INNOVARE JOURNAL OF EDUCATION
Vol 11, Issue 4, 2023, 41-50
ISSN: 2347-5528
Research Article

Investigating Mathematics Teachers' Understanding and Practices of Learner-centered Teaching in Junior Secondary Schools within Katima Circuit in the Zambezi Region of Namibia

Richard Salufu Mwazi and Kgomotso Gertrude Garegae
Department of Mathematics and Science Education, University of Botswana, Gaborone, Botswana

Kelvin Mubiana Katukula
Social Sciences Division, Centre for Research Services, University of Namibia, Windhoek, Namibia.
Centre for Research on Evaluation, Science and Technology, Stellenbosch University, Stellenbosch, South Africa

Linus Kambeyo
School of Education, University of Namibia, Rundu, Namibia

Abstract

This study investigated mathematics teachers' understanding and practices of learner-centered teaching (LCT) in junior secondary schools within Katima Circuit in the Zambezi Region of Namibia. A qualitative study method was used and purposeful sampling procedures were used to select participants. Research instruments included open-ended interviews and recordings from twenty mathematics teachers in selected junior secondary schools in the Zambezi Region. Results of the study indicate that teachers understand the concepts of LCT and have adequate training and knowledge on the benefits and teaching approach in LCT due to the inclusion of the LCT methods in teacher education and other training workshops. However, the study also found that most mathematics teachers use only cooperative learning during teaching and learning mathematics. The study also identified significant challenges teachers face in implementing LCT, including overcrowded classrooms, lack of resources, and learners' lack of motivation. Considering the above findings, the study recommends that the government and stakeholders support teachers with resources and further staff development opportunities.

Keywords: learner-centered teaching, learner-centered methods, teacher-centered methods

Introduction

Non-implementation of learner-centered teaching (LCT) in Namibian schools is a cause for concern despite several studies on effective teaching and learning across the globe, all concurring that LCT and learning teaching approaches promote active learners' participation and involvement in the whole teaching and learning processes of mathematics education (Ahmed, 2013; Awe & Kasanda, 2016; Bhusumane & Nkhwalume, 2019; Cain, 2020; Katukula, 2018; Ramlia et al., 2013).

LCT focuses on the learners' experiences, perspectives, backgrounds, talents, interests, capacities, and needs. It helps to create a learning environment conducive to learning and promotes the highest levels of motivation, learning, and achievement for all learners (Weinberger & McCombs, 2001). However, despite the clear benefits of LCT and efforts by governments across the world towards the adoption of the implementation of LCT in schools, research studies indicate the absence or minimal usage of LCT and poor classroom practice in most mathematics teaching (Awe & Kasanda, 2016; Bhusumane & Nkhwalume, 2019; Kapenda, 2011; Katukula, 2018; Mungoo & Moorad, 2015; Ndirangu, 2017). This is supported by studies done in Namibia about LCT, which revealed less practice of this teaching approach by Namibian teachers (Awe & Kasanda, 2016; Katukula, 2018).

The lack of LCT practices in schools could be due to teachers' lack of understanding of the concepts of LCT and other challenges in the teaching and learning environment. The shift from Teacher-centered Teaching (TCT) to the new constructivist teaching approach called LCT has been the challenge faced by the Namibian education system and many African countries in the implementation and application phase. In their report, Vavrus et al. (2011) state that a lack of high-quality training results in teachers teaching the way they were taught and it is difficult for them to adapt and adopt the LCT as prescribed by the Namibian learner-centered educational policy. However, Amakali's (2017) study found that teachers' misconceptions have hindered the implementation and application of LCT. These

