 shared that while the autonomy provided by CALL is generally beneficial, “some students have trouble staying disciplined without the immediate presence of a teacher to guide them”. This observation reflects a challenge for many online learning platforms: the absence of in-person supervision may lead some students to struggle with time management and staying focused. Without a physical classroom setting, students may require additional motivation and strategies to maintain consistent engagement, suggesting that further support mechanisms, such as periodic check-ins, could be beneficial.

A related concern was the lack of spontaneous, open discussions in online settings. P12 noted that “for open discussions and spontaneous exchange of ideas, traditional methods still have the upper hand,” even though CALL is excellent for individualised practice. This response suggests that, while CALL can enhance personal skill-building, it may not fully replicate the dynamic discussions and immediate feedback that happen naturally in face-to-face classes. The absence of these spontaneous exchanges may limit students’ exposure to diverse perspectives and reduce opportunities for active learning, highlighting an area where traditional methods still hold a distinct advantage.

Technical issues, a common challenge in digital learning, were also identified as a limitation. P16 commented that “engagement seems higher with the interactive tasks,” but noted that “occasional technical glitches can throw off the flow.” This feedback underscores the importance of reliable technology for CALL’s success; even minor disruptions can impact lesson continuity, reducing the effectiveness of the learning experience. These observations emphasise the need for robust infrastructure and ongoing technical support to mitigate potential disruptions.

Despite these challenges, 36.7%(11) lecturers pointed out that the extensive range of resources available through CALL significantly enriches the learning experience. P22 mentioned that “the range of resources available online has definitely boosted learning outcomes,” giving students access to more materials than could typically be covered in a traditional classroom. However, P24 highlighted a drawback of this increased autonomy, noting that “online learning increases student autonomy,” but results in “less student-to-student interaction compared to face-to-face sessions.” This trade-off suggests that while CALL provides valuable resources and fosters independent learning, it may reduce the sense of community and peer support that is often integral to classroom-based education.

5.6.5 Comparative Analysis of Effectiveness: Blending CALL with Traditional Methods

A recurring theme in the qualitative findings was the effectiveness of combining CALL with traditional methods, as 15.9% (4) of lecturers observed that this hybrid approach leverages the strengths of both digital and in-person learning environments. By blending CALL’s flexibility and diverse resources with the interpersonal benefits of face-to-face instruction, educators can create a balanced and comprehensive educational experience. This model, which allows students to access materials from home while participating in interactive classroom activities, is especially beneficial for improving attendance, engagement, and performance. Participants responded in the following ways:

P9: "Attendance rates have actually gone up since we started using these tools. I think the flexibility of learning from home helps minimise distractions."

P17: "The low-stakes environment that tech-based methods offer gives students a space to experiment with language. I think it's helped build their confidence."

P25: "Being able to conduct formative assessments digitally has made tracking engagement so much easier, and the data comes in real-time, which is helpful."

P27: "Blending online tools with in-person classes has brought the best results. Both approaches have strengths, and together, they create a more balanced learning experience."

P28: "Homework assignments done online seem to stick better in their minds. Maybe it's the flexibility to engage with the material when they're ready that helps."

P29: "With online tools, I can introduce real-world language resources, which keeps them interested and shows them how language skills apply outside the classroom."

81% (21) of lecturers noted that CALL's flexibility enables students to learn in ways that suit their personal schedules and environments, which in turn positively impacts attendance. P9 observed that "attendance rates have actually gone up since we started using these tools," attributing this to "the flexibility of learning from home," which minimises distractions. This comment highlights one of the hybrid model's advantages: that, when students can access learning materials and assignments remotely, they are more likely to stay engaged and attend consistently. This approach provides an adaptable learning structure that can accommodate students' varied schedules and personal needs, making it easier for them to stay on track.

In addition to improving attendance, the blended model supports student confidence and motivation by providing a low-stakes environment for language experimentation. P17 noted that "the low-stakes environment that tech-based methods offer gives students a space to experiment with language," which has helped to "build their confidence." This response illustrates the value

of CALL as a tool for self-directed exploration, where students can practice language skills without fear of immediate evaluation. When combined with traditional, in-person feedback, this approach helps students to internalise language concepts more confidently.

Tracking and assessing student engagement is also more manageable in a blended model, as CALL offers digital tools for real-time feedback. P25 indicated this benefit, sharing that “being able to conduct formative assessments digitally has made tracking engagement so much easier,” with the added advantage of “real-time” data. This aspect of CALL enables lecturers to monitor student progress closely, allowing them to identify areas where additional support might be needed. The ability to collect ongoing engagement data allows educators to tailor their instruction based on individual student needs, thereby enriching the traditional learning environment with data-informed support.

The complementary nature of blended learning was a common theme, as reflected by P27, who observed that “blending online tools with in-person classes has brought the best results.” This participant noted that each approach “has strengths,” and that using both “creates a more balanced learning experience.” This statement suggests that while CALL excels in providing flexibility and access to diverse resources, traditional methods offer essential social and communicative interactions that are harder to replicate online. Together, they form a balanced approach that optimally supports language learning.

Blended learning also reinforces student retention of material, particularly with flexible homework assignments that students can complete when they are most ready to engage. P28 mentioned that “homework assignments done online seem to stick better in their minds,” attributing this to “the flexibility to engage with the material when they’re ready.” This perspective underscores the

benefit of allowing students to review material on their own terms, fostering a more personalised and effective learning process that aligns with individual schedules and readiness.

The hybrid approach enables lecturers to integrate real-world language resources, making learning more relevant and engaging. P29 explained that “with online tools, I can introduce real-world language resources,” which not only “keeps them interested” but also “shows them how language skills apply outside the classroom.” This demonstrates that CALL can bridge the gap between theoretical learning and practical application, helping students to see the real-world value of their language skills. This alignment with real-world contexts is particularly effective in making learning meaningful and motivating students to apply their knowledge.

5.7 SUMMARY

Chapter five examined the effectiveness of CALL in fostering language acquisition within Namibian higher education. The primary focus of the chapter was on assessing how CALL tools contributed to the development of essential language skills; speaking, listening, reading, and writing and how these tools influenced students' learning experiences and lecturers' instructional approaches. Through both quantitative and qualitative data, the chapter sought to clarify the extent to which CALL supplemented or enhanced traditional language teaching methods, particularly by examining CALL's impact on students' opportunities for practice, interactivity, and self-directed learning.

In addition to evaluating CALL's impact on language proficiency, the chapter investigated the factors that affected CALL's integration into language education, specifically regarding accessibility, usability, and digital literacy among students and lecturers. It discussed lecturers' perspectives on instructional design and assessment strategies, exploring the ways they

incorporated CALL into their teaching, the challenges they encountered, and the methods they found most effective for evaluating language learning outcomes in a CALL environment. The chapter provided a nuanced understanding of CALL's role in Namibian higher education, showing how technology-driven language instruction could be structured to support broader educational objectives. The next chapter analyses the barriers to the effective delivery of CALL in Namibian higher education.

CHAPTER SIX

BARRIERS TO THE DELIVERY OF COMPUTER-ASSISTED-LANGUAGE LEARNING (CALL)

RESEARCH QUESTION 3

6.1 INTRODUCTION

This chapter addresses research question 3 of the study, which explores the barriers that hinder the effective delivery and integration of CALL in Namibian higher education institutions. Drawing on responses from both students and lecturers, this chapter examines how factors such as socio-economic status, access to technology, institutional infrastructure, and pedagogical readiness affect the use of CALL tools in language education. Understanding these obstacles is critical to identifying the gaps that must be addressed to create an inclusive, equitable, and supportive environment for CALL integration.

Research Question 3:

What are the barriers that hinder the effective delivery of Computer-Assisted Language Learning (CALL) in Namibia's higher education institutions?

To answer this question, the chapter is guided by the following sub-objectives:

For Students:

- To examine how socio-economic background affects access to CALL tools, including devices, internet connectivity, and study environments.
- To identify technical and infrastructural barriers that limit student engagement with CALL platforms.
- To explore students' perceived institutional limitations and suggestions for improving CALL delivery and accessibility.

- To assess how psychological and emotional factors related to digital inequality affect student participation in CALL.

For Lecturers:

- To investigate how socio-economic disparities among students influence equitable access to CALL in teaching practice.
- To identify institutional and technical challenges that hinder the effective implementation of CALL in language teaching.
- To explore lecturers' perspectives on infrastructure, curriculum alignment, training needs, and student engagement as barriers to CALL delivery.
- To evaluate how CALL-related challenges impact learning continuity, assessment, and academic performance in diverse classroom settings.

6.2 IMPACT OF SOCIO-ECONOMIC BACKGROUND ON ACCESS TO CALL TOOLS

Socio-economic background often plays a significant role in determining access to educational resources, and this section explores how it affects students' access to CALL tools. Students were asked to respond to the question, "How has your socio-economic background impacted your access to CALL tools?" This question examines the extent to which socio-economic factors, such as family income, educational resources at home, and access to technology, influence students' abilities to engage with CALL. The analysis helps to determine whether disparities in socio-economic status contribute to unequal access to CALL, and what implications this has for the effectiveness of CALL in language learning. The following five themes were identified: the impact of socio-economic background on access to CALL tools, limited access to devices and technology, inconsistent internet access, lack of dedicated study environments, dependence on external support and financial constraints. The themes were analysed below:

6.2.1 Limited Access to Devices and Technology

The theme of limited access to devices and technology emerged from the participants' responses when they were asked about barriers that hinder the effective delivery of CALL. These responses focus on students who face challenges in accessing devices or are restricted to shared or outdated equipment, impacting their ability to use CALL tools effectively. The following responses were given:

P1: "My family can't afford a personal laptop, so I rely on the campus computer lab, which is sometimes full, making it hard to get work done."

P6: "With my part-time job, I can only afford a basic smartphone. It's hard to keep up when most CALL resources work better on a computer."

P9: "We only have one shared family computer, so I don't always get time to use it when I need to study."

P12: "It's challenging because I don't have consistent access to devices. I rely on a friend's help sometimes, but it's not always possible."

P15: "I only get to use CALL tools at school. Once I'm home, I don't have the resources, which makes it hard to practice regularly."

P21: "I've had to rely on second-hand devices that don't always work well, which slows down my progress in language learning."

P22: "Sharing a single device with my siblings is hard, especially when everyone has their own assignments to complete."

Access to devices such as laptops, computers, or tablets is essential for effective engagement with CALL tools. However, a significant number, 82.1% (23) of students face barriers in this area, with limited or shared access to technology impacting their ability to use CALL tools consistently and independently. For example, some students, such as P1, rely on-campus computer labs, as their families cannot afford a personal laptop. The limited availability of these public resources often means competing with other students for access, leading to time constraints that prevent full engagement with CALL resources. Similarly, P9 highlighted the challenges associated with their situation where they rely on a shared family computer, which limits their time with CALL tools, as they must balance usage with other family members' needs.

Other students submitted that, even with devices, they may not be suitable for CALL activities. P6 explains that they can only afford a basic smartphone, which doesn't support many of the functions needed for effective language learning via CALL, such as larger text or more interactive, multimedia-based tools that are optimised for computers. This challenge reflects the economic limitations that prevent students from obtaining the right tools for the optimal use of CALL resources.

Another issue with limited device access is dependence on outdated or malfunctioning equipment, as noted by P21. This student mentions relying on second-hand devices that don't function reliably, slowing down their progress in language learning. Outdated technology can often be slower, more prone to technical issues, and less compatible with modern CALL software, which can impede the learning experience. These limitations hinder students from exploring the full potential of CALL, as they cannot consistently access the interactive, multimedia features that make CALL effective.

Some students such as P15 note that they only have access to CALL tools within the campus settings, such as computer labs, and once at home, they lack the resources to continue studying. This reliance on on-campus resources adds a layer of inconsistency, as students cannot reinforce their language skills outside of the classroom, limiting the continuity and effectiveness of their learning experience. Similarly, P22 describes the difficulty of sharing a single device with siblings, which restricts their access to CALL resources, especially when all family members have competing educational demands.

6.2.2 Inconsistent or Costly Internet Access

The theme of ‘inconsistent or costly internet access’ featured prominently when students were asked to respond to how their socio-economic backgrounds impacted their access to CALL tools. These responses reflect the students’ challenges with accessing reliable or affordable internet, which limits their use of CALL resources.

P2: "Internet at home is expensive, so I have to use public Wi-Fi or campus networks, which aren't always reliable."

P3: "It's been difficult without a stable internet connection. I sometimes have to visit a friend's place to get assignments done."

P4: "We don't have Wi-Fi at home, and mobile data is costly. This really limits how much time I can spend on language-learning apps."

P10: "I've missed out on some assignments because our electricity is unreliable, and I can't always charge my laptop."

P16: "Getting online is challenging. Sometimes I have to go to the library or a café with free Wi-Fi, but it's not ideal."

P17: "I use my phone data sparingly because it's costly, so I'm not able to access all the resources available."

P18: "Since my family prioritizes essentials, I don't always have data or an internet connection for extra study resources."

P20: "Even though I have a laptop, paying for data each month is tough, so I can't use CALL tools as often as I'd like."

P24: "With no internet at home, I feel like I'm missing out on so many tools that could really help me improve my language skills."

Reliable internet access is fundamental for the effective use of CALL tools, as it enables students to access online language resources, participate in interactive exercises, and benefit from real-time feedback. However, many students face challenges related to both the cost and reliability of internet access. P2 notes that high home internet costs mean they have to rely on less dependable public or campus Wi-Fi, which can be inconsistent and thus, limits when and where they can study. This inconsistent access to Wi-Fi adds a level of unpredictability to their study habits, interrupting their ability to complete assignments on time or engage with online language resources effectively.

Similarly, P3 and P16 describe the difficulties that come with the lack of stable home internet, which leads them to often than not, resort to visiting friends or using public spaces with free Wi-Fi to complete their studies. While this allows them temporary access, it reduces their study flexibility, as they are bound by the hours and availability of others. This lack of stable internet

impacts their ability to engage fully with CALL tools, which often require continuous access for optimal learning.

Some students, such as P4 and P17, highlight the prohibitive cost of mobile data, leading them to restrict their time on language-learning apps and other CALL resources to save on expenses. Mobile data is often more expensive than a home Wi-Fi plan. As such, students must carefully ration their usage, which hinders their ability to explore and practice language-learning activities thoroughly. Furthermore, according to P10, unreliable electricity presents an additional challenge, as they cannot keep devices charged consistently, making it difficult to use CALL tools when needed.

The burden of internet costs is also a challenge for students such as P18 and P20, who submit that, despite owning devices, the monthly expense of internet data is challenging to meet. This limitation affects the frequency of their access to CALL resources, and for some, this means only limited exposure to the language-learning support that CALL provides. For students like P24 with no internet at home, the complete lack of access isolates them from the tools and materials that could significantly enhance their language skills, creating a profound disparity in learning opportunities.

6.2.3 Lack of Dedicated Study Environment(s)

The following responses address the lack of quiet, private spaces for study at home, which affects the students' ability to focus and consistently engage with CALL tools.

P7: "Not having a quiet space at home to use these tools is challenging. My family shares a single room, and there are always distractions."

P8: "I can use the computer lab at college, but I feel I'm always rushing to finish, as there are often other students waiting."

P23: "My parents prioritise my education, but that means sacrifices in other areas, so I try to make the most of the resources we do have."

A conducive study environment is essential for focus and consistent engagement with CALL resources, yet many students lack such a space at home. P7 describes the challenge of studying in a shared family room with constant distractions, which disrupts their ability to focus on CALL tasks, and ultimately compromises the quality of their language practice. The absence of a quiet, private environment makes it difficult to concentrate on language-learning activities that often require attentive listening and participation.

Students who rely on-campus resources, such as P8, face time pressures due to the high demand for computers in the computer lab, which forces them to rush through assignments rather than engage deeply with the material. This constraint affects the learning outcomes from CALL, as the students cannot take full advantage of the interactive and self-paced features of the technology. P23 mentions their family's prioritisation of education but recognises that sacrifices in other areas limit their access to an ideal study environment, making it challenging to use CALL resources effectively.

6.2.4 Dependence on External Support

This theme includes responses in which students highlight their dependence on friends, family, or external support systems to access the resources they need for CALL.

P12: "It's challenging because I don't have consistent access to devices. I rely on a friend's help sometimes, but it's not always possible."

P19: "I'm lucky to have a good setup at home, but I've seen classmates struggling without internet access, and it affects their performance."

P23: "My parents prioritise my education, but that means sacrifices in other areas, so I try to make the most of the resources we do have."

36.7% (11) of students depend on external support from friends, family, or other sources to access the necessary technology for CALL. P12 describes relying on a friend's device to complete assignments, which, while helpful, isn't consistently available and adds a layer of uncertainty to their studies. This dependence limits the students' ability to develop independent study habits and places them in a vulnerable position, should this support become unavailable.

For P19, having a supportive family setup at home has been beneficial, but they are aware that many of their classmates do not have similar access, affecting overall performance. P23 acknowledges their family's commitment to supporting their education, but also notes that this comes at the expense of other family needs, creating a delicate balance between academic priorities and household demands.

6.2.5 Financial Constraints and Resource Allocation

These responses reflect how limited financial resources affect the students' ability to access and engage with CALL tools.

P13: "Having to work a part-time job to support myself means I don't have much extra money for data or technology upgrades."

P14: "Our family's financial situation doesn't allow for extras like high-speed internet or a new laptop, so I make do with what's available."

P11: "My parents don't really understand why I need extra internet data for study, so I have to be cautious with my usage."

P18: "Since my family prioritizes essentials, I don't always have data or an internet connection for extra study resources."

Financial limitations pose significant barriers to accessing CALL resources, affecting everything from device ownership to monthly data costs. P13 explains that working part-time to support themselves leaves little extra money for technology upgrades or data, making it challenging to keep up with CALL tools that require newer devices and steady internet access. Similarly, P14 mentions their family's limited budget, which doesn't allow for "extras" such as high-speed internet or a new laptop, so they make do with limited, less effective resources.

P11 faces misunderstandings within their family regarding internet needs for study, meaning that they must use data sparingly to avoid additional household costs. P18 discusses how their family's limited resources prioritise essential expenses, leaving minimal funds for data or technology upgrades needed for CALL.

6.3 STUDENTS' OPINION FOR BETTER INTEGRATION OF CALL INTO THE CURRICULUM

One of the most pressing challenges in the implementation of Computer-Assisted Language Learning (CALL) in Namibian higher education is the persistent inequality in access to Information and Communication Technology (ICT). While CALL is recognised for its ability to

deliver innovative, interactive, and multimodal language instruction, its success is significantly dependent on equitable access to digital tools, infrastructure, and institutional support systems (Al-Samarraie et al., 2020). When these foundational resources are lacking, the potential benefits of CALL are undermined, particularly in resource-constrained educational environments.

This section critically examines how students themselves view the integration of CALL into the language learning curriculum, especially in light of access-related barriers. Students were invited to respond to an open-ended question: “What suggestions do you have for better integrating CALL into the language learning curriculum?” A total of 28 students provided responses that were categorised into five thematic areas: Increased Access to Technology and Resources, Training and Technical Support, Integration into Regular Class Activities, Enhanced Interactivity and Engagement, and Progress Tracking and Feedback. These categories reflect students’ lived experiences with CALL and their expectations for a more equitable and effective digital learning environment.

6.3.1 Increased Access to Technology and Resources

The theme of ‘Increased Access to Technology and Resources’ appeared prominently in the students’ responses. 73.3% (22) of students expressed the need for more devices, reliable internet access, and extended campus facilities to better support their use of CALL tools. Limited access to personal computers, Wi-Fi, and data plans restricts the students' ability to engage consistently with language-learning technology. Suggestions such as device loans, subsidised data plans, and extended computer lab hours reflect the students’ desire for institutional support to help bridge socio-economic disparities in access. For the study, this theme highlights a fundamental barrier to the adoption of CALL, showing that its successful integration relies on addressing issues of access.

Improved access would make CALL a more inclusive, equitable, and widely used tool in language learning.

P1: "It would be helpful if we had access to more devices on campus, especially for students who don't have their own computers."

P8: "If the school could loan out devices like laptops or tablets, it would really help students who can't afford their own."

P18: "Having the CALL materials available offline would be useful for students who don't have constant internet access."

P19: "I think we need more flexible access hours to the computer lab. Sometimes, it's only open during class times."

The theme of 'Increased Access to Technology and Resources', emerged as students consistently emphasised the need for more devices, reliable internet connectivity, and greater flexibility in using campus facilities. A lack of personal devices, limited access to campus computers, and high costs of data all present significant barriers for students, many of whom are eager to use CALL tools but face logistical constraints. P1 noted, "It would be helpful if we had access to more devices on campus, especially for students who don't have their own computers,".

Students echoed this need for better access, with P8 proposing that "if the university could loan out devices like laptops or tablets, it would really help students who can't afford their own." Some students also recommended offline access options. For example, P18 submitted that, "Having the CALL materials available offline would be useful for students who don't have constant internet

access." These responses underscore that equitable access to technology is foundational to any successful CALL programme.

6.3.2 Training and Technical Support

The theme of 'Training and Technical Support' was another significant focus in the students' responses. Many students pointed out that, both they and their lecturers could benefit from additional training on how to use CALL tools more effectively. Requests for workshops, dedicated help desks, and tool guides indicate that students face technical challenges that hinder their learning experience. This theme suggests that providing CALL resources alone is insufficient without structured guidance and support to empower students and lecturers alike. For the study, this theme underscores the importance of investing in training and ongoing support, as it ensures that CALL tools are not just available but used effectively. By addressing this need, institutions can maximise the potential impact of CALL within the curriculum.

P2: "I think it would make a big difference if our lecturers received more training on how to use the CALL tools effectively."

P5: "Maybe offering workshops on how to use CALL tools would be a good idea. Not everyone is comfortable with technology."

P6: "It would be great if there were a dedicated support team or help desk for students who need technical assistance."

P7: "A little more guidance on how to navigate the tools would go a long way. Some of the programs aren't intuitive."

P12: "More tutorials or video guides on how to use the different features would be helpful, especially for beginners."

P25: "A checklist or guide on what each CALL tool is best for would help students know how to use each one effectively."

The theme, 'Training and Technical Support', reflects students' need for structured training and ongoing technical support, both for themselves and for their lecturers. 67.9% (19) of students expressed that while they are enthusiastic about using CALL, they often lack the knowledge and confidence to fully utilise its features. Additionally, the students believe that lecturers could benefit from more training to maximise the educational potential of CALL tools. P2 suggested that "it would make a big difference if our lecturers received more training on how to use the CALL tools effectively," while P5 proposed "offering workshops on how to use CALL tools," acknowledging that not all students feel comfortable with technology.

Students also requested accessible, on-demand support resources, such as a help desk or video tutorials. P6 suggested that "it would be great if there were a dedicated support team or help desk for students who need technical assistance." This need for guided support was echoed by P12, who suggested the need for "more tutorials or video guides on how to use the different features", emphasising that technical challenges can be a barrier to learning if not addressed.

This theme stresses that simply providing CALL tools is insufficient; effective integration requires structured support that empowers both students and educators. Providing training sessions, clear usage guides, and technical assistance could significantly enhance the effectiveness of CALL by ensuring that all users are equipped to use it confidently. This needs for support reflects the broader

importance of building digital literacy alongside technology implementation, which is essential for maximising the potential of CALL in language education.

6.3.3 Integration into Regular Class Activities

The theme of ‘Integrating CALL into Regular Class Activities’ was widely mentioned by students. Responses indicated that students want CALL to be embedded into the main curriculum rather than being treated as supplementary or optional tasks. Suggestions such as CALL-focused group activities, study sessions, and class assignments reflect students’ desire for a more cohesive, collaborative approach to language learning. For the study, this theme illustrates that CALL is most effective when it is interwoven with traditional instruction, supporting and reinforcing the material covered in class. A more integrated approach would likely improve engagement, ensuring that CALL is an essential, impactful part of the language-learning process.

P10: "Maybe we could have language lab sessions where we all use CALL tools together and can ask questions if we get stuck."

P11: "It would be nice if lecturers integrated CALL tools with other class activities so it feels like part of the course, not just extra work."

P16: "If there were more group activities using CALL, I think it would make language learning more collaborative and fun."

P20: "Encouraging lecturers to make more use of CALL in class, not just as homework, would help us understand it better."

P26: "Making CALL part of the grading would encourage more students to take it seriously and actually use the tools."

P23: "It would be great if the school could organise study groups where we use CALL tools together and support each other."

60% (18) of students suggested that CALL be incorporated directly into class sessions, assignments, and group activities, so that it becomes a central component of the learning process. P10 recommended "language lab sessions where we all use CALL tools together," allowing students to support each other in a collaborative learning environment.

Similarly, P11 mentioned that "it would be nice if lecturers integrated CALL tools with other class activities," reflecting a desire for CALL to feel less like an additional task and more like a cohesive part of coursework. The students also suggested that making CALL activities part of the grading criteria would encourage wider engagement. P26 remarked that "making CALL part of the grading would encourage more students to take it seriously and actually use the tools", emphasising that integrating CALL into assessments could make it a more impactful part of the language-learning curriculum.

The theme highlights the importance of embedding CALL into regular coursework rather than treating it as a stand-alone resource. When CALL is fully integrated into the classroom experience, it can reinforce language skills, support collaborative learning, and ensure that students are consistently engaged. This integration is crucial for building a seamless, effective learning experience that maximises the benefits of both CALL and traditional language instruction.

6.3.4 Enhanced Interactivity and Engagement

The theme of 'Enhanced Interactivity and Engagement' was frequently suggested by students who wish for CALL to be a more immersive and enjoyable learning experience. Students proposed adding elements such as language games, audio exercises, and mobile-friendly features to make

learning more engaging and accessible. These suggestions reflect the value students place on dynamic and adaptable tools that can help sustain interest and promote retention through active participation. In relation to the study, this theme points to the importance of designing CALL experiences that are both engaging and flexible. Interactive and engaging features can make CALL more effective, fostering motivation and making language learning feel less like a chore.

P9: "I think adding more interactive features in the CALL tools would make learning languages more interesting and engaging."

P15: "Making the CALL tools mobile-friendly would be a big help since some of us mostly use our phones to study."

P22: "More language games or interactive elements would make learning feel less like work and more like play."

P24: "More audio-based exercises would help with pronunciation, especially for students who struggle with speaking practice."

P28: "Creating a feedback system where we can rate the CALL tools would help improve the ones we use and make them more effective."

This theme of ‘Enhanced Interactivity and Engagement’, reflects the students’ desire for CALL tools that are interactive, engaging, and adaptable to their learning preferences. 64.3% (18) students recommended adding features like language games, mobile-friendly options, and audio-based exercises to make CALL a more enjoyable and flexible learning experience. P9 shared that "adding more interactive features in the CALL tools would make learning languages more interesting and engaging," suggesting that more immersive tools could keep students motivated.

Students also emphasised the need for flexibility in how they access CALL, with P15 noting, "Making the CALL tools mobile-friendly would be a big help since some of us mostly use our phones to study." Similarly, P22 suggested that "more language games or interactive elements would make learning feel less like work and more like play," underlining the importance of engagement for effective learning. P24 highlighted the value of "audio-based exercises" for helping with pronunciation, especially for students who may struggle with speaking practice.

This theme shows that students are more likely to stay engaged with CALL tools when they are user-friendly, interactive, and designed with adaptability in mind. For the study, this theme highlights that effective CALL integration should consider students' need for an engaging and flexible learning environment. Incorporating interactive features can make CALL more appealing and effective, helping students to remain motivated and actively involved in their language development.

6.3.5 Progress Tracking and Feedback

The theme of 'Progress Tracking and Feedback' was also prominent within the student responses, with many expressing a desire to monitor their language-learning progress and receive regular feedback. Students suggested features such as software that tracks improvements, feedback sessions with lecturers, and online practice exercises with immediate results. This desire for measurable progress indicates that the students are motivated by being able to track their skills and see areas for improvement. The theme emphasises the value of incorporating feedback mechanisms and progress tracking within CALL. These features would support self-assessment, boost confidence, and make CALL a more responsive and supportive part of the language-learning curriculum.

P13: "Having access to online practice exercises that we can do at home would make it easier to learn at our own pace."

P17: "I would appreciate it if we had feedback sessions on how we're doing with the CALL exercises, just like with other assignments."

P21: "It would be helpful if the software could track our progress so we can see how much we're improving over time."

P27: "I'd love if there were a way for us to share tips and resources with each other on how to make the most of CALL tools."

'Progress Tracking and Feedback' emerged as students expressed a strong desire for tools that allow them to monitor their progress and receive timely feedback on their language skills. 78.6% (22) students highlighted that knowing their performance and identifying areas for improvement is essential for maintaining motivation and confidence in their learning. P13 pointed out that "having access to online practice exercises that we can do at home would make it easier to learn at our own pace," suggesting that self-paced exercises with feedback can support independent learning.

Students also recommended features such as feedback sessions and progress-tracking software. P17 noted, "I would appreciate it if we had feedback sessions on how we're doing with CALL exercises," while P21 expressed that "it would be helpful if the software could track our progress so we can see how much we're improving over time." These responses indicate that measurable progress is important to students, providing them with both motivation and clear indicators of growth.

6.4 LECTURERS' VIEWS ON THE IMPACT OF SOCIO-ECONOMIC BACKGROUND ON ACCESS TO CALL

Lecturers often have unique views into the socio-economic factors that influence their students' access to CALL tools. Lecturers were asked, "In your view, how does socio-economic background impact students' access to CALL?" This question sought to explore whether lecturers believe that socio-economic disparities among students create barriers to accessing technology and how this affects the effectiveness of CALL. The responses help to contextualise how socio-economic issues, as perceived by educators, are impacting the equitable delivery of CALL. In this question, 22 participants responded about the socio-economic factors affecting students' access to CALL tools.

6.4.1 Limited Access to Devices and Internet Connectivity

Access to personal devices and stable internet is essential for the effective use of CALL tools, yet many students face barriers due to socio-economic constraints. Without reliable devices or internet, students often depend on shared resources, such as university computer labs, or friends' devices, which limits their time and consistency with CALL. This lack of access restricts the students' abilities to engage in language learning on their own schedule and to fully utilise the tools available, creating a significant barrier to learning continuity. Responses under this theme demonstrate the practical barriers that students face due to a lack of personal devices, limited internet access, and reliance on shared or public resources. Lecturers provided the following responses:

P1: "Many students from lower-income families struggle with consistent access to devices or the internet. It's heartbreaking to see potential hindered by something as basic as access."

P2: "Some students can only use CALL tools at school because they don't have reliable internet at home. It's a huge barrier to independent study."

P5: "It's common to see students sharing devices with family members, which really limits the amount of time they can spend on learning outside of school hours."

P9: "I've seen students who do have devices but can't afford the data to use them regularly for language learning. It's like having the tool but missing the fuel."

P15: "There are students who rely on the school's computer lab for all their work. When that's the only access they have, they're limited to school hours, which isn't enough."

P22: "Many students rely on friends or shared family devices, which affects their ability to engage consistently with CALL. It's a hidden barrier that isn't always obvious."

Access to personal devices and reliable internet is foundational for effectively using CALL tools in language learning. However, many students from low-income families struggle with inconsistent or limited access to these essential resources, which hinders their ability to engage fully with language-learning activities. As P1 points out, the absence of personal devices and consistent connectivity is a "basic yet powerful barrier" that holds students back, underscoring the critical role of access to technology in reaching their learning potential. This lack of resources affects the students' abilities to study independently and meaningfully outside of school hours, limiting both the depth and continuity of their engagement with CALL tools.

The challenge extends to home internet access as well. For example, P2 explains that some students "can only use CALL tools at school because they don't have reliable internet at home," creating a "huge barrier to independent study" and reducing opportunities for practice in a self-

paced, home setting. Similarly, P5 observes that students often "have to share devices with family members," which limits the time they can spend on CALL tools, increasing competition for device use among household members. This shared access creates an inconsistent learning experience, preventing students from maintaining language practice outside of structured school hours.

A further challenge is the high cost of data or internet required for CALL, even for students who do have devices. P9 describes it as "having the tool but missing the fuel", meaning that despite having a device, some students cannot afford regular data costs necessary for online resources. Students like P15 and P22 rely heavily on university computer labs, confining their CALL usage to the hours when these resources are available. Consequently, their engagement with language-learning tools becomes inconsistent, reducing CALL's potential to support a self-directed, flexible learning environment.

Limited access to personal devices and reliable internet connectivity poses significant barriers to the equitable delivery of CALL. Without these resources, students face substantial setbacks, impacting both the quantity and quality of their interaction with language-learning tools. This highlights the need for educational institutions to provide greater access to devices and consider solutions such as loaning laptops to students in need.

6.4.2 Geographic and Infrastructure Challenges

Students face unique challenges, largely because poor internet infrastructure and limited connectivity options make it difficult to access online CALL resources. Even if students have access to devices, unreliable connectivity limits their ability to participate fully in language learning exercises. This theme highlights the compounded challenges that come with both socio-

economic and geographic barriers, further widening the gap in educational opportunities for these students.

P4: "Students from rural areas face additional challenges with internet access. For them, even having a working device doesn't guarantee reliable connectivity."

P16: "The impact of socio-economic background is clear. Students without personal devices or reliable internet are often left behind despite their best efforts."

P20: "When students can't access language learning tools outside of school, it limits the continuity of their practice, which is crucial for language acquisition."

In addition to socio-economic barriers, geographic location and infrastructure limitations, particularly in rural or remote areas, restrict students' access to CALL tools. P4 highlights that students in rural areas often face "unreliable internet connectivity." Even when they possess functional devices, a lack of dependable internet makes it difficult to engage with online language-learning tools, which require stable connections for effective use. This limited connectivity prevents students from participating in interactive CALL exercises, reducing opportunities for real-time feedback and hindering language acquisition.

The compounded challenges of socio-economic background and rural location mean that rural students are often at a disadvantage compared to their urban counterparts. P16 observes that "students without personal devices or reliable internet are often left behind despite their best efforts" to keep up. This lack of infrastructure limits their ability to maintain a consistent language-learning routine, which is essential for reinforcing language skills and building confidence.

P20 further notes that students who cannot access language-learning tools outside of school experience disruptions in continuity, stating, "The lack of access to CALL resources at home interrupts their practice routines, which are vital for language retention." This gap in continuous access affects the students' long-term language development, underscoring the need for infrastructure improvements in rural areas to support equitable access to digital learning resources.

6.4.3 Financial Constraints and Competing Responsibilities

Financial limitations are a major barrier, with many students struggling to afford updated devices, data, or software subscriptions needed for CALL. Additionally, students who work part-time to support their studies have less time and fewer resources to engage consistently with CALL. These financial and personal responsibilities prevent students from accessing the full range of CALL resources, affecting their ability to keep pace with peers who have greater resources and fewer competing demands.

P6: "A lot of my students can't afford updated devices, which makes it tough to use newer CALL software. Some can't even load certain interactive elements."

P10: "Some students have to work part-time to support their studies, so they don't have the time or resources to use CALL effectively. It's a balancing act that takes a toll."

P13: "Even small costs like software subscriptions can be a barrier. For some, it's just not possible to afford any extra expenses."

P19: "Some families prioritise education but don't have the means to support it fully, leaving students in a difficult position when it comes to accessing CALL."

P18: "It's tough to see students who are eager to learn but are held back because their home setup isn't conducive to online learning. They're at a constant disadvantage."

Financial constraints and competing obligations at home further hinder students' ability to engage with CALL tools. For many, financial limitations prevent them from purchasing updated devices or software required to run modern CALL applications effectively. P6 points out that students who "can't afford updated devices often struggle to load or use interactive CALL features," leaving them unable to fully benefit from language-learning technology. This inability to keep up with technological updates translates to missed learning opportunities.

Some students are also financially responsible for themselves or contribute to family income through part-time jobs, reducing both their time and energy for language learning. P10 describes this "balancing act" as an additional strain on students, as they juggle academic commitments with the need to support their studies financially. As a result, they often have less time to engage with CALL and may lack the energy for consistent practice.

Recurring costs, such as software subscriptions, also deter students from fully utilising CALL. P13 notes that "even small costs like software subscriptions can be a barrier," as some students simply "can't afford any extra expenses." P19 observes that families who prioritise education may still lack the financial means to support it fully, leaving students in a difficult position. These financial constraints limit students' ability to practice on the same level as their peers with greater resources, highlighting the inequity in CALL access.

6.4.4 Impact on Learning Continuity and Academic Performance

Socio-economic disparities create gaps in access that directly impact students' ability to engage continuously with CALL tools, which is crucial for language acquisition. Students with stable

access to technology tend to progress faster, while those relying on limited resources fall behind. The inconsistency in access can lead to a fragmented learning experience, negatively affecting both language retention and overall academic performance, adding pressure on students to keep up with their peers.

P3: "I see a difference in engagement; those with access to technology at home tend to advance faster than those who rely solely on school resources."

P7: "The socio-economic divide is apparent. Students from better-off backgrounds can use CALL tools as intended, while others miss out on many features due to limited resources."

P12: "Many of my students from disadvantaged backgrounds show great interest in CALL, but they simply can't engage fully without the same resources as their peers."

P17: "The expectation to perform on par with peers who have better access to technology places additional stress on students with fewer resources."

P20: "When students can't access language learning tools outside of school, it limits the continuity of their practice, which is crucial for language acquisition."

Regarding the foregoing, P3 notes that students with stable technology access at home "tend to advance faster," as they can consistently engage with CALL resources. In contrast, students who rely solely on school resources experience fragmented access, impacting their language-learning progress and skill retention.

This resource disparity becomes clear in classroom performance, where students with better access can fully utilise CALL tools, while those from less advantaged backgrounds face

limitations. P7 observes this divide, where "students from better-off backgrounds can use CALL tools as intended," while others miss out on key features due to limited resources. P12 notes that although disadvantaged students "show high interest in CALL, their ability to engage is constrained by limited resources," revealing a gap in educational equity that affects motivation and progress.