© 2023 The Authors. Published by Innovare Academic Sciences Pvt Ltd. This is an open access article under the CC BY license (https://creativecommons.org/licenses/by/4.0/).
DOI: https://dx.doi.org/10.22159/ijoe.2023v11i4.47648. Journal homepage: https://journals.innovareacademics.in/index.php/ijoe.
Acknowledgment: The authors would like to thank all the research participants who participated in the study and the schools where these participants are teaching. **Authors' Contributions:** All the authors contributed to the design and implementation of the research, the analysis of the results, and the writing of the manuscript. **Conflict of Interest:** There are no conflicts of interest in this research. **Funding Source:** Nil.
Correspondence concerning this article should be addressed to Kelvin Mubiana Katukula, Social Sciences Division, Centre for Research Services, University of Namibia, Windhoek, Namibia. **Email:** kkatukula@unam.na

misconceptions include teachers relinquishing their responsibilities for teaching, discipline, and care of learners and teachers interpreting LCT as group work, pair work, and individual work (Awe & Kasanda, 2016; Katukula, 2018). Therefore, this study investigated teachers' understanding and level of learner-centered practice in mathematics teaching.

Studies done in Namibia on educational reform after independence are on the perceptions and practice of LCT in schools and teacher education. Many interviews and classroom observations have been conducted (Arreman et al., 2015) (Zeichner & Dahlström, 2000). According to a study by Awases (2015), one common theme which seems to be emerging from them all is that teachers are familiar with the term "learner-centered" but tend to understand it rather superficially in terms of classroom methodology, such as group work.

The use of LCT in teaching and learning is significant, especially in teaching mathematics. Mathematics is a practical subject amenable to LCT where learners can take active roles in teaching and learning. However, despite proven and researched studies, there is a concern over the rate at which LCT is used in schools. The other concern relates to the practice of LCT regarding teachers' knowledge and practice of LCT. However, the shift toward LCT in Namibia education is not without problems. One of the main reasons stems from the Namibian education system being rooted in a traditional philosophy of learning influenced by Confucianism (Nguyen & McInnis, 2002; Pham, 2010), in which teachers are considered knowledge providers and learners are receivers of such knowledge. As a result, progress toward the adoption of learner-centered methods of teaching by teachers has been slow. Van and Harrison (2013) observed that LCT methods have a long way to go and are not progressing as expected.

Research has consistently demonstrated that LCT practices are more effective than traditional teacher-centered approaches (Weimer, 2013). However, changing from the teacher-centered approach requires conditions for implementing LCT. One such requirement is the provision of adequate resources for teaching and learning, which is not the case in the Katima Urban circuit. Another requirement is the teachers' knowledge and attitudes toward implementing LCT. In this research study, the researcher argues that the inability of public schools to adopt LCT deprives learners of such communities of one of the fundamental human rights, which is quality education based on inquiry-based and problem-solving teaching approaches. Therefore, this study's underlying research problem was to investigate the teachers' knowledge, attitudes, and practices of LCT in teaching mathematics in Katima Urban schools.

Learner-Centered Teaching

The definition of LCT is subjective and argumentative because learner-centeredness complies with various approaches that encompass an active role of learners in their learning. Hence, Pedersen and Min (2003) reiterated that various approaches fit beneath the umbrella of learner-centered learning, but there is no specific definition. LCT also stipulates that the focus of teaching and learning should be the learner. However, the one shoe fits all approach used in the teacher-centered approach does not consider individual learners' unique learning needs. Thus, according to Otukile-Mongwaketse (2011), teachers should always provide various opportunities to cater to learners' diversity, and an appropriate blend of teaching and learning resource materials should be provided. However, this must be matched with providing educational resources to match the demands of implementing the newly introduced LCT curriculum.

Namibia's education systems have adopted LCT to teaching since the education reform of 1996 and assume that learners learn best when actively involved in the learning process through a high degree of participation, contribution, and production (NIED, 2016). Therefore, in practice, the teaching strategies used by teachers must be varied and flexible within well-structured sequences of lessons (NIED, 2016). From the above definitions, one can conclude that the LCT approach considers learners' needs in developing teaching plans and promotes learner participation, and the teacher takes a facilitation role.

Teachers' Understanding (Knowledge), Attitude, and Practice of LCT

Teachers' beliefs and attitudes towards learner-centered learning are fundamental in ensuring that the aims of the curriculum are achievable. However, according to research studies conducted in Thailand by Nonkukhetkhong et al. (2006), Prapaisit de Segovia and Hardison (2008) found that due to a lack of knowledge of LCT, teachers tend to implement it as they understood it. This could be due to various reasons, such as teachers' confusion about what was expected from the curriculum (Tudor, 1996) or contextually inappropriate approaches imposed on the teachers (Holliday, 2006).

Interestingly, according to Kumaravadivelu (1991) and Nunan (1989), the curriculum specifications and what teachers claimed took place in their classroom might be far from reality in actual classroom practices. Amakali (2017) reiterates that since LCT is based on active learning and requires learners to play more active roles during the teaching and learning process, this definition is misinterpreted mainly by Namibian teachers as they tend to think that a learner-centered classroom, learners should take full responsibilities of all the classroom roles in the teaching and learning of mathematics. In the Malaysian teaching context, Ali (2019) found that over-emphasis on examination results, minimum exposure to the target language, and teachers' lack of English language proficiency and training inevitably led the teachers in his study to abandon altogether the learner-centered principles behind teaching envisaged in the curriculum. Regarding LCT, Nsengimana et al. (2017) observed that LCT was limited to oral questioning, group discussion, and experimentation or doing exercises. Their study concluded that teachers' knowledge and skills regarding the learner-centered pedagogical paradigm were limited.

The Namibian education system has been experiencing similar challenges since the inception of the LCT policy in terms of application and implementation, according to studies by Amakali (2017), Awe and Kasanda (2016), Kapenda (2008), and Katukula (2018). Amakali (2017) added that the main challenge was Namibian teachers' lack of understanding of learner-centered education. In her recommendation, Amakali (2017) calls for a re-launch of LCT in teacher education, particularly teacher-training institutions, for the country to have a renewed focus on how this teaching philosophy should be applied in the classroom situation if quality education is to be attained. Amakali (2017) further reports that Namibian teachers do not sufficiently understand social constructivism, which underpins the Namibian education system. Amakali also suggested for implementation of LCT methodologies (teachers as facilitators of learning and learners as creators of knowledge) that can bring about a new paradigm shift in teachers' and learners' perceptions about their roles and responsibilities in a learner-centered classroom, and hence the need for this study to investigate teachers' understanding, practices and their roles in a learner-centered mathematics classroom.

Various studies which were carried out on the attitudes of teachers on the application of learner-centered learning indicated that there were situations where the teachers might think that they were using learner-centered approaches, but they were still using teacher-centered pedagogy (Ebert-May et al., 2011). According to Weimer (2013), most classroom observations showed that teachers continued to be lecture-focused even after attending workshops on the learner-centered method. Darsih (2018) reports that learners have intellectual abilities of different levels (i.e., slow learners, average learners, and above-average learners), and each learner is unique. Darsih further proposes that teachers need to provide a variety of teaching methods/approaches that accommodate learners' differences which promote cooperative learning, and these include group work, not as transmitters of knowledge to learners. As Darsih (2018) cites, Li states, "LCT is not learning without teachers, but it starts with the teachers." It is clear from the above citation that LCT does not mean a teacher should relinquish his/her teaching roles to learners.

Learner-Centered Teaching and Mathematics

Kapenda (2011) states, "LCT is a philosophy that underpins much of what is regarded as good practice in Mathematics teaching

and learning." Jaworski (1994) and Ernest (1994) claim that mathematics allows learners to construct their knowledge and understanding. Jaworski (1994) further cautioned that teaching Mathematics is difficult, mainly if it is based on a constructivist perspective. The LCT sees a learner as an active participant in learning and a teacher as a facilitator of learning. Learners are not viewed as empty vessels but as active participants in the whole learning process, and problem-based learning is highly promoted. The classroom instruction should be more problem-based for learning to be more learner-centered.

Many scholars of the mathematics education research community continue to reveal that doing mathematics or learning mathematics in LCT should be based on problem-based learning. According to Roh (2003), problem-based learning is a classroom strategy that organizes mathematics instruction around problem-solving activities. It allows learners to think critically, present creative ideas, and communicate mathematically with peers. Rather than seeking a correct answer, learners interpret the problem, gather needed information, identify possible solutions, evaluate options, and present conclusions. Proponents of mathematical problem-solving insist that learners become good problem-solvers by learning mathematical knowledge heuristically (Roh, 2003).