Academic expectations also add pressure on students with fewer resources. P17 shares that student with limited access "feel pressured to perform on par with peers" who have better access, creating additional stress. Without regular practice, as P20 points out, "language acquisition becomes difficult, and students can't build or maintain skills." These inconsistencies negatively affect both performance and retention, highlighting the significant impact of socio-economic factors on language-learning outcomes.

6.4.5 Psychological and Social Impacts of Inequality in Access

Beyond practical barriers, unequal access to CALL can have psychological and social effects on students. Feelings of embarrassment or inadequacy may arise in students who cannot afford the same resources as their peers, creating a sense of inequity and impacting their confidence. Furthermore, students from tech-literate families may adapt more easily to CALL tools, while others without familial support feel additional stress in navigating technology independently. These socio-emotional challenges underscore the broader impact of socio-economic disparities on learning.

P8: "When a student doesn't have a quiet space to study at home, even access to CALL tools doesn't help as much. Many students deal with these compounded issues."

P11: "Students who come from tech-literate families tend to navigate CALL tools more easily. Others struggle because their family can't guide them with technology."

P14: "I can tell that some students are embarrassed to admit they lack the resources for CALL. It creates a sense of inequality that goes beyond just access."

P21: "Even with school support, gaps in access remain. A socio-economic divide becomes a technology divide, impacting their ability to benefit fully from CALL."

The lack of equitable access to CALL impacts not only learning outcomes but also students' social and psychological well-being. P8 highlights that "when students lack a quiet space at home, even access to CALL tools doesn't help as much", as compounded issues of environment and resources create frustration. This frustration arises as students realise they are disadvantaged compared to peers with more conducive learning environments.

The socio-economic background of a student's family can also impact their familiarity with technology. P11 observes that "students from tech-literate families adapt to CALL tools more easily," while others may struggle due to a lack of technological support at home. This lack of support adds to the stress, as students feel isolated in their learning process, feeling inadequate when engaging with technology.

Feelings of embarrassment and inequality are common among students who cannot afford necessary resources. P14 shares that some students "feel embarrassed to admit they lack resources," which creates a sense of inferiority among peers. This self-consciousness may discourage students from engaging openly in CALL activities. P21 points out that even with support from the university, "a socio-economic divide becomes a technology divide," impacting

students' confidence and sense of belonging. This divide fosters a sense of inequity, which not only affects students' engagement with CALL but also their confidence and integration in the academic community.

6.5 FACTORS IMPEDING THE DELIVERY OF CALL IN LANGUAGE TEACHING

In addition to the challenges discussed earlier, this section takes a broader look at the specific factors lecturers believe are hindering the delivery of CALL in their language teaching. Lecturers were asked the question, "In your opinion, what are the factors that impede the delivery of CALL in language teaching?" This question sought to understand the obstacles that lecturers face, such as limited resources, insufficient training, or student readiness for CALL. The responses provided a comprehensive view of the barriers that exist from the educators' perspective and helped in identifying areas where improvements can be made to enhance the delivery of CALL in the classroom. The following themes were identified and analysed below: access to technology and infrastructure, technical issues, training and confidence, curriculum alignment and integration, student engagement and differentiation.

6.5.1 Access to Technology and Infrastructure

Access to adequate technology and infrastructure emerged as a foundational requirement for effective CALL implementation in language teaching. Lecturers frequently mentioned that up-to-date devices, dedicated language labs, and sufficient funding are crucial. Without these resources, CALL's potential for interactive and multimedia learning is limited, as outdated software and insufficient devices restrict the functionality and reach of the tools.

P1: "We don't always have the resources needed to keep the technology up to date. When software or devices are outdated, it limits what we can do with CALL."

P7: "Not every classroom is equipped for CALL. If we don't have the right setup, it's almost impossible to use CALL tools effectively."

P9: "Some CALL tools are costly, and with limited budgets, it's challenging to access the resources that would enhance language teaching."

P20: "Language labs would be helpful for CALL, but our campus doesn't have dedicated spaces for this type of technology-enhanced learning."

Participants consistently cited limited resources and outdated infrastructure as significant barriers to effective CALL implementation in language teaching. Inadequate funding, outdated software, and the lack of dedicated facilities were recurring concerns among lecturers, who pointed out that outdated technology restricts the interactive features they can use within CALL, thus limiting its potential for creating engaging and dynamic lessons. P1 noted that “we don’t always have the resources needed to keep the technology up to date,” which can mean older devices and incompatible software, reducing CALL’s functionality and leaving a gap between its potential and practical application in the classroom. Furthermore, P7 shared that “not every classroom is equipped for CALL,” making it difficult to use CALL tools consistently and meaningfully. Dedicated language labs, as P20 for example, observed, were cited as potentially transformative, providing spaces specifically designed for tech-enhanced learning, which would allow CALL to be used more effectively. These responses show the need for institutions to invest in up-to-date technology, facilities, and resources to create a solid foundation for language learning through CALL.

6.5.2 Technical Issues

Frequent technical issues were cited as a disruption to the effective delivery of CALL. 46.7%(14) of lecturers described how technical interruptions, such as slow internet and system crashes, undermine the flow of lessons and discourage engagement with CALL. These recurring issues underscore the need for reliable technology and timely IT assistance to ensure a smooth learning experience. For the study, this theme points to the necessity of not only providing CALL tools but also maintaining dependable infrastructure and support services. Recognising this need illustrates that sustainable CALL integration depends on technical reliability and consistent IT support, which together foster a conducive learning environment.

P8: "Technical issues, like slow internet or system crashes, disrupt lessons and make it difficult to maintain a flow with CALL activities."

P19: "The fast pace of technological change means that what we use today might be outdated in just a few years, which makes it hard to keep up."

P2: "Some of my students don't have reliable internet access outside of campus, so they can't practice at home, which slows their progress."

Technical challenges, such as unreliable internet, system crashes, and limited IT support, were also frequently cited as persistent disruptions in CALL-based language learning. These challenges make it difficult for lecturers to maintain a cohesive and engaging flow in lessons. P8 explained that "technical issues, like slow internet or system crashes, disrupt lessons," reducing the students' ability to stay engaged. Slow internet and outdated infrastructure also limit students' ability to fully use CALL tools, and the lack of prompt IT support often leaves lecturers managing technical issues independently, which impacts lesson quality. For students without reliable internet outside of

campus, P2 noted that limited connectivity at home can further restrict learning continuity, widening gaps in practice and limiting the impact of CALL as a comprehensive tool. The rapid pace of technological change adds additional pressure on institutions, as P19 described, requiring frequent updates and replacements. Together, these responses suggest that sustainable CALL implementation depends on consistent technical support, stable infrastructure, and improved access solutions to ensure a seamless and uninterrupted learning experience.

6.5.3 Training and Confidence

63.3% (19) of lecturers often described how insufficient training and lack of confidence with technology limit both their own and their students' engagement with CALL. This skill gap can result in underutilised resources, as lecturers and students feel uncertain in navigating CALL tools effectively. For CALL to reach its full potential, both educators and learners need structured training sessions that build competence and ease with technology. In the study, this theme emphasises that successful integration relies on equipping users with the skills needed to confidently apply CALL tools. Highlighting this requirement in the study suggests that robust training programs are essential for cultivating a supportive environment where CALL can thrive.

P3: "There's a learning curve with new technology, and without proper training, both students and lecturers struggle to use CALL effectively."

P5: "I notice that some students lack confidence with technology, which makes it difficult for them to engage fully with CALL tools."

P12: "Certain CALL platforms are not user-friendly, which creates frustration for students and takes up valuable class time just learning how to use them."

P18: "For students with limited tech skills, CALL can create additional stress, and they may feel left behind compared to peers who adapt more easily."

A lack of adequate training and confidence in using CALL emerged as a substantial barrier, affecting both lecturers and students. Without structured training and ongoing support, both groups may struggle to use CALL tools fully, leading to missed opportunities for enhanced learning. Regarding this, P3 noted that "there's a learning curve with new technology," which, without proper guidance, can leave students and lecturers feeling uncertain or frustrated. P12 pointed out that "certain CALL platforms are not user-friendly," often requiring significant time and effort just to navigate, which detracts from class time and engagement. Additionally, students with limited digital skills may feel at a disadvantage, as P18 mentioned, experiencing stress and feeling "left behind" compared to peers who adapt more easily to technology. These responses reveal that structured training programs are essential for successful CALL usage, as they can help both lecturers and students develop the confidence and competence needed to make full use of CALL's educational potential.

6.5.4 Curriculum Alignment and Integration

Participants largely agreed that there are challenges in aligning CALL with existing lesson plans and curricular goals. Integrating CALL with traditional methods requires thoughtful planning to ensure it supports rather than disrupts the flow of language instruction. While CALL offers interactive possibilities, its value depends on how seamlessly it can be incorporated to complement established course outcomes.

P11: "It can be difficult to balance traditional teaching methods with CALL, especially when students have varied comfort levels with technology."

P16: "The variety of CALL tools can be overwhelming, and it's hard to determine which ones are truly effective for language learning."

P13: "Many of the CALL resources available are generic and not customized to our language curriculum, so they don't always fit well with what we're teaching."

Integrating CALL into the existing curriculum posed additional challenges, particularly in terms of balancing new technology with traditional teaching methods and meeting specific course objectives. P11 shared that "it can be difficult to balance traditional teaching methods with CALL," particularly when students' comfort levels with technology vary. Many CALL resources are not specifically customised to fit existing curricula, and as P13 noted, "many of the CALL resources available are generic," making it hard to align them with particular learning goals. Additionally, P16 expressed that the abundance of CALL tools can feel overwhelming, making it difficult for lecturers to choose resources that consistently support language learning objectives. These responses suggest that effective CALL integration requires institutions to align CALL resources with curriculum goals, ensuring that they support rather than compete with traditional methods. This alignment would enhance the overall relevance and impact of CALL within language instruction.

6.5.5 Student Engagement and Differentiation

Differentiating instruction and keeping students actively engaged emerged as essential considerations when implementing CALL in diverse classrooms. While CALL can support personalised learning, large class sizes and varying student digital literacy levels often complicate its use. Additionally, some students tend to over-rely on CALL, which may reduce engagement in

other critical language activities. This theme underscores the importance of employing varied strategies to ensure balanced and inclusive engagement.

P4: "Class sizes are often too large for me to provide personalized support with CALL tools. It's hard to manage technology and individual needs with so many students."

P15: "Students sometimes rely too heavily on CALL and expect it to do all the work, which reduces their motivation to engage in traditional language exercises."

P21: "It's difficult to adapt CALL resources to different proficiency levels within one class, as some students need more support than others."

P17: "We don't always receive feedback on how students are progressing with CALL, so it's hard to assess if these tools are making an impact."

Maintaining student engagement and adapting CALL to meet varied learning needs emerged as a significant challenge in large and diverse classrooms. Participants noted that the different levels of digital literacy and language proficiency among students can make CALL implementation complex. P4 explained that “class sizes are often too large to provide personalized support,” making it challenging to meet the individual needs of students, particularly those who may rely too heavily on CALL or struggle with certain tools. For example, P15 observed that some students “rely too heavily on CALL,” potentially disengaging from other essential language activities, while P21 mentioned the difficulty of adapting CALL resources to different proficiency levels within the same class. Limited feedback mechanisms in some CALL tools further complicate lecturers’ ability to assess students’ progress, as P17 noted, “we don’t always receive feedback on how students are progressing with CALL.” These responses illustrate the need for differentiated

engagement strategies that cater to varied learning needs, ensuring that all students benefit from both CALL and traditional language exercises.

6.6 SUMMARY

Chapter six of this study discusses several key barriers to the effective implementation of CALL in Namibian higher education. A primary obstacle identified is the socio-economic background of students, which affects their access to essential devices and internet connectivity. Students from low-income families lack personal computers or reliable internet, which significantly limits their ability to engage fully with CALL resources outside campus facilities. This socio-economic disparity creates an uneven playing field, where some students are better equipped to benefit from digital learning than others.

Another barrier discussed is the inadequate technological infrastructure, particularly limited internet connectivity and unreliable electricity, which impedes consistent use of CALL. These challenges are more pronounced in remote areas, where intermittent connectivity can severely restrict access to online resources, reducing students' opportunities to participate in digital learning. The chapter also highlights the limitations of institutional support, including insufficient funding for CALL initiatives, inadequate administrative backing, and a lack of comprehensive training programs for both students and lecturers. Without institutional commitment and resources, CALL integration remains inconsistent, which diminishes its impact.

Additionally, gaps in digital proficiency among both students and lecturers serve as another significant barrier. While some are skilled in using digital tools, others struggle due to limited experience or training, affecting their ability to engage with CALL tools effectively. The chapter concludes with recommendations provided by participants on how to address these barriers,

emphasising the need for improved infrastructure, increased financial support, and expanded training programmes. These suggested interventions are aimed at bridging existing gaps and supporting a more seamless integration of CALL in Namibian higher education. The next chapter explores mitigation strategies aimed at overcoming the barriers identified in the implementation of CALL within Namibian higher education. It also focuses on developing a comprehensive CALL model tailored to address these challenges and enhance language learning outcomes.

CHAPTER SEVEN

MITIGATION STRATEGIES AND MODEL DEVELOPMENT FOR EFFECTIVE CALL IMPLEMENTATION IN HIGHER EDUCATION

RESEARCH QUESTION 4

7.1 INTRODUCTION

This chapter addresses research question 4, focusing on how barriers to Computer-Assisted Language Learning (CALL) can be addressed through the development of mitigation strategies and a proposed implementation model. Drawing from qualitative data gathered from both students and lecturers, the chapter explores practical solutions and support structures that can enhance CALL adoption and sustainability in Namibia's higher education system.

The analysis is presented in two main sections: student perspectives and lecturer perspectives. Each section identifies strategies related to access, institutional support, training, curriculum integration, and collaborative learning. The findings from chapter 4 to 7 contribute directly to the formulation of a Logical Framework and a Universal CALL Model (UCALM), which will be presented in Chapter Eight.

Research Question 4:

What are the mitigation strategies leading to the development of a model to support the delivery of Computer-Assisted Language Learning (CALL) in the context of higher education?

To guide the exploration and analysis, the chapter is informed by the following sub-objectives:

For Students:

- To identify students' perceived benefits of CALL and their suggestions for improving accessibility, interactivity, and alignment with academic needs.
- To explore student recommendations for institutional support, including access to devices, connectivity, and study environments.
- To examine the role of collaborative learning, peer engagement, and group-based tasks in enhancing CALL integration.
- To evaluate student feedback on the importance of progress tracking, flexibility, and feedback in promoting motivation and self-paced learning.

For Lecturers:

- To determine lecturers' views on support needs for effective CALL implementation, including infrastructure, training, and technical assistance.
- To assess how CALL enhances student engagement, motivation, and learning outcomes from the educator's perspective.
- To explore lecturer recommendations for improving CALL integration into teaching practices, curriculum delivery, and feedback systems.
- To identify preferred strategies for sustaining CALL in resource-constrained settings and creating equitable access for all students.

7.2 SUPPORT NEEDS FOR IMPLEMENTING CALL STRATEGIES

This section of the study sought to identify the specific types of support that lecturers believe are essential for successfully implementing CALL intervention strategies. Participants were asked to

respond to the question that says, “What type of support do you think would be necessary for the successful implementation of CALL intervention strategies?”, the study aimed to gather context into the core needs required to facilitate CALL adoption effectively. Areas of focus included technological infrastructure, institutional resources, training, and technical support, as they are important for overcoming challenges associated with CALL integration.

STUDENTS’ RESPONSES ON CALL MITIGATION STRATEGIES

7.2.1 Perceived Benefits for Improved Integration

Students’ perspectives on the advantages of CALL for enhancing its integration, form an essential foundation for designing strategies that prioritise student-CENTRED learning. Students were asked to suggest ways in which CALL could be more effectively woven into their curriculum, giving them the opportunity to share ideas for improving its accessibility, engagement, and alignment with their academic needs. Their responses provide valuable guidance for refining CALL so that it is more inclusive, resonant, and relevant within their learning experiences.

P2: "CALL would be more accessible if it worked on mobile devices. Not everyone has a computer, and mobile compatibility would make it easier to practice outside of campus."

P3: "Linking CALL activities directly to our weekly course topics would make it feel more relevant and useful, helping us reinforce what we’re learning in real-time."

P4: "Group activities in CALL, like collaborative projects or conversations, would help us build conversational skills and make the experience more engaging."

P7: "It would be helpful to have a progress tracker in CALL, so we could see our improvement over time. This feature could help motivate us to keep practicing."

P8: "Making CALL resources available in more campus locations, like study rooms or the library, would make it more accessible and practical to use."

P10: "An introductory session on using CALL would be helpful. Some students may not use it because they aren't familiar with the technology."

P13: "Integrating CALL more into our exam preparation would be beneficial. Practice tests or review exercises could help us prepare better and reinforce key concepts."

P15: "Offline access to CALL resources would help a lot, especially for students who don't always have reliable internet access outside campus."

P21: "Including more audio and video content from native speakers in CALL would improve our listening skills and make learning more engaging and practical."

Mobile accessibility emerged as a significant consideration for P2, who pointed out that optimising CALL tools for mobile devices could broaden their reach, especially for students lacking access to personal computers. This response suggests that by enhancing mobile compatibility, CALL could extend learning opportunities beyond campus, providing a more flexible framework that meets students where they are. This need for accessible technology speaks to the importance of ensuring that CALL adapts to students' circumstances, rather than limiting engagement to those with specific devices. P3 stressed the importance of aligning CALL activities with weekly course content to make the learning experience more seamless. This perspective highlights students' preference for CALL to reinforce classroom learning directly, fostering a natural extension of their coursework. In linking CALL exercises with current topics, students may find the tool more relevant to their academic goals, which could strengthen their engagement and aid in retention.

This response hints at a potential benefit of contextualising CALL within the curriculum, thus making it more meaningful and integrated.

P4 indicated that the value of collaborative activities within CALL, such as group projects or conversation exercises, are necessary to develop conversational skills and increase engagement. This perspective suggests that CALL could facilitate peer learning and provide interactive practice that mirrors real-world communication. Through collaboration, CALL would not only support language skill development but also foster social learning, which could be particularly effective for students who benefit from collective exercises. This response suggests that CALL could be more effective if designed to include elements of social interaction and teamwork, essential components for active learning. P7 highlighted the motivational potential of a progress-tracking feature in CALL, suggesting it would allow students to monitor their growth and thereby encourage consistent practice. This proposal hints at a self-regulatory benefit to CALL, where students might set personal goals and track their development in a structured way. Such a feature would not only enhance accountability but also enable students to celebrate incremental successes, thus fostering a positive learning trajectory. Progress tracking could therefore play a vital role in sustaining student interest and dedication to language acquisition through CALL.

P8 noted the potential benefit of expanding the availability of CALL resources to multiple locations on campus, such as study rooms or the library. This observation points to accessibility as a key factor in CALL's effectiveness, highlighting the importance of ease of access in students' learning experiences. In broadening the availability of CALL tools, institutions could mitigate logistical barriers and create a more inclusive environment for all students. This response suggests that, without adequate access points, CALL might inadvertently exclude students who are keen to engage but constrained by resource limitations. P10 observed that an introductory session on

CALL usage would likely improve students' willingness to engage with the technology, as some students may currently avoid it due to unfamiliarity. This recommendation speaks to the need for onboarding and familiarisation, suggesting that initial guidance could be essential for maximizing CALL's potential. In supporting students in developing baseline technological skills, institutions could reduce entry barriers and ensure that more students feel equipped to navigate CALL independently. This response implies that without adequate support, even high-quality CALL tools may be underutilised.

P13 advocated for the inclusion of CALL in exam preparation, suggesting that practice tests or review exercises in CALL could better support students' learning outcomes. This response indicates a desire for CALL to serve not only as a learning tool but also as an assessment aid, helping students prepare more thoroughly and identify areas of improvement ahead of exams. Integrating review and preparatory exercises into CALL could provide structured and targeted practice, which may be particularly effective for reinforcing key language concepts before assessments. P15 responded that offline access to CALL resources would help students who lack consistent internet access outside of campus, pointing to a socioeconomic dimension in CALL accessibility. This response reveals that limited connectivity may hinder some students' ability to use CALL, suggesting a digital divide within the student population.

P21 expressed interest in more audio and video content from native speakers, proposing that this addition would improve listening skills and make learning more engaging. This response emphasises the importance of authentic language exposure within CALL, suggesting that hearing native accents and expressions could bridge the gap between classroom learning and real-world application. Incorporating multimedia elements could make CALL more practical and immersive, supporting a deeper engagement with language that goes beyond traditional text-based exercises.

7.2.2 Institutional Support and Access to Resources

This theme addresses the critical need for institutional support to ensure equitable access to the foundational resources required for students to effectively engage with CALL tools. For many students, consistent access to computers, mobile-compatible applications, stable internet connectivity, and uninterrupted electricity are essential to fully participate in CALL-based language learning. Without these resources, students face significant barriers that impact the continuity and quality of their learning experience, limiting their ability to engage deeply with CALL content.

In settings where students rely on shared or outdated devices, limited access disrupts their ability to participate consistently in online activities and complete assignments on time. For example, a lack of personal computers can mean students are limited to using computer labs or public resources, which often have restricted hours or are subject to high demand. This restricted access affects their ability to study at convenient times and participate in self-paced learning activities, essential for language acquisition.

The integration of mobile-compatible CALL applications offers another level of accessibility, as many students may rely on smartphones rather than computers. However, mobile-based learning also depends on stable internet access and data affordability. For students who face high data costs or limited connectivity at home, accessing CALL resources becomes a costly challenge, further exacerbating inequities in language learning. Participants shared their views with the responses below.

P1: "It would help if the university provided more access to computers and devices, especially for students who don't have their own laptops."

P6: "If the school could provide us with some form of discounted or subsidised data plans that works on mobile devices, it would make studying from home much more affordable."

P10: "Maybe they could make an app version of the CALL tools so that those of us who only have access to smartphones can still use them."

P15: "Access to more updated technology, like new computers in the labs, would help. Sometimes the old equipment doesn't run the software properly."

P22: "Having the option to use the CALL resources at home would be amazing. That way, I could study when it's most convenient for me."

Participants shared their views about the essential supports needed to engage fully with CALL tools. P1 stated that increased access to computers and devices to keep at home would be beneficial, especially for students without personal laptops. This response emphasises the challenge many students face in accessing CALL consistently due to a lack of personal technology, highlighting how shared resources on campus can be crucial for equitable participation. P6 expressed that studying from home would be more feasible if the university could offer discounted or subsidised data plans for students, particularly those who rely on mobile devices. This response draws attention to the financial barriers associated with mobile data costs, demonstrating how socio-economic factors influence students' ability to engage with CALL resources outside of campus.

The need for mobile-compatible CALL tools was another focus, with P10 suggesting that an app version of CALL resources would allow those who rely on smartphones to access language learning tools more easily. This response emphasises the reality that not all students have access

to computers, but many may have smartphones. P15 shared the barrier of outdated technology in computer labs, noting that older equipment sometimes prevents CALL software from running smoothly. Access to updated technology is essential for maximising CALL's potential, as outdated devices limit students' ability to engage with interactive features effectively. Flexible and remote access to CALL resources was reflected in P22's comment, where the option to use CALL tools from home would allow students to study at their convenience. This feedback shows how the flexibility to access CALL tools beyond campus hours supports self-paced learning, allowing students to control their engagement according to their schedules.

7.2.3 Increased Access to Technology and Resources

Increased access to technology and resources is essential for students to engage fully with CALL tools, as many rely on institutional support to access the necessary devices and internet connectivity. For some students, lack of access to personal laptops and reliable internet poses a barrier to continuous engagement with CALL, especially for those who must depend on shared campus resources. For example, access to updated computers in university labs and extended lab hours is critical for students without personal devices, ensuring they can complete assignments and access language-learning tools outside of scheduled class times. Similarly, mobile-compatible CALL applications can broaden accessibility for students who primarily use smartphones, while subsidised or discounted internet data plans would help reduce the financial burden on students needing to study from home. These types of institutional support allow for more equitable engagement with CALL, making it possible for students from diverse socio-economic backgrounds to participate fully. For the study, this theme highlights the necessity of addressing resource disparities in CALL access, as well as the role that institutions play in creating inclusive, technology-enhanced learning environments.

P4: "It would be great if the university offered 24-hour lab access during exam periods. Sometimes it's hard to fit everything into regular lab hours, especially when assignments pile up."

P8: "Having downloadable resources that we can access offline would make a big difference. Internet access can be unreliable, especially off-campus."

P9: "If there were regular workshops to show us how to troubleshoot common tech issues, it would save a lot of time and stress when things go wrong."

P17: "A hotline or quick-response email for tech support would be amazing. We often need immediate help, but it's hard to find the right assistance in time."

P20: "A language lab set up with headphones, microphones, and updated software just for CALL would be a big help, especially for practicing speaking and listening."

P23: "More seating in the labs and quiet study spaces with CALL tools would make it easier to focus. The labs are often crowded, and a quieter environment would help."

The responses reveal significant student needs related to extended access to campus facilities, reliable technical support, and dedicated spaces optimised for CALL. Students face challenges aligning their study schedules with limited lab hours, especially during high-demand periods like exams. P4 highlights the importance of extended lab availability, suggesting that 24-hour access during exams would accommodate students' diverse schedules and reduce barriers to completing assignments. This response underscores the gap between students' needs and current campus facility schedules, revealing how extended access could facilitate more effective use of CALL resources.

The reliability of internet access and the availability of offline resources also emerged as crucial factors in enabling consistent engagement with CALL. P8 and P9 emphasise that interruptions in connectivity and insufficient tech guidance disrupt the learning experience, especially for students who depend on campus resources. P8's suggestion for downloadable, offline resources highlights how CALL could better support students with limited or unreliable internet, providing continuity in their language studies. P9, on the other hand, suggests workshops for troubleshooting common tech issues, indicating that basic technical training could empower students to resolve issues independently, thereby minimising learning disruptions.

Quick-response technical support emerged as a recurring theme, with P17 expressing a need for a dedicated hotline or email support system that offers timely assistance. This response reveals that many students encounter barriers while navigating CALL tools and that having immediate access to assistance would reduce frustration and support continuous learning. The need for proactive support solutions suggests that students often feel unprepared or lack confidence when dealing with technical challenges on their own.

Participants voiced the need for dedicated spaces and specialised equipment for language learning. P20 suggests a language lab outfitted with specialised audio equipment for CALL, pointing to the importance of immersive resources for effective practice in speaking and listening skills. Similarly, P23 notes the importance of quiet and spacious areas within labs, which would enhance focus and reduce overcrowding, particularly during peak usage times. These responses reflect a broader call for institutional investment in well-equipped, student-CENTRED learning environments that cater specifically to language acquisition needs.

7.2.4 Training, Tutorials and Individualised Guidance

Training, tutorials, and Individualised guidance are critical components in ensuring that students and faculty effectively engage with CALL tools. Comprehensive training introduces users to CALL's features and functions, building a foundational understanding that allows them to navigate the technology with confidence. Regular tutorials offer ongoing support, addressing specific functions or troubleshooting common issues, which is particularly valuable, as students encounter new tools or features throughout their studies. Individualised guidance, such as one-on-one assistance or tailored advice for specific learning goals, further enhances user experience by meeting unique needs and addressing varying levels of digital proficiency. Together, these support measures empower students and educators to integrate CALL into their language learning or teaching with minimal disruptions, ultimately improving overall engagement and ensuring that CALL can be used to its fullest potential in diverse educational settings.

P3: "Offering training sessions for both students and lecturers would be really helpful. Sometimes, it's hard to keep up with all the features if you don't have guidance."

P5: "I'd appreciate some online tutorials or guides. Sometimes it feels like there's a lot to learn, and having resources to look back on would make it easier."

P12: "Having more workshops would be helpful. I think a lot of us feel like we're only using a fraction of what CALL can actually do."

P16: "More one-on-one time with lecturers who can guide us on specific CALL tools would make it less overwhelming."

P19: "I think it would help if we had resources that outline what each tool does and when to use them for different assignments."

Students' responses reveal a strong need for comprehensive training, accessible tutorials, and Individualised guidance to help students and lecturers make full use of CALL tools. Many participants express a feeling of being "overwhelmed" by the wide range of features within CALL, indicating that without structured support, they struggle to fully utilise these tools. For example, P3 notes the importance of "training sessions for both students and lecturers," suggesting that guidance for both groups is essential to bridge knowledge gaps and foster confidence in using CALL's many functionalities. This response points to training as a way to make CALL more accessible and effective across all user levels.

The need for on-demand resources also stands out, with P5 mentioning the value of "online tutorials or guides" to help navigate the features and provide a reference point for ongoing learning. For students who may need to revisit specific aspects of CALL at their own pace, such resources are especially useful. Similarly, P12 underscores the need for workshops, explaining that many students feel they're "only using a fraction of what CALL can actually do." This highlights how interactive learning support could unlock CALL's potential, encouraging students to explore beyond basic functions and enhance their learning experience.

Individualised support is another prominent theme, with P16 noting that "one-on-one time with lecturers" would help students feel less intimidated by CALL. Personalised guidance allows for tailored support, addressing specific needs and assignments in a way that makes CALL feel more manageable. Furthermore, P19 suggests "resources that outline what each tool does and when to use them," emphasising that strategic guidance on not only how but also when to use specific

CALL features would empower students to use the tools more effectively for different learning tasks.

7.2.5 Collaborative Learning and Study Support

Collaborative learning and study support play a crucial role in enhancing students' engagement and understanding within the language learning process. In a collaborative environment, students can work together on assignments, share knowledge, and support each other, which often leads to a deeper grasp of complex language concepts. Study support systems, such as peer groups or study labs, provide additional layers of assistance, creating spaces where students can clarify doubts, discuss topics, and develop a sense of community. These approaches also foster motivation and accountability as students work towards common learning goals, which is particularly beneficial in CALL settings where peer interaction can simulate real-life communication scenarios. Together, collaborative learning and supportive study environments build a more interactive and resilient learning experience, empowering students to actively engage with both technology and their peers in meaningful ways.

P7: "It would be great if there were more group study sessions where we could use the CALL tools together and help each other out."

P13: "If there were mentors or peer tutors who could help students navigate CALL, it would make things much easier for new students."

P23: "The institution could encourage lecturers to assign tasks that make us use CALL more often; practice would help us become more comfortable with it."

P26: "I'd love more collaborative projects using CALL. Working with others would make learning more engaging and help us develop teamwork skills."

The responses underscore the value of collaborative learning and study support as essential elements for enhancing engagement and comfort with CALL tools. P7 suggests the implementation of "more group study sessions" where students could utilise CALL tools together, emphasising that collaborative environments would allow students to support each other and share strategies for using the technology effectively. This sentiment reflects a broader need for shared learning spaces where students can benefit from peer interaction, reinforcing both their language skills and technical proficiency.

Mentorship and peer support also emerged as valuable resources, as P13 notes that having "mentors or peer tutors" to guide students through CALL could significantly ease the adjustment process for newcomers. This response indicates that structured peer support could help bridge the knowledge gap for less experienced students, fostering a more inclusive learning environment where everyone can benefit from CALL, regardless of their starting skill level.

Further, P23 highlights the role of lecturers in encouraging CALL usage, suggesting that more frequent assignments involving CALL could help students build familiarity and confidence with the tools. Through integrating CALL into regular coursework, students are given more opportunities to practice, making it an integral part of their academic routine rather than an additional task. This approach could help normalise CALL within the curriculum, making students more comfortable and adept in its use.

P26 emphasises the appeal of "collaborative projects using CALL," pointing out that teamwork not only makes learning more engaging but also helps students develop essential collaborative

skills. This response shows the added value of CALL in facilitating interactive, project-based learning, where students can tackle language challenges collectively, making the experience more dynamic and motivating. These responses reveal that collaborative learning and structured study support enhance the CALL experience, fostering an environment where students can learn from each other and grow together.

7.2.6 Integration into Regular Coursework

Students suggested that CALL should be better integrated into daily learning and recommended feedback mechanisms to track their progress.

P11: "More Individualised support would go a long way. Sometimes it feels like lecturers assume everyone knows how to use the tools, but that's not always the case."

P14: "It would make a difference if lecturers integrated CALL into regular classes rather than just as extra work. That way, we'd have more hands-on experience with it."

P21: "More communication about available resources would help. Sometimes there are tools we don't even know about because they aren't advertised."

The responses reflect a clear need for more structured and Individualised support to enhance students' engagement and ease with CALL tools. P11 points out the importance of "more Individualised support," highlighting that lecturers may sometimes assume a baseline familiarity with CALL tools that not all students possess. This comment underscores the gap between students' varying skill levels and the support provided, suggesting that additional guidance, such as one-on-one assistance or tutorials, could help bridge this knowledge gap and make CALL more accessible to all students.

P14 emphasises the benefits of integrating CALL into “regular classes” rather than assigning it as supplementary work. This response suggests that embedding CALL within core coursework would provide students with more practical, hands-on experience, allowing them to build familiarity with the tools in a structured, consistent way. When CALL is part of the main curriculum, students are more likely to perceive it as an essential learning aid rather than an optional extra, which may lead to increased engagement and comfort with the technology.

Additionally, P21 points to the need for better communication about available resources, remarking that students often miss out on useful tools simply because “they aren’t advertised.” This observation reveals an information gap that could be addressed through more transparent and proactive communication, such as announcements or resource guides, to ensure students are aware of and can access all relevant CALL tools. The responses suggest that Individualised support, curriculum integration, and effective communication about resources are crucial for fostering a more inclusive and supportive CALL environment, helping students gain confidence and competence with language-learning technology.

7.3 COLLABORATIVE LEARNING AND ENGAGEMENT WITH CALL

Collaborative learning and engagement with CALL highlight the role of technology in creating interactive, shared learning experiences where students can actively participate in language practice alongside their peers. Through incorporating tools that facilitate group projects, peer feedback, and shared exercises, CALL encourages students to engage in collaborative tasks that mirror real-world communication and teamwork. These activities not only support language skills through direct interaction but also build confidence as students learn from each other’s understanding and perspectives. In a collaborative setting, students benefit from exchanging ideas,

correcting each other's mistakes, and gaining diverse approaches to language use that enrich their understanding. This process enhances engagement, as students are more motivated and invested when they can work together to achieve learning goals, rather than practicing in isolation. Collaborative learning with CALL thus creates a supportive environment where active participation, feedback, and teamwork are central, helping students to strengthen both language proficiency and interpersonal skills. Students were asked to respond to the question; "What is the impact of collaborative learning with CALL on student engagement, motivation, and language proficiency development?" The following themes were identified: enhanced peer support and feedback, increased engagement and motivation, real-world conversational practice, skill-building and teamwork, enhanced language practice and skill improvement.

7.3.1 Enhanced Peer Support and Feedback

Enhanced peer support and feedback centres on the importance of collaborative features within CALL that enable students to give and receive feedback, share knowledge, and support each other's language development. Students value these peer interactions as they can often break down language concepts, provide personalised advice, and offer alternative explanations that make learning more accessible and less intimidating. Collaborative tools within CALL allow students to share recordings, exchange notes, and discuss answers, creating a dynamic learning space where they can refine specific skills, like pronunciation and comprehension, through constructive peer feedback. This support network makes language learning more interactive and allows students to practice and reinforce what they have learned in class. Support and feedback reflect how shared learning experiences enhance engagement and lead to a deeper, community-driven approach to language acquisition.

P1: "It's really helpful to have digital tools that let us connect with classmates, especially on projects where we need to practice together."

P15: "Sometimes, a partner can explain things in a way that makes more sense. CALL group tools would make it easier to get this kind of peer support."

P19: "Being able to compare notes and discuss answers on CALL tools would be really helpful for reinforcing what we learn in class."

P24: "Having a space to give each other feedback on language assignments would be really helpful, especially for things like speaking and pronunciation."

The responses from students reveal that they view collaborative elements within CALL as valuable for improving language skills, reinforcing class concepts, and fostering a supportive learning environment. P1 highlights the importance of "digital tools that let us connect with classmates," indicating that the ability to work on projects with peers not only aids in practical application but also enhances the learning experience through shared engagement.

P6 and P24 emphasise the role of peer feedback in enhancing specific language skills, such as pronunciation and listening. Similarly, P24 expresses the need for a "space to give each other feedback on language assignments," especially for oral skills. These responses suggest that students recognise the limitations of solitary study and find that peer review in CALL environments provides feedback that is often missed in solo practice.

The responses from P15 and P19 further highlight the benefits of collaborative tools in CALL for reinforcing classroom learning and enhancing comprehension through peer explanations. P15's comment that "a partner can explain things in a way that makes more sense" points to the value of

collaborative study for clarifying complex concepts, as peers can often break down information in a relatable way. P19 also notes that "comparing notes and discussing answers" using CALL tools can reinforce what has been learned, allowing students to consolidate knowledge and correct misunderstandings through dialogue with classmates.

7.3.2 Increased Engagement and Motivation

Increased engagement and motivation are core benefits of integrating CALL into collaborative learning experiences, as students feel more connected and inspired when interacting with peers through digital tools. In working together on CALL-supported tasks, students experience language learning as a dynamic and social process, which enhances their willingness to participate and persevere. When students engage in interactive group exercises, such as shared projects or peer feedback sessions, they become more actively involved, with each participant contributing to the collective learning experience. This shared responsibility not only enhances engagement but also boosts motivation, as students feel a sense of accomplishment from completing tasks alongside their classmates. Engaging in CALL activities with peers also reduces the isolating nature of language study, making it less monotonous and more enjoyable. As students feel more connected through these collaborative efforts, their enthusiasm for language learning grows, sustaining a positive cycle of motivation that encourages continued progress and commitment.

P7: "When we are able to do projects together on CALL, it makes language learning less intimidating and more engaging."

P10: "Group work challenges would make studying more interactive. I think we'd all learn more if we could practice together."

P17: “Interactive group exercises would definitely make it easier to stay motivated. Studying with others keeps you on track.”

P23: “Working on language skills alone can be tiring. With more group-based exercises on CALL, we would probably feel more engaged and motivated.”

The responses reflect a strong appreciation for the role of collaborative activities within CALL in creating a more supportive, engaging learning environment. Participants value group work in CALL as a way to make language learning feel “less intimidating” (P7), suggesting that working alongside peers can alleviate the pressure students might feel when learning independently. This peer support fosters a shared learning experience that many find motivating, as P10 points out, emphasising that “group work challenges” would enhance interactivity and make the process more enriching.

Moreover, the responses illustrate how group-based exercises on CALL contribute to sustained motivation and accountability. P17 highlights the value of “interactive group exercises” for staying motivated, reinforcing the idea that studying in a group setting can help students maintain consistent effort and focus. Similarly, P23 remarks that group activities make learning more engaging, as individual study can be “tiring,” implying that collaborative tasks would provide the needed encouragement and break the monotony of solitary work.

These responses collectively underline that collaborative learning through CALL tools not only enriches the language-learning experience by making it more interactive but also promotes greater engagement and motivation through shared responsibilities and peer support. This social aspect of learning is seen as crucial for maintaining interest and enthusiasm, as students benefit from the encouragement and accountability that come from working in groups.

7.3.3 Real-World Conversational Practice

Real-world conversational practice is a crucial aspect of language learning that CALL tools effectively support. Students value opportunities within CALL platforms to engage in realistic dialogues that mirror everyday interactions, helping bridge the gap between classroom learning and practical application. For example, features like role-play, interactive exercises, and peer discussions allow students to apply new vocabulary and grammatical structures in context, which makes learning more meaningful and memorable. This form of practice goes beyond rote memorisation, requiring learners to respond dynamically to their peers and adapt to conversational cues as they would in real situations. Additionally, collaborative features enable students to work in pairs or small groups to simulate conversations, creating a space where they can make mistakes, receive feedback, and refine their skills without the pressure of formal assessment. Real-world conversational practice not only builds confidence but also ensures that students feel prepared to use the language outside of academic settings, making their learning more effective and applicable to daily life.

P3: “I think using CALL for small group discussions or practice sessions would boost our confidence since we’d be working in a relaxed, friendly environment.”

P9: “I think using CALL for paired exercises or role-play activities would be great practice for real-life conversations.”

P12: “If we had more chances to work together, like through shared assignments or discussion boards, it would make learning less isolating.”

P14: "It's helpful to practice speaking with classmates. Using CALL to do this lets us make mistakes and learn from each other in a comfortable setting."

P18: "I feel like collaborative exercises help retain information better. If CALL had more of these, it would make the learning process feel more natural."

P22: "Collaborative tools on CALL would make it easier to practice conversational skills in a way that feels more real and spontaneous."

Students' responses reveal a clear appreciation for the collaborative elements of CALL, particularly for enhancing confidence, facilitating real-world language practice, and building social connections that alleviate feelings of isolation in the learning process. P3 highlights how small group discussions or practice sessions on CALL create a "relaxed, friendly environment" that boosts confidence, showing the supportive potential of CALL for students who may feel less at ease in traditional, large-group settings. This sense of security within smaller, peer-supported groups allows students to take risks with language use without fear of judgment.

Similarly, P9 emphasises the value of using CALL for paired exercises and role-play activities, which provide an avenue for practicing "real-life conversations." This points to the role of CALL in bridging the gap between theoretical knowledge and practical application, giving students the chance to apply what they learn in realistic, interactive settings. CALL's capacity to simulate authentic conversations helps students prepare for everyday interactions, a significant factor for language retention and confidence.

Another key response from P12 is the sense of reduced isolation when learning collaboratively through CALL. Shared assignments and discussion boards are seen as tools that "make learning

less isolating," reflecting how CALL fosters a sense of community even when learning remotely. This collaborative structure supports social connection and peer learning, both of which are essential for a well-rounded educational experience, especially in language acquisition where dialogue and exchange are central to the learning process.

P14 echoes the benefits of peer interaction, noting that practicing language skills with classmates allows students to "make mistakes and learn from each other" in a supportive space. CALL provides a platform where students can comfortably experiment with language, transforming errors into valuable learning experiences through shared exploration. The implication is that CALL not only aids in individual skill development but also encourages a constructive, shared approach to learning where students actively help each other improve.

P18 emphasises the impact of collaborative exercises on language retention, suggesting that CALL's group activities help students "retain information better." This indicates that active engagement with peers enhances memory and understanding of language concepts, making CALL a powerful tool for reinforcing knowledge through practice and repetition within an interactive group setting.

P22 adds that collaborative CALL tools facilitate practice in a way that feels "more real and spontaneous," suggesting that CALL helps recreate the flow and unpredictability of natural conversation. This authenticity is particularly important for language learners, as it allows them to experience the nuances of conversational skills in an environment that mirrors real-life interactions.

7.3.4 Skill-Building and Teamwork

The concept of skill-building and teamwork in CALL emphasises the dual benefits that collaborative language learning activities bring to students. Through team-based exercises and projects, students can practice language skills while simultaneously developing essential interpersonal competencies. Working with peers on language tasks encourages learners to improve communication skills, adapt to different perspectives, and take on various roles within a group. This approach not only makes language learning more dynamic but also prepares students for real-world situations where teamwork is crucial. Additionally, group work within CALL provides a natural context for students to support each other, share views, and collectively solve problems, enhancing both individual and group learning outcomes. Through integrating teamwork with language practice, CALL fosters a supportive learning environment where students can build confidence and engage more fully, making language acquisition a comprehensive, socially enriching experience.

P8: "I'd love to have more group-based assignments where we can practice conversations. It's easier to remember words and phrases when you're actually using them with others."

P16: "Team projects using CALL would not only be fun but also teach us skills like teamwork, which is important in any language."

P21: "With the right tools, CALL could let us practice as a group without the pressure of being graded right away. Just learning together would be nice."

P4: "Sometimes, learning feels like a solo task, but if we had group activities on CALL, it would be easier to support each other and learn together."

P26: "I'd love more collaborative projects using CALL. Working with others would make learning more engaging and help us develop teamwork skills."

The responses reveal students' desire for collaborative learning experiences through CALL, where language practice is enriched by interaction and group dynamics. P8 underscores that engaging in group-based assignments makes language learning more effective, explaining that it's "easier to remember words and phrases when you're actually using them with others." This reflects the cognitive benefits of active recall and social reinforcement in language acquisition, where the practical use of language in conversation helps solidify vocabulary and expressions in a memorable context.

P16 adds another dimension by emphasising the broader educational benefits of teamwork in CALL projects, stating that these assignments would not only facilitate language practice but also teach "skills like teamwork, which is important in any language." This response suggests that students view language learning as an opportunity to develop interpersonal skills that are essential in collaborative environments, bridging academic learning with real-world applications. By fostering group interactions, CALL can create a dual-purpose learning environment that supports both language proficiency and collaborative skills.

For P21, the appeal of CALL's group activities lies in the absence of immediate grading pressure, which allows students to practice language "without the pressure of being graded right away." This perspective highlights students' need for a low-stakes environment where they can build confidence, experiment with language, and make mistakes in a supportive context. The relaxed setting provided by group-based CALL exercises reflects the pedagogical principles of safe

learning environments, where students are more likely to take linguistic risks and participate actively.

P4 points out that language learning can feel isolating when practiced individually, suggesting that if CALL included more group activities, students could "support each other and learn together." This statement reflects the social and emotional benefits of peer support, which can mitigate the sense of isolation often reported in language learning. The collaborative nature of CALL thus provides a platform for mutual encouragement, allowing students to benefit from shared feedback, and collective problem-solving as they work towards their language goals.

Similarly, P26 sees collaborative CALL projects as enhancing engagement, stating that "working with others would make learning more engaging and help us develop teamwork skills." This sentiment reinforces the idea that learning is most effective when it is engaging and interactive, allowing students to feel motivated and actively involved in the learning process. Group work in CALL also introduces an element of social accountability, as students are more likely to participate and contribute when they are part of a team effort.

These responses reveal that students are enthusiastic about integrating collaborative and group-based exercises into CALL, as these activities fulfill multiple educational objectives: enhanced language retention, the development of interpersonal skills, reduced anxiety associated with graded assessments, and the opportunity for peer support. The responses indicate that students value CALL as a tool for not only individual language practice but also for fostering a community of learning, where they can build confidence, practice conversational skills, and engage in meaningful interactions that support their linguistic and personal development.

7.3.5 Enhanced Language Practice and Skill Improvement

Enhanced language practice and skill improvement through CALL is a recurring theme, as students identify the benefits of focused, repeated practice in building core language competencies. CALL provides a structured yet flexible platform for developing pronunciation, listening comprehension, and conversational skills, which are crucial for language acquisition. With tools that allow learners to repeat exercises, listen to native accents, and engage in real-life scenarios, students can practice at their own pace and develop a deeper understanding of the language. For example, pronunciation and listening tools offer immersive experiences where learners can repeat phrases, record their own speech, and receive feedback, activities that are often limited in traditional classroom settings. This structured practice supports students' self-confidence as they can independently recognize and correct errors, tracking their progress over time. The variety of interactive exercises in CALL, from audio features to scenario-based conversations, encourages skill improvement in an engaging and accessible way, making language learning more effective and aligned with real-world application.

P1: "Using CALL has been great for practicing speaking exercises. It's helped me build confidence by repeating phrases and improving my pronunciation."

P4: "I enjoyed the listening exercises available on CALL tools. The range of accents really broadened my understanding of the language."

P9: "I appreciated the pronunciation exercises. Hearing words spoken by native speakers and repeating them made a big difference for me."

P14: "CALL has been really useful for listening comprehension. Practicing with real-life scenarios has made me feel more prepared for conversations."

P20: "I liked the audio recording feature. I could record myself and listen back, which helped me hear where I was making mistakes."

These responses collectively underscore the positive impact of CALL tools on improving language skills, particularly in speaking and listening comprehension. Students highlighted the confidence-building aspect of CALL, as it provides a structured, low-pressure environment for repeated practice, especially in speaking. P1 noted that engaging in speaking exercises helped "build confidence by repeating phrases and improving pronunciation," suggesting that CALL offers unique opportunities for students to refine their language skills without the immediate pressure of a live audience. This repeated, self-paced engagement with language materials can be particularly valuable for learners who may feel anxious in traditional speaking environments.

CALL's listening exercises also emerged as a powerful tool for comprehension and familiarity with diverse accents. P4 emphasised the benefit of "a range of accents," which expanded their understanding of the language and prepared them for real-world interactions. This variety of exposure to language, particularly in the form of native accents, is essential for developing nuanced listening skills, which helps students feel more competent and ready for authentic conversations.

Additionally, students noted the significance of pronunciation exercises and audio features. P9 appreciated the value of hearing native speakers and attempting to "repeat them," indicating that CALL tools provide an invaluable model for pronunciation practice, a skill that is often challenging to develop independently. The audio recording feature, as described by P20, offered another level of self-assessment. Through recording and listening to their speech, students could identify and correct specific errors, fostering self-directed learning and improvement.

These responses show that CALL's features play a crucial role in fostering a supportive and autonomous learning experience, where students can practice, self-correct, and grow in their language skills outside the constraints of traditional classroom settings. This theme reveals the substantial benefits CALL tools offer in terms of skill enhancement, student confidence, and preparedness for real-life communication.

7.3.6 Flexibility and Self-Paced Learning

Flexibility and self-paced learning are key advantages that students associate with CALL, as it allows them to adapt their study routines to personal schedules and preferences. With the ability to access language tools anytime and from anywhere, students feel less pressure to meet rigid timelines, which can improve their focus and reduce anxiety. This flexibility is especially beneficial for students juggling multiple responsibilities, as they can complete assignments and revisit materials on their own terms. Self-paced learning also encourages students to engage more thoroughly with content, enabling them to review challenging areas repeatedly until they feel confident. For example, the opportunity to redo assignments without immediate grading pressure fosters a mastery-oriented approach, where the emphasis is on skill acquisition rather than just performance. Ultimately, this flexibility and control over the learning process leads to a more personalised, motivated, and sustainable language-learning experience, which can be especially empowering in a higher education setting where self-directed study is essential.

P5: "Being able to access language tools anytime has been super helpful. I like studying at my own pace without feeling rushed."

P8: "Using CALL allowed me to track my progress. Seeing my improvements in vocabulary and grammar really motivated me to keep going."

P16: "Being able to do assignments from home has made things easier. CALL has brought flexibility, which really suits my study habits."

P18: "I love that I can access all of my work online. It makes it easy to revisit things I need more practice on without needing to ask the lecturer."

P25: "It was helpful to be able to redo assignments until I got them right. CALL allows you to practice without the pressure of immediate grading."

The responses illustrate how students find value in the accessibility, flexibility, and self-paced nature of CALL, which facilitates Individualised learning and increased motivation. Students appreciate the ability to access language tools "anytime," as P5 notes, allowing them to study without the time constraints often present in a classroom environment. This flexibility suits diverse study habits, as P16 observes, enabling students to complete assignments at their own pace, which is particularly beneficial for those who balance multiple commitments or prefer revisiting material as needed.

Progress tracking is another significant advantage that students experience through CALL, as seen in P8's reflection on monitoring vocabulary and grammar growth. The ability to observe one's improvement can be highly motivating, reinforcing consistent practice and learning. P18 highlights the convenience of accessing all learning materials online, which allows students to revisit lessons independently, reducing dependency on lecturers for repetitive practice. This independence fosters self-directed learning, an essential skill for academic success.

Additionally, CALL's non-graded practice opportunities provide a low-pressure environment where students can refine their skills without the immediate fear of assessment. As P25 notes, the

chance to redo assignments until mastery offers a learning-centric approach, emphasising skill improvement over performance anxiety.

7.3.7 Progress Tracking and Motivation

Progress tracking and motivation are interlinked aspects of effective learning, and in the context of CALL, they play a crucial role in improving student engagement and commitment. The ability to monitor one's improvement over time, as highlighted by students, helps create a tangible sense of achievement that builds confidence and encourages consistent practice. For example, when students see steady progress in vocabulary or grammar, they feel a greater sense of accomplishment, which boosts their motivation to keep moving forward. Immediate feedback is another component that enhances motivation by allowing students to correct mistakes promptly, reinforcing learning without delays and enabling real-time improvement. Features like vocabulary flashcards and self-paced exercises also support regular skill reinforcement, making language learning an active, ongoing process. These progress-tracking tools help students set and achieve incremental goals, making the learning experience more rewarding and personalised. This self-reflective process cultivates a motivated, self-directed learning environment, empowering students to take ownership of their language skills in a way that traditional, delayed feedback models cannot easily replicate.

P8: "Using CALL allowed me to track my progress. Seeing my improvements in vocabulary and grammar really motivated me to keep going."

P11: "Having immediate feedback on assignments through CALL was great. I knew what to improve right away, rather than waiting for the next class."

P21: “The vocabulary flashcards on CALL tools are amazing. I can test myself anytime, which keeps me on track with new words.”

The responses reveal that students find substantial motivational value in CALL tools that provide real-time progress tracking, immediate feedback, and vocabulary reinforcement. Tracking progress, as noted by P8, is a key benefit that gives students a visible record of their improvements in specific areas, such as vocabulary and grammar. This feature fosters a sense of accomplishment, which motivates students to continue studying consistently. Similarly, P11 highlights the benefit of immediate feedback on assignments, which enables students to identify areas for improvement right away instead of waiting for traditional classroom feedback. This instant feedback supports an adaptive learning approach, where students can make immediate adjustments to enhance their understanding and skills.

The vocabulary flashcard feature mentioned by P21 also demonstrates the value of on-demand, interactive resources that support language retention. Being able to test oneself regularly keeps vocabulary practice consistent, allowing students to build and reinforce new language knowledge independently. Together, these elements of progress tracking, immediate feedback, and vocabulary reinforcement contribute to a more dynamic and supportive learning environment. This real-time adaptability encourages self-monitoring and active engagement with the language, which are essential for long-term skill retention and improvement. The immediacy and accessibility provided by CALL therefore enable students to take greater ownership of their learning journey, enhancing both confidence and motivation.

LECTURERS MITIGATION FOR ADDRESSING BARRIERS TO CALL

7.3.8 Enhanced Student Engagement and Motivation

Lecturers were asked to respond to the question: “How do CALL tools enhance student engagement, motivation, and language learning outcomes?” Enhanced student engagement and motivation through CALL tools has become a defining strength of technology-driven language learning. Through Incorporating interactive elements like quizzes, flashcards, and immediate feedback, CALL has transformed learning from a passive to an active experience. Students become more invested in their progress, as they can directly see their achievements and areas for improvement, fostering a continuous cycle of engagement. The instant results from CALL exercises, such as quiz scores and feedback on speaking exercises, encourage students to revisit tasks and improve upon their previous attempts, motivating them to build competence through practice. Moreover, CALL creates a supportive space for students who might feel less comfortable participating in traditional classroom settings. Features such as online speaking practice and self-paced exercises allow these students to build confidence at their own pace, eventually translating to increased willingness to engage in class. This flexible and responsive approach caters to individual learning preferences, resulting in higher motivation, more meaningful participation, and a lasting interest in language learning.

P8: "The quizzes and interactive exercises keep students engaged. They're more excited to participate because they enjoy the interactive elements."

P9: "I've seen students become more motivated. The instant scores they get on certain exercises make them eager to improve and try again if they didn't get it right."

P12: "I've found that CALL really supports shy students. They're more comfortable practicing speaking exercises online doing presentations before speaking up in person."

P16: "Students seem to learn vocabulary faster with CALL's flashcards and spaced repetition features. It's a more structured way for them to memorize and review words."

P18: "I like how CALL allows students to work at their own speed. This has made a noticeable difference in their comfort levels and their willingness to ask questions."

The responses from participants highlight how CALL tools have enhanced student engagement and motivation by fostering an interactive and flexible learning environment. P8 noted that “quizzes and interactive exercises keep students engaged”, attributing higher participation to these tools' engaging, game-like qualities. This response underscores the value of interactive elements in making learning feel dynamic and enjoyable, which encourages students to participate actively. Similarly, P9 observed increased motivation, explaining that students are driven to improve their performance due to the “instant scores” they receive on assignments, a feature that provides immediate reinforcement and spurs continuous effort.

In addition, P12 emphasised how CALL creates a supportive environment for shy students, explaining that they “are more comfortable practicing speaking exercises online”, which provides a lower demand setting for students to develop language skills before presenting in front of peers. This indicates that CALL can be instrumental in breaking down communication barriers, giving quieter students a platform to build their confidence in a less intimidating setting.

Participants also observed specific CALL features that effectively facilitate language acquisition. P16 mentioned that “flashcards and spaced repetition” help students learn vocabulary at an accelerated rate, suggesting that the structured and repetitive nature of these tools aligns well with effective memorisation strategies. The structured design of CALL tools thus provides a systematic approach that reinforces vocabulary acquisition and long-term retention.

P18 highlighted CALL's flexible pacing as a key benefit, remarking that students can "work at their own speed," which positively impacts their comfort levels and willingness to seek help when needed. The ability for students to adjust their learning pace is significant in language acquisition, as it allows them to revisit challenging concepts without the pressure of keeping up with a uniform class pace.

7.3.9 Immediate Feedback and Progress Tracking

Immediate feedback and progress tracking in CALL play a crucial role in fostering responsive and effective learning environments. With CALL, students receive instant feedback into their performance on exercises and assignments, enabling them to recognise and correct mistakes immediately. This feedback opportunity supports deeper learning and helps students internalise correct information more effectively than traditional methods that often delay feedback. Additionally, progress tracking within CALL allows both students and educators to monitor growth over time. For students, being able to view their progress such as improvements in vocabulary, grammar accuracy, boosts motivation and gives a sense of accomplishment. For lecturers, progress tracking tools provide valuable data on each student's engagement and development, helping to identify areas where individual students may need extra support.

P3: "I love being able to track each student's progress. It gives me real jest into who might need extra support, even if they don't say it themselves."

P5: "The digital feedback tools are fantastic. I can provide immediate feedback, and it feels much more productive than waiting until the next class."

P11: "Having a way to monitor participation through CALL tools has been eye-opening. I can see who's really engaged and who might need more encouragement."

P24: "The instant feedback in CALL tools is so valuable. Students know immediately if they've made a mistake, which helps them learn and remember better."

The analysis of responses highlights the significant impact of CALL tools in facilitating both student monitoring and immediate feedback, which in turn enhances the learning experience by offering a more tailored and responsive approach to education. CALL's tracking features allow educators to gain valuable feedback on student engagement and academic progress, often beyond what would be evident in a traditional classroom setting. As P3 mentions, tracking individual progress offers "clear understanding" of students' needs, particularly helping instructors identify those who might need additional support, even when students do not outwardly request it. This capability is critical for fostering an inclusive learning environment where each student's progress is recognised and addressed, ensuring that no one is left behind simply because they might be less forthcoming about their struggles.

Furthermore, responses emphasise the productivity and immediacy of digital feedback through CALL, which fosters a proactive learning process. P5 underscores how CALL tools' feedback mechanisms allow instructors to provide guidance instantly, facilitating learning in real time. Immediate feedback helps students identify and correct their mistakes on the spot rather than waiting until the next class, as would be typical with traditional feedback methods. This real-time correction is reinforced by P24, who notes that students can immediately see if they've made a mistake, aiding both memory retention and concept reinforcement. By addressing errors as they occur, students can more accurately internalise correct information, which can lead to stronger, more confident language skills over time.

P11 indicated that the ability to monitor participation also plays a crucial role in supporting student engagement and motivation. The transparency afforded by CALL tools allows instructors to see levels of participation and engagement, revealing who might need more encouragement or guidance. This visibility provides lecturers with the opportunity to support students who may be less active in their learning, enabling timely interventions that help these students feel more connected and involved in their studies. Additionally, by enabling instructors to see who is excelling and who might be struggling, CALL's tracking functionality allows for a more targeted approach to teaching, where attention can be allocated based on individual needs rather than a one-size-fits-all approach.

7.3.10 Flexibility and Accessibility of Learning Materials

Flexibility and accessibility of learning materials are vital advantages that CALL brings to the educational environment. Allowing students to access resources anytime and anywhere, CALL supports diverse study routines and learning needs. This flexibility accommodates different schedules, helping students learn at their own pace and on their own time. Students who might have missed a class or need additional practice can catch up on or review material without depending entirely on in-person instruction, which ensures continuity and minimises learning gaps. Additionally, the accessibility of resources online makes learning more inclusive, benefiting students who may have limited time on campus or varying learning speeds. With CALL tools, educators can provide resources like video tutorials, interactive quizzes, and practice exercises that students can revisit as needed.

P10: "Using CALL has helped me manage class time better. The students can do some parts of the lesson at their own pace, so we can use face-to-face time more efficiently."

P13: "The flexibility with CALL has allowed me to keep lessons going even if students miss a class. They can catch up on the material online, which is a big help."

P18: "I like how CALL allows students to work at their own speed. This has made a noticeable difference in their comfort levels and their willingness to ask questions."

P22: "The ease of integrating video content has made explaining complex concepts simpler. Students grasp new ideas better when they see them in action."

P10 highlighted that using CALL tools allows for better time management in the classroom by enabling students to work through certain lesson components independently, freeing up valuable face-to-face time for more interactive and personalised instruction. This flexible structure allows teachers to address students' specific needs during class, rather than spending the entire session on basic explanations or demonstrations. P13 echoed this sentiment, adding that CALL's adaptability is especially beneficial for students who may miss a class. With online resources readily accessible, these students can catch up on their own, helping to ensure continuity and preventing gaps in learning.

Furthermore, P18 indicated that CALL's self-paced format positively impacts student comfort and participation, noting that students are more willing to ask questions when they can control the pace of their learning. This individualised learning experience not only supports diverse learning styles but also fosters an environment where students feel more confident to engage and clarify uncertainties. P22 pointed out an additional advantage: the integration of multimedia, particularly video content, within CALL. Videos help students grasp challenging material more effectively through visually demonstrating complex concepts, translating abstract ideas into tangible, comprehensible examples.

This chapter marks the end of data analysis (Chapters 4 to 7). Based on the findings, the next chapter of the study presents a Logical Framework and proposes a structured model for supporting the integration of CALL in higher education. The proposed model is named the Universal Computer-Assisted-Language Learning Model (UCALM) that is presented and discussed in chapter eight. This framework is grounded in the needs of both students and lecturers, addresses the main barriers and suggests targeted interventions. Each component of the framework includes practical steps to create a sustainable and inclusive CALL environment.

The Logical Framework and a Universal CALL Model (UCALM) are presented and discussed in the next chapter. They are developed to guide the systematic integration of CALL into teaching and learning practices across higher education institutions in Namibia. The chapter also proposes a structured CALL course design, illustrating how CALL can be embedded within the academic curriculum.

7.4 SUMMARY

Chapter Seven examined the mitigation strategies necessary to support CALL implementation in higher education, focusing on identifying and addressing barriers to create a model for effective CALL integration. This chapter explored key areas such as the perceived benefits of CALL, institutional support needs, collaborative learning opportunities, and common obstacles. Through gathering views from students and lecturers, the study aimed to develop practical solutions that would enhance CALL integration and maximise its potential in language learning.

The chapter investigated the perceived benefits and suggested ways to improve CALL's integration within the curriculum. Students shared perspectives on essential resources and institutional support required to access CALL, highlighting the importance of equitable access to

technology and the impact of collaborative learning tools on their engagement. Additionally, students discussed ways to address barriers, emphasising resource needs like computers, mobile-compatible applications, and stable internet connectivity.

The chapter further examined lecturers' views, focusing on their training and support needs for successful CALL implementation. The study explored lecturer-identified challenges in CALL integration, the role of institutional support and resource allocation, and suggestions for improvement.

The next chapter presents a practical response to the identified challenges by introducing a Logical Framework and a Universal CALL Model (UCALM). These outputs offer a structured, evidence-based approach to integrating CALL into higher education in Namibia. Chapter Eight also outlines a proposed CALL course design, providing a tangible blueprint for incorporating CALL into academic programmes and instructional practice.

CHAPTER EIGHT

PROPOSED MODEL FOR CALL INTEGRATION IN HIGHER EDUCATION

8.1 INTRODUCTION

Chapter Eight presents the culminating product of the study: a Logical Framework and Universal CALL Model (UCALM) for the integration of Computer-Assisted Language Learning (CALL) in Namibian higher education. Based on the study findings from Chapters 4 to 7, this chapter introduces and presents the Logical Framework that was developed to synthesise the objectives, indicators, means of verification, and assumptions supporting the proposed CALL integration model in higher education. Following the logical framework, the chapter presented the Universal CALL Model (UCALM), a multi-phase approach designed to address the pedagogical and infrastructural needs of CALL implementation. The model is structured around five key components: Access to Resources and Infrastructure, Training and Capacity Building, Institutional and Curriculum Integration, Student-CENTRED Engagement, and Monitoring and Evaluation. Each component is justified based on findings from Chapters 4 to 7 in line with the study's objectives and identified challenges. In addition, a proposed CALL course structure is outlined to demonstrate how CALL could be operationalised as an independent course within academic programmes.

The Logical Framework Approach, often referred to as the logframe, was initially developed in 1969 by Leon J. Rosenberg under contract to the U.S. Agency for International Development (USAID) as a response to increasing demands for improved project planning, monitoring, and evaluation. The intention was to introduce a more structured and objective methodology that would

ensure development projects were systematically integrated with clearly defined objectives, measurable indicators, and logical causal relationships between activities, outputs, outcomes, and goals (Rosenberg, 1969). Over time, the Logical Framework Approach was adopted widely by major international development agencies such as the World Bank, European Commission, and United Nations as a standard tool for results-based management and performance accountability (Bakewell & Garbutt, 2005). Its strength lies in its capacity to simplify complexity, promote transparency, and enhance strategic coherence in both planning and implementation phases of a project.

This chapter will:

- Introduce and present the Logical Framework in a table form
- Provide an objective structured explanation of each part (goal, objectives, indicators, assumptions) of the framework
- Present the Universal CALL Model (UCALM) as the proposed
- Present the proposed CALL course (Principles and Practical Application of Computer-Assisted-Language Learning (PPA-CALL)
- Justify how the CALL Model was derived based on findings from Chapters 4, 5, 6, and 7
- Present a diagram for the Universal CALL Model (UCALM)

This section introduces the Logical Framework for the Use of Computer-Assisted Language Learning (CALL) in Higher Education, developed as a product of the study's four main research questions. This framework has been designed to demonstrate the logical progression from research questions to proposed actions and outcomes. It shows how the findings of the study have been

translated into a structured and actionable framework, which serves as a bridge between empirical results and the practical implementation of CALL in higher education institutions.

The logical framework is divided into four thematic objectives, each corresponding to one of the research questions. Each objective is further detailed with measurable indicators, the methods for verifying those indicators, and assumptions that may affect the implementation or interpretation of results. The structure of this framework clarifies what the study aimed to achieve (objectives), how those aims were measured (indicators), where and how the data was collected (means of verification), and the underlying conditions necessary for success (assumptions). This format is consistent with international logical framework matrix (logframe) best practices, offering a transparent, outcome-oriented view of how the study contributes toward the advancement of CALL.

Based on research question 1, the framework aims to increase awareness and positive perceptions of CALL among students and lecturers. Indicators such as attitudinal shifts measured through questionnaire responses provided empirical grounding for assessing changes in perceptions. Outputs included a set of qualitative and quantitative data showing varying levels of acceptance of CALL, and the activities involved administering structured instruments to gather this data.

The focus of research question 2 is to identify the CALL tools and features that students and lecturers found most useful. Using frequency analysis and thematic coding, the framework captured preferences related to interactivity, feedback, content quality, and ease of use. These outputs informed recommendations for tool selection and classroom integration strategies. It assumes that participants are already using or aware of CALL tools, which was verified through survey responses.

Research question 3 addressed the barriers to CALL delivery, including socio-economic challenges, technological access, institutional support, and training. A variety of tools, including coded qualitative data and frequency tables, were used to verify reported challenges. Assumptions in this area included institutional readiness and the presence of basic technological infrastructure, which varied between institutions.

Research question 4 builds on the preceding findings to propose mitigation strategies and establish a practical, sustainable CALL framework. The goal was to propose a contextually relevant model that can be adapted across institutions. Indicators included the number and type of mitigation strategies identified by participants. Activities included participants engagement and synthesis of prior objectives, resulting in a well-documented CALL framework tailored to the higher education environment.

8.2 LOGICAL FRAMEWORK FOR CALL

Research Question 1

Table 8.1: *(What are the attitudes and perceptions of Namibia's Higher Education students towards CALL?)*

OBJECTIVES <i>(What the study wants to achieve)</i>	INDICATORS <i>(How to measure change)</i>	MEANS OF VERIFICATION <i>(Where/how to get information)</i>	ASSUMPTIONS <i>(What else to be aware of)</i>
Goal	Increased awareness and acceptance of CALL in language education	Questionnaire responses showing positive attitudes and perceptions	Students and lecturers are willing to adopt technology-based learning
Outcomes	Change in attitude towards CALL integration in teaching and learning	Questionnaire responses completed	Respondents answer truthfully and reflect real beliefs
Outputs	Qualitative and quantitative data from	Number of completed surveys	Access to students and lecturers is granted;

	survey responses collected from students and lecturers		participants are willing to contribute
Activities	Design and administer student and lecturer questionnaires	Questionnaire tools; Consent forms	Participants are honest; logistical arrangements allow full data collection

Research Question 2

Table 8.2: *(What are the factors and characteristics identified by the users of CALL that best support their language learning?)*

OBJECTIVES <i>(What the study wants to achieve)</i>	INDICATORS <i>(How to measure change)</i>	MEANS OF VERIFICATION <i>(Where/how to get information)</i>	ASSUMPTIONS <i>(What else to be aware of)</i>
Goal	To identify key CALL features that enhance language learning effectiveness	Questionnaire responses highlighting specific CALL tools and features	Participants are aware of the CALL tools they use and can articulate their usefulness
Outcomes	Better understanding of which CALL components (e.g., feedback, interactivity, content delivery) support language learning	Frequency analysis of tool usage; Thematic coding of qualitative data	Students and lecturers provide detailed and honest feedback
Outputs	1. Ranked list of preferred CALL tools 2. Documented perceptions of effective CALL features	Completed questionnaires	Participants have diverse experiences with CALL tools
Activities	Develop and administer CALL effectiveness questionnaire	Questionnaire forms	Participants are willing to reflect critically on their learning tools

Research Question 3

Table 8.3: *(What are the factors that impede the delivery of Computer-Assisted Language Learning (CALL)?)*

OBJECTIVES <i>(What the study wants to achieve)</i>	INDICATORS <i>(How to measure change)</i>	MEANS OF VERIFICATION <i>(Where/how to get information)</i>	ASSUMPTIONS <i>(What else to be aware of)</i>
Goal	To examine and document the barriers that hinder the effective implementation of CALL in higher education	Number and type of reported challenges such as access, training, infrastructure	Student and lecturer collected data
Outcomes	Increased awareness of socio-economic, technical, and institutional challenges affecting CALL use	Categorised list of common barriers from both groups	Data triangulation between qualitative and quantitative tools
Outputs	1. Compilation of specific delivery challenges 2. Barrier comparison across institutions	Survey reports, coded data excerpts, frequency tables	Institutions have different but comparable infrastructure and support systems
Activities	1. Analyse data for recurring barriers 2. Examine barriers across UNAM and NUST 3. Identify possible underlying causes	Data coding sheets, thematic maps, summary tables	All relevant variables such as infrastructure, bandwidth, software access, and training levels are disclosed by participants

Research Question 4

Table 8.4: *(What are the mitigation strategies leading to the development of a framework to support the delivery of Computer-Assisted Language Learning (CALL) in the context of higher education?)*

OBJECTIVES <i>(What the study wants to achieve)</i>	INDICATORS <i>(How to measure change)</i>	MEANS OF VERIFICATION <i>(Where/how to get information)</i>	ASSUMPTIONS <i>(What else to be aware of)</i>
---	--	---	--

Goal	To identify and develop effective strategies to overcome CALL barriers and create a sustainable CALL framework	Number and type of suggested strategies; lecturer/student agreement on effectiveness	Questionnaires, literature comparison, framework design documents
Outcomes	Clear and context-specific mitigation strategies and framework components	Inclusion of strategies such as access, training, support, and collaboration	Thematic analysis results, expert review feedback
Outputs	1. A proposed CALL Model for Namibian higher education 2. Strategic recommendations for implementation	Draft framework, visual model, summary reports	CALL needs vary, but core framework can be adapted
Activities	1. Synthesise findings from research questions 1–3 2. Design and a practical CALL Model for Namibian higher education	Considerations for stakeholder workshops, feedback forms, revised framework drafts and framework adaptation	Considerations for stakeholder participation to remain consistent and constructive

8.3 INTRODUCING THE UNIVERSAL COMPUTER-ASSISTED LANGUAGE LEARNING MODEL (UCALM)

The Universal Computer-Assisted Language Learning Model (UCALM) is proposed as a systems-based instructional design framework for planning, implementing, and sustaining Computer-Assisted Language Learning in higher education language programmes. The model provides structured guidance for integrating digital and AI-supported tools into language instruction in ways that support pedagogical coherence, institutional coordination, and long-term scalability.

UCALM was informed by empirical evidence gathered from students and lecturers at the University of Namibia and the Namibia University of Science and Technology, as well as by

established scholarship in CALL and instructional design. The framework responds to recurring challenges related to access, educator capacity, curriculum integration, and sustained support identified in the study. Rather than focusing on individual tools or isolated instructional practices, UCALM organises CALL as an interconnected instructional system operating across institutional, curricular, and pedagogical levels.

As a practical and conceptual framework, UCALM outlines key design pillars that guide decision-making related to infrastructure, professional development, curriculum design, learner capability, inclusivity, and continuous improvement. Its purpose is to support sustainable, equitable, and instructionally grounded language learning through technology-enhanced approaches that can be adapted across diverse higher education settings.