Ali (2019) asserts that a learner-centered approach embraces teaching where real-life problems are selected as learning tasks that facilitate teaching and learning. Therefore, it can be concluded from Ali's work that LCT in the Mathematics classroom approach should embrace a problem-based learning environment. This is also supported by a qualitative study by Ramlia et al. (2013), who outlined some teaching approaches that can increase/stimulate in-depth learning in the teaching of secondary mathematics. These include fun learning, effective communication; problem-based instruction; constructivist approach; real-life application; technology-integrated learning, and learner-centered learning.

Learner-Centered Teaching Methods

Schreurs and Al-Huneidi (2011) assert that LCT in teaching should be based on the constructivist instructional model, which revolves around the following five learning principles:

1. Engage: Learners should be engaged in the concept, process, or skill(s) to be learned.
2. Explore: Learners should actively explore their environment or manipulate materials.
3. Explain: Learners should experience opportunities to verbalize their conceptual understanding or to demonstrate new skills or behaviours.
4. Elaborate: Practice skills and behaviours result in deeper and broader understanding.
5. Evaluate: To assess learners' understanding abilities.

The following LCT methods have been collectively used to teach learners over the years. These methods embrace the basic tenets of the LCT method.

Problem-Based or Inquiry Learning

Problem-based or inquiry learning consists of activities where learners collaborate to solve problems. Problem-solving requires various sub-skills that can be coordinated through goal-directed collaboration among learners. Problem-based learning is often used in classes that lend themselves to laboratory or small group work but has also been adapted for large classrooms (Oliver, 2007).

Experiential Learning

Experiential learning refers to a mode of learning in which learners construct knowledge and skills through direct action, experience, and reflection (Estes, 2004). From this view, the role of an educator is to provide the experiences from which learning can occur through active reflection. Experiential learning originates in Dewey's (1938) inquiry-based approach to learning. Although experiential learning is often practiced in applied community settings, such as internships, community service, and fieldwork, it can also be used in classroom settings (Wurdinger, 2005).

Participative Learning

Participative learning involves allowing learners to play an active role in the structure and content of courses and learning activities. For example, in collaboration with a teacher, learners may design course syllabi, identify course assignments, create learner assessment devices, and even grade (Simkin, 2005; Wingfield & Black, 2005).

Collaborative Learning

Collaborative learning denotes goal-directed learning in small groups of learners (O'Donnell et al., 2005). These forms of learning are sometimes called peer-assisted learning, group learning, peer tutoring, and other terms.

Cooperative Learning

Cooperative learning is a unique form of collaborative learning generally defined in opposition to competitive or individualistic learning. Competitive learning occurs when individuals or groups must work in opposition to each other; individual learning consists of learning by oneself, often in a competitive context. In contrast, cooperative learning is deliberately organized through an interdependent structure in which group members must rely upon one another to perform particular learning tasks. Intentional design is an essential tenet of cooperative learning (Barkley et al., 2005). Nsengimana et al. (2017) recommended the incorporation of the teaching methods mentioned above into the curriculum, and this is also supported by Amakali (2017), who suggested that teacher-training instructors (lecturers) should also demonstrate how LCT can be applied in an actual classroom teaching situation. Amakali further noted that this would help pre-service teachers learn to teach using LCT methods.

Theoretical Framework

The framework underpinning this study is drawn from the theory of social constructivism. The framework is adapted from the model "A Conceptual Paradigm for Developing Learner-centered Spaces" (Robert, 1995). This suggests the need to move away from teacher-centered teaching approaches that are didactic, limiting, and passive modes of teaching and instead toward LCT which facilitates active, multifunctional, inspirational, and situational approaches to learning. The learner-centered paradigm represents an epistemological shift from regarding pupils as the occupants of learning spaces to pupils' actions during instructional episodes as the prime motivation for developing learning spaces.

Figure 1
Conceptual Paradigm of Learner-Centered Teaching (LCT)

Note. Adapted from "A conceptual paradigm for developing learner-centered spaces," by C. Robert, 1995, ERIC, p. 8 (https://files.eric.ed.gov/fulltext/ED395562.pdf). Copyright 1995 by ERIC.