8.4 THE UNIVERSAL COMPUTER-ASSISTED LANGUAGE LEARNING MODEL (UCALM)

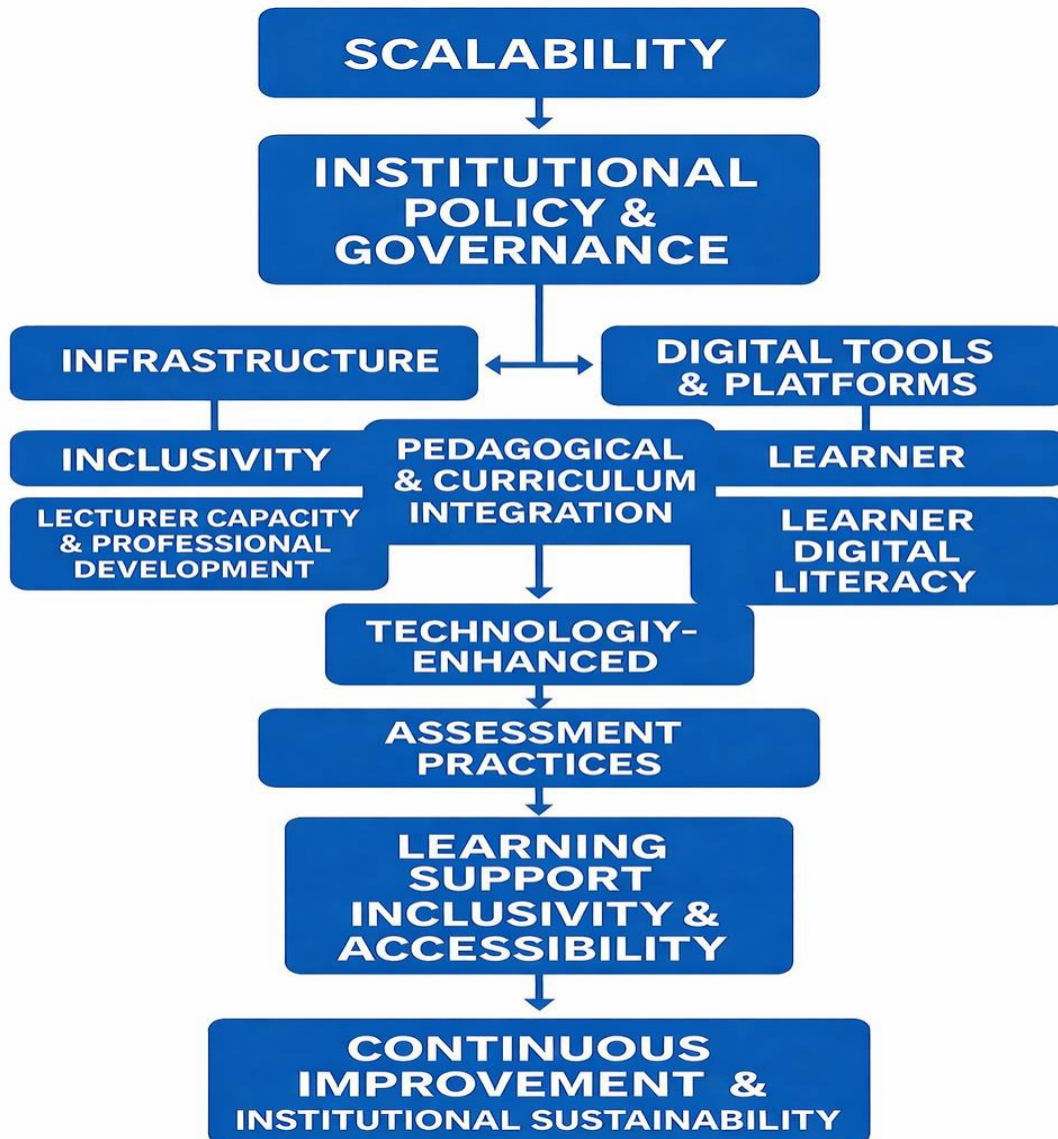


Figure 8.1: Universal Computer-Assisted Language Learning Model (UCALM)

The Universal Computer-Assisted Language Learning Model presents eight interconnected pillars that together form the foundation for integrating digital and AI-supported technologies into language education. Central to the model is the language learner, reflecting a sustained commitment to learner-focused instructional design. Each pillar operates in coordination with the others to support coherent, inclusive, and adaptable CALL implementation across programmes and institutions. The model embeds mechanisms for monitoring, feedback, and adaptation, enabling continuous instructional improvement and the progressive development of learner autonomy.

A. ACCESS TO RESOURCES AND INFRASTRUCTURE

Objective:

Guarantee equitable access to essential CALL resources, including devices, software, and connectivity, for all students and lecturers.

Key Strategies:

- **Device Loan Programmes:** Establish institutional loan schemes for students who lack personal access to computers or tablets.
- **Reliable Internet Access:** Ensure continuous, stable, high-speed internet access for students and staff at all times.
- **Dedicated CALL Laboratories:** Create or repurpose language laboratories equipped with updated CALL software, reliable connectivity, and appropriate audio-visual tools.
- **Mobile-Compatible CALL Tools:** Prioritise applications that function effectively on mobile devices to support learners who rely primarily on smartphones.

Expected Outcome:

- Broader and more inclusive access to CALL resources across socio-economic backgrounds, supporting consistent engagement with digital language learning materials.

B. INSTITUTIONAL POLICY AND GOVERNANCE**Objective:**

Provide formal institutional structures that support consistent, responsible, and sustainable CALL and AI-supported language learning.

Key Strategies:

- **Policy Frameworks:** Develop policies that formally recognise CALL and AI-supported learning as core components of language programmes.
- **Ethical Oversight:** Establish governance mechanisms addressing data use, academic integrity, transparency, and responsible AI deployment.
- **Quality Assurance Structures:** Integrate CALL-related practices into institutional review, accreditation, and evaluation processes.
- **Clear Adoption Guidelines:** Define criteria for selecting, reviewing, and discontinuing CALL and AI-supported tools.

Expected Outcome:

- Stable governance structures that promote accountability, consistency, and long-term sustainability in CALL implementation.

C. CURRICULUM AND PROGRAMME INTEGRATION

Objective:

Position CALL as an integral component of curriculum design and programme-level planning.

Key Strategies:

- **Curriculum Alignment:** Map CALL tools and activities directly to course and programme learning outcomes.
- **Embedded CALL Activities:** Integrate CALL-based tasks, exercises, and projects as required components of coursework.
- **Assessment Integration:** Design assessments that formally recognise CALL engagement and learning outcomes.
- **Programme-Level Coordination:** Ensure consistency in CALL use across courses within a programme.

Expected Outcome:

- A unified and coherent approach to CALL integration that reinforces instructional value and ensures consistent learner experience.

D. PEDAGOGICAL DESIGN AND ASSESSMENT PRACTICES**Objective:**

Structure learning activities and assessment processes that support meaningful language development through CALL and AI-supported tools.

Key Strategies:

- **Sequenced Learning Tasks:** Design structured learning activities that integrate human-guided instruction with AI-supported practice and feedback.

- **Formative Feedback Cycles:** Use CALL tools to support iterative feedback and learner reflection.
- **Assessment Transparency:** Clearly define criteria, progression standards, and feedback functions within CALL-supported assessment.
- **Balance of Automation and Human Input:** Maintain educator oversight in assessment and feedback processes.

Expected Outcome:

- Instructionally coherent learning experiences that support progression, clarity, and meaningful feedback across proficiency levels.

E. LECTURER CAPACITY AND PROFESSIONAL DEVELOPMENT

Objective:

Develop sustained educator expertise in CALL pedagogy and AI-supported language instruction.

Key Strategies:

- **Targeted Professional Development:** Offer regular workshops focused on CALL design, AI-supported pedagogy, and instructional decision-making.
- **Pedagogical Support Communities:** Facilitate collaboration and knowledge-sharing among lecturers.
- **Ongoing Skill Development:** Support educators in adapting instruction as technologies and pedagogical practices evolve.
- **Recognition of Instructional Work:** Acknowledge CALL-related instructional design and innovation within workload and evaluation systems.

Expected Outcome:

- Enhanced lecturer confidence, consistency, and instructional quality in CALL-supported language teaching.

F. LEARNER DIGITAL CAPABILITY AND AUTONOMY**Objective:**

Support learners in developing the skills required to engage effectively and critically with CALL and AI-supported tools.

Key Strategies:

- **Student Orientation Programmes:** Introduce learners to CALL tools, feedback interpretation, and responsible AI use.
- **Scaffolded Autonomy:** Design activities that gradually increase learner responsibility and self-regulation.
- **Metacognitive Support:** Encourage reflection on learning strategies, feedback use, and language development.
- **Guidance on AI Output:** Provide instruction on evaluating and integrating AI-generated feedback and content.

Expected Outcome:

- Learners who engage autonomously and critically with CALL tools while maintaining agency in their language learning.

G. INCLUSIVITY, EQUITY, AND ETHICAL RESPONSIBILITY

Objective:

Ensure fairness, accessibility, and ethical integrity in CALL and AI-supported language learning.

Key Strategies:

- **Inclusive Design Practices:** Accommodate diverse linguistic, cultural, and digital backgrounds in CALL activities.
- **Accessibility Measures:** Address barriers related to disability, access, and prior digital experience.
- **Bias Monitoring:** Regularly review AI-supported tools for potential bias or inequitable outcomes.
- **Transparent Use of AI:** Communicate clearly how AI systems function within learning and assessment processes.

Expected Outcome:

- Equitable participation and responsible use of CALL across diverse learner populations.

H. MONITORING, SCALABILITY, AND CONTINUOUS IMPROVEMENT**Objective:**

Sustain instructional quality as CALL initiatives expand across courses, programmes, and institutions.

Key Strategies:

- **Data-Informed Monitoring:** Use CALL analytics to track engagement, performance, and participation patterns.
- **Feedback Mechanisms:** Collect regular input from students and lecturers regarding

CALL effectiveness.

- **Periodic Review Cycles:** Conduct scheduled evaluations to refine tools, practices, and policies.

- **Defined Success Indicators:** Monitor indicators such as learner progression, satisfaction, and completion rates.

Expected Outcome:

- A responsive and scalable CALL system that adapts to evolving instructional needs while preserving coherence and quality.

Table 8.5: Implementation Phases for the CALL Model

Phase	Key Actions	Timeframe	Implementation Responsibility
Phase 1: Foundation	-Launch device loan programmes and negotiate subsidised data plans. - Conduct initial CALL training for lecturers and students. - Establish peer support networks and help desk services. - Prepare CALL labs and resources.	1–2 Years	- ICT Department - Teaching and Learning Centre - Faculty Deans / HoDs - Library and eLearning Units
Phase 2: Curriculum Integration	- Align CALL tools with curriculum objectives and assessments. - Integrate CALL as part of coursework. - Implement grading for CALL activities. - Reinforce CALL policies at an institutional level.	2–4 Years	- Curriculum Committees - Course Coordinators / Lecturers - Assessment & Quality Assurance Offices - Deans and Academic Directors
Phase 3: Personalisation and Feedback	- Introduce gamified, adaptive content for personalised learning. - Regularly survey and	3–5 Years	- Educational Technologists / Instructional Designers - Quality Assurance

	collect feedback from students and lecturers. - Implement real-time progress tracking tools. - Adapt CALL materials based on evaluation and feedback.		Units - Lecturers - Academic Support Services
Phase 4: Continuous Improvement	- Evaluate success metrics and make adjustments to CALL strategies. - Conduct quarterly reviews based on data and feedback. - Expand CALL resources and tools to align with emerging needs. - Foster ongoing support and development programmes for CALL.	Ongoing	- Institutional Research / Quality Assurance Offices - Teaching and Learning Centre - ICT and Strategic Planning Units - Faculty Leadership

The Universal CALL Model (UCALM) is a structured approach to effectively incorporate CALL within the higher education system. This model prioritises equitable access to resources by introducing initiatives like device loan programmes, subsidised internet access, and dedicated language labs. To support sustainable implementation, it emphasises comprehensive training and ongoing technical support for both students and lecturers, fostering confidence and competence in CALL technology. Institutional and curriculum integration is a key pillar, embedding CALL as a fundamental part of language programmes, aligning it with course objectives, and including CALL in assessments. Additionally, the model values student-CENTRED engagement by incorporating adaptive learning paths, interactive content, and collaborative activities, allowing students to engage with language learning in diverse and meaningful ways. A commitment to ongoing evaluation is built into the model, with progress-tracking tools and regular feedback mechanisms to refine strategies and maintain alignment with educational goals. This model aims to create a sustainable, inclusive, and adaptable CALL environment that responds to both the technical and

pedagogical needs of Namibian students and lecturers, ultimately enhancing language learning outcomes across the sector.

8.5 PROPOSED COURSE FOR CALL FOR HIGHER EDUCATION

This section presents a proposed course structure for Computer-Assisted Language Learning (CALL) tailored to the needs of higher education institutions in Namibia. This course was developed in response to the findings of this study; it is designed to equip both students and lecturers with the theoretical knowledge and practical skills necessary to effectively integrate CALL tools into language teaching and learning. The course emphasises hands-on training, pedagogical principles of CALL, digital literacy, and curriculum-aligned application of technology. It aims to enhance the capacity of language instructors while promoting student engagement, autonomy, and proficiency through structured exposure to interactive learning platforms and digital content.

COURSE TITLE:

PRINCIPLES AND PRACTICAL APPLICATION OF COMPUTER-ASSISTED-LANGUAGE LEARNING (PPA-CALL)

Course Level: NQF 7 (Undergraduate) and adjustable to NQF 8 & 9 (Postgraduate)

Credit Hours: 150 (Adjustable based on institution requirements)

Course Code: PPA CALL-105 & PPA CALL-505 (Adjustable based on institution requirements)

Prerequisites: None

Course Duration: 12 weeks

Course Description

This course introduces students to the principles and practical applications of CALL within the higher education context. It emphasises how CALL can enhance language acquisition through technology-supported tools and techniques, including digital resources, online collaboration, and interactive content. The course addresses key elements of CALL, focusing on technical skills, institutional support, collaboration, and Individualised learning paths. Students will explore CALL tools, engage in real-world conversational practice, and complete projects designed to increase engagement, skill acquisition, and technological proficiency in language learning.

Course Objectives

Upon successful completion of this course, students will be able to:

- Identify and utilise key CALL resources that support language learning.
- Demonstrate proficiency with various CALL tools for improving language skills in speaking, listening, reading, and writing.
- Collaborate effectively with peers through CALL platforms to enhance language learning and teamwork.
- Reflect on and evaluate the role of CALL in promoting engagement, self-paced learning, and progress tracking.
- Integrate CALL into a cohesive language-learning plan that considers individual needs, institutional resources, and ongoing improvement.

Table 8.6: Course Outline for Computer-Assisted-Language Learning (CALL)

Week	Topics	Learning Objectives	Activities	Assessment
1	Introduction to CALL in Language Learning	Understand the benefits and challenges of CALL; identify CALL resources available in Namibia.	Lecture, discussions on current CALL resources, orientation on basic tools.	Reflection on CALL expectations (5%)

2	Access to Resources and Infrastructure	Learn to use CALL devices and navigate online resources; explore equitable access to tools.	Practical session in language lab, internet research on CALL tools.	Lab work report (5%)
3	Training and Technical Skills	Gain proficiency in software for language learning; understand troubleshooting basics.	Hands-on training in CALL tools, peer support activities.	Practical quiz on technical skills (10%)
4	CALL in Speaking and Listening	Develop skills in pronunciation, listening comprehension, and conversational practice.	Use speech recognition, record and review exercises.	Pronunciation exercise submission (10%)
5	CALL in Reading and Writing	Utilise CALL tools to enhance vocabulary, grammar, and reading comprehension.	Interactive reading and writing tasks; vocabulary flashcards.	Writing sample using CALL tools (5%)
6	Collaborative Learning with CALL	Engage in team-based projects; practice peer feedback and teamwork.	Group project using CALL tools, peer review session.	Group project submission (10%)
7	Integrating CALL into Language Curriculum	Learn to align CALL resources with course goals and assessments.	Workshop on lesson planning with CALL tools; group discussions.	Lesson plan assignment (10%)
8	Self-Paced Learning and Progress Tracking	Apply progress tracking tools to monitor and enhance learning.	Set learning goals and monitor with tracking tools.	Progress journal submission (5%)
9	Immediate Feedback and Adaptive Learning Paths	Use adaptive tools that provide immediate feedback; personalise learning activities.	Engage in CALL exercises with real-time feedback; personalise activities.	Quiz on adaptive tools (10%)
10	CALL for Real-World Conversational Practice	Practice conversational skills in simulations or role-plays using CALL.	Role-playing exercises; conversational practice.	Recorded conversation submission (10%)
11	Assessment and Continuous Improvement	Understand how CALL tools support ongoing assessment and improvement.	Self-assessment and peer assessment session.	Self-assessment reflection (5%)
12	Final Project and Review	Develop a CALL-integrated lesson or project reflecting course concepts.	Presentation of final projects; course review and reflection.	Final project (20%)

Assessment Breakdown

1. Reflection on CALL Expectations – 5%
2. Lab Work Report – 5%
3. Practical Quiz on Technical Skills – 10%
4. Pronunciation Exercise Submission – 10%
5. Writing Sample – 5%
6. Group Project Submission – 10%
7. Lesson Plan Assignment – 10%
8. Progress Journal Submission – 5%
9. Quiz on Adaptive Tools – 10%
10. Recorded Conversation Submission – 10%
11. Self-Assessment Reflection – 5%
12. Final Project – 20%

Key Learning Resources

- CALL Platforms: Duolingo, Babbel, and other mobile-compatible language learning applications.
- Online Collaboration Tools: Zoom, Google Meet, Microsoft Teams.
- Reading and Writing Tools: Grammarly, ChatGPT, Microsoft Word, Google Docs.
- Listening and Speaking Tools: VoiceThread, Listening and Speaking app and audio recording software.
- Progress Tracking and Feedback Tools: Kahoot, Quizlet, built-in tracking features in CALL platforms.

Teaching Methodology

This course adopts a blended approach, combining lectures, practical lab sessions, group projects, and individual exercises. Students will learn through hands-on experience, collaborative assignments, and interactive tools, with continuous instructor and peer feedback to enhance learning. The curriculum integrates self-paced modules to accommodate diverse learning styles and progress levels.

This syllabus serves as a practical guide for operationalising the CALL framework, directly responding to the identified needs of students and lecturers. It provides a structured approach to technology-enhanced language learning, promoting skills development, accessibility, and engagement across varying language competencies and learning environments in Namibian higher education.

8.6 JUSTIFICATION FOR THE DERIVATION OF THE UNIVERSAL CALL MODEL BASED ON FINDINGS

The development of the Universal CALL Model (UCALM) was directly informed by a systematic analysis of the findings presented across Chapters four to seven of this study. Each chapter contributed critical knowledge that collectively shaped the structure, focus, and components of the proposed model.

Chapter four explored the attitudes and perceptions of students and lecturers towards CALL, revealing a generally positive disposition towards the integration of technology in language learning. Students and lecturers demonstrated strong agreement with the conceptual definition of CALL, and many indicated frequent use of CALL tools. However, the findings also highlighted varying levels of computer competence and confidence among users, along with inconsistent access to technology. These findings pointed to the need for foundational support components in the model, particularly in terms of training, digital literacy, and equitable access to resources.

Chapter 5 assessed the effectiveness of CALL in enhancing language learning outcomes, showing that CALL positively influences engagement, skill development, and personalized learning. Students identified specific skills, especially listening and reading—that were effectively developed through CALL tools. Moreover, the chapter revealed that interactive, feedback-rich, and multimedia-enhanced environments provided by CALL facilitated better language retention. These results informed the inclusion of adaptive learning, gamification, and feedback mechanisms in the UCALM to reinforce student-CENTRED instructional strategies.

Chapter 6 identified barriers to the delivery of CALL, such as limited access to internet connectivity, inadequate digital infrastructure, and a lack of institutional support. Both students and lecturers cited financial and technical constraints, inconsistent internet access, and insufficient integration of CALL into curriculum and policy as key impediments. These findings underscored the importance of embedding infrastructure, institutional policy support, and monitoring and evaluation mechanisms into the model to ensure sustainability and relevance in different educational contexts.

Chapter 7 presented mitigation strategies and proposed a logical framework that mapped out objectives, outcomes, activities, and assumptions related to the integration of CALL. This framework served as the conceptual foundation from which the Universal CALL Model was derived. The chapter synthesised the evidence from earlier findings to propose a structured, adaptable, and phased approach for implementing CALL, encompassing dimensions such as access, training, engagement, and continuous improvement. In sum, the Universal CALL Model

was not arbitrarily formulated but rather logically derived from empirical evidence gathered throughout the study. It addresses identified needs, leverages proven strengths, and mitigates observed challenges.

8.7 SUMMARY

Chapter Eight presents the culminating product of the study: a comprehensive and context-specific framework for the integration of Computer-Assisted Language Learning (CALL) in higher education. The chapter begins with a narrative presentation of the Logical Framework, which maps the four core objectives of the study into an organised structure that links goals, outcomes, outputs, and activities with measurable indicators and assumptions. This framework served as both an analytical tool and a foundation for the development of the proposed CALL framework.

Following this logical progression, the chapter introduced the Universal Computer-Assisted Language Learning Model (UCALM) as a comprehensive, learner-centred framework designed to address the pedagogical, institutional, and infrastructural demands of CALL integration in higher education. Rather than a linear or phased approach, UCALM is structured around eight interdependent pillars: Infrastructure and Access; Digital Literacy and Skills Readiness; Pedagogical and Curriculum Alignment; Instructional Design and Learning Architecture; Technology-Enhanced Learning Tools and Platforms; Assessment, Feedback, and Learning Analytics; Inclusive and Accessible Learner Support; and Continuous Improvement and Institutional Sustainability.

Each pillar is theoretically grounded and empirically justified through the findings presented in Chapters 4 to 7, reflecting the study's objectives and the contextual challenges identified in CALL implementation. These pillars position UCALM as a systemic model that integrates instructional

design, institutional governance, learner support, and technological capacity to support sustainable, equitable, and pedagogically coherent CALL practices.

In addition, the chapter outlines a proposed CALL course structure, demonstrating how the model could be operationalised within academic programmes to formalise CALL as a core component of language instruction. Together, the logical framework, the UCALM, and the proposed course reflect a coherent and implementable response to the study's research objectives.

The chapter consolidates the entire research process into a practical, scalable, and sustainable solution. It provides a roadmap for institutions seeking to adopt and adapt CALL strategies, enhancing language learning outcomes and bridging the digital pedagogical gap within the Namibian higher education context.

CHAPTER NINE

SUMMARY OF FINDINGS, CONCLUSION AND RECOMMENDATIONS

9.1 INTRODUCTION

This chapter presents a summary of the study's findings regarding the integration, effectiveness, and challenges of CALL in Namibia's higher education. The chapter synthesises findings from students' and lecturers' perspectives, exploring their attitudes towards CALL, its impact on language acquisition, barriers to its successful implementation, and both the challenges and opportunities presented by its integration within the educational framework.

The chapter also presents a section dedicated to the discussion of the theoretical integration of research findings, grounded in the study's theoretical frameworks: the Technology Acceptance Model (TAM), Diffusion of Innovation Theory (DOIT), Assessment Theory (AT), and Social Learning Theory (SLT). Together, these frameworks help contextualise the attitudes, institutional readiness, and broader educational dynamics surrounding CALL.

In addition to summarising the study's key findings, this chapter provides actionable recommendations aimed at addressing the identified barriers and supporting CALL's effective integration and long-term sustainability. These recommendations focus on enhancing digital literacy, improving technological infrastructure, fostering institutional support, and developing a CALL framework tailored to the unique needs of Namibia's higher education context. This chapter thereby offers a roadmap for maximising CALL's potential as a transformative tool in language education, ensuring equitable access and encouraging a collaborative, adaptable learning environment for both students and lecturers.

9.2 SUMMARY OF FINDINGS

The summary of findings provides an overview of the study's key understanding, offering a synthesis of the data collected in alignment with the research objectives. This section presents the study's findings across critical areas, including students' and lecturers' attitudes towards CALL, the effectiveness of CALL in enhancing language acquisition, the factors that impede its successful implementation, and the opportunities and challenges for integrating CALL into Namibia's higher education system. In summary presenting these findings, the summary clarifies areas where CALL has potential and identifies obstacles that must be addressed to ensure sustainable and impactful adoption of CALL. The purpose of this section is to consolidate the study's results, enabling a vivid understanding of the current CALL framework in Namibian higher education and setting a foundation for the study's conclusions and recommendations.

RESEARCH QUESTION ONE - SUMMARY OF FINDINGS

9.3 ATTITUDES AND PERCEPTIONS OF STUDENTS TOWARDS CALL

Attitudes and perceptions of students towards CALL are the range of beliefs, feelings, and assumptions that students hold regarding the use of CALL tools in their educational experience (Shingoya, 2024). This concept includes students' expectations about the value and effectiveness of CALL, their comfort and confidence levels in using these tools, and their engagement or hesitation towards incorporating technology into their language learning process. In the context of this study, assessing these attitudes and perceptions provides a critical foundation for understanding how well CALL aligns with students' needs and preferences in the Namibian higher education system, where digital access and educational traditions may impact CALL adoption differently than in other global contexts.

9.3.1 Attitudes and Perceptions Towards CALL

The study established that both students and lecturers generally hold positive attitudes towards CALL. It was observed that students appreciated the flexibility and interactivity that CALL tools offer in language learning. However, the findings also indicated that students felt underprepared to fully engage with CALL due to limitations in their digital proficiency, particularly in managing and creating digital texts. Similarly, lecturers expressed positive views of CALL but noted that inadequate institutional support and insufficient training posed challenges to effective integration.

9.3.2 Positive Perceptions and Motivators for Adoption of CALL

Namibian students value CALL's flexibility and interactivity, mirroring findings from studies in various educational settings worldwide. Salom (2023) found that students in Namibia valued CALL tools for allowing self-paced learning, a feature equally appreciated by Namibian students who often have competing demands on their time, such as work commitments. The interactive nature of CALL, which includes multimedia resources, quizzes, and adaptive feedback mechanisms, was another feature that students reported as highly motivating. This is consistent with Bond and Bedenlier (2018) findings, where the interactive components of educational technology and its application boosted students' motivation and engagement.

Like Al-Azawei et al. (2016), who studied Middle Eastern students' responses to CALL, this study found that perceived usefulness was a significant factor in CALL's acceptance. Namibian students appreciated how CALL tools facilitated specific language goals, such as pronunciation, vocabulary building, and grammar exercises. Students noted that CALL tools helped build confidence through repeatable exercises and instant feedback, which allowed them to practice and refine language skills at their own pace.

9.3.3 Concerns Regarding Usability and Accessibility

While students found CALL beneficial, the study identified specific challenges that affect perceptions and potentially limit the full adoption of CALL in Namibia. Usability was a concern, particularly among students with limited digital literacy skills or less access to technology. These findings are in line with the observations of Ndlovu et al. (2018), who noted that students in low-resourced settings often struggle with more complex CALL tools. In Namibia, students from rural areas or lower socio-economic backgrounds expressed difficulty in navigating certain CALL platforms, particularly when content was highly interactive or dependent on stable internet connectivity, which remains limited in some regions.

9.3.4 Influence of Culturally Relevant Content on CALL Perceptions

The study also highlighted the importance of culturally relevant content as a determinant of student engagement with CALL. Namibian students expressed a preference for CALL materials that included African or Namibian cultural elements, noting that culturally resonant content made language learning feel more relevant and connected to their own experiences. This perspective agrees with the findings of Chilisa (2018), who argues that standardised CALL materials, often developed outside of Africa, may lack cultural sensitivity and fail to engage students fully in language learning.

9.3.5 Barriers Related to Socioeconomic Factors and Access to Resources

Another critical finding was that students' socioeconomic backgrounds significantly influenced their attitudes toward CALL. Students from wealthier urban areas, who generally have better access to technology and internet connectivity, were more likely to view CALL favorably and use it regularly. In contrast, students from low-income or rural backgrounds often lacked the resources

to access CALL outside campus facilities, which limited their exposure to and familiarity with CALL tools. This disparity in access is similar to the digital divide observed in other African nations, such as Botswana, where Chilisa (2018) found that access to CALL was hindered by socioeconomic inequalities.

9.3.6 Comparison to Other Contexts and Implications for Namibian Higher Education

While Namibian students' attitudes are similar to those observed in other developing contexts, there are unique challenges that distinguish Namibia's experience with CALL. Al-Sharafi and Ayub (2014) found that Yemeni students were primarily concerned with cultural relevance and infrastructure, whereas Namibian students placed an equal emphasis on digital literacy. Namibia's cultural and socioeconomic diversity requires a more tailored approach, potentially incorporating mobile-friendly, culturally inclusive, and easy-to-navigate CALL tools to meet the needs of a wide student demographic.

In terms of implications for higher education, the study suggests that fostering positive attitudes toward CALL requires addressing usability, accessibility, and cultural inclusivity. Given the positive responses from students who were able to use CALL, Namibian higher education institutions effectively have a significant opportunity to enhance language learning by promoting CALL through accessible, culturally relevant, and user-friendly tools. In order to optimise adoption, universities could consider implementing digital literacy training as part of orientation programmes, providing students with foundational skills to maximise their engagement with CALL. Additionally, the development of CALL content that resonates with Namibian culture could increase students' intrinsic motivation, making language acquisition more meaningful and contextually relevant.

RESEARCH QUESTION TWO - SUMMARY OF FINDINGS

9.4 FACTORS AND CHARACTERISTICS IDENTIFIED BY THE USERS OF CALL THAT BEST SUPPORT THEIR LANGUAGE LEARNING

This study submits that CALL holds substantial potential for enhancing language acquisition among Namibian higher education students, especially in developing linguistic skills such as listening, pronunciation, vocabulary, and grammar. Students who engaged consistently with CALL tools demonstrated increased language proficiency. This finding is consistent with global research showing CALL's effectiveness in fostering language skills through interactive, feedback-driven, and self-paced learning (Song et al., 2024). However, the study also identifies challenges to CALL's effectiveness in Namibia, particularly related to infrastructure, accessibility, and limited technological familiarity among students.

9.4.1 Impact of CALL on Language Proficiency

This study corroborates the widely recognised benefits of CALL in improving specific language skills, including listening, speaking, reading, and writing. Students reported improvements in vocabulary acquisition, pronunciation, and grammar, largely due to CALL's interactive exercises, instant feedback, and the ability to repeat exercises at their own pace. These findings are consistent with those of Mahapatra and Mishra (2019), who found that CALL significantly enhanced students' English writing skills in Indian higher education. Similarly, Lan (2022) reported improved language performance among Taiwanese students using CALL, particularly when it came to pronunciation and fluency, due to continuous practice and instant feedback.

9.4.2 Flexibility and Self-Paced Learning

Namibian students appreciated the flexibility of CALL, which enables self-paced learning, a key feature in contexts where students may have competing demands or less structured access to learning resources outside of class. Self-paced learning allows students to control their progress, repeating exercises as needed and focusing on areas requiring improvement. This observed advantage resonates with findings by Muharom and Nugroho (2022) who observed that the self-paced nature of CALL allowed students in South Korea to practice language skills at their convenience, resulting in higher retention and mastery rates.

9.4.3 Use of CALL for Diagnostic, Formative, and Summative Assessment

The present study found that CALL's integration of diagnostic, formative, and summative assessments significantly supports learning outcomes by enabling continuous evaluation and tailored feedback, a finding that is well consistent with Assessment Theory (AT) (Kholid, 2024). CALL's diagnostic assessments allow for early identification of strengths and weaknesses, enabling tailored instruction that meets students at their current skill level. This is in agreement with Wong and Hung (2024) who observed that diagnostic assessments in a CALL-based environment allowed instructors to address specific learning gaps early in a university setting.

Moreover, formative assessments, such as quizzes and practice exercises in CALL, provide ongoing feedback to students, which keeps them engaged and motivated. This approach helps students become aware of their progress and makes it easier to self-correct, enhancing their language proficiency. Anders (2022) demonstrated that students who received regular formative assessments via CALL showed marked improvement in Arabic language skills, mirroring the progress reported by Namibian students in this study.

Summative assessments, which measure cumulative knowledge at the end of a module, were also found to be effective in the Namibian context when delivered via CALL. Students noted that CALL's automated grading allowed for faster feedback, a feature critical for those in remote areas or who have limited access to campus resources. In line with Serrano et al. (2019) findings, this study also establishes that the efficiency and speed of CALL assessments foster a continuous learning loop, enhancing retention and understanding of language skills. This ability to quickly process and deliver results not only supports learning but aligns with AT's emphasis on timely feedback and assessment transparency.

9.4.4 Limitations to CALL's Effectiveness in Namibia

Despite its potential, the study highlights several limitations affecting CALL's full effectiveness in the Namibian context, including infrastructure constraints, digital literacy gaps, and limited access to devices or reliable internet. These limitations reflect the challenges documented in similar studies from low-resource settings, such as in studies conducted by Matheus (2021) and Ntinda (2022), where lack of access to high-quality internet infrastructure impeded students' effective use of CALL.

For Namibian students, reliable internet access remains a critical issue, particularly for those in rural or underserved areas (Kadhila & Nyambe, 2021). According to Diffusion of Innovation Theory (DOIT), accessibility, trialability, and compatibility are key factors for successful technology adoption. The limited access to devices and the internet hampers trialability, as students are unable to consistently engage with or fully test CALL tools. Limited access to technology also restricts CALL's compatibility with students' learning needs, as these students cannot reap the full benefits of CALL's self-paced, multimedia-rich resources without reliable connectivity.

9.4.5 Cultural Relevance and CALL Content

Another significant finding is the need for CALL content that resonates with Namibian cultural contexts and linguistic diversity. Students indicated that culturally relevant content such as locally inspired themes, African narratives, and Namibian-specific contexts would improve engagement and make language learning feel more relevant. This need agrees with the findings of Murphy (2023) and Wilson (2023), who argue that standard CALL materials developed outside of African contexts often lack cultural sensitivity, resulting in disengagement among students.

The Social Learning Theory (SLT) framework emphasises the importance of observational and contextual learning, suggesting that students learn more effectively when content reflects familiar cultural settings and real-world applications (Kanandjebo, 2022). For Namibian students, culturally relevant content supports both language acquisition and socio-cultural identity, helping them relate language skills to practical, meaningful contexts. Additionally, incorporating cultural relevance aligns with SLT's concept of modeling, where students observe and imitate language in scenarios that mirror their lived experiences.

9.4.6 Social Interaction and Collaboration in CALL

Although CALL has been shown to improve language proficiency, Namibian students expressed a preference for social interaction and collaborative learning opportunities that traditional classrooms provide. Social interactions, such as group discussions, role-play, and peer reviews, were seen as valuable complements to CALL's benefits. Similarly, Ransom (2024) found that CALL tools with built-in social features, such as forums or language exchange platforms, enhanced engagement among students.

Social Learning Theory (SLT) also supports the integration of social elements in CALL, as it posits that learning is optimised through social interactions and collaboration (Qureshi et al., 2023; Chen, 2024). When applied to CALL, SLT emphasises the importance of including tools that allow students to engage in discussions, peer review, and collaborative exercises, which can reinforce language acquisition by facilitating real-world communication and language practice. Enhancing CALL with social features for Namibian students could strengthen the learning experience by providing avenues for collaborative learning, language immersion, and shared feedback.

RESEARCH QUESTION THREE - SUMMARY OF FINDINGS

9.5 FACTORS THAT IMPEDE THE DELIVERY OF CALL

Factors that Impede the delivery of CALL are the obstacles and challenges that hinder the successful implementation and use of CALL in educational contexts (Gharib et al., 2023; Barikzai et al., 2024). These factors encompass a range of barriers, including limited technological infrastructure, insufficient digital literacy, inadequate institutional support, and socio-economic challenges that restrict access to the necessary devices and internet connectivity (Dey & Kumar, 2024). Additionally, faculty resistance to change, lack of comprehensive training for instructors, and technical difficulties further complicate the effective delivery of CALL (Sithole & Mbukanma, 2024). The purpose of investigating these impediments in the findings section was to identify specific constraints within the Namibian higher education landscape that affect the integration of CALL.

9.5.1 Infrastructure and Accessibility Challenges

A major impediment to effective CALL delivery in Namibia's higher education institutions is the limited infrastructure, specifically unreliable internet connectivity, insufficient digital devices, and

inadequate computer labs (Kadhila & Nyambe, 2021; Ndakolo, 2023). This barrier is particularly pronounced in rural areas, where bandwidth and device accessibility can severely limit students' ability to participate in CALL activities consistently. Similar findings have been reported in other studies of low-resource settings, such as by Nyahodza and Higgs (2017) and Kaliisa and Michelle (2019), who observed that insufficient digital infrastructure prevented equitable access to CALL resources in South African higher education institutions.

The Diffusion of Innovation Theory (DOIT), which emphasises the importance of accessibility and trialability for successful adoption, is particularly relevant in this context (Dearing & Cox, 2018). In Namibia, limited infrastructure reduces students' ability to fully explore and engage with CALL tools, thereby affecting trialability and inhibiting adoption rates (Shilongo, 2023). DOIT suggests that, for technology adoption to succeed, students must have adequate opportunities to experiment with new tools. Namibian students are deprived of these critical interactions without reliable internet and device access, hindering the perceived usability and eventual integration of CALL in their learning routines.

9.5.2 Financial Constraints

The study further identifies financial limitations as a major barrier to CALL's implementation. High costs associated with digital infrastructure, device maintenance, and software licensing hinder both institutions and students from fully utilizing CALL resources. Namibian universities lack the necessary funds to invest in updated software, provide students with adequate technical support (Katire, 2024). This finding is consistent with Mhlanga (2024) who highlighted the financial obstacles limiting CALL's adoption in other African contexts, emphasising that the lack of funding for necessary hardware and software restricts language learning through technology.

Diffusion of Innovation Theory also addresses affordability and resource accessibility as core factors influencing the adoption of new technologies (Pinho et al., 2021). Financial constraints limit not only trialability but also compatibility with existing institutional capabilities, reducing CALL's potential to support language acquisition. Students from economically disadvantaged backgrounds are disproportionately affected, exacerbating educational inequalities in access to language learning resources.

9.5.3 Insufficient Teacher Training and Support

The study finds that a lack of proper teacher training and professional development further impedes the effective delivery of CALL. Educators often lack both the technical skills to operate CALL tools and the pedagogical knowledge to integrate them effectively into their curricula. In many cases, teachers express a lack of confidence in using digital tools or are unfamiliar with how to incorporate CALL into lesson planning, a sentiment shared by teachers in other developing regions. Arani et al. (2024) and Tseng (2022) found similar barriers in Taiwanese higher education, where inadequate training resulted in limited CALL adoption by instructors.

This is in agreement with the Technology Acceptance Model (TAM), which emphasises perceived ease of use as a critical determinant of technology acceptance (Davis, 1989). For teachers, technical difficulties or a lack of clear guidance on integrating CALL led to lower perceived ease of use, making them less likely to adopt CALL in their teaching practices. Without sufficient training and support, educators are unable to effectively model CALL usage to their students, thereby limiting the potential benefits of technology-driven language learning.

Social Learning Theory (SLT) further stresses the importance of teacher training, as teachers play a central role in modeling and demonstrating effective use of technology. When teachers are

proficient and confident in using CALL, they are better able to engage students through observational learning, an important component of SLT. In the Namibian context, inadequate teacher training means students have fewer opportunities to observe and imitate technology-based language learning, weakening the learning process.

9.5.4 Resistance to Technological Change and Cultural Barriers

A noteworthy finding of this study is the resistance among both educators and students to the adoption of CALL, which is often rooted in a preference for traditional teaching methods and concerns over technology's effectiveness for language learning (Freeworth, 2021). Teachers may perceive CALL as a challenge to established instructional methods or may fear that digital tools diminish the value of direct teacher-student interaction. Similar findings are evident in Rosenberg (2023), who documented resistance among teachers who were reluctant to replace their established instructional practices with unfamiliar CALL technologies.

The Diffusion of Innovation Theory (DOIT) explains the resistance, as it underscores the importance of compatibility on how well a new technology aligns with existing values, beliefs, and practices. In Namibia, educators have not yet developed a mindset conducive to digital learning, partly due to limited exposure to CALL and doubts regarding its effectiveness (Paz, 2024). This gap in compatibility hinders CALL adoption, as technology that is perceived as misaligned with local pedagogical norms faces considerable resistance.

Additionally, cultural factors play a role in the resistance to CALL adoption. The Social Learning Theory (SLT) emphasises that learning often occurs in social contexts through collaboration and interaction (Culver et al., 2024). In Namibia, where students value traditional learning environments and direct interaction with instructors, CALL's perceived impersonal approach to

learning may feel incongruent with cultural expectations. For effective CALL adoption, its implementation must bridge these cultural expectations by integrating collaborative elements that align with SLT's focus on social interaction.

9.5.5 Digital Literacy and Technical Proficiency Gaps

Another identified barrier is the general lack of digital literacy among students, which affects their ability to use CALL tools effectively. While CALL relies on students' basic computer skills, many Namibian students lack the necessary proficiency to navigate digital learning environments confidently. This concurs with the findings by Chen and Lee (2024), who noted similar barriers in Taiwan, where low digital literacy among students limited CALL's effectiveness in language acquisition.

In the Technology Acceptance Model (TAM), perceived ease of use directly influences technology adoption. For students with low digital literacy (Dahri et al., 2024), CALL tools are likely perceived as complex and challenging, reducing their motivation to engage with technology for language learning. This limitation not only affects CALL adoption but also diminishes students' ability to make full use of its interactive features, such as immediate feedback and multimedia resources.

9.5.6 Challenges with Curriculum Integration and Assessment Alignment

The study also identifies the misalignment between CALL activities and the existing language curricula and assessment practices in Namibia. CALL resources are not always tailored to align with curriculum objectives, leading to difficulties in fully integrating technology with traditional assessments. Teachers reported that CALL activities do not consistently map to curriculum goals,

a sentiment shared by Banks (2024), who found that alignment challenges limited CALL's effectiveness in supporting curriculum-based language acquisition in universities.

The Assessment Theory (AT) framework supports the need for assessment alignment in CALL, emphasising that assessments should be tailored to learning objectives to gauge student progress (Brookhart, 2023) accurately. For CALL to be effective in Namibia, it needs to incorporate assessments that align with curriculum standards and provide opportunities for formative and summative evaluation. Without alignment, CALL risks being perceived as an auxiliary tool rather than an integral component of language learning, limiting its perceived utility among educators and students.

RESEARCH QUESTION FOUR - SUMMARY OF FINDINGS

9.6 MITIGATION STRATEGIES AND THE DEVELOPMENT OF A CALL FRAMEWORK

Mitigation strategies and the development of a CALL Framework are practical, evidence-based approaches to overcoming the identified challenges in CALL implementation. The study demonstrates key strategies to address limitations such as infrastructure deficits, digital literacy gaps, and insufficient training resources. Mitigation strategies include targeted investments in reliable technology infrastructure, expanded access to digital devices and reliable internet connectivity, and continuous, hands-on training programmes for both students and lecturers. These strategies aim to build the necessary digital competency and comfort levels required for successful CALL integration, ultimately supporting broader educational goals within Namibian higher education.

The development of a tailored CALL framework is proposed as a comprehensive framework that integrates these mitigation strategies in a phased and adaptable approach. This framework is built on the principle of contextual relevance, addressing unique socio-economic and infrastructural landscape by proposing features like incremental rollouts via pilot programmes, which allow for real-time feedback and iterative improvements. The framework also emphasises localised training programmes, designed to support both faculty and students with varying levels of digital proficiency, and infrastructural support initiatives to ensure equitable access across institutions. Through this framework, the study presents a blueprint for overcoming existing barriers, promoting sustainability, and maximising the educational benefits of CALL in Namibia's higher education system.

This study reveals both significant challenges and promising opportunities for integrating CALL in Namibia's higher education system. It identifies specific barriers, such as inadequate infrastructure, limited digital literacy, and cultural resistance, as well as opportunities related to flexibility, personalised learning, social learning, and blended learning potential. Through the application of the Diffusion of Innovation Theory (DOIT), Technology Acceptance Model (TAM), Social Learning Theory (SLT), and Assessment Theory (AT), the study examines how these challenges and opportunities interact within the local context and how they can be addressed or leveraged to enhance language learning through CALL.

9.6.1 Integration Challenges In CALL

Integration challenges in CALL primarily revolve around infrastructural, pedagogical, and socio-cultural factors that hinder the seamless adoption of technology in language learning within higher education. In Namibia, limited access to reliable internet, inadequate digital devices, and

inconsistent power supply significantly impedes CALL's effective implementation. Beyond infrastructure, educators often face challenges in aligning CALL activities with curriculum standards and assessments, with many lacking sufficient training and support for integrating CALL tools into their teaching methods. Furthermore, socio-cultural factors, including varying levels of digital literacy among students and lecturers, and a preference for traditional teaching methods, create resistance to fully embracing CALL. These integration challenges emphasise the need for comprehensive support structures, such as targeted training, improved access to resources, and a shift towards technology-friendly policies within institutions, to promote successful CALL adoption in Namibia's higher education landscape.

9.6.2 Infrastructure Limitations and Accessibility Barriers

In Namibia, infrastructure remains a major barrier to the seamless integration of CALL (Shingoya, 2024). Insufficient access to reliable internet, particularly in rural areas, and limited availability of digital devices hinder students' and educators' engagement with CALL (Targema-Takema, 2024). This finding is consistent with studies conducted by Salimi (2024), which revealed that without reliable digital infrastructure, educational technology initiatives in developing regions struggle to gain traction.

Diffusion of Innovation Theory (DOIT) provides a lens to understand how infrastructure limitations impact CALL integration by affecting trialability and observability. Trialability is the opportunity to test CALL resources before fully adopting them, which is essential for building trust and familiarity with technology (Call, 2024). Inadequate infrastructure in Namibia reduces the opportunity for students and educators to experiment with CALL tools, limiting their understanding of its potential (Shilongo, 2023). Moreover, DOIT's concept of observability, which

refers to the visibility of a technology's benefits, is hindered without consistent infrastructure, making it difficult for educators and institutions to perceive the real advantages of CALL.

9.6.3 Cultural Resistance and Preference for Traditional Learning Methods

This study identifies a significant resistance among some lecturers and students toward adopting technology-based learning tools. Lecturers and students are more comfortable with traditional, face-to-face methods, which they perceive as more reliable and interactive. This resistance is often rooted in concerns about losing valuable teacher-student interaction and doubt regarding CALL's effectiveness in a cultural context that values in-person learning. These attitudes were similarly observed in studies like Şahin et al. (2024), where preference for established teaching methods contributed to slow CALL adoption rates in Iranian higher education.

The TAM underscores how perceived usefulness and ease of use influence the acceptance of new technology. If teachers and students view traditional methods as more effective or easier to use, they are less likely to adopt CALL, especially when it requires technical adaptation. SLT also suggests that learning through social interaction is valued within the Namibian context (Brien & Hutchins, 2024), where collaborative, in-person activities are preferred. CALL integration should, therefore, incorporate interactive features that align with these social learning preferences to bridge the gap between traditional learning styles and digital methods.

9.6.4 Financial Constraints and Budget Limitations

Limited funding also poses a significant challenge to CALL integration. Institutions lack the budget to support ongoing costs associated with CALL tools, including software licensing, device maintenance, and the hiring of technical staff. This financial limitation is also seen in other low-

resource educational settings, (O’Flynn et al., 2024), where inadequate funding led to restricted access to CALL resources.

In the context of DOIT, limited financial resources impact compatibility and relative advantage. When an innovation is not financially feasible or perceived as more costly than beneficial, adoption is hindered. Without sufficient funding, institutions are less likely to perceive CALL as a sustainable tool for language education, reducing its relative advantage over traditional teaching methods. Assessment Theory (AT) also emphasises that effective assessment practices depend on accessible tools; financial constraints thus limit the ability of Namibian institutions to assess CALL’s impact comprehensively, which further decreases its perceived utility.

9.6.5 Teacher Training and Support Limitations

Lack of training and support for teachers in using CALL tools has been identified as a further barrier (Şahin et al., 2024). Educators are unfamiliar with technology-integrated language teaching methods and require additional training to use CALL tools effectively. This barrier is also evident in similar contexts where limited teacher training restricts CALL’s effectiveness, as seen in Şahin et al. (2024) in East Asia and Warschauer (1996) in the U.S., where CALL adoption was impeded by teachers’ limited digital literacy.

According to TAM, the perceived ease of use of CALL is crucial for teacher adoption. When teachers lack training, CALL tools appear complex and intimidating, reducing their likelihood of acceptance. SLT emphasises that for CALL to be integrated effectively, teachers need to model its use for students, which requires sufficient familiarity and confidence with the technology. In providing adequate training, institutions can ensure that teachers feel more equipped to implement CALL, thus enhancing its adoption.

9.7 THEORETICAL INTEGRATION OF RESEARCH FINDINGS

This section discusses the integration of four theoretical frameworks applied to this study: the Technology Acceptance Model (TAM), Diffusion of Innovation Theory (DOI), Assessment Theory (AT), and Social Learning Theory (SLT). Each theory was applied across the four research questions to examine how CALL is adopted, implemented, and experienced in Namibian higher education.

9.7.1 Technology Acceptance Model (TAM) Integration

The Technology Acceptance Model (TAM), which emphasises Perceived Usefulness (PU) and Perceived Ease of Use (PEOU), is critical in understanding students' and lecturers' attitudes towards CALL in Namibia. Findings related to Research Question 1 demonstrated that students found CALL useful for acquiring language skills such as vocabulary and grammar, confirming TAM's emphasis on PU. Students also valued CALL for enabling repeatable practice, which built confidence and self-directed learning.

However, the findings revealed disparities in digital readiness and access. Students from rural and economically disadvantaged backgrounds found CALL platforms less easy to use due to low digital literacy, corroborating TAM's PEOU construct. Without user-friendly design and digital literacy support, CALL tools are perceived as complex, reducing adoption rates.

The influence of social factors, as emphasised in the Technology Acceptance Model (TAM), also contributed to the adoption of CALL. Both students and lecturers reported that the enthusiasm of peers and instructors encouraged greater use of CALL tools, particularly in institutions where digital language technologies were already integrated into regular teaching practices. Additionally,

lecturers identified the availability of institutional support and access to training as critical factors, reaffirming the importance of facilitating conditions as outlined in the extended TAM framework.

9.7.2 Diffusion of Innovation Theory (DOI) Integration

The Diffusion of Innovation Theory provides a useful framework for understanding the systemic and contextual factors that influence the adoption of Computer-Assisted Language Learning in Namibian higher education. Several key constructs from the theory, including relative advantage, compatibility, complexity, trialability, and observability, were evident in the study's findings.

Students acknowledged that CALL offered a relative advantage over traditional learning methods by providing flexible and interactive learning opportunities. The availability of self-paced exercises and rich multimedia content was particularly effective in supporting the development of grammar and vocabulary skills. However, the complexity of some CALL platforms created obstacles to widespread adoption. This was especially true in cases where users lacked adequate technical training or digital literacy, making the tools difficult to navigate and apply effectively.

Compatibility also presented challenges in the adoption process. Some lecturers expressed resistance to using CALL, citing a perceived misalignment between digital learning tools and established teaching traditions. Many placed a high value on direct, in-person teacher-student interaction and felt that CALL did not fully support this pedagogical approach.

Observability, defined as the extent to which the results of an innovation are visible to others, was another important factor. In instances where the outcomes of CALL use were not immediately clear or where feedback mechanisms were weak or absent, some educators remained sceptical about its effectiveness. The lack of visible improvement in learner performance made it difficult to convince stakeholders of CALL's value.

Furthermore, the study found that trialability was limited, particularly in rural and under-resourced campuses. Students in these environments had fewer opportunities to explore or test CALL tools due to restricted access to technology and reliable internet connectivity. This lack of exposure delayed both student engagement and broader institutional support for CALL implementation.

9.7.3 Assessment Theory (AT) Integration

Assessment Theory provides a critical framework for understanding how Computer-Assisted Language Learning supports language learning outcomes through the use of assessments that are authentic, equitable, and centred on the learner. The findings of this study confirm the core principles of Assessment Theory, which emphasise the importance of aligning assessments with learning outcomes, using multiple forms of assessment, ensuring authenticity and fairness, and providing timely feedback.

Students reported that the immediate feedback and interactive exercises offered through CALL platforms were instrumental in supporting their language development, particularly in the areas of listening and writing. These tools facilitated both formative and summative assessments, allowing learners to monitor their progress, identify areas of weakness, and make informed decisions about their learning. This approach is in line with the principle of continuous assessment promoted by Assessment Theory, which advocates for the ongoing collection of information to support learning and guide instruction.

However, several challenges were also identified in the alignment between CALL activities and institutional assessment frameworks. Some instructors noted that the tasks provided through CALL platforms were not always directly linked to the expected learning outcomes or aligned with the national curriculum. This misalignment presents a risk of positioning CALL as an optional or supplementary resource, rather than as a fully integrated component of language instruction.

The findings further emphasised the need for fairness and equity in the use of CALL-based assessments. Disparities in digital access and technological resources contributed to unequal opportunities for participation, which in turn affected student performance and introduced potential biases in assessment results. To address this issue, it is necessary to implement inclusive assessment practices that consider the diverse cultural and socio-economic contexts of learners. These considerations are especially important in the application of Assessment Theory within African educational settings, where equitable access remains a significant concern.

9.7.4 Social Learning Theory (SLT) Integration

Social Learning Theory provides a foundational lens through which to understand how Computer-Assisted Language Learning operates within social and cultural learning contexts. This theory places emphasis on several key components of learning, including modelling, observational learning, feedback, reinforcement, and self-efficacy. The application of this theory was particularly important in analysing how CALL is adopted and experienced by students and lecturers in Namibian higher education institutions.

Findings from Research Questions One and Two indicated that students benefit significantly from opportunities for peer interaction and collaborative engagement. These opportunities are essential elements of Social Learning Theory, which asserts that learners acquire knowledge and skills not only through direct instruction but also by observing and interacting with others. CALL tools that included online forums, discussion boards, and language exchange functionalities were found to be consistent with traditional learning values prevalent in the Namibian context. These tools helped foster student engagement and motivation by creating socially interactive learning environments. The principle of modelling was also evident in the study's findings. When lecturers were digitally proficient and demonstrated confidence in using CALL tools, students were more inclined to adopt

and engage with these technologies themselves. In contrast, a lack of modelling by instructors—often due to insufficient training or institutional support was found to hinder student adoption of CALL, particularly in under-resourced institutions where access to training and technology was limited.

Furthermore, the concept of self-efficacy, another key tenet of Social Learning Theory, was reflected in the data. Students who had greater exposure to digital tools and more frequent opportunities to use CALL reported higher levels of confidence and more positive learning outcomes. This was supported by the presence of feedback mechanisms embedded within CALL platforms. For example, immediate corrections, performance badges, and interactive quizzes served as forms of reinforcement that motivated students to remain engaged and improve their language skills.

In addition, the findings confirmed that cultural contextualisation is a vital factor in the effectiveness of CALL. Students demonstrated increased interest and connection when CALL content was localised and reflected familiar cultural references. Platforms that incorporated culturally relevant material were more successful in supporting observational learning, as they allowed students to engage with language in a context that felt meaningful and authentic.

9.8. INTEGRATION OF QUANTITATIVE AND QUALITATIVE FINDINGS: JOINT DISPLAY ANALYSIS

As presented earlier in Table 3.5, the integrated findings from both quantitative and qualitative data strands revealed a high degree of convergence across all four research questions. This convergence confirms the strength of the triangulation process employed in this study and validates the relevance of using a convergent parallel mixed-methods approach.

Table 9.1 presents a joint display of convergent findings derived from both quantitative and qualitative data sources, aligned with the four research questions guiding this study. This integration was central to the convergent parallel mixed-methods design, which sought to compare student survey responses with lecturer responses in order to produce a comprehensive and corroborated understanding of Computer-Assisted Language Learning (CALL) in the context of Namibian higher education. The analysis in Table 9.1 illustrates where the two datasets reinforced each other (strong convergence), where unique findings emerged from each strand (complementarity), and where minor divergences occurred, particularly in access and institutional readiness across urban and rural settings. This integrative approach enhanced the reliability and depth of the study's conclusions and supported the formulation of the Universal CALL Model presented in Chapter Eight.

For **Research Question One**, which explored student attitudes and perceptions towards CALL, quantitative results showed that 81% of students had positive attitudes, with 73% acknowledging improvement in their English proficiency and 78% favouring blended learning formats. These findings converged with qualitative data from lecturers, who observed increased motivation and engagement, especially among urban students. However, a minor divergence emerged around equitable access, particularly between rural and urban populations, where lecturers noted disparities.

In response to **Research Question Two**, both data sets highlighted the instructional features that support language learning through CALL. Students valued multimedia content, interactivity, mobile compatibility, and real-time feedback, while lecturers emphasised learner autonomy, adaptive learning environments, scaffolded instruction, and ongoing formative assessment. The

findings strongly converged around the importance of learner-CENTRED design and digital interactivity in enhancing engagement and proficiency.

Research Question Three focused on barriers to CALL delivery. Quantitative responses identified unreliable internet (66%), lack of personal devices (59%), and high data costs (61%) as major impediments. Lecturers echoed these concerns, adding institutional challenges such as inadequate ICT policies, lack of training, and infrastructure deficits. The convergence in both strands revealed widespread systemic, technological, and financial limitations affecting effective implementation.

Research Question Four examined potential mitigation strategies. Survey data showed that 74% of students preferred hybrid learning models and mobile-optimised content, with an emphasis on flexible access. Correspondingly, lecturers proposed enhanced teacher training, improved infrastructure, curriculum alignment, and culturally localised CALL content. There was strong convergence between students' desire for mobile responsiveness and flexibility and lecturers' advocacy for institutional readiness and strategic investment.

The integration of these findings within a joint display not only enhanced the validity of the study's conclusions but also informed the development of a holistic framework for the improved delivery and sustainability of CALL in Namibian higher education institutions.

Table 9.1: Joint Display of Convergent Findings for Each Research Question

Research Question	Quantitative Survey Findings (Students)	Qualitative Themes (Lecturers)	Interpretation / Convergence
RQ1: What are the attitudes and perceptions of Namibia's Higher Education students towards CALL?	81% of students reported positive attitudes toward CALL; 73% believed CALL improved their English proficiency; 78% preferred blended formats	Lecturers observed enhanced student motivation, greater engagement, and curiosity toward technology, mainly among urban-based students	High convergence. Both datasets reflect a shared belief in the value of CALL. Slight divergence exists regarding equitable access across rural and urban settings.
RQ2: What are the factors and characteristics identified by users of CALL that best support their language learning?	Students valued multimedia content (videos, audio), mobile compatibility, interactive quizzes, self-paced learning, and instant feedback mechanisms	Lecturers highlighted learner autonomy, adaptive platforms, scaffolded instruction, and the value of continuous formative assessment	Strong convergence. Both groups emphasised the importance of interactive, learner-CENTRED features in enhancing language proficiency and engagement.
RQ3: What are the factors that impede the delivery of CALL?	66% cited unreliable internet; 59% lacked personal devices; 61% mentioned high data costs	Lecturers reported gaps in institutional ICT policies, insufficient training, poor infrastructure, and rural-urban inequality in access	Clear convergence. Both groups identified systemic, infrastructural, and affordability barriers. Lecturers added emphasis on policy-level and institutional support shortcomings.
RQ4: What are the mitigation strategies leading to the development of a framework to support CALL delivery?	74% endorsed hybrid learning models; mobile-optimised content was preferred; students requested flexible access to learning tools	Lecturers advocated for professional development, increased bandwidth, curriculum integration, and	Strong convergence. Consensus exists around the need for blended learning, responsive policy, and better resourcing. Students favored mobile solutions; lecturers stressed strategic institutional investment.

		localised content design	
--	--	--------------------------	--

9.9 STUDY CONCLUSIONS

This section draws the study's conclusions based on the four research questions examined: effectiveness, challenges, and potential strategies for integrating Computer-Assisted Language Learning (CALL) in Namibian higher education. Using a convergent parallel mixed-methods design, the research gathered data from both students and lecturers at the University of Namibia (UNAM) and the Namibia University of Science and Technology (NUST). The findings provide a perspective on how CALL is experienced, valued, and constrained within the Namibian higher education context.

9.9.1 Attitudes and Perceptions

The study concludes that both students and lecturers hold largely positive attitudes towards CALL. Students appreciated the flexibility, accessibility, and engaging features of CALL platforms, such as multimedia resources and interactive feedback. Lecturers viewed CALL as an important pedagogical tool that supports learner autonomy, differentiated instruction, and multimodal learning. However, the study also concluded that concerns about platform usability, the cultural relevance of some digital content, and disparities in digital proficiency among students temper this enthusiasm. These perceptions suggest that while the conceptual acceptance of CALL is strong, practical and contextual barriers remain that must be addressed to ensure equitable and effective integration.

9.9.2 Supportive Features and Characteristics

The study concluded that key factors and characteristics of CALL identified by users include self-paced learning, real-time feedback, access to diverse multimedia content, adaptability to different learning styles, and opportunities for skill-specific development, especially in speaking and listening. Students valued CALL for allowing personalised learning experiences and flexible engagement, while lecturers emphasised its ability to scaffold independent learning and support formative assessment. These conclusions are aligned with global literature that identifies interactivity, personalisation, and learner control as core strengths of CALL environments.

9.9.3 Barriers to Effective Delivery

Study conclusions indicated that despite the recognised benefits of CALL, several systemic and operational barriers limit its effective delivery in Namibian higher education. Infrastructure challenges such as inconsistent internet connectivity, limited access to digital devices, and outdated software were cited as major impediments. Additionally, it can be concluded that the lack of comprehensive digital literacy among both students and lecturers undermines full engagement with CALL tools. Institutional gaps, including the absence of supportive policies, insufficient funding, and the misalignment of CALL content with curricular and assessment frameworks, further constrain implementation. These barriers reflect broader structural inequalities within the education system and highlight the need for targeted interventions.

9.9.4 Mitigation Strategies and Future Directions

The study concluded that participants strongly advocated for a set of coordinated, context-sensitive strategies to enhance CALL integration. These include infrastructural investments, the development of digital literacy programmes, curricular redesign to embed CALL practices, and

the formulation of institutional policies that support CALL adoption and sustainability. Additionally, the study found strong support for inclusive and culturally relevant platform design, as well as ongoing professional development for lecturers. Central to these strategies is the proposed Universal CALL Model (UCALM), developed through this study, which offers a phased, scalable roadmap for implementing CALL across Namibia's higher education institutions. The UCALM prioritises stakeholder engagement, continuous feedback loops, and adaptability to diverse learning environments.

9.10 STUDY RECOMMENDATIONS

Based on the findings and conclusions of this study, the following recommendations are proposed to enhance the effective implementation, integration, and sustainability of Computer-Assisted Language Learning (CALL) within Namibian higher education institutions. These recommendations are categorised according to key policy, institutional, lecturer, student, and curricular levels.

9.10.1 Policy-Level Recommendations

- National education policies should formally recognise CALL as a strategic priority for language instruction and allocate dedicated funding streams to support its integration and long-term sustainability.
- Policy frameworks should prioritise equitable access to digital tools and infrastructure, with particular attention to the needs of students from rural areas and marginalised communities.
- National standards and guidelines should be developed to inform the systematic integration of CALL into tertiary language curricula and institutional teaching policies.

9.10.2 Institutional-Level Recommendations

- Higher education institutions should establish dedicated CALL centres or language laboratories equipped with up-to-date hardware, high-speed internet connectivity, and audio-visual resources to facilitate CALL activities.
- Curriculum design committees should ensure the structured inclusion of CALL components within language learning syllabi, with alignment to course objectives, assessment strategies, and learning outcomes.
- Institutions should invest in the development and staffing of specialised technical support units to provide timely assistance, maintain infrastructure, and resolve technological issues associated with CALL implementation.

9.10.3 Lecturer-Level Recommendations

- Institutions should mandate regular professional development workshops to equip lecturers with pedagogical and technical competencies in CALL. These should cover practical tool usage, instructional design, troubleshooting, and student support strategies.
- Peer mentoring initiatives and communities of practice should be established to promote the exchange of expertise, collaborative innovation, and reflective practice among lecturers engaging with CALL.
- Lecturers should receive institutional support and resources to develop culturally relevant CALL materials that reflect Namibia's linguistic diversity and local contexts, thereby enhancing learner engagement and cultural resonance.

9.10.4 Student-Level Recommendations

- CALL orientation and digital literacy training should be integrated into first-year induction programmes to build foundational competence and confidence among students.
- Students should be actively involved in the co-design and feedback processes related to CALL tools and content. This participatory approach will ensure that CALL solutions are learner-centred, motivating, and contextually appropriate.
- Institutions should introduce financial assistance mechanisms, such as digital device loan schemes and subsidised data plans, to support students who face barriers to accessing CALL resources.

9.10.5 Curriculum and CALL Course Structure Recommendations

- A dedicated CALL course should be introduced within undergraduate and postgraduate language education programmes to build sustainable capacity in CALL theory and practice.
- The course should provide hands-on exposure to CALL applications, including adaptive learning technologies, pronunciation software, collaborative learning platforms, and progress-tracking tools.
- Assessment methods within the CALL course should incorporate elements such as self-reflective journals, interactive tasks with real-time feedback, collaborative digital projects, and e-portfolio submissions to promote applied and reflective learning.

9.11 REINTRODUCTION OF THE PROPOSED PRODUCT: THE UNIVERSAL CALL MODEL (UCALM)

In this section, it is important to reiterate that the proposed Universal Computer-Assisted Language Learning Model (UCALM), presented and discussed in Chapter Eight, represents the culmination

of this study by offering a practical, scalable, and evidence-based framework for integrating CALL in higher education. Rather than being organised around a limited set of components, UCALM is structured around eight interdependent pillars that collectively address the pedagogical, institutional, technological, and human dimensions of CALL implementation. These pillars are: Infrastructure and Access; Digital Literacy and Skills Readiness; Pedagogical and Curriculum Alignment; Instructional Design and Learning Architecture; Technology-Enhanced Learning Tools and Platforms; Assessment, Feedback, and Learning Analytics; Inclusive and Accessible Learner Support; and Continuous Improvement and Institutional Sustainability.

Together, these eight pillars ensure that CALL integration is not reduced to issues of access or training alone, but is understood as a systemic process that requires alignment across infrastructure provision, curriculum design, instructional practices, learner support mechanisms, and institutional governance. Each pillar is grounded in the empirical findings reported in Chapters Four to Seven and responds directly to the study's objectives and the challenges identified in the implementation of CALL. In this way, UCALM moves beyond fragmented or tool-driven approaches and provides a coherent framework capable of supporting sustainable and context-responsive digital language education.

Revisiting UCALM at the end of Chapter Nine, following the summary of findings, is therefore both necessary and strategic. The model offers a practical lens through which the research findings can be synthesised, interpreted, and operationalised. Reintroducing UCALM at this stage reinforces its relevance, explicitly connects the empirical evidence back to the theoretical framework, and demonstrates how the proposed recommendations extend and strengthen the model. This reflection ensures that readers leave with a clear, actionable understanding of how the

study's findings contribute to advancing technology-supported language learning through a comprehensive, eight-pillar institutional framework.

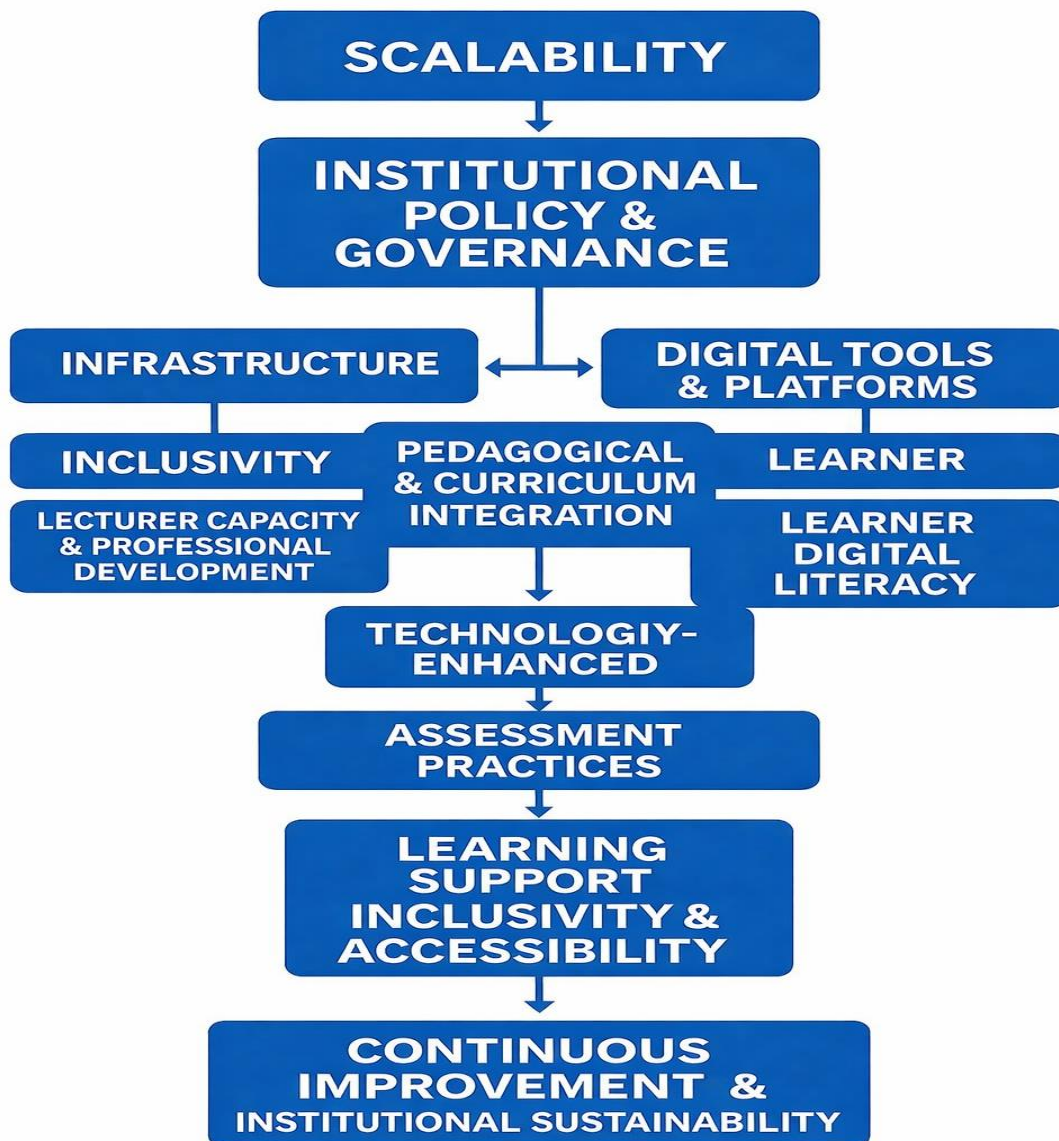


Figure 9.1: Reiteration of The Universal Computer-Assisted Language Learning Model (UCALM)

REFERENCES

- Abdaljaleel, M., Barakat, M., Alsanafi, M., Salim, N. A., Abazid, H., Malaeb, D., ... & Sallam, M. (2024). A multinational study on the factors influencing university students' attitudes and usage of ChatGPT. *Scientific Reports*, 14(1), 1983.
- Adedokun, T. A., Zulu, S. P., Awung, F. N., & Usadolo, S. E. (2023). Sustainable Lessons Learnt from the Attitudes of Language Instructors toward Computer-Assisted Language Teaching. *Research in Social Sciences and Technology*, 8(4), 216-236.
- Afunde, N. L. (2015). *An investigation of the integration of Information Communication Technology in teaching of science subjects at the Namibian College of Open Learning* [Master's thesis, University of Namibia]. UNAM Scholarly Repository.
- Ahmadi, D. M. R. (2018). The use of technology in English language learning: A literature review. *International journal of research in English education*, 3(2), 115-125.
- Aikuma Project. (2023). *Aikuma: Open-source mobile app for language documentation*. <https://aikuma.org/>
- Ajabnoor, N., & Fatima, Z. (2024). An Analysis of The Literature Onon The Connection Between Student Engagement In The Educational System And Academic Achievement. *Educational Administration: Theory and Practice*, 30(5), 7621-7628.
- Akhmedova, Z., & Rahmatova, N. (2024). LMS (Learning Management System) Learning Management System Features. *Science and innovation in the education system*, 3(1), 85-94.
- Al-Emran, M., Elsherif, H. M., & Shaalan, K. (2016). Investigating attitudes towards the use of mobile learning in higher education. *Computers in Human behavior*, 56, 93-102.

- Al-Fadda, H. A., & Al-Shumaimeri, Y. A. (2021). The Effect of Chunking and Graphic Organisers on EFL Adult Learners' Reading Comprehension. *Journal of Language Teaching and Research*, 12(1), 103-116.
- Al-Jarf, R., & Al-Shehri, S. (2012). The Role of Technical Support in Enhancing CALL. *Arab World English Journal*, 3(1), 71-81.
- Al-Sharafi, M. A., & Ayub, A. F. M. (2014). Acceptance of Computer-Assisted language learning (CALL) by English language teachers: A case study of Yemen. *International Journal of Computer-Assisted Language Learning and Teaching*, 4(3), 30-43.
- Albeihi, H. H. M., & Rice, M. F. (2025). Generative AI and language diversity: Implications for teachers and learners. *Arab World English Journal (AWEJ)*, 16(1), 43–54.
- Albelbisi, N., & Albelbisi, H. (2020). Adaptive Learning Systems in Education: A Comprehensive Review. *Journal of Educational Computing Research*, 58(6), 1461-1495.
- Alber, R. (2011). *Scaffolding lessons: Six strategies*. Edutopia. <https://www.edutopia.org/blog/scaffolding-lessons-six-strategies-rebecca-alber>
- Albinus, F. P. P. (2023). *Assessing mathematics teachers' integration levels of information and communication technology: A case of Ongha circuit, Ohangwena region* [Master's thesis, University of Namibia]. UNAM Scholarly Repository.
- Alenezi, M., Wardat, S., & Akour, M. (2023). The need of integrating digital education in higher education: Challenges and opportunities. *Sustainability*, 15(6), 4782.
- Alghamdi, A., & Shah, S. R. (2022). Enhancing strategic competence through AI-driven CALL environments. *Language Learning & Technology*, 26(2), 1–20.

- Alhadi, M. A. A. (2024). *Effects of chunking intervention on enhancing geometry performance in high school students with mathematics learning difficulties* (Doctoral dissertation, Rutgers University-School of Graduate Studies).
- Ali, S. (2020). Implementation of computer-assisted language learning in higher education: A critical review of the literature. *Journal of Educational Computing Research*, 57(4), 978-1006.
- Allard, G., & Williams, C. (2020). National-level innovation in Africa. *Research Policy*, 49(7), 104074.
- Alonso, A., & Beaven, A. (2021). Developing oral skills with digital tools: A CALL approach. *Computer-Assisted Language Learning*, 34(6), 715–732.
- Alotaibi, M., & Hussain, R. (2021). The Impact of Chatbots on the Development of English Language Listening Comprehension. *Journal of Educational Technology & Society*, 24(1), 1–13.
- Alvarez-Marinelli, H., Galvis, A. H., & Rodriguez, J. (2016). EFL Learners' Perception and Use of Digital Language Learning Resources. *Profile: Issues in Teachers' Professional Development*, 18(2), 123-137.
- Alzahrani, A. (2020). Using WhatsApp for developing EFL writing skills: Students' perceptions and experiences. *English Language Teaching*, 13(7), 106-117.
- American Educational Research Association, American Psychological Association, & National Council on Measurement in Education. (2014). *Standards for educational and psychological testing*. American Educational Research Association. <https://eric.ed.gov/?id=ED565876>.