The study emphasized implementing LCT in Namibian classrooms, especially in mathematics subjects. According to Robert (1995), in

the LCT approaches, teachers must enable learners to construct or reconstruct their knowledge, values, and beliefs and demand attention to the multiple dyadic relations inherent in an instructional episode. The conceptual paradigm recommends that teachers arrange their instructional episode/teaching strategies in terms "of the learner, the Content, the Media, the Teacher, and the Context within which teaching-learning interact simultaneously during a period, within some space."

Structural changes to these elements to suit learner-centered learning and teaching are assumed to lead to positive learner outcomes as it permits opportunities to connect the content to real life, provide opportunities for higher-order thinking as opposed to passive listening, promote greater learner-faculty and Learner interaction, increase's learner retention, improve learner's self-esteem, provides for the improvement of social interaction skills, greater acceptance of others, and a greater sense of "community" in the class, encourages alternative forms of assessment and encourages innovation in both teaching and learner involvement.

The Learner is the Focus

The LCT focuses on and promotes learners' interests and voices, providing them with opportunities to shape their learning experience. As Jacobs, Renadya and Power (2016) suggest, in a learner-centered classroom, the learner becomes more active in learning activities and thinking about and shaping their learning. In addition, the personalization of learning recognizes that learners engage in different ways and places. As a result, learners tend to benefit from individually paced, targeted learning tasks that formally assess existing skills and knowledge and that address the learner's needs and interests.

Content

LCT views learners as active agents who bring their knowledge, past experiences, education, and ideas, impacting how they take on new information and learn. This is supported by Piaget's theory which suggests that children form and gain knowledge based on their own experiences through equilibration. According to D'Mello et al. (2014), cognitive equilibrium is usually restored afterthought, reflection, problem-solving, and other effortful cognitive activities. These outcomes that cognitive equilibrium offers are compatible with the learner approach as it encourages learners to engage in learning instead of memorizing facts without understanding the knowledge. LCT, therefore, generates intellectual growth that creates independent thinkers and learners.

Media (Information Communication Technology)

Technology allows teachers to use learner data to form intervention and enrichment groups and flexible grouping for dynamic small-group instruction (Technology, 2017). Technology also creates a blended learning environment that creates efficiencies that free up classroom time for collaboration, experiments, demonstrations, and project-based learning. Technology also offers powerful tools for collaboration. In a learner-centered model, the ability to offer ongoing and meaningful feedback is essential, and lastly, gaining proficiency with technology and various tools also helps learners develop unique skills. A study by Mizuko et al. (2008) indicated the development of learners' information management and problem-solving skills and their use of meta-cognitive strategies for self-regulated learning.

The Teacher

Teaching is one of the most complex human endeavors imaginable, partly because teachers arrange content information, determine the appropriateness of available resources, and judge the people involved. The role of a teacher in LCT is to act as facilitator and guides, provide anytime, anywhere, and on-demand support, embody core values that support deeper learning, truly encourage learners to drive their learning, create real-world and authentic learning experiences, leverage technology to personalize learning, commit to professional and personal growth (Devika, 2021). The teacher's adoption of a teaching style depends on the teacher's beliefs, past training, and teaching experiences. Therefore, teachers must move to contemporary constructivist teaching approaches that empower learners (Chin'anga, 1999).

Purpose of Study

The study aimed to investigate teachers' understanding and practices of LCT in teaching mathematics education in a few selected junior secondary schools in the Zambezi region of Namibia.

Research Questions

The following research questions guided the study:

1. What are mathematics teachers' understandings of LCT concepts and LCT methods?
2. How do mathematics teachers implement learner-centered methods of teaching in the classroom?
3. What problems do Mathematics teachers face in the use of the learner-centered methods of teaching in the classroom?
4. What are the teachers' suggestions for improving LCT methods?

Methodology

Participants

The population for this study was full-time junior secondary mathematics teachers from four selected schools in the Katima Mulilo urban circuit, Zambezi region of Namibia. The Katima Mulilo