- Anders, J., Foliano, F., Bursnall, M., Dorsett, R., Hudson, N., Runge, J., & Speckesser, S. (2022). The effect of embedding formative assessment on pupil attainment. *Journal of Research on Educational Effectiveness*, 15(4), 748-779.
- Arani, S. M. N., Zarei, A. A., & Sarani, A. (2024). Factors impeding implementing CALL-based instruction: A mixed-methods study. *System*, 126, 103461.
- Arinto, P. B. (2016). Issues and challenges in open and distance e-learning: Perspectives from the Philippines. *The International Review of Research in Open and Distributed Learning*, 17(2), 162–180.
- Ashikuti, S. (2019). *Implementing Namibia's language policy: a case study of classroom practices and language beliefs in rural and urban Namibian schools* (Doctoral dissertation, University of Reading).
- Axmedova, Z. I. (2024). Learning management system imkoniyatlari. *Golden Brain*, 2(1), 509-516.
- Ayotunde, O. O., Jamil, D. I., & Cavus, N. (2023). The impact of artificial intelligence in foreign language learning using learning management systems: a systematic literature review. *Information Technologies and Learning Tools*, 95(3), 215.
- Babbie, E. (2021). *The Practice of Social Research* (15th ed.). Cengage.
- Bai, H., Pan, Z., & Hirumi, A. (2021). Effectiveness of game-based learning in CALL: A meta-analysis. *Computer-Assisted Language Learning*, 34(1), 56-78.
- Baichoo, M., Fane, J., Loken, T., & Mahood, A. (2021). *Establishing and managing a blended approach to institutional work-integrated learning*. Taylor & Francis. <https://www.taylorfrancis.com>.

- Bakewell, O., & Garbutt, A. (2005). The Use and Abuse of the Logical Framework Approach. SIDA.
- Baltuskaite, R., & Andriuskevicius, A. (2017). The effectiveness of game-based learning in the classroom: A systematic review. *Baltic Journal of Modern Computing*, 5(3), 426-436.
- Bamgbose, A. (2011). African languages today: The challenge of and prospects for empowerment under globalization. In H. Coleman (Ed.), *Dreams and Realities: Developing Countries and the English Language* (pp. 19–33). British Council.
- Bang, H. M., Shu, S. B., & Weber, E. U. (2020). The role of perceived effectiveness on the acceptability of choice architecture. *Behavioural Public Policy*, 4(1), 50-70.
- Banks, A. M. (2024). *Training Secondary Teachers in Content-Disciplinary Literacy: A Blended Model for Meeting the Literacy Needs of Students in the Secondary Classroom* (Doctoral dissertation, Central Connecticut State University).
- Bao, H., & Kuo, C. H. (2021). Gamification in language learning: Effects on EFL students' engagement, attitude, and proficiency. *Journal of Educational Technology & Society*, 24(1), 39-52.
- Barikzai, S., Bharathi S, V., & Perdana, A. (2024). Challenges and strategies in e-learning adoption in emerging economies: a scoping review. *Cogent Education*, 11(1), 2400415.
- Barr, D., & O'Brien, M. (2016). Universal Design for Learning (UDL): A review and critique for inclusive practice. *Journal of Inclusive Practice in Further and Higher Education*, 7(1), 52-67.
- Basal, A., & Cagiltay, K. (2021). Gamifying language learning with leaderboards: An investigation of their effectiveness and user preferences. *Journal of Educational Computing Research*, 59(2), 354-376.

- Bates, T. (2019). *Teaching in a digital age: Guidelines for designing teaching and learning*. BCCampus. <https://pressbooks.bccampus.ca/teachinginadigitalage/>
- Bax, S. (2003). CALL – Past, Present and Future. *System*, 31(1), 13-28.
- Beatty, K. (2003). *Teaching and researching computer-assisted language learning*. Longman.
- BERA. (2018). *Ethical Guidelines for Educational Research* (4th ed.). British Educational Research Association.
- Bibauw, S., François, T., & Desmet, P. (2019). Discussing with a computer to practice a foreign language: Research synthesis and conceptual framework of dialogue-based CALL. *Computer-Assisted Language Learning*, 32(8), 827-877.
- Bibauw, S., François, T., & Desmet, P. (2019). Exploring student interaction in online language learning environments: A framework for analysis. *ReCALL*, 31(2), 220–239.
- Bingimlas, K. A. (2009). Barriers to the successful integration of ICT in teaching and learning environments: A review of the literature. *Eurasia Journal of Mathematics, Science & Technology Education*, 5(3), 235-245.
- Birch, D. (2021). AI and Language Learning: A Match Made in Heaven. *Lingvist*. <https://lingvist.com/blog/ai-and-language-learning/>
- Bird, S., Hanke, F., Adams, O., & Lee, H. (2014). WeSay: A tool for community-focused language documentation. *Language Documentation & Conservation*, 8, 157–180.
- Birenbaum, M. (2003). *New directions for testing and measurement: Using transparency as an assessment tool*. Jossey-Bass.

- Black, P., & Wiliam, D. (1998). Assessment and classroom learning. *Assessment in Education: Principles, Policy & Practice*, 5(1), 7-74.
- Blake, R. (2013). CALL and the future of language education. *Language Learning & Technology*, 17(3), 1-9.
- Blin, F., & Jalkanen, J. (2010). Perspectives on CALL: Introduction to the special issue. *ReCALL*, 22(1), 1-9.
- Boer, P. J. (2021). Considering local context in expanding ICT integration at primary education: lessons learnt from Namibian case study. *International Journal of Smart Technology and Learning*, 2(4), 272-286.
- Bolliger, D. U., & Martindale, T. (2018). Key considerations when designing online assessments in higher education. *Journal of Online Learning Research*, 4(2), 161-181.
- Bond, M., & Bedenlier, S. (2019). Facilitating student engagement through educational technology: Towards a conceptual framework. *Journal of Interactive Media in Education*, 2019(1).
- Bonsu, N. O., Bervell, B., Kpodo, E., Arkorful, V., & Edumadze, J. K. (2020). Computer-assisted instruction in the teaching and learning of history: A systematic review in Africa. *Computer*, 14(9), 584-605.
- Brame, C. J., & Biel, R. (2015). Test-enhanced learning: The potential for testing to promote greater learning in undergraduate science courses. *Cell Biology Education*, 14(2), 1-12.
- Branch, R. M., & Dousay, T. A. (2015). *Survey of instructional design models* (5th ed.). Association for Educational Communications and Technology (AECT).

- Brien, A. R., & Hutchins, T. L. (2024). The key to successful social interactions: Elevating social learning and memory in autism through elaborative reminiscing and caregiver connection. *Topics in Language Disorders*, 44(4), 265-284.
- Brookhart, S. M. (2023). *Classroom Assessment Essentials*. ASCD.
- Brown, C. M., & Lawless, K. A. (2016). Technology-enhanced assessments for secondary school students with disabilities: A review of the literature. *Computers & Education*, 101, 51-63.
- Brown, J. D. (2003). *Testing in language programmes: A comprehensive guide to English language assessment*. McGraw-Hill.
- Brown, R., & Liedholm, C. E. (2002). Online assessment and students with disabilities: Issues and challenges. *Journal of Special Education Technology*, 17(4), 39-47.
- Bruwer, B. J. (2024). Language policy in Namibia: An outlook from a pre-colonial to post-independence era. In *The Palgrave handbook of language policies Handbook of Language Policies in Africa* (pp. 645-663). Cham: Springer International Publishing.
- Bryman, A. (2021). *Social research methods* (6th ed.). Oxford University Press.
- Bubeck, S., Chandrasekaran, V., Eldan, R., Gehrke, J., Horvitz, E., Kamar, E., ... & Zhang, Y. (2023). *Sparks of Artificial General Intelligence: Early experiments with GPT-4*. arXiv preprint arXiv:2303.12712.
- Buschfeld, S., & Kautzsch, A. (2017). Towards an integrated approach to postcolonial and non-postcolonial Englishes. *World Englishes*, 36(1), 104-126.
- Buss, R. R., & Caws, C. (2020). Situated learning and cultural relevance in online language education. *CALICO Journal*, 37(2), 178–195.
- Cakrawati, L. M. (2017). Students' perceptions on the use of online learning platforms in EFL classroom. *English Language Teaching and Technology Journal*, 1(1), 22-30.

- Call, D. R. (2024). *Characterizing and Improving the Adoption Rate of Model-Based Systems Engineering Through an Application of the Diffusion of Innovations Theory* (Doctoral dissertation, Colorado State University).
- Campbell, S., Greenwood, M., Prior, S., Shearer, T., Walkem, K., Young, S., ... & Walker, K. (2020). Purposive sampling: complex or simple? Research case examples. *Journal of research in Nursing*, 25(8), 652-661.
- Cárdenas-Claros, M. S., & Gruba, P. (2020). Toward culturally inclusive CALL design: A case for localisation. *CALICO Journal*, 37(2), 123–141.
- Caws, C., & Heift, T. (2016). Evaluation in CALL: Tools, interactions, outcomes. In *The Routledge handbook of language learning and technology* *Handbook of language learning and Technology* (pp. 127-140). Routledge.
- Chabaya, R. A., & Chiome, C. (2022). Access and use of digital technologies in higher education: Implications for inclusive education in Southern Africa. *International Journal of Higher Education*, 11(1), 125–137.
- Chaka, J. G., & Govender, I. (2017). Students' perceptions and readiness towards mobile learning in colleges of education: a Nigerian perspective. *South African Journal of Education*, 37(1), 1-12.
- Chapelle, C. (2017). The past, present, and future of CALL. *Language Learning & Technology*, 21(2), 1-19.
- Chapelle, C. A. (2001). *Computer applications in second language acquisition: Foundations for teaching, testing, and research*. Cambridge University Press.

- Chapelle, C. A. (2017). The potential of technology for language learning. In C. A. Chapelle & S. Sauro (Eds.), *The Handbook of Technology and Second Language Teaching and Learning* (pp. 3-20). Wiley-Blackwell.
- Chapelle, C. A. (2021). Towards inclusive CALL. *Computer-Assisted Language Learning*, 34(1), 1-11.
- Chapelle, C. A., & Voss, E. (Eds.). (2021). *Validity argument in language testing: Case studies of validation research*. Cambridge University Press.
- Chen, C. (2021). Effects of computer-assisted language learning on self-regulated learning and motivation: A study of Taiwanese college students. *Computer-Assisted Language Learning*, 34(1), 1-27.
- Chen, C. H., & Lin, C. P. (2013). The effects of a CALL teacher training programme on teachers' perceptions and practices. *Computer-Assisted Language Learning*, 26(1), 1-20.
- Chen, C. M., & Chung, C. J. (2008). Personalised English Vocabulary Learning System with Mobile Devices. *Journal of Computer-Assisted Learning*, 24(3), 253-268.
- Chen, C. M., & Hsu, W. H. (2008). Personalized intelligent e-learning system using learning styles and learner characteristics. *Expert systems with applications*, 34(4), 2647-2664.
- Chen, C. W., & Li, L. Y. (2021). The effects of mobile-assisted language learning on EFL students' motivation and performance. *International Journal of Mobile Learning and Organisation*, 15(2), 165-177.
- Chen, C.-H., Huang, Y.-M., & Chen, Y.-S. (2018). Effects of scaffolding on mobile language learning of EFL students. *Computers & Education*, 116, 54-63.
- Chen, K. T. C. (2023). Identifying barriers faced by university EFL instructors in integrating mobile-assisted language learning. *Contemporary Educational Technology*, 15(4), ep467.

- Chen, K. Z., & Lee, Y. H. (2024). One-person armies: the border-crossing Taiwanese native-language teachers in technology-rich classrooms. *Interactive Learning Environments*, 32(5), 2265-2278.
- Chen, L., & Park, S. (2021). Cross-cultural considerations in natural language processing: An overview. *Journal of Language and Technology*, 22(3), 145-162.
- Chen, L., Liu, M., & Li, X. (2020). Personalized intelligent English learning system based on machine learning. *Journal of Intelligent & Fuzzy Systems*, 39(5), 6815-6826.
- Chen, M. (2017). The effect of computer-assisted language learning on the development of second language acquisition: A meta-analysis. *Journal of Educational Computing Research*, 55(8), 1059-1085.
- Chen, M., Wang, Y., & Wang, Y. (2019). An empirical study of a computer-assisted learning system for Chinese EFL learners. *Education and Information Technologies*, 24(2), 1291-1309.
- Chen, N. S., & Chen, R. Y. (2015). An exploration of mobile social media applications for language learning. *Journal of Educational Technology & Society*, 18(2), 282-293.
- Chen, N., & Wang, X. (2016). Integration of CALL into College English Teaching: A Literature Review. *Higher Education of Social Science*, 11(6), 146-149.
- Chen, R. (2020). *The use of UMU interactive platform in Chinese language reading skills of grade 10 Thai students* (Master's Thesis, Rangsit University).
- Chen, X. (2020). The Impact of Lesson Duration in CALL on EFL Learners' Performance: A Meta-Analysis. *Educational Sciences: Theory and Practice*, 20(3), 63-75.
- Chen, Y. (2010). Effects of learner training on student motivation and engagement in computer-assisted language learning. *Computer-Assisted Language Learning*, 23(3), 183-197.

- Chen, Y. (2021). A systematic review of mobile-assisted language learning: Issues and challenges. *Educational Research Review*, 33, 100382.
- Chen, Y. H., & Huang, S. H. (2019). The application of artificial intelligence in English language learning. *Journal of Educational Technology & Society*, 22(2), 75-85.
- Chen, Y. L., & Chen, W. C. (2020). Designing a user-CENTRED game-based CALL system for English vocabulary learning. *Educational Technology & Society*, 23(1), 249-262.
- Chen, Y. L., Huang, Y. M., & Chen, N. S. (2018). Scaffolding design in computer-assisted language learning: A systematic review and meta-analysis. *British Journal of Educational Technology*, 49(3), 398-409.
- Chen, Y. L., Peng, J. L., & Tsai, C. C. (2019). A study on the implementation of computer-assisted language learning in higher education in Taiwan: From the perspective of technological pedagogical content knowledge. *Computers & Education*, 131, 33-47.
- Chen, Y. L., Wu, H. K., & Liang, J. C. (2019). Exploring the effects of a CALL-based platform with interactive exercises on student engagement and learning outcome. *Computers & Education*, 128, 63-76.
- Chen, Y.-S., Chen, N.-S., & Tsai, C. C. (2009). The interactions of multimedia, learning styles, and achievement motivation on learning performance: An experimental study. *Computers & Education*, 52(1), 155-166.
- Chen, Y., & Li, H. (2021). Exploring the effects of using a mobile learning app on EFL college students' self-efficacy, motivation, and achievement. *Journal of Educational Computing Research*, 59(5), 1275-1296.

- Chen, Y., Huang, H., & Chen, N. (2018). Applying scaffolding to improve the effectiveness of Computer-Assisted language learning. *Journal of Educational Technology & Society*, 21(2), 222-233.
- Chen, Y., Lian, Y., & Liu, Q. (2021). The Impact of Instant Feedback on College English Writing Instruction in the Era of Big Data. *Journal of Educational Computing Research*, 59(3), 558-573.
- Chen, Z. (2024). Exploring the application scenarios and issues facing Metaverse technology in education. *Interactive Learning Environments*, 32(5), 1975-1987.
- Chen, Z., Yang, L., & Li, J. (2021). The use of technical language in popular language learning apps: a case study of Duolingo, HelloChinese, Memrise, Rosetta Stone, and Tandem. *International Journal of Mobile Learning and Organisation*, 15(4), 361-376.
- Chigona, A., & Chetty, R. (2010). Online assessment in higher education: A case for formative assessment. *South African Journal of Higher Education*, 24(3), 486-498.
- Chilisa, B. (2018). Decolonizing indigenous research methodologies: 25 years of WIPCE. *International Review of Education*, 64(5), 687-704.
- Chimombo, J. (2016). The impact of poverty on education in East Africa. *International Journal of Educational Development*, 50, 13-19.
- Chun, D., Kern, R., & Smith, B. (2016). Technology in language use, language teaching, and language learning. *The Modern Language Journal*, 100(S1), 64-80.
- Cisłowska, A. I., & Peña-Acuña, B. (2025). Integration of chatbots in additional language education: A systematic review. *European Journal of Educational Research*, 13(4),
- Cochran, W. G. (1977). *Sampling Techniques* (3rd ed.). John Wiley & Sons.

- Cohen, L., Manion, L., & Morrison, K. (2018). *Research methods in education* (8th ed.). Routledge.
- Cottrell, R., & Donaldson, R. (2019). *Digital assessment in higher education: A roadmap for learning, teaching, and assessment*. Routledge.
- Creswell, J. D. (2019). *Research Design: Qualitative, Quantitative, and Mixed Methods Approaches* (4th ed.). SAGE Publications.
- Creswell, J. W., & Creswell, J. D. (2018). *Research Design: Qualitative, Quantitative, and Mixed Methods Approaches* (5th ed.). SAGE Publications.
- Creswell, J. W., & Plano Clark, V. L. (2018). *Designing and conducting mixed methods research* (3rd ed.). SAGE Publications.
- Cross Academy. (2022). *Engaging and reaching all students: Differentiation techniques in higher education*. <https://kpcrossacademy.ua.edu>
- Cui, Y., & Liu, Z. (2020). Effects of CALL-based professional development on college English teachers' CALL competence and teaching practice. *Computer-Assisted Language Learning*, 1-27.
- Culver, D. M., Duarte, T., Kraft, E., & Werthner, P. (2024). Learning as a Social Enterprise: Wenger-Trayner's Social Learning Theory in Coach Development. In *The Routledge Handbook of Coach Development in Sport* (pp. 177-193). Routledge.
- Czerniewicz, L. (2020). Inequitable power dynamics of global knowledge production and exchange in the digital age. *Higher Education*, 79, 769–785.

- Dahri, N. A., Yahaya, N., Al-Rahmi, W. M., Aldraiweesh, A., Alturki, U., Almutairy, S., ... & Soomro, R. B. (2024). Extended TAM based acceptance of AI-Powered ChatGPT for supporting metacognitive self-regulated learning in education: A mixed-methods study. *Heliyon*, 10(8).
- Dai, W. (2024). Digital Literacy Education: A New Approach to Cultivating 21st Century Key Competencies. *Journal of Basic and Applied Research International*, 30(5), 48-57.
- Daire, A. P. (2014). Role modelling and its effect on teaching in higher education institutions in Namibia. *Journal of Education and Practice*, 5(32), 45-50.
- Dalsgaard, C., & Paulsen, M. F. (2009). Transparency in cooperative online education. *International Journal of Computer-Supported Collaborative Learning*, 4(4), 481-506.
- Dascalu, M., Bodea, C. N., & Moldoveanu, A. (2019). Enhancing the quality of computer-assisted language learning through gamification. *Education and Information Technologies*, 24(4), 2297-2319.
- Davis, F. D. (1989). Technology acceptance model: TAM. *Al-Suqri, MN, Al-Aufi, AS: Information Seeking Behavior and Technology Adoption*, 205, 219.
- de Almeida, G., & Gimenez, T. (2020). Digital language learning in a Brazilian public school: An investigation on the impact of connectivity and teacher training. *Education and Information Technologies*, 25(6), 5539-5555.
- De Bock, K. W., Coussement, K., De Caigny, A., Słowiński, R., Baesens, B., Boute, R. N., ... & Weber, R. (2024). Explainable AI for operational research: A defining framework, methods, applications, and a research agenda. *European Journal of Operational Research*, 317(2), 249-272.

- De Costa, P. I., & Chun, D. M. (2013). *Networked CALL: Social interaction in CALL*. Bloomsbury Publishing.
- De Costa, P. I., & Lee, J. F. (2017). Technology-mediated TBLT: An examination of online language learning tasks with integrated content and form-focused instruction. *Computer-Assisted Language Learning*, 30(5), 402-421.
- Dearing, J. W., & Cox, J. G. (2018). Diffusion of innovations theory, principles, and practice. *Health affairs*, 37(2), 183-190.
- Dey, B., & Kumar, R. (2024). Breaking Barriers: The Empowering Effects of Mobile E-Learning for Women in the Digital Age. *Bharati International Journal of Multidisciplinary Research & Development*, 2(5), 1-14.
- Diessel, H. (2019). Usage-based construction grammar. *Language and Linguistics Compass*, 13(9), e12346.
- Domingo, M. M. (2024). Factors influencing learners' performance in the Namibia Senior Secondary Certificate Ordinary Level English as a second language. *Namibia Educational Reform Forum Journal*, 32(2), 85–106.
- Dong, M. (2019). A review of the research on mobile-assisted language learning in China. *Computer-Assisted Language Learning*, 32(7), 712-740.
- Ducate, L., & Lomicka, L. (2009). Podcasting: An effective tool for honing language students' pronunciation? *Language Learning & Technology*, 13(3), 66-86.
- Egbert, J., Paulus, T. M., & Nakamichi, Y. (2002). The impact of CALL instruction on classroom computer use: A foundation for rethinking technology in teacher education. *Language Learning & Technology*, 6(3), 108-126.

- Ellis, R. (2016). Task-based language teaching and CALL. In S. Fotos & C. Browne (Eds.), *New perspectives on CALL for second language classrooms* (pp. 23-44). Routledge.
- Enayati, F., & Gilakjani, A. P. (2020). The Impact of Computer-Assisted Language Learning (CALL) on Improving Intermediate EFL Learners' Vocabulary Learning. *International Journal of Language Education*, 4(1), 96-112.
- Eom, S. B., & Ashworth, P. (2016). *The role of CALL in promoting effective online assessment. In Handbook of research on CALL* (pp. 503-523). Routledge.
- Erlangga, D. T. (2022). Student problems in online learning: solutions to keep education going on. *Journal of English Language Teaching and Learning*, 3(1), 21-26.
- Esimaje, A., Jolayemi, D., & van Rooy, B. (2023). African solutions to the challenges of teaching and learning English in higher education. In *African Perspectives on the Teaching and Learning of English in Higher Education* (pp. 249-262). Routledge.
- Etikan, I., & Bala, K. (2017). Sampling and sampling methods. *Biometrics & Biostatistics International Journal*, 5(6), 215-217.
- Fan, Y., Chen, N., & Xu, Y. (2019). *The Application of Intelligent Voice Assistant in English Oral Learning*. 2019 IEEE International Conference on Artificial Intelligence and Computer Applications (ICAICA), 83-87.
- Fang, Y. (2019). Personalized language learning with mobile technology: A systematic review. *Computers & Education*, 143, 103644.
- Fareh, S., & Allahyar, N. (2021). Technology integration in English language teaching: Current practices, challenges, and future directions. *Educational Research Review*, 33, 100366.

- Fauziati, A., & Ahmadi, M. R. (2019). English Language Teachers' Perspectives on Computer-Assisted Language Learning (CALL) Curriculum. *Indonesian Journal of Applied Linguistics*, 9(1), 139-151.
- February, P. J. (2018). *Teaching and learning to read in Afrikaans: Teacher competence and computer-assisted support* [Doctoral dissertation, University of Jyväskylä]. JYX Digital Repository.
- First Literacy. (2015). *How learning works: Research-based principles for smart teaching*. <https://firstliteracy.org>.
- Flick, U. (2018). *An Introduction to Qualitative Research* (6th ed.). SAGE Publications.
- Fotaris, P., & Mastoras, T. (2020). Improving language learning through the use of interactive educational technology: A literature review. *Educational Technology Research and Development*, 68(3), 1369-1393.
- Fotouhi, P., & Bagheri, M. S. (2016). Investigating the challenges and opportunities of CALL in Iranian higher education: A mixed-methods study. *Educational Technology & Society*, 19(1), 242-253.
- Freeworth, S. (2021). *A phenomenological case study of faculty experiences with student resistance in stem gateway courses: A comparison of the use of Learning Assistants (LAs) and traditional teachings styles*. Bowling Green State University.
- Fuchs, C., & Snyder, B. (2021). *Technology-enhanced language learning for specialized domains: Practical applications and mobility*. Springer.
- Garris, R., Ahlers, R., & Driskell, J. E. (2002). Games, motivation, and learning: A research and practice model. *Simulation & Gaming*, 33(4), 441-467.

- Garrison, D. R., & Vaughan, N. D. (2008). *Blended learning in higher education: Framework, principles, and guidelines*. John Wiley & Sons.
- Gawazah, L. (2021). *An investigation into the contemporary English language needs of second year students of the Department of Computer Science at the Namibia University of Science and Technology* (Master's dissertation, Namibia University of Science and Technology).
- Gawazah, L. & Woldemariam, H. Z. (2022). Interrogating the contemporary English language needs for the ICT industry in the Namibian context. *BOHR: International Journal of Smart Computing and Information Technology*, 4(1)12-25. doi: 10.54646/bijcit.2023.21.
- Gerlach, J., Stock, R. M., & Buxmann, P. (2014). Never forget where you're coming from: The role of existing products in adoptions of substituting technologies. *Journal of Product Innovation Management*, 31, 133-145.
- Gharib, A. M., Peterson, G. M., Bindoff, I. K., & Salahudeen, M. S. (2023). Potential barriers to the implementation of computer-based simulation in pharmacy education: a systematic review. *Pharmacy*, 11(3), 86.
- Ghory, S., & Ghafory, H. (2021). The impact of modern technology in the teaching and learning process. *International Journal of Innovative Research and Scientific Studies*, 4(3), 168-173.
- Gibbons, J., & Stacey, M. (2006). Supporting learning in South African schools: Principals' leadership and teachers' professional development. *South African Journal of Education*, 26(1), 35-47.
- Gikandi, J. W., Morrow, D., & Davis, N. E. (2011). Online formative assessment in higher education: A review of the literature. *Computers & Education*, 57(4), 2333-2351.

- Godwin-Jones, R. (2017). Emerging technologies: Autonomous language learning. *Language Learning & Technology*, 21(2), 1-3.
- Golonka, E. M., Bowles, A. R., Frank, V. M., Richardson, D. L., & Freynik, S. (2014). Technologies for foreign language learning: A review of technology types and their effectiveness. *Computer-Assisted Language Learning*, 27(1), 70-105.
- Gómez-Martínez, M. A., Serrano-Laguna, Á., & Pulido-Arcas, J. A. (2021). Immersive technologies for language learning in higher education. *Journal of Educational Technology & Society*, 24(1), 162-175.
- Gómez-Martínez, P., Serrano-Laguna, Á., & Pulido-Arcas, J. A. (2021). The impact of virtual reality on motivation and engagement in language learning. *Journal of Educational Technology & Society*, 24(1), 63-75.
- Gonzales, A. (2016). The contemporary US digital divide: from initial access to technology maintenance. *Information, Communication & Society*, 19(2), 234-248.
- González-Lloret, M., & Ortega, L. (2014). *Technology-mediated TBLT: Researching technology and tasks*. John Benjamins Publishing Company.
- González-Ramos, A. M., & Muñoz-Carril, P. C. (2020). Gamification in language learning: A review of the state of the art. *Journal of New Approaches in Educational Research*, 9(2), 87-93.
- Gou, P. (2023). Teaching English using mobile applications to improve academic performance and language proficiency of college students. *Education and Information Technologies*, 28(12), 16935-16949.
- Grabeel, K. L., Russomanno, J., Oelschlegel, S., Tester, E., & Heidel, R. E. (2018). Computerized versus hand-scored health literacy tools: a comparison of Simple Measure of

- Gobbledygook (SMOG) and Flesch-Kincaid in printed patient education materials. *Journal of the Medical Library Association: JMLA*, 106(1), 38.
- Graham, L., & Metaxas, P. T. (2003). Of course it's true; I saw it on the Internet!: Critical thinking in the Internet era. *Communications of the ACM*, 46(5), 70-75.
- Guichon, N., & McLornan, S. (2017). The effectiveness of a virtual learning environment for learning French as a second language. *Canadian Journal of Learning and Technology*, 43(3), 1-16.
- Gumban, E. (2024). Computer-Assisted Language Learning: Its Effectiveness in Enhancing Receptive Skills of College Students. *Psychology and Education: A Multidisciplinary Journal*, 24(4), 455-460.
- Gutiérrez-Colón, M., & Somsivilay, P. (2021). English as a Foreign Language: Listening to Students and Teachers, a Case Study in LAO PDR. *International Journal of Instruction*, 14(2), 535-550.
- Gutiérrez-Colón, M., Rama, P., & Pardo-Ballester, C. (2021). Environmental sustainability and CALL: addressing the challenges. *Language Learning & Technology*, 25(1), 1-20.
- Haingura, G. & Haiduwa, M. (2019). The role of computer-assisted language learning in Namibian higher education. *Namibia University of Science and Technology Journal*, 5(1), 56-64.
- Hakkarainen, K., Ilomäki, L., Lipponen, L., Muukkonen, H., Rahikainen, M., Tuominen, T., & Valtonen, T. (2018). *Learning with technology: Theoretical foundations, pedagogical practices, and future opportunities*. Helsinki: University of Helsinki.
- Haleem, A., Javaid, M., Qadri, M. A., & Suman, R. (2022). Understanding the role of digital technologies in education: A review. *Sustainable operations and computers*, 3, 275-285.

- Hamakali, H. P. S., & Josua, L. M. (2023). Engendering technology-assisted pedagogy for effective instructional strategy in the University of Namibia language centre. *Research in Educational Policy and Management*, 5(1), 18-32.
- Hampel, R., & Stickler, U. (2005). New skills for new classrooms: Training tutors to teach languages online. *Computer-Assisted Language Learning*, 18(4), 311-326.
- Han, H. J., & Cho, H. (2021). Developing a game-based CALL programme for English grammar learning: A quasi-experimental study. *Educational Technology Research and Development*, 69(2), 849-868.
- Han, L., & Zheng, W. (2019). Natural Language Processing and Machine Learning in CALL. In M. Thomas (Ed.), *Handbook of Research on Integrating Technology Into Contemporary Language Learning and Teaching* (pp. 126-148). IGI Global.
- Harris, C. (2021). *Linguistic rights in Africa: A critical analysis of the survivability of indigenous languages of Namibia* (Doctoral dissertation, University of Namibia).
- Hautemo, A. M., & van der Merwe, M. F. (2021). Scaffolding of Wikipedia translation for technology-enhanced language learning. *Journal for Language Teaching= Ijenali Yekufundzisa Lulwimi= Tydskrif vir Taalonderrig*, 55(1), 11-35.
- Healey, D., & Warschauer, M. (2010). A survey of CALL: What works? *CALICO Journal*, 27(2), 329–351.
- Healey, D., & Warschauer, M. (2010). CALL in context: Introduction. *Language Learning & Technology*, 14(1), 2-8.
- Heift, T., & Schulze, M. (2007). *Errors and Intelligence in Computer-Assisted Language Learning: Parsers and Pedagogues*. Routledge.

- Hengari, M. (2023). *An exploration of selected Windhoek secondary school teachers' integration of ICTs in the classroom* [Master's thesis, University of Namibia]. UNAM
- Hernández-Ramos, P., Gonyea, R. M., & Moreno, J. F. (2017). Faculty confidence and competence with online instruction: Need for research on training and development needs. *Online Learning Journal*, 21(3), 15-29.
- Herron, C., & Yoon, S. (2013). Incorporating Digital Dictionaries into the CALL Classroom. *TESL-EJ*, 17(1), 1-13.
- Hirschberg, J., & Manning, C. D. (2015). Advances in natural language processing. *Science*, 349(6245), 261-266.
- Hlas, A. C., Conroy, K., & Hildebrandt, S. A. (2017). Student teachers and CALL: Personal and pedagogical uses and beliefs. *Calico Journal*, 34(3), 336-354.
- Hockly, N. (2018). *What are the most important edtech trends in higher education?* eCampus News. <https://www.ecampusnews.com/2018/10/01/what-are-the-most-important-edtech-trends-in-higher-education/>
- Holmes, A. G. D. (2020). Researcher positionality: A consideration of its influence and place in qualitative research. *A New Scholar*, 8(1), 1–10.
- Hore, M. (2023). *Monitoring and evaluation approaches and performance of higher learning institutions in Namibia; case of selected institutions in Namibia* (Doctoral dissertation, Africa Nazarene University).
- Hsu, C. C., & Wang, C. Y. (2019). Using online simulation games to improve EFL learners' English proficiency and motivation. *Computer-Assisted Language Learning*, 32(6), 581-605.

- Hsu, C. Y., & Wang, C. Y. (2016). Developing Pre-Service English Teachers' CALL Competence: An Empirical Study. *English Teaching: Practice and Critique*, 15(1), 81-96.
- Hsu, Y. C., Ching, Y. H., & Grabowski, B. L. (2017). Teacher training in technology integration: A case study of a professional development initiative for secondary school teachers in Taiwan. *Computers & Education*, 105, 1-15.
- Hsu, Y.-C., Wu, C.-H., & Huang, Y.-M. (2021). Investigating the Effects of a Chatbot on Language Learning Motivation and Engagement. *Journal of Educational Technology & Society*, 24(1), 45–56.
- Huang, H. H., & Yang, J. C. (2019). Exploring the effects of game-based learning on students' learning performance and motivation. *Interactive Learning Environments*, 27(6), 864-878.
- Huang, J. H., Liao, C. Y., & Huang, Y. M. (2021). Virtual reality-based language learning: A review of the recent years. *Interactive Learning Environments*, 1-17.
- Huang, J. J., Liaw, S. S., & Lai, C. Y. (2016). The effects of multimedia scaffolds on Chinese character acquisition of elementary school students. *Educational Technology Research and Development*, 64(1), 137-157.
- Huang, X., & Liang, H. (2020). The effects of computer-assisted language learning on Chinese college students' English proficiency. *Journal of Educational Computing Research*, 57(7), 1914-1937.
- Huang, Y. H., Kuo, C. H., & Kao, C. P. (2021). Game-based vocabulary learning in EFL contexts: A systematic review. *Journal of Educational Computing Research*, 59(2), 308-329.
- Huang, Y. M., Huang, Y. M., Wu, T. C., & Teng, Y. T. (2019). Using virtual reality to enhance English speaking skills and motivation in EFL learners. *Educational Technology & Society*, 22(4), 132-145.

- Hubbard, P. (2008). CALL's Past and Future: Importance of the Learner. In A. Palalas & N. Ally (Eds.), *The International Handbook of e-Learning* (pp. 423-441). Hershey, PA: IGI Global.
- Hubbard, P. (2019). *The practice of English language teaching*. Pearson Education Limited.
- Hubbard, P. (2021). *An Invitation to CALL: Foundations of Computer-Assisted Language Learning*. APACALL
- Hubbard, P., & Stockwell, G. (2013). Using online diagnostic assessment to improve student learning: A preliminary investigation. *Assessment & Evaluation in Higher Education*, 38(6), 691-704.
- Hunsu, N. J., & Adesope, O. O. (2018). Effects of online diagnostic quizzes on student achievement in an introductory statistics course. *Journal of Educational Computing Research*, 56(8), 1179-1201.
- Hutchinson, B., & Zhu, Y. (2023). Natural language processing in education: Trends and challenges. *Language Learning & Technology*, 27(1), 56–73.
- Huynh, T. (2023). *Chunking instruction: A cognitive approach to enhance learning*. <https://tankhuynh.com>.
- Hwang, G. J., & Choi, H. J. (2018). Development and evaluation of a digital formative assessment tool for enhancing students' learning achievements, motivation, and learning adaptability. *Computers & Education*, 121, 59-76.
- Iiyambo, R. A. (2022). *An investigation of the information and communication technology (ICT) integration strategies used by junior primary teachers in teaching phonemes in the Oshana region* (Master's Thesis, University of Namibia).
- Ikromjonovich, B. I. (2023). Sustainable development in the digital economy: balancing growth and environmental concerns. *Al-Farg'oniy avlodlari*, 1(3), 42-50.

- Israel, M., & Hay, I. (2006). *Research Ethics for Social Scientists*. Sage.
- Ithindi, E. T. (2019). *The use of Moodle as an e-learning tool for English language teaching and learning in Namibia* [Doctoral dissertation]. CORE.
- Jain, R., Kumar, V., & Gupta, S. (2021). Applications of deep learning in machine translation: A review. *Journal of Artificial Intelligence Research*, 70, 85–102.
- Jalali, S., Rahimi, M., & Shirzad, S. (2020). The language of computer-assisted language learning research: a systemic functional linguistics perspective. *Computer-Assisted Language Learning*, 33(5-6), 498-526.
- Jang, H., Park, J., & Lee, Y. (2023). The evolving role of NLP tools in autonomous language learning. *International Journal of Educational Technology*, 34(2), 112–130.
- Jatileni, C., & Jatileni, M. (2018). *Teachers' perception on the use of ICT in teaching and learning: A case of Namibian primary education*. University of Eastern Finland.
- Jebali, M., & Daraei, M. (2021). The effects of gamification on language learning motivation: A meta-analysis. *Journal of Educational Computing Research*, 59(3), 623-647.
- Jenkins, M., & Haynes, M. (2019). The effectiveness of CALL for teaching pronunciation to L2 learners. *TESOL Journal*, 10(4), e422. doi: 10.1002/tesj.422
- Jin, J., & Zhang, M. (2020). An adaptive computer-assisted language learning system based on learning style. *Computers & Education*, 144, 103701.
- Jin, L. (2012). Using online corpora in vocabulary instruction in an EFL context. *Language Learning & Technology*, 16(1), 24-36.
- Jin, Y., & Kim, Y. (2018). Digital literacy for foreign language education: A framework for teacher education. *Journal of Educational Technology & Society*, 21(4), 85-98.

- Johnson, L., Adams Becker, S., Estrada, V., & Freeman, A. (2016). *NMC/CoSN horizon report: 2016 K-12 edition*. The New Media Consortium.
- Johnson, M. (2020). Embedding cultural context in language algorithms: Challenges and solutions. *International Journal of Computational Linguistics*, 18(2), 78-91.
- Joo, Y., & Park, H. (2021). An AI-based CALL system for personalized learning support: Exploring learners' preferences and learning behaviors. *Educational Technology & Society*, 24(1), 240-254.
- Jung, Y. K., & Lee, H. J. (2020). Investigating EFL students' motivation for and perceptions of mobile language learning. *Journal of Educational Technology & Society*, 23(1), 117-128.
- Kadhila, N., & Nyambe, J. (2021). Barriers to the Quality of Emergency Online Pedagogies in Higher Education during the COVID-19 Pandemic: A Case Study from the University of Namibia: A case study from Namibia. *Journal of Learning for Development*, 8(3), 516-531.
- Kaisara, G., & Bwalya, K. J. (2021). Investigating the E-learning challenges faced by students during COVID-19 in Namibia. *International Journal of Higher Education*, 10(1), 308-318.
- Kaliisa, R., & Michelle, P. (2019). Mobile learning policy and practice in Africa: Towards inclusive and equitable access to higher education. *Australasian Journal of Educational Technology*, 35(6), 1-14.
- Kaliisa, R., & Picard, M. (2017). A systematic review on mobile learning in higher education: The African perspective. *Turkish Online Journal of Educational Technology-TOJET*, 16(1), 1-18.

- Kamati, P. K., & Shikongo, J. (2023). Assessment of Instructors' Ability to Incorporate Technology into Physics Teaching in Namibia. *Global Journal of Physical and Applied Sciences*, 1(1), 1-13.
- Kamwangamalu, N. M., & Mutelo, M. E. (2019). Factors influencing adoption of Moodle by Namibian language teachers. *Journal of Educational Technology Development and Exchange*, 12(1), 1-15.
- Kamwanyah, N. N., & Fourie, L. C. H. (2018). Factors influencing the adoption of e-learning in Namibia. *International Journal of Educational Technology in Higher Education*, 15(1), 8.
- Kanandjebo, L. N. (2022). *A professional development framework for teaching mathematics meaningfully with technology in Namibian secondary schools: A design-based research study* (Doctoral dissertation, Stellenbosch: Stellenbosch University).
- Kanandjebo, M. (2022). *A professional development framework for teaching mathematics meaningfully with technology in Namibian secondary schools: A design-based study* [Doctoral dissertation, Stellenbosch University]. SUNScholar.
- Kang, H. (2020). *Beyond the Classroom: The Pros and Cons of Chatbots in Language Learning*. EdTech Magazine. <https://bit.ly/3LR3ALn>.
- Kangira, J. (2022). *Education in Namibia*. Encyclopaedia Britannica. <https://www.britannica.com/place/Namibia/Education>.
- Kaplan, A. M., & Haenlein, M. (2010). Users of the world, unite! The challenges and opportunities of social media. *Business horizons*, 53(1), 59-68.
- Karpicke, J. D., & Roediger, H. L. (2008). The critical importance of retrieval for learning. *Science*, 319(5865), 966-968.

- Kashihakumwa, J., Nantana, N., & Nangolo, E. (2018). Challenges faced in integrating technology into language learning in Namibia. *Journal of Education and Human Development*, 7(1), 13-26.
- Katire, F. (2024). *The role of Technical and Vocational Education and Training Institutions in the Namibian National System of Innovation: A Case Study of Community Skills Development Centres in the Hospitality and Tourism Sectors* (Master's Thesis, Stellenbosch University).
- Katushemerewe, F., & Nerbonne, J. (2015). Computer-assisted language learning (CALL) in support of (re)-learning native languages: the case of Runyakitara. *Computer-Assisted Language Learning*, 28(2), 112-129.
- Kazondovi, C. M. (2018). *An evaluation of the implementation of the Information and Communications Technology (ICT) policy for education in the Faculty of Education at the University of Namibia*. University of Namibia.
- Ke, F. (2019). Game-based learning in teacher education: A review of the literature from 2004 to 2018. *Educational Research Review*, 27, 28-51.
- Keramati, M., & Eslami-Rasekh, A. (2020). The effect of AI-based writing feedback on L2 writing proficiency. *Language Learning & Technology*, 24(2), 78-93.
- Kessler, G. (2010). Fluency and complexity in an automated writing evaluation programme. *CALICO Journal*, 27(1), 87-105.
- Kessler, G. (2018). Technology and the future of language teaching. *Foreign language annals*, 51(1), 205-218.
- Kessler, G., & Bikowski, D. (2020). Developing Language Learners' Digital Literacies through CALL. *Language Learning & Technology*, 24(1), 1-12.

- Khoiriyah, A., Fadhilah, M., & Rais, K. (2020). The effectiveness of web-based English language learning platform to improve students' English proficiency. *Journal of Language Teaching and Research, 11*(1), 78-88. doi:10.17507/jltr.1101.07
- Kholid, B., Rahman, A., & Irawan, L. A. (2024). Implementing Diagnostic Assessment in Designing Differentiated Learning for English Language Learning at the Junior High Schools. *Journal of Language and Literature Studies, 4*(2), 445-458.
- Kim, K. S., & Lee, J. E. (2018). Effects of using speech recognition software on the improvement of pronunciation among Korean learners of English. *Multimedia-Assisted Language Learning, 21*(2), 69-95.
- Kim, Y., & Lee, D. (2022). Semantic role labeling for cultural understanding in language processing. *AI and Society, 37*(1), 112-124.
- Ko, M. H., & Rossen, S. (2017). *Mobile technologies for language learning: A look at the past and a glimpse into the future*. Routledge
- Koedinger, K. R., McLaughlin, E. A., & Stamper, J. (2021). AI in education: The present and the future. *Journal of Educational Psychology, 113*(4), 736-749.
- Koo, H. Y., Han, J. S., & Kim, D. (2021). Virtual reality-based language learning for learners with foreign language anxiety. *Education and Information Technologies, 1-20*.
- Kot, M., & Biłas, M. (2013). Gobbledygook, or not. *Responsibility: An Interdisciplinary Perspective, Wydawnictwo Matrix, 281, 292*.
- Kotzé, D., & Jacobs, L. (2010). Enhancing student participation and learning through innovative teaching: A case study in accounting. *African Journal of Business Management, 4*(1), 51-60.

- Kuehnast, M., Schulz, K., & Lüdeling, A. (2024). Development of basic reading skills in Latin: a corpus-based tool for computer-assisted fluency training. *Cogent Education*, 11(1), 2416819.
- Kukulska-Hulme, A., & Shield, L. (2008). An overview of mobile-assisted language learning: From content delivery to supported collaboration and interaction. *ReCALL*, 20(3), 271-289.
- Kukulska-Hulme, A., Beirne, E., Conole, G., Costello, E., Coughlan, T., Ferguson, R., & FitzGerald, E. (2018). *Innovating Pedagogy 2017: Open University Innovation Report 6*. The Open University.
- Kukulska-Hulme, A., Lee, H., & Norris, L. (2018). Mobile language learning innovation inspired by augmented reality. *ReCALL*, 30(3), 293-311.
- Kukulska-Hulme, A., Shaw, S., & Sharples, M. (2018). Game-based learning and gamification in CALL. In S. Papadima-Sophocleous, L. Bradley, & S. Thouësny (Eds.), *CALL and complexity - short papers from EUROCALL 2018* (pp. 266-271). Research-publishing.net.
- Kumar, S., Choudhary, R., & Sharma, M. (2019). Intelligent language tutoring system based on natural language processing. *International Journal of Emerging Technologies in Learning*, 14(20), 51-67.
- Lai, C., & Kritsonis, W. A. (2017). Computer-assisted language learning: A synthesis of a meta-analysis. *Journal of International Education Research*, 13(1), 1-10.
- Lai, C., & Kuo, C.-H. (2015). Examining the effects of online learning on student engagement and academic performance in higher education. *Journal of Online Learning and Teaching*, 11(2), 210-222.
- Lai, C., & Wang, Q. (2018). Intelligent CALL: An overview and future directions. *ReCALL*, 30(1), 1-19.

- Lamy, M. N., & Hampel, R. (2017). *Online communication in language learning and teaching*. Palgrave Macmillan.
- Lan, E. M. (2022). A comparative study of computer and mobile-assisted pronunciation training: The case of university students in Taiwan. *Education and Information Technologies*, 27(2), 1559-1583.
- Lan, Y.-J., & Wang, Q. (2021). Effectiveness of using CALL in the EFL classroom: A meta-analysis. *Computers & Education*, 158, 104029.
- Lee, H., & Hwang, Y. (2022). Technology-enhanced education through VR-making and metaverse-linking to foster teacher readiness and sustainable learning. *Sustainability*, 14(8), 4786.
- Lee, H., & Lee, J. (2019). CALL-based multimodal materials for listening comprehension: EFL learners' perceptions and performance. *Computer-Assisted Language Learning*, 32(5-6), 467-488.
- Lee, H., & Lin, H. (2018). The effects of an online assessment system on students' English writing performance. *British Journal of Educational Technology*, 49(4), 680-694.
- Lee, J. F., & Lee, J. H. (2019). Effects of digital literacy on second language learning: A meta-analysis. *Educational Research Review*, 26, 71–81.
- Lee, J. H., & Lee, J. (2018). Chunking in CALL: Learner performance and perceptions. *Computer-Assisted Language Learning*, 31(5-6), 499-523.
- Lee, J. H., & Lee, J. (2019). Integrating online collaborative projects into foreign language classrooms: Effects on intercultural communicative competence. *Language Teaching Research*, 23(2), 186-204.

- Lee, J. H., & Lim, C. K. (2021). An AI-based CALL system for improving learners' English pronunciation. *Journal of Educational Technology & Society*, 24(1), 147-162.
- Lee, J., & Lee, H. (2019). Digital literacy and CALL: Lower digital literacy learners' preferences and their effects on L2 learning. *Computer-Assisted Language Learning*, 32(3), 235-259.
- Lee, J., & Lee, J. (2019). How do CALL and Digital Literacy Influence EFL Learners' Self-Directed Learning? *Journal of Educational Technology & Society*, 22(3), 232-245.
- Lee, L. (2019). CALL and task-based language teaching: Interaction, feedback and assessment. In N. Arnold & T. Murphey (Eds.), *The Routledge handbook of second language acquisition and pedagogy* (pp. 427-441). Routledge.
- Lee, L., & Huang, H. (2018). What makes good CALL software? Perceptions of ESL teachers. *CALICO Journal*, 35(3), 309-330.
- Lee, L., & Lee, J. (2019). Investigating English language learners' engagement in a computer-assisted language learning environment using eye-tracking technology. *Australasian Journal of Educational Technology*, 35(5), 1-14.
- Lee, M. J. W., & Lee, J. (2018). The use of chunking and elaboration strategies in instructional design: A case study in mobile learning. *Australasian Journal of Educational Technology*, 34(6), 38-53.
- Leech, G. (2016). The state of the art in corpus linguistics. *International Journal of Corpus Linguistics*, 21(3), 403-426.
- Levy, M. (1997). *Computer-Assisted Language Learning: Context and Conceptualization*. Oxford University Press.
- Levy, M. (2016). *CALL dimensions: Options and issues in computer-assisted language learning*. Routledge.

- Levy, M., & Stockwell, G. (2006). *CALL dimensions: Options and issues in computer-assisted language learning*. Routledge.
- Levy, M., & Stockwell, G. (2013). *CALL dimensions: Options and issues in computer-assisted language learning*. Routledge.
- Lewis, T. K., Cariveau, T., Brown, A., Ellington, P., & Stocker, J. (2024). Efficacy of Strategic Incremental Rehearsal in a Word List. *Behavior Analysis in Practice*, 1-9.
- Li, J., & Liang, X. (2016). Artificial Intelligence in Education: A Review. *Journal of Educational Technology & Society*, 19(2), 33-41.
- Li, J., & Zhu, W. (2019). Teaching CALL to English majors in China: A training programme for enhancing CALL self-efficacy. *Computers & Education*, 137, 154-166.
- Li, L., & Wang, Y. (2021). The application of artificial intelligence in language learning. *Journal of Physics: Conference Series*, 1784(1), 012042.
- Li, S., & Li, L. (2021). The effectiveness of a mobile app in supporting vocabulary learning in a Chinese as a foreign language classroom. *Language Learning & Technology*, 25(1), 67-85.
- Li, S., Gu, B., & Wang, X. (2021). The effects of artificial intelligence-based feedback on language learners' performance and motivation. *Educational Technology Research and Development*, 69(2), 859-874.
- Li, W., & Huang, H. (2021). Virtual and augmented reality in language learning. In F. Botelho, & M. Helm (Eds.), *The Routledge Handbook of Second Language Acquisition and Pedagogy of Chinese* (pp. 411-427). Routledge.
- Li, X. (2017). Application of sequencing strategy in computer-assisted language learning. *Journal of Language Teaching and Research*, 8(3), 503-508.

- Li, X., & Huang, L. (2021). Virtual and augmented reality in foreign language teaching and learning: A literature review. *Educational Technology & Society*, 24(2), 1-14.
- Li, Y., & Li, Y. (2017). *Mobile-assisted language learning. Handbook of research on CALL*, 369-386.
- Li, Y., Li, X., & Li, W. (2016). The effects of a CALL assisted EFL curriculum on students' English proficiency and communication skills. *Computer-Assisted Language Learning*, 29(4), 738-753.
- Lin, C. H., & Zheng, B. (2016). Enhancing students' engagement and motivation with blended learning in the flipped classroom. *Journal of Educational Technology & Society*, 19(3), 1-12.
- Lin, E. Y.-C., Hsu, H.-T., & Chen, K. T.-C. (2023). Factors that influence students' acceptance of mobile learning for EFL in higher education. *Eurasia Journal of Mathematics, Science and Technology Education*, 19(6), em2279.
- Lin, J. (2018). Enhancing digital literacy in CALL: A review of literature. *Computer-Assisted Language Learning*, 31(5-6), 473-491.
- Lin, L., & Zheng, B. (2016). The effectiveness of blended learning in language courses. *Journal of Education and Practice*, 7(21), 32-38.
- Lin, Y. J., & Wang, H. C. (2021). Using virtual reality to facilitate learners' creative self-efficacy and intrinsic motivation in an EFL classroom. *Education and Information Technologies*, 26(4), 4487-4505.
- Lin, Y. R., & Hsieh, Y. C. (2020). Application of computer-assisted language learning in online assessment. *Journal of Educational Technology & Society*, 23(1), 123-137.

- Lisekwe, L. (2019). The challenges and opportunities of implementing computer-assisted language learning in higher education in Namibia. *Journal of Language and Cultural Education*, 7(1), 80-94.
- Liu, H., & Zhang, X. (2018). Integrating cultural nuances into machine translation. *Journal of Computational Linguistics and Culture*, 5(4), 234-250.
- Liu, L., & Chen, N. (2021). Enhancing language learning through flipped learning in CALL: A review of recent research. *ReCALL*, 33(1), 1-17.
- Liu, T. Y., & Chen, Y. J. (2015). Using mobile gamification to enhance English learning for elementary school students. *Journal of Educational Technology & Society*, 18(2), 75-88.
- Liu, Y., Huang, R., Wang, Y., & Zhang, J. (2021). Personalized learning for English as a foreign language: A review of research and development of adaptive educational technologies. *Journal of Educational Technology Development and Exchange*, 14(1), 1-18.
- Liu, Z., Chen, Y., & Chen, C. (2022). Language features and intercultural perspectives in CALL research articles: a corpus-based study. *Journal of Language Teaching and Research*, 13(1), 173-187.
- Lu, X., & Samah, N. (2024). Research on Intelligent Educational Technology in Business English Education in Building Multi-model Learning Environments and Personalized Learning Paths. *Journal of Human CENTRED Technology*, 3(2), 84-92.
- Luan, J., & Li, Y. (2016). Designing interactive multimedia simulations for developing scientific inquiry skills: A design-based research approach. *Computers & Education*, 102, 201-214.
- Mahapatra, S., & Mishra, S. (2019). Articulating identities—the role of English language education in Indian universities. *Teaching in higher education*, 24(3), 346-360.

- Mampane, R. M., Omidire, M. F., & Aluko, F. R. (2018). Decolonising higher education in Africa: Arriving at a glocal solution. *South African Journal of Education*, 38(4).
- Mann, A. (2021). *How AI is Transforming the Way We Learn Languages*. Medium. <https://towardsdatascience.com/how-ai-is-transforming-the-way-we-learn-languages-7da66f421d9a>
- Marzban, A., & Sadighi, F. (2023). Enhancing EFL learners' grammatical competence through adaptive CALL systems. *Journal of Language and Linguistic Studies*, 19(1), 56–72.
- Matheus, E. (2021). *An investigation into the use of smartphones in accessing electronic resources at the University of Namibia* (Doctoral dissertation, University of Namibia).
- Maulana, R. (2024). Vocabulary-Based Computer-Assisted Language Learning (CALL). *International Journal Education and Computer Studies (IJECS)*, 4(2), 46-56.
- Mavhunga, E., & Fourie, L. C. H. (2018). A theoretical framework for understanding the adoption of CALL by language teachers. *South African Journal of Education*, 38(4), S1-S11.
- Mayer, R. E. (2014). *Cognitive theory of multimedia learning*. *The Cambridge Handbook of Multimedia Learning*, 43-71.
- Mbala, B. N. (2019). *An investigation of cellphone use on the academic performance of Namibia school learners: A case study of Caprivi Senior Secondary School and Kizito College* [Master's thesis, University of Namibia]. UNAM Scholarly Repository.
- Mbangula, H., & Dörnell, J. (2023). Barriers to ICT integration in Namibian tertiary institutions: A post-COVID-19 analysis. *Namibia Journal of Education and Development*, 4(1), 23–40.
- Mbukusa, N. R. (2018). Perceptions of Students' on the Use of WhatsApp in Teaching Methods of English as Second Language at the University of Namibia. *Journal of Curriculum and Teaching*, 7(2), 112-119.

- McEnery, T., & Hardie, A. (2012). *Corpus linguistics: Method, theory and practice*. Cambridge University Press.
- Mena, G. (2024). Blended learning in higher education: An emerging strategy for inclusive teaching. *Journal of Digital Pedagogy*, 18(1), 45–59.
- Merriam, S. B., & Tisdell, E. J. (2015). *Qualitative Research: A Guide to Design and Implementation* (4th ed.). Jossey-Bass.
- Meskill, C., & Anthony, N. (2010). *Teaching languages with technology: Communicative approaches to interactive whiteboard use*. A&C Black.
- Meurers, D., & Dickinson, M. (2017). Evidence and interpretation in language learning research: Opportunities for collaboration with computational linguistics. *Language Learning*, 67(S1), 66-95.
- Mhlanga, D. (2024). Digital transformation of education, the limitations and prospects of introducing the fourth industrial revolution asynchronous online learning in emerging markets. *Discover Education*, 3(1), 32.
- Ministry of Higher Education, Technology and Innovation. (2020). *National policy on ICT in education: Implementation framework*. Government of the Republic of Namibia.
- Ministry of Higher Education, Technology and Innovation. (2020). *Revised National Science, Technology and Innovation Policy (NSTIP) 2020–2030*. Government of the Republic of Namibia.

- Mohammadi, D., Salehi, M., & Shirzadi, B. (2017). Exploring EFL learners' attitudes towards using a language learning software program: A TAM-based approach. *Computer-Assisted Language Learning*, 30(3-4), 205-227.
- Molenda, M. (2015). Instructional design and technology. In J. M. Spector (Ed.), *The SAGE encyclopedia of educational technology* (Vol. 1, pp. 400–404). SAGE Publications.
- Moodle. (n.d.). *Moodle: Open-source learning platform*. <https://moodle.org/>
- Morrison, G. R., Ross, S. M., Kalman, H. K., & Kemp, J. E. (2019). *Designing effective instruction* (8th ed.). Wiley.
- Moses, C., Nghipandulwa, L. L. T., & Shikusho, S. P. (2022). Investigating the challenges faced by teachers in the implementation of digital technology in Secondary Schools in Rundu Circuit, Kavango East Region Namibia. *Open Journal of Social Sciences*, 10(9), 286-301.
- Moyo, M., & Madesa, R. (2019). Assessment in Africa: Current trends and emerging issues. *Journal of Educational Research and Practice*, 9(2), 1-9.
- Mufeti, T. K. (2020). Learning in Namibia: an opportune solution or an impediment to learning?—The case at the University of Namibia. *International Journal of Internet Education*, 19(1), 16-22.
- Mufune, P. (2019). Social learning theory and its application in education: An overview. *International Journal of Educational Sciences*, 28(2), 231-239.
- Muharom, F., & Nugroho, A. (2022). Self-directed use of digital devices for out-of-class English learning. *International Journal of Education in Mathematics, Science and Technology*, 10(1), 257-271.

- Mukeredzi, T., & Nleya, P. T. (2019). The influence of indigenous knowledge systems on competency-based education and training in Zimbabwe. *Journal of Vocational Education and Training*, 71(3), 354-368.
- Mungunda, E. G., & Mughogho, S. K. (2019). Factors affecting the adoption of computer-assisted language learning by English as a foreign language teacher in Namibia. *International Journal of Emerging Technologies in Learning (iJET)*, 14(02), 99-115.
- Mupawose, R., & Mutula, S. M. (2018). Mobile devices in computer-assisted language learning: A review of the Namibian context. *South African Journal of Libraries and Information Science*, 84(1), 54-63.
- Murphy, S. (2023). *Academic Disengagement of African American Male Students in Classroom Settings: A Qualitative Descriptive Study* (Doctoral dissertation, Franklin University).
- Murray, L., & Hourigan, T. (2019). Supporting student learning in higher education with adaptive e-learning systems: A systematic literature review. *International Journal of Educational Technology in Higher Education*, 16(1), 1-27.
- Mushaandja, T., Mlambo, N., & Sabao, C. (2022). Healthcare communication for the Namibian healthcare context: Review of the literature. *NAWA Journal of Language and Communication*, 16(1), 5-18.
- Mutanga, O. N., van der Merwe, A., & Greyling, W. J. (2017). Acceptance of e-learning by university students in Namibia. *South African Journal of Higher Education*, 31(5), 87-106.
- Muyenga, S. (2015). *The adoption of CALL by English language teachers in Namibia*. Namibia University of Science and Technology.
- Nakalema, N. (2019). Teaching and learning indigenous languages in Namibian higher education: A review of literature. *African Educational Research Journal*, 7(2), 153-162.

- Nakanene, N. K., & Namasasu, J. (2016). Investigating university students' adoption and use of digital resources for language learning in Namibia. *British Journal of Educational Technology*, 47(5), 977-991.
- Nakashole, P. (2024, January 9). Results will improve gradually – Steenkamp. *The Namibian*.
- Namibia Statistics Agency. (2024). 2023 *Population and Housing Census main report*. Namibia Statistics Agency. <https://nsa.org.na>
- Nampila, J. (2013). *Development of a computer-assisted School Information System for Namibian schools* [Master's thesis, Namibia University of Science and Technology]. NUST Institutional Repository.
- Narro, V. (2022). *English in Namibia*. World Englishes.
- National Commission for the Protection of Human Subjects of Biomedical and Behavioral Research. (1979). *The Belmont Report: Ethical principles and guidelines for the protection of human subjects of research*. U.S. Department of Health, Education, and Welfare. <https://digital.library.unt.edu/ark:/67531/metadc1213679/>
- Nchindo, E. B. (2019). *Teachers' perceptions of the introduction of computer-assisted learning in Mathematics in rural senior secondary schools in the Zambezi region, Namibia* [Master's thesis, University of Namibia]. UNAM Scholarly Repository.
- Ndakolo, E. N. (2023). *Teacher's creation of teaching and learning materials using information communication technology at selected remote schools in the Khomas region, Namibia* (Master's Thesis, University of Namibia).

- Ndeyapo, A., & Boakye, M. (2019). Integrating technology into teaching and learning: A case of computer-assisted language learning in Namibia. *International Journal of Education and Development using Information and Communication Technology (IJEDICT)*, 15(3), 24-42.
- Ndhlovu, F. (2021). *Language, Vernacular Dispossession and Cultural Reproduction in Africa*. Routledge.
- Ndhlovu, F., & Hurst, E. (2022). *Decolonising multilingualism in Africa: Indigenous language revitalisation and digital futures*. Multilingual Matters.
- Ndibalema, P. (2021). Online Assessment in the Era of Digital Natives in Higher Education Institutions. *International Journal of Technology in Education*, 4(3), 443-463.
- Ndinelago, N., & Mugandani, R. (2021). Online language resources and tools for higher education students in Namibia. *International Journal of Emerging Technologies in Learning*, 16(6), 111-125.
- Ndlovu, E. V., Lawrie, M., & van der Merwe, M. (2018). Mobile-assisted English language learning in Namibia: Students' perceptions and experiences. *The International Review of Research in Open and Distributed Learning*, 19(5), 194-212.
- Nepembe, M. N., Amakali-Nauseb, T., & Emvula, O. (2023). Perceptions of undergraduate student nurses on e-learning at University of Namibia Main Campus, Windhoek: a lesson learnt from the COVID-19 pandemic. *International Journal of Community Medicine and Public Health*, 10(11), 4396.
- Ngaruka, M., & Ndezi, L. (2020). The effectiveness of diagnostic digital online assessments on students' language proficiency: A study of the Namibian higher education context. *International Journal of Emerging Technologies in Learning (iJET)*, 15(16), 206-217.

- Nghuulikwa, P. K. (2023). *The effects of language admission requirements of Namibian universities on indigenous English second language students* (Doctoral dissertation, North-West University (South Africa)).
- Nikolov, M., & Mihaljević Djigunović, J. (2011). All shades of every color: An overview of early teaching of foreign languages to young learners. *Language Teaching*, 44(02), 151-180.
- Ntinda, N. S. (2022). *Examining the readiness of the Namibia college of open learning in adopting automation technologies for improved service delivery* (Master's Thesis, University of Namibia).
- Nurawalia, A. (2021). Effectiveness of Using CALL for Teaching Writing. *Premise: Journal of English Education and Applied Linguistics*, 10(1), 101-122.
- Nyahodza, L., & Higgs, R. (2017). Towards bridging the digital divide in post-apartheid South Africa: a case of a historically disadvantaged university in Cape Town. *South African Journal of Libraries and Information Science*, 83(1), 39-48.
- O'Flynn, E., Ahmed, A., Biswas, A., Bempong-Ahun, N., Perić, I., & Puyana, J. C. (2024). E-learning Supporting Surgical Training in Low-Resource Settings. *Current Surgery Reports*, 1-9.
- Ojong, A. S., & Addo, E. H. (2024). Advancing Inclusivity, Equity, and Diversity in English Language Education: Empowering Underrepresented Students in Africa. *Journal of English Language Teaching and Applied Linguistics*, 6(2), 144-157.
- Okeke-Uzodike, U., & Chikoko, G. (2015). Social learning theory and its application in the context of distance education. *International Journal of Educational Development*, 42, 51-62.
- Okonkwo, C. W. (2019). *An investigation on the adoption and diffusion of mobile applications in Africa* (Doctoral dissertation, North-West University).

- Olson, D. J. (2024). A systematic review of proficiency assessment methods in bilingualism research. *International Journal of Bilingualism*, 28(2), 163-187.
- Osakwe, J. O., Nomusa, D., & Jere, N. (2017). Teacher and learner perceptions on mobile learning technology: A case of Namibian high schools from the Hardap region. *Online Submission*, 1(1), 13-41.
- Osakwe, J. O., Ujakpa, M. M., & Iyawa, G. (2019). Enabling quality education in Namibia through mobile learning technologies. In *2019 IST-Africa Week Conference (IST-Africa)* (pp. 1-10). IEEE. <https://doi.org/10.23919/istafrica.2019.8764812>.
- Osakwe, J., Dlodlo, N., & Jere, N. (2017). Where learners' and teachers' perceptions on mobile learning meet: A case of Namibian secondary schools in the Khomas region. *Technology in Society*, 49, 16-30.
- Park, M., & Son, J. B. (2022). Pre-service EFL teachers' readiness in computer-assisted language learning and teaching. *Asia Pacific Journal of Education*, 42(2), 320-334.
- Patahuddin, P., Bancong, H., Syawal, S., & Jusuf, H. (2024). A Glance at Computer-Assisted Language Learning (CALL): A Bibliometric Analysis. *Al-Lisan: Jurnal Bahasa (e-Journal)*, 9(2), 84-98.
- Paz, C. N. (2024). Learning from the Shadows of the Past: Teachers' Lived Experiences in Blended Teaching. *Educational Research (IJMCER)*, 6(3), 429-488.
- Pellegrino, J. W., Chudowsky, N., & Glaser, R. (2001). The nature of assessment and reasoning from evidence. Knowing what students know: *The science and design of educational assessment*. 37-54.
- Pennycook, A. (2021). *Critical applied linguistics: A critical re-introduction*. Routledge.

- Perez, E., Manca, S., Fernández-Pascual, R., & Mc Guckin, C. (2025). *A systematic review of social media as a teaching and learning tool in higher education: A theoretical grounding perspective*. ResearchGate.
- Perifanou, M., & Economides, A. A. (2022). Designing open and inclusive language learning ecosystems: Challenges and opportunities in the post-COVID-19 era. *Education and Information Technologies*, 27(5), 6365–6384.
- Pimmer, C., & Pachler, N. (2013). Mobile learning in formal and informal settings: A European perspective. In M. J. W. Lee, C. McLoughlin, & N. T. Tsai (Eds.), *Open and distance education theory revisited: Implications for the digital era* (pp. 207-228). Springer.
- Pinho, C., Franco, M., & Mendes, L. (2021). Application of innovation diffusion theory to the E-learning process: higher education context. *Education and Information Technologies*, 26(1), 421-440.
- Popham, W. J. (2010). Assessment literacy for teachers: Faddish or fundamental? *Theory into Practice*, 49(1), 4-11.
- Putri, M. D., Rahmat, A., & Sanjaya, Y. (2024). The Use of Chunking Technique Combined with the Writing Is Thinking Technique to Control Students' Cognitive Load When Learning About the Human Reproductive System. *KnE Social Sciences*, 83-90.
- Qureshi, M. A., Khaskheli, A., Qureshi, J. A., Raza, S. A., & Yousufi, S. Q. (2023). Factors affecting students' learning performance through collaborative learning and engagement. *Interactive Learning Environments*, 31(4), 2371-2391.

- Rachmawati, U. (2016). Computer-Assisted Language Learning (CALL) as EFL teaching and learning media in Indonesia: Opportunity and challenges. *Edulingua: Jurnal Linguistik Terapan Dan Pendidikan Bahasa Inggris*, 3(2).
- Ransom, J. (2024). *Revisiting Africa's Flagship Universities Local, National and International Dynamics*. African Books Collective.
- Rasheed, R. A., Kamsin, A., & Ahmad, F. (2019). Adaptive Learning in Higher Education: A Review of the Literature. *Journal of Educational Computing Research*, 57(7), 1569-1604.
- Rastogi, V., & Rastogi, A. (2014). Technical Support for English Language Learning through ICT: An Analysis of Learners' Needs and Expectations. *International Journal of Computer Applications*, 101(3), 13-19.
- Read, T., & Madera, E. B. (2020). Toward a framework for language MOOCs and mobile assisted language learning. *Propósitos y representaciones*, 8(1), 20.
- Reinders, H. (2018). Computer-assisted language learning. In J. I. Lontas (Ed.), *The TESOL Encyclopedia of English Language Teaching* (pp. 1-6). John Wiley & Sons.
- Reinders, H. (2020). Mobile learning in language education. *Language Teaching*, 53(1), 1-18.
- Reinders, H., Kizilcec, R. F., & de Bot, K. (2021). Plain language in CALL: challenges and opportunities. *EUROCALL Review*, 29(1), 6-17.
- Reiser, R. A., & Dempsey, J. V. (2007). *Trends and issues in instructional design and technology* (2nd ed.). Pearson Merrill Prentice Hall.
- Reiser, R. A., & Dempsey, J. V. (2018). *Trends and issues in instructional design and technology* (4th ed.). Pearson.
- Richards, J. C., & Rodgers, T. S. (2014). *Approaches and methods in language teaching*. Cambridge university press.

- Richards, J. C., & Rodgers, T. S. (2014). *Approaches and methods in language teaching* (3rd ed.). Cambridge University Press.
- Rinaldi, A. J., & Jaidi, J. (2020). Syllable Chunking and Its Impact on the Recognition and Production of Words in a Foreign Language. *Journal of Language Teaching and Research*, 11(6), 616-626.
- Roediger, H. L., & Karpicke, J. D. (2006). The power of testing memory: Basic research and implications for educational practice. *Perspectives on Psychological Science*, 1(3), 181-210.
- Rogers, E. M. (1962). *Diffusion of innovations*. Free Press of Glencoe.
- Roman, G. (2024). A Multifaceted Approach to Linguistic and Cultural Inclusion for Migrants and Refugees in Europe. In *Transformative Intercultural Global Education* (pp. 370-384). IGI Global.
- Romero-Sánchez, M., García-Sánchez, F., & García-Peñalvo, F. J. (2020). The Use of Chatbots in Language Learning: A Systematic Review. *Sustainability*, 12(24), 10538.
- Rosenberg, L. J. (1969). *Logical Framework: A Project Design and Evaluation Tool*. U.S. Agency for International Development (USAID).
- Rothmann, S., & Coetzee, M. (2013). The role of cross-cultural interaction in promoting student engagement in Namibian higher education. *South African Journal of Education*, 33(1), 1-16.
- Rousell, D. (2016). Dwelling in the Anthropocene: Reimagining university learning environments in response to social and ecological change. *Australian Journal of Environmental Education*, 32(2), 137-153.

- Saatcioglu, A., & Ozoglu, M. (2019). A systematic review of adaptive learning in higher education. *Innovations in Education and Teaching International*, 56(5), 570-581.
- Sabao, C., & Nauyoma, O. (2020). On the 'proposed' introduction of Kiswahili to the Namibian school curriculum: Emerging perspectives. *Journal of Namibian Studies: History Politics Culture*, 28, 103-113.
- Şahin, A., Soylu, D., & Jafari, M. (2024). Professional Development Needs of Teachers in Rural Schools. *Iranian journal of educational sociology*, 7(1), 219-225.
- Saka, M. (2020). Barriers to the use of computer-assisted language learning in Namibian higher education. *International Journal of Emerging Technologies in Learning (iJET)*, 15(22), 19-35.
- Salimi, F. (2024). *Exploring Educational Technology Policies and Practices of the World Bank* (Doctoral dissertation).
- Salom, S. N. (2023). *An investigation on the efficacy of computer-assisted language learning in enhancing writing comprehension: A case study of Westside High School in Namibia* [Master's thesis, Namibia University of Science and Technology]. NUST Institutional Repository.
- Salsabilla, S., & Zayn, M. (2023). Bridging Pedagogical Gaps: Unraveling the Transformative Impact of a Literacy-Based Learning Approach in English Language Teaching. *L'Geneus: The Journal Language Generations of Intellectual Society*, 12(3), 98-105.
- Saunders, M., Lewis, P., & Thornhill, A. (2019). *Research methods for business students* (8th ed.). Pearson.
- Saunders, M., Lewis, P., & Thornhill, A. (2019). *Research methods for business students* (8th ed.). Pearson Education.

- Schmid, E. C. (2017). *Teacher education in computer-assisted language learning: A sociocultural and linguistic perspective*. Bloomsbury Publishing.
- Seet, L. W., & Loh, K. W. (2018). Exploring factors that contribute to anxiety and stress in online assessments: A qualitative study. *Journal of Computer-Assisted Learning*, 34(3), 260-270.
- Selwyn, N. (2021). *Education and technology: Key issues and debates*. Bloomsbury Publishing.
- Serrano, D. R., Dea-Ayuela, M. A., Gonzalez-Burgos, E., Serrano-Gil, A., & Lalatsa, A. (2019). Technology-enhanced learning in higher education: How to enhance student engagement through blended learning. *European Journal of Education*, 54(2), 273-286.
- Shaambeni, A. (2019). *The use of print library materials in the era of digital resources in institutions of higher learning in Namibia* [Master's thesis, University of Namibia].
- Shadiev, R., & Yang, M. (2020). Review of studies on technology-enhanced language learning and teaching. *Sustainability*, 12(2), 524.
- Shaketange, L. L. (2018). Challenges and opportunities for implementing recognition of prior learning at the University of Namibia. *Creative Education*, 9(13), 2070-2087.
- Shilongo, L. M. (2023). Examining factors that impede effective implementation of ICT-based curriculum in Namibian primary schools. *International Journal of Smart Technology and Learning*, 3(3-4), 250-270.
- Shingenge, F., & Henning, E. (2024). Towards embedded academic language development in a teacher education programme. *European Journal of Teacher Education*, 1-19.
- Shingoya, P. (2024). *Exploring the perceptions of technology usage amongst distance learners in African universities: A case of the University of Namibia* (Master's Thesis).

- Shiyoya, S., & Botha, A. (2020). Exploring the challenges and opportunities of implementing CALL at higher education institutions in Namibia. *The Journal of Pan African Studies*, 13(7), 74-94.
- Shu, H. C., Cheng, W., & Wang, W. C. (2016). Effects of scaffolding design in a mobile context on reading comprehension and engagement. *Journal of Educational Computing Research*, 54(7), 1055-1078.
- Simbolon, N. E. (2021). EFL students' perceptions of blended learning in English language course: learning experience and engagement. *Journal on English as a Foreign Language*, 11(1), 152-174.
- Sinclair, T. E. (2024). Evidence-Based Practice in Special Education: Constructing an Operational Definition. In *Research Methods in Special Education* (pp. 1-15). Routledge.
- Sitali, G. N. (2022). *A sociolinguistic investigation into the linguistic landscape of Windhoek's Mandume Ndemufayo and Independence Avenue streets, Namibia* (Master's Thesis, Namibia University of Science and Technology).
- Sithole, V. L., & Mbukanma, I. (2024). Prospects and Challenges to ICT Adoption in Teaching and Learning at Rural South African Universities: A Systematic Review. *Research in Social Sciences and Technology*, 9(3), 178-193.
- Sivapalan, N., & Lai, Y. C. (2018). Support for CALL: A review of help desks in language centres. *ReCALL*, 30(1), 84-102.
- Smit, I., & Gachago, D. (2021). Digital technologies and higher education in Namibia: Opportunities and barriers. *International Journal of Educational Technology in Higher Education*, 18(1), 1-20.

- Smith, J. (2019). Advancements in NLP for culturally sensitive applications. *Proceedings of the International Conference on Language and Culture*, 1(1), 98-104.
- Son, J. B., & Kim, J. (2018). Accessibility of mobile-assisted language learning: A systematic review. *Computer-Assisted Language Learning*, 31(1-2), 121-149.
- Song, C., Shin, S. Y., & Shin, K. S. (2024). Implementing the Dynamic Feedback-Driven Learning Optimization Framework: A Machine Learning Approach to Personalize Educational Pathways. *Applied Sciences*, 14(2), 916.
- Staddon, R. V. (2023). Exploring higher education students' perspectives on factors affecting use, attitudes and confidence with learning technologies. *International Journal of Instruction*, 16(2).
- Stell, G. (2021). English in Namibia: A Socio-Historical Account. *The Dynamics of English in Namibia: Perspectives on an Emerging Variety*. Amsterdam: John Benjamins, 21-41.
- Stockwell, G. (2010). Using mobile phones for vocabulary activities: Examining the effect of the platform. *Language Learning & Technology*, 14(2), 95-110.
- Stockwell, G. (2022). *Technology and language learning: Integrating theory and practice*. Routledge.
- Stockwell, G., & Hubbard, P. (2013). Online formative assessment in higher education: A review of the literature. *Journal of Computer-Assisted Learning*, 29(4), 265-282.
- Sun, Y., & Chen, Y. H. (2019). Exploring the effect of technical support on the adoption of online learning technologies: A perspective of IT help-seeking behaviour. *Computers & Education*, 137, 1-11
- Sundararajan, B., & Adesope, O. (2020). Learning from video in higher education: A meta-analysis. *Educational Research Review*, 29, 100314.

- Susanty, L. (2024). Critical Analysis of the Research on Digital Literacy. *Sinergi International Journal of Education*, 2(1), 12-25.
- Sutskever, I., Vinyals, O., & Le, Q. V. (2014). Sequence to sequence learning with neural networks. *Advances in Neural Information Processing Systems*, 27.
- Sweller, J. (1988). Cognitive load during problem solving: Effects on learning. *Cognitive Science*, 12(2), 257-285.
- Tan, J. K., Yeo, S. K., & Lim, S. S. (2021). Chunking Video-Based Instructional Material to Enhance Learning. *Journal of Educational Technology & Society*, 24(1), 97-111.
- Tang, Y., Chen, N.-S., & Chen, H.-Y. (2021). Personalized learning pathways in second language learning: An AI-based approach. *Computer-Assisted Language Learning*, 34(1), 56-82.
- Targema-Takema, R. N. (2024). *Developing a framework that supports the integration of learning technologies in primary education in Nigeria* (Doctoral dissertation, University of Portsmouth).
- Ten Hacken, P. (2003). CALL: An Overview. In J. Aarts, & J. Van Der Auwera (Eds.), *The Handbook of Contemporary Semantic Theory* (pp. 699-711). John Wiley & Sons.
- Theofanidis, D., & Fountouki, A. (2018). Limitations and delimitations in the research process. *Perioperative Nursing-Quarterly scientific, online official journal of GORNA*, 7(3 September-December 2018), 155-163.
- Thorne, S. L., & Payne, J. S. (2005). Evolutionary trajectories, internet-mediated expression, and language education. *CALICO Journal*, 22(3), 371-397.
- Tjihonge, C. (2019). A critical review of the use of computer-assisted language learning in the Namibian higher education sector. *Journal of Educational and Social Research*, 9(3), 19-27.

- Tjihonge, H. T. (2019). The use of formative assessment in promoting communicative language teaching (CLT) in tertiary institutions in Namibia. *Journal of Educational and Social Research*, 9(3), 163-174.
- Tomlinson, B., Schwienhorst, K., & Chirinos, A. (2020). Using Voice-Activated Assistants like Alexa in Language Learning. *TESL-EJ*, 24(2), 1–17.
- Tseng, T. H., Lin, S., Wang, Y. S., & Liu, H. X. (2022). Investigating teachers' adoption of MOOCs: the perspective of UTAUT2. *Interactive Learning Environments*, 30(4), 635-650.
- Uiras, H. T. (2021). The impact of diagnostic digital online assessment tools on self-directed learning and metacognitive awareness in foreign language learning. *International Journal of Emerging Technologies in Learning (iJET)*, 16(3), 117-130.
- Uiras, J. (2019). English language education policy in Namibia: A critical analysis. *Language, Culture and Curriculum*, 32(2), 139-151.
- UNESCO. (2019). *Namibia: ICT in education*. <https://www.itu.int/en/ITU-D/Statistics/Documents/countries/nam/NAMICTProfile2019.pdf>.
- UNESCO. (2022). *Enhancing inclusive and equitable quality education for multilingual learners in Africa*. <https://unesdoc.unesco.org/ark:/48223/pf0000381013>.
- UNESCO. (2022). *Harnessing technology to support multilingual education and the preservation of Indigenous languages*. <https://unesdoc.unesco.org/ark:/48223/pf0000382367>
- UNESCO. (2025). *New UNESCO report calls for multilingual education to unlock learning and inclusion*. UNESCO News. <https://www.unesco.org/en/articles/new-unesco-report-calls-multilingual-education-unlock-learning-and-inclusion>

- Van Dusen-Sellers, M., Bicer, A., & Grainger, J. (2020). Mobile-assisted language learning in higher education: An investigation of student engagement and attitude. *Educational Technology Research and Development*, 68(6), 2661-2685.
- Vander Ark, T. (2021). *How Duolingo uses AI to personalize language learning*. *Getting Smart*.
<https://www.gettingsmart.com/2021/01/how-duolingo-uses-ai-to-personalize-language-learning/>.
- Venkatesh, V., Morris, M. G., Davis, G. B., & Davis, F. D. (2003). User acceptance of information technology: Toward a unified view. *MIS Quarterly*, 27(3), 425-478.
- Vesselinov, R., & Grego, J. (2019). *Duolingo effectiveness study*. Duolingo Inc.
- Vlachos, P., & Papacharalambous, G. (2019). Virtual Reality and Language Learning: State of the Art and Future Challenges. *Journal of Computer-Assisted Learning*, 35(3), 255-267.
- Vygotsky, L. S. (1978). *Mind in society: The development of higher psychological processes*. Harvard University Press.
- Waiganjo, I. N., & Paxula, G. (2020). Teachers' perceptions and use of information and communication technology in teaching and learning: Kadjimi Circuit, Kavango West, Namibia. *International Journal of Education and Development using Information and Communication Technology*, 16(3), 22-37.
- Wambugu, P. W., & Changeiywo, J. M. (2015). Digital assessment in higher education: A comparative study of traditional exams and e-exams. *International Journal of Education and Research*, 3(5), 51-62.
- Wang, C., & Li, X. (2020). Effectiveness of a mobile-based CALL application on Chinese EFL learners' grammar and vocabulary: A mixed-methods study. *Journal of Educational Computing Research*, 57(7), 1635–1659.

- Wang, D., Liu, D., & Sun, C. (2020). Effects of augmented reality on vocabulary learning: A meta-analysis. *Educational Research Review*, 30, 100326.
- Wang, J., & Chen, N. S. (2020). The effects of using a computer-assisted language learning system on English grammar learning. *Journal of Educational Computing Research*, 58(4), 789-812.
- Wang, J., & Li, Y. (2020). The Effects of Mobile-Based CALL on Chinese EFL Learners' Vocabulary Acquisition and Grammar Performance. *English Language Teaching*, 13(10), 129-140.
- Wang, J., Su, L., & Cheung, Y. K. (2019). Using adaptive learning to improve Chinese learners' academic writing. *Computer-Assisted Language Learning*, 32(7), 657-677.
- Wang, L., Schultz, T., & Lopez, M. J. (2020). Speech technology in computer-assisted language learning. In *The Routledge Handbook of Computer-Assisted Language Learning* (pp. 71-88). Routledge. TopRoutledge. of Form.
- Wang, Q., & Li, X. (2020). The role of social media and mobile applications in facilitating language learning. In M. Thomas (Ed.), *The Handbook of Research on Social Media Applications for the Tourism and Hospitality Sector* (pp. 1-17). IGI Global.
- Wang, Q., & Vásquez, C. (2020). Active learning in computer-assisted language learning. *The Modern Language Journal*, 104(S1), 20-36.
- Wang, S., & Li, J. (2020). Mobile-assisted language learning: A review of recent research. *British Journal of Educational Technology*, 51(5), 1362-1378.
- Wang, T. (2023). *Curriculum design for the digital age: Strategies for effective technology integration*. ResearchGate. <https://www.researchgate.net>.

- Wang, T. H., & Chen, M. C. (2018). Effects of immediate feedback on learning performance and motivation in an EFL computer-mediated communication environment. *Computers & Education, 127*, 139-150.
- Wang, X., & Li, Y. (2020). Utilizing mobile-based computer-assisted language learning applications for L2 learning: A review of literature. *International Journal of Emerging Technologies in Learning (iJET), 15*(5), 92-104.
- Wang, X., Chen, J., & Li, Y. (2022). Balancing Technology Use with Environmental Sustainability in Language Education. *Journal of Educational Technology Development and Exchange, 15*(1), 47-58.
- Wang, X., Liu, T., & Sun, Y. (2020). The effect of augmented reality on vocabulary learning: A meta-analysis. *Educational Research Review, 29*, 100314.
- Wang, Y. (2021). Artificial intelligence in language education: A review of recent advances and future directions. *International Journal of Artificial Intelligence in Education, 31*(1), 1-17.
- Wang, Y., & Li, H. (2020). Mobile-assisted language learning and social media: Opportunities and challenges. *Journal of Educational Technology & Society, 23*(1), 56–68.
- Wang, Y., & Li, M. (2020). The effect of using mobile-based CALL on Chinese EFL learners' grammar and vocabulary learning. *Education and Information Technologies, 25*(6), 5075-5092.
- Wang, Y., & Liao, H. (2025). Designing language learning with artificial intelligence (AI) chatbots: An activity theory perspective. *Smart Learning Environments, 12*, 45.
- Wang, Y., & Vásquez, C. (2022). Open-source technologies and inclusive CALL: Opportunities for global South education. *Language Learning & Technology, 26*(1), 46–63.

- Ware, P., & Hellmich, E. (2014). CALL in the K-12 context: Language learning outcomes and opportunities. *Calico Journal*, 31(2), 140-157.
- Warschauer, M. (1996). Computer-assisted language learning: An introduction. In Fotos, S. (Ed.), *Multimedia language teaching* (pp. 3-20). Logos International.
- Warschauer, M. (2011). Learning to write in the laptop classroom. *Writing & Pedagogy*, 3(1), 165-181.
- Warschauer, M., & Healey, D. (1998). Computers and language learning: An overview. *Language Teaching*, 31(2), 57-71. <https://doi.org/10.1017/S0261444800012989>.
- Warschauer, M., & Healey, D. (2017). Technology and language learning: Past, present, and future. In S. Loewen & M. Sato (Eds.), *The Routledge Handbook of Instructed Second Language Acquisition* (pp. 432-447). Routledge.
- Warschauer, M., & Matuchniak, T. (2010). New technology and digital worlds: Analyzing evidence of equity in access, use, and outcomes. *Review of Research in Education*, 34(1), 179-225.
- Warschauer, M., & Meskill, C. (2000). Technology and second language learning. *Annual Review of Applied Linguistics*, 20, 205-225.
- Wiles, R., Crow, G., Heath, S., & Charles, V. (2008). The Management of Confidentiality and Anonymity in Social Research. *International Journal of Social Research Methodology*, 11(5), 417-428.
- Williams, K. S., Gibson, C. C., & Hunter, J. M. (2016). The impact of online diagnostic quizzes on student achievement in an introductory biology course. *Journal of Biological Education*, 50(2), 151-158.

- Wilson, P. (2023). *Culturally Relevant Pedagogy: Assessment of a Holistic Curriculum and African American Students: A Single Case Study* (Doctoral dissertation, Northcentral University).
- Wong, M. H. I., & Hung, T. S. (2024). Concept-Based Grammar Teaching in the Digital Era: Potential and Challenges. In *Routledge Encyclopedia of Technology and the Humanities* (pp. 200-218). Routledge.
- Wood, D., Bruner, J. S., & Ross, G. (1976). The role of tutoring in problem solving. *Journal of Child Psychology and Psychiatry*, 17(2), 89-100.
- Woyo, E., Rukanda, G. D., & Nyamapanda, Z. (2020). ICT policy implementation in higher education institutions in Namibia: A survey of students' perceptions. *Education and Information Technologies*, 25(5), 3705-3722.
- Xu, T., & Rienties, B. (2021). Chatbot-supported language learning: A mixed-methods study on the development of students' speaking proficiency, linguistic accuracy, and complexity. *Computer-Assisted Language Learning*, 34(3), 241-261.
- Yang, H. H., & Liu, Y. F. (2021). Supporting language learners' self-regulated learning through an adaptive CALL system: A review of research. *Educational Technology & Society*, 24(1), 112-126.
- Yang, J.-C., & Chen, G.-D. (2021). Artificial intelligence in second language learning and teaching. *Language Learning & Technology*, 25(1), 1-6.
- Yang, N. D. (2019). Task-based language teaching and learning with technology. In N. Arnold & T. Murphey (Eds.), *The Routledge handbook of second language acquisition and pedagogy* (pp. 442-455). Routledge.

- Yang, S. J., & Chang, Y. H. (2013). Interactive assessment system for English learning: Developing a multimedia-enhanced online testing and assessment system. *Turkish Online Journal of Distance Education*, 14(1), 247-263.
- Yang, S.-H. (2010). Task-based CALL and the design of constructivist learning environments: A case study of a beginning-level Chinese language course. *CALICO Journal*, 27(2), 277-296.
- Yang, Y., & Song, Y. (2024). Developing and evaluating a mobile app with a self-regulation scheme to facilitate primary students' self-regulated vocabulary learning. *Computer-Assisted Language Learning*, 1–33. <https://doi.org/10.1080/09588221.2024.2342868>
- Yanguas, I. (2020). Telecollaboration and discourse competence development: A case for online intercultural exchange. *System*, 94, 102319.
- Yousefzadeh, M., & Foroutan, E. (2020). The impact of artificial intelligence on language learning: A systematic review. *Teaching English with Technology*, 20(3), 62-85.
- Yu, K., & Chen, N. S. (2021). Effectiveness of virtual reality for improving pronunciation and communicative skills in language learning. *Computer-Assisted Language Learning*, 34(5), 519-537.
- Zainuddin, H., & Perera, C. J. (2021). Effectiveness of gamification in language learning: A meta-analysis. *Educational Technology Research and Development*, 69(3), 1017-1050.
- Zepke, N. (2024). Mapping student engagement using a theoretical lens. *Teaching in Higher Education*, 29(1), 176-193.
- Zhang, L., & Chen, X. (2021). The effect of augmented reality on EFL learners' reading comprehension and motivation. *Journal of Educational Computing Research*, 59(4), 646-664.

Zhang, Q., & Kenny, R. (2016). The effect of technology on language learning and instruction. *Modern Language Journal*, 100(S1), 132-149.

Zsiga, E. C. (2024). *The sounds of language: An introduction to phonetics and phonology*. John Wiley & Sons.

APPENDICES

APPENDIX A: STUDENTS' QUESTIONNAIRE

CONSENT FORM

Dear students

My name is Lazarus Gawazah, and I am a PhD candidate at The University of Namibia. I am conducting a research study titled "Computer-Assisted-Language Learning in the Context of Higher Education in Namibia: A Case Study of the UNAM and NUST." The purpose of this study is to investigate the effectiveness and utilisation of Computer-Assisted-Language Learning (CALL) tools in higher education institutions in Namibia.

As part of this study, I would like to invite you to participate by completing a questionnaire about your experience with CALL tools in your language learning. Participation in this study is entirely voluntary, and you have the right to refuse or withdraw from the study at any time without any questions asked. Your responses will be kept confidential and anonymous, and only I, as the researcher, will have access to the data. No identifiable information will be disclosed in any publications or reports resulting from this study.

Your participation will contribute valuable perspectives to our understanding of CALL effectiveness in higher education contexts in Namibia. If you have any questions about the study, please do not hesitate to contact me at lazarusgawazah@gmail.com or +264812298110 and my supervisors; Professor Collen Sabao at csabao@unam.na

Thank you for considering participating in this study.

Sincerely, Lazarus Gawazah

Please respond to each question by selecting the most appropriate response(s). For multiple-choice items, tick (☐) your answer. For open-ended questions, write your responses in the space provided.

1. **What is your gender?**
 - ☐ Female
 - ☐ Male
2. **What is your age?**
 - ☐ 18 to 24
 - ☐ 25 to 34
 - ☐ 35 and above
3. **What is your field of study?**
 - ☐ Humanities
 - ☐ English Major (Majoring in English)
 - ☐ English and Linguistics
 - ☐ Other (please specify): _____
4. **What is the name of your institution?**
 - ☐ UNAM (University of Namibia)
 - ☐ NUST (Namibia University of Science and Technology)
5. **How do you perceive the use of computers as effective tools for language learning?**
 - ☐ Strongly Agree
 - ☐ Agree
 - ☐ Neutral
 - ☐ Disagree
 - ☐ Strongly Disagree
6. **CALL is an approach that uses computer-based resources (e.g., internet) for language teaching and learning. Do you agree with this statement?**
 - ☐ True
 - ☐ False
7. **How would you rate your computer proficiency?**
 - ☐ Very Proficient
 - ☐ Proficient
 - ☐ Moderately Proficient
 - ☐ Slightly Proficient
 - ☐ Not Proficient
8. **How frequently do you use language learning and interaction tools in your studies?**
 - ☐ Very Frequently
 - ☐ Frequently

☐ Occasionally

☐ Rarely

☐ Never

9. **How competent are you in managing and creating digital texts?**

☐ Very Competent

☐ Competent

☐ Moderately Competent

☐ Slightly Competent

☐ Not Competent

10. **How confident do you feel about using CALL for language learning?**

☐ Very Confident

☐ Confident

☐ Moderately Confident

☐ Slightly Confident

☐ Not Confident

11. **What benefits do you perceive CALL brings to language learning?**

☐ Strongly Agree

☐ Agree

☐ Neutral

☐ Disagree

☐ Strongly Disagree

12. **Which Learning Management Systems (LMS) are you familiar with? (Tick all that apply)**

☐ Moodle

☐ MS Teams

☐ Google Classroom

☐ Blackboard Learn

☐ Canvas

13. **How would you rate the user-friendliness of the LMS software you use?**

☐ Very user-friendly

☐ User-friendly

☐ Neutral

☐ Somewhat difficult to use

☐ Very difficult to use

14. **How do you rate the importance of the following language skills?**

Language Skill	Very Important	Important	Moderately Important	Slightly Important	Not Important
Speaking	☐	☐	☐	☐	☐
Listening	☐	☐	☐	☐	☐

Reading	☐	☐	☐	☐	☐
Writing	☐	☐	☐	☐	☐

15. How would you rate the user-friendliness of the LMS software you have used?

- ☐ Very user-friendly
- ☐ User-friendly
- ☐ Neutral
- ☐ Somewhat difficult to use
- ☐ Very difficult to use

16. Which language learning and interaction tools do you use? (Tick all that apply)

- ☐ Duolingo
- ☐ ChatGPT (OpenAI)
- ☐ Lingvist
- ☐ FluentU
- ☐ Rosetta Stone

17. What is your competency level in using a computer to manipulate, organise, create and manage texts?

- ☐ Inadequate
- ☐ Below average
- ☐ Adequate
- ☐ Above average
- ☐ Exceptional

18. Do you think that computers are effective tools that can be used to teach language?

- ☐ Yes
- ☐ No

19. What are the benefits of using CALL for language learning? (Tick all that apply)

- ☐ It provides access to authentic and up-to-date language materials
- ☐ It offers a controlled environment for language practice with immediate feedback
- ☐ It provides opportunities for interaction with other learners and native speakers
- ☐ It is customisable to individual needs and preferences
- ☐ CALL enhances motivation to learn

20. To what extent do you think the socio-economic background of students affects their access to and utilisation of CALL tools?

21. How would you rate the importance of integrating CALL into the Namibian higher education system?

22. What factors influence your intention to use CALL for language learning?

23. How would you describe your access to resources such as computers?

24. How do external factors (e.g., social influence, perceived ability to use technology) affect your decision to use CALL for language learning?

25. In your opinion, what are the main challenges of integrating CALL into the Namibian higher education system?

26. Can you describe a time when you felt frustrated while using CALL for language learning?

27. Share your thoughts on the role of CALL in promoting collaborative language learning experiences.

28. Can you describe any positive experiences you have had while using CALL in your higher education studies?

29. In your opinion, what are the factors that hinder the delivery of CALL in language learning?

30. How do you think CALL can be better integrated into the curriculum at your institution?

31. What support do you think is necessary from your institution to facilitate the effective use of CALL?

32. Do you have any additional comments or suggestions for improving the delivery of CALL in language learning?

Thank you for your participation!

APPENDIX B: LECTURERS' QUESTIONNAIRE

CONSENT FORM

Dear Faculty

My name is Lazarus Gawazah, and I am a PhD candidate at The University of Namibia. I am conducting a research study titled "Computer-Assisted-Language Learning in the context of higher education in Namibia: A case study of the UNAM and NUST." The purpose of this study is to investigate the effectiveness and utilisation of Computer-Assisted-Language Learning (CALL) tools in higher education institutions in Namibia.

The questionnaire aims to gather perspectives into the effectiveness of CALL as an online assessment tool in higher education. It includes questions about the respondent's experience with CALL as an assessment tool, the types of assessments used, and the benefits and challenges associated with its use.

As part of this study, I would like to invite you to participate by completing a questionnaire about your experience with CALL tools in your language learning. Participation in this study is entirely voluntary, and you have the right to refuse or withdraw from the study at any time without any questions asked. Your responses will be kept confidential and anonymous, and only I, as the researcher, will have access to the data. No identifiable information will be disclosed in any publications or reports resulting from this study.

Your participation will contribute valuable perspectives to our understanding of CALL effectiveness in higher education contexts in Namibia. If you have any questions about the study,

please do not hesitate to contact me at lazarusgawazah@gmail.com or +264812298110 and my supervisor; Prof Collen Sabao at csabao@unam.na

Thank you for considering participating in this study.

Sincerely, Lazarus Gawazah

Please respond to each question by selecting the most appropriate response(s). For multiple-choice items, tick (☐) your answer. For open-ended questions, write your responses in the space provided.

1. **What is your gender?**
 - ☐ Female
 - ☐ Male
2. **What is your age?**
 - ☐ 18 to 24
 - ☐ 25 to 34
 - ☐ 35 to 44
 - ☐ 45 and above
3. **What is your academic rank?**
 - ☐ Junior Lecturer
 - ☐ Lecturer
 - ☐ Senior Lecturer
 - ☐ Reader
 - ☐ Professor
4. **How many years have you been teaching at the university level?**
 - ☐ Less than 1 year
 - ☐ 1–5 years
 - ☐ 6–10 years
 - ☐ 11–15 years
 - ☐ More than 15 years
5. **What is the name of your institution?**
 - ☐ UNAM (University of Namibia)
 - ☐ NUST (Namibia University of Science and Technology)
6. **CALL is an approach that uses computer-based resources such as the Internet to present, reinforce, and assess learning materials with interactive elements. Do you agree?**
 - ☐ True
 - ☐ False
7. **How would you rate your computer proficiency?**
 - ☐ Learner

- ☐ Beginner
- ☐ Intermediate
- ☐ Advanced
- ☐ Expert

8. **How familiar are you with the following Learning Management Systems (LMS)?**

(Tick all that apply)

- ☐ Moodle
- ☐ MS Teams
- ☐ Google Classroom
- ☐ Blackboard Learn
- ☐ Canvas
- ☐ Brightspace by D2L
- ☐ Edmodo

9. **Which language teaching and interaction tools do you use and recommend to students?** (Tick all that apply)

- ☐ Duolingo
- ☐ ChatGPT
- ☐ Lingvist
- ☐ FluentU
- ☐ Rosetta Stone
- ☐ Other (please specify): _____

10. **Which instructional design strategies do you use with students in CALL environments?** (Tick all that apply)

- ☐ Scaffolding
- ☐ Sequencing
- ☐ Chunking
- ☐ Lesson duration
- ☐ Active learning and rehearsal for long-term memory

11. **How frequently do you use the following assessment strategies?**

Assessment Strategy	Used Frequently	Used Occasionally	Rarely Used	Never Used
Traditional assessments (tests, essays)	☐	☐	☐	☐
Self-assessments (reflections, peer evaluations)	☐	☐	☐	☐
Rubric-based assessments (grading criteria)	☐	☐	☐	☐
Formative assessments (quizzes, check-ins)	☐	☐	☐	☐
Summative assessments (final exams, projects)	☐	☐	☐	☐

12. How would you rate the user-friendliness of the LMS software you have used?

- ☐ Very user-friendly
- ☐ User-friendly
- ☐ Neutral
- ☐ Somewhat difficult to use
- ☐ Very difficult to use

13. How much do you agree with the following statement: “There is adequate support from the institution to deliver CALL in language teaching.”

- ☐ Strongly disagree
- ☐ Somewhat disagree
- ☐ Neither agree nor disagree
- ☐ Somewhat agree
- ☐ Strongly agree

14. What are the specific challenges you have faced in delivering CALL in language teaching?

15. To what extent do you think the socio-economic background of students affects their access to and utilisation of CALL tools?

16. How would you rate the importance of integrating CALL into the Namibian higher education system?

- ☐ Not important
- ☐ Somewhat important
- ☐ Very important

17. What factors influence your intention to use CALL for language learning?

18. How do external factors (e.g., social influence, perceived ability to use technology) affect your use of CALL for language teaching?

19. In your opinion, what are the main challenges of integrating CALL into the Namibian higher education system?

20. Can you describe a time when you felt frustrated while using CALL for language teaching?

21. Have you noticed differences in student engagement and learning outcomes when using CALL software compared to traditional methods? What do you think are the reasons for this?

22. What are the challenges of using CALL as an online assessment tool in higher education?

23. Share your thoughts on the role of CALL in promoting collaborative language learning experiences.

24. Can you describe any positive experiences you have had while using CALL to deliver lessons?

25. In your opinion, what factors impede the delivery of CALL in language teaching?

26. What type of support do you think would be necessary for the successful implementation of CALL intervention strategies?

27. Do you have any additional comments or suggestions for improving the delivery of CALL in language learning?

Thank you for your participation!

APPENDIX C: UNAM ETHICAL CLEARANCE CERTIFICATE



ETHICAL CLEARANCE CERTIFICATE

Ethical Clearance Reference Number: SHS 0061 **Date:** 11 October 2022

This Ethical Clearance Certificate is issued by the University of Namibia Decentralized Ethics Committee (DEC) in accordance with the University of Namibia's Research Ethics Policy and Guidelines. Ethical approval is given in respect of undertakings contained in the Research Project outlined below. This Certificate is issued on the recommendations of the ethical evaluation done by the School of Humanities, Society & Development Decentralized Ethics Committee.

Title of Project: Computer Assisted Language Learning in the context of Higher Education in Namibia: A case study of the University of Namibia (UNAM) and Namibia University of Science and Technology (NUST)

Researcher: Lazarus Gawazah

Student Number: 201501426

Supervisor(s): Prof Collen Sabao & Prof Jairos Kangira

Centre for Research Services

Take note of the following:

1. Any significant changes in the conditions or undertakings outlined in the approved Proposal must be communicated to the ethics committee. An application to make amendments may be necessary.
2. Any breaches of ethical undertakings or practices that have an impact on ethical conduct of the research must be reported to the ethics committee
3. The Principal Researcher must report issues of ethical compliance to the ethics committee (through the Chairperson) at the end of the Project or as may be requested by the ethics committee
4. The ethics committee retains the right to:
 - i) Withdraw or amend this Ethical Clearance if any unethical practices (as outlined in the Research Ethics Policy) have been detected or suspected,
 - ii) Request for an ethical compliance report at any point during the course of the research.

The ethics committee wishes you the best in your research.

A handwritten signature in black ink, appearing to read "Trywell Kalusopa", written over a horizontal line.

Prof. Trywell Kalusopa (Chairperson, Decentralised Ethics Committee)

A handwritten signature in black ink, appearing to read "Davis Mumbengegwi", written over a horizontal line.

Prof. Davis Mumbengegwi (Head, Multidisciplinary Research)

APPENDIX D: UNAM RESEARCH PERMISSION LETTER

CENTRE FOR RESEARCH SERVICES
Office of the Pro-Vice Chancellor: Research, Innovation & Development
University of Namibia, Private Bag 13301, Windhoek, Namibia
340 Mondume Ndemufayo Avenue, Pioneers Park, Office F223 - Fblock, Second Floor
☎ +264 61 206 4673; E-mail: cmr@unam.na; URL: <http://www.unam.edu.na>



RESEARCH PERMISSION LETTER

Date: 24/10/2022

Student Name: Lazarus Gawazah

Student Number: 201501426

Programme: Doctor of Philosophy (English Studies)

Approved Research Title: Computer assisted-language learning in the context of higher education in Namibia: a case study of the University of Namibia (UNAM) and Namibia University of Science and Technology (NUST)

TO WHOM IT MAY CONCERN

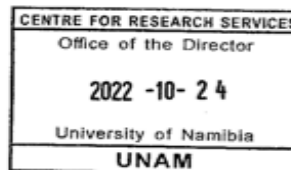
I hereby confirm that the above-mentioned student is registered at the University of Namibia for the programme indicated. The proposed study met all the requirements as stipulated in the University guidelines and has been approved by the relevant committees.

The proposal adheres to ethical principles as per attached Ethical Clearance Certificate. Permission is hereby granted to carry out the research as described in the approved proposal.

Best Regards

A handwritten signature in black ink, appearing to read 'AEE Shikongo'.

Dr. AEE Shikongo
Head: Postgraduate Support Services
Tel: +264 61 206 3129
E-mail: aeshikongo@unam.na



APPENDIX E: REQUEST TO CONDUCT RESEARCH AT NUST

Lazarus Gawazah

P. O. Box 26388

Windhoek

Namibia

17 October 2022

The Registrar

Namibia University of Science and Technology

Private Bag 13388

13 Jackson Kaujeua Street

Windhoek

Namibia

RE: REQUEST FOR PERMISSION TO CONDUCT RESEARCH AT THE NUST

Dear Sir/madam

My name is Lazarus Gawazah, a current student at the UNAM. I am studying towards a Doctor of Philosophy Degree in English Studies (PhD). I have recently received an Ethical Clearance Certificate from the School of Humanities, Society and Development Research Ethics Committee to conduct research on my topic titled: '**Computer-Assisted-Language Learning in the Context of Higher Education in Namibia: A Case of the UNAM and NUST**'. The study requires data collection from undergraduate students studying towards Bachelor of English and Linguistics Degree and Staff members in the Faculty of Commerce, Human Sciences and Education in the Department of Human Sciences, Education and Languages at NUST. My supervisors are Professor Collen Sabao and Professor Jairos Kangira from the University of Namibia.

I hereby request your consent for the following activities within your institution:

1. To collect data from students and staff members in the Faculty of Commerce, Human Sciences and Education in the Department of Human Sciences, Education and Languages at NUST.

Please find attached my Ethical Clearance Certificate issued by the University of Namibia and the approved research proposal for further details about the study. The ethical clearance approval was granted after the UNAM ethics committee was satisfied that all their ethical guidelines observed. These include confidentiality, voluntary participation and the right of the participant to withdraw without any questions asked.

If you require any further information, please do not hesitate to contact me on cell: +264812298110. Email: lazarusgawazah@gmail.com or my Supervisor, Prof Collen Sabao, Tel: +264 61 206 4323. Email: csabao@unam.na

Your consideration is greatly appreciated.

Yours sincerely



Lazarus Gawazah

Student Number: 201501426

APPENDIX F: APPROVAL TO CONDUCT RESEARCH AT NUST



**NAMIBIA UNIVERSITY
OF SCIENCE AND TECHNOLOGY**

13 Jackson Kaujeua Street
Private Bag 13388
Windhoek
NAMIBIA

T: +264 61 207 2118
F: +264 61 207 9118
E: registrar@nust.na
W: www.nust.na

Office of the Registrar

04 November 2022

Lazarus Gawazah
Email: lazarusgawazah@gmail.com
Windhoek
NAMIBIA

Dear Mr. Gawazah,

RE: CONSENT TO CONDUCT YOUR RESEARCH WITH THE NAMIBIA UNIVERSITY OF SCIENCE AND TECHNOLOGY STAFF AND STUDENT

Approval is hereby granted for you to conduct the research on *"Computer assisted-language learning in the context of higher education in Namibia: A case study of the University of Namibia (UNAM) and the Namibia University of Science and Technology (NUST)"*

Any information gathered during the research is to be used for the purpose of the study only and must be treated as confidential. The results of the study should be shared with the University. Individual information of staff and students will not be made available, nor will biographical information of students be made available in such a way that individual students can be identified.

I wish you all the best with your research.

Yours sincerely,

**Ms. Selma Heelu
ASSISTANT REGISTRAR**

CC: Deputy Vice-Chancellor: Research and Innovation
Registrar



APPENDIX G: NUST REQUEST TO CONDUCT RESEARCH WITH STAFF MEMBERS

Lazarus Gawazah

P. O. Box 26388

Windhoek

Namibia

04 November 2022

The Registrar

Namibia University of Science and Technology

Private Bag 13388

13 Jackson Kaujeua Street

Windhoek

Namibia

RE: REQUEST FOR YOUR PERMISSION TO CONDUCT RESEARCH WITH STAFF MEMBERS IN THE FACULTY OF COMMERCE, HUMAN SCIENCES AND EDUCATION IN THE DEPARTMENT OF HUMAN SCIENCES, EDUCATION AND LANGUAGES AT NUST.

Dear Sir/madam

My name is Lazarus Gawazah, a current student at the UNAM. I am studying towards a Doctor of Philosophy Degree in English Studies (PhD). I have recently received an Ethical Clearance Certificate from the School of Humanities, Society and Development Research Ethics Committee at UNAM to conduct research on my topic titled: **‘Computer-Assisted-Language Learning in the Context of Higher Education in Namibia: A Case of the UNAM and NUST’**. The study requires data collection Staff members in the Faculty of Commerce, Human Sciences and

Education in the Department of Human Sciences, Education and Languages at NUST. My supervisors are Professor Collen Sabao and Professor Jairos Kangira from the University of Namibia.

I hereby request your consent for the following activities within your institution:

1. To collect data from staff members in the Faculty of Commerce, Human Sciences and Education in the Department of Human Sciences, Education and Languages at NUST.

Please find attached my Ethical Clearance Certificate issued by the University of Namibia and the approved research proposal for further details about the study. The ethical clearance approval was granted after the UNAM ethics committee was satisfied that all their ethical guidelines observed. These include confidentiality, voluntary participation and the right of the participant to withdraw without any questions asked.

If you require any further information, please do not hesitate to contact me on cell: +264812298110. Email: lazarusgawazah@gmail.com or my Supervisor, Prof Collen Sabao, Tel: +264 61 206 4323. Email: csabao@unam.na

Your consideration is greatly appreciated.

Yours sincerely



Lazarus Gawazah

Student Number: 201501426

APPENDIX H: APPROVAL TO CONDUCT RESEARCH WITH NUST STAFF



**NAMIBIA UNIVERSITY
OF SCIENCE AND TECHNOLOGY**

Department: Human Resources

13 Jackson Kaujeua Street
Private Bag 13388
Windhoek
NAMIBIA

T: +264 61 207 2255
F: +264 61 207 9255
E: hrrs@nust.na
W: www.nust.na

07 November 2022

Mr Lazarus Gawazah
P. O. Box 26388
Windhoek
Namibia

Dear Mr Gawazah,

RE: APPROVAL AND PERMISSION TO CONDUCT RESEARCH WITH STAFF MEMBERS AT NUST

With reference to your request dated 04 November 2022, approval has been granted for you to conduct a study with staff members in the Faculty Department of Human Sciences, Education and Languages at NUST – Research title: *“Computer Assisted-Language Learning in the Context of Higher Education in Namibia: A Case of the University of Namibia (UNAM) and Namibia University of Science and Technology (NUST).”*

Take due note that you are allowed to do research with staff members on condition that all NUST ethical guidelines are strictly adhered to and the data collected must be for study purposes **only**. Upon completion, the results of your research should be shared with the University. Individual and biographical information of staff will not be made available and must be treated confidential and in a manner that do not expose or invade their privacy. The participants shall have the right to withdraw at any time without questioned.

I wish you all the best.

Sincerely,

Ms Riëtte Duvenhage
Director-Human Resources

RD/adw

APPENDIX I: LETTER FROM THE LANGUAGE EDITOR

EXPRESS LANGUAGE EDITING

expressediting1@gmail.com

Proofreading, technical, grammar, punctuation, and spelling

P. O. BOX 26388

WINDHOEK

0812298110

Date: 05 June 2025

Dissertation Author: Lazarus Gawazah

PhD Dissertation Title: *Computer Assisted-Language Learning in the context of higher education in Namibia: A case study of the University of Namibia (UNAM) and Namibia University of Science and Technology (NUST)*

To Whom It May Concern:

This letter confirms that the manuscript of the PhD dissertation corresponding to the information detailed above was edited by a professional language editor at Express Language Editing.

We guarantee 100% language accuracy in the text, as edited and delivered to the author on 05 June 2025. We make no claims as to the substantive matter covered by the dissertation and have not altered the intent or research content drafted by the author.

The author may accept or reject any of our comments or suggestions upon receipt of the document we edited. Should you have any questions or concerns, please contact expressediting@gmail.com

Sincerely,
Express Language Editing

Disclaimer: Please note that the author of the document should notify us if there are any changes made to the document after our editing. We will revise the document and gladly resend it to you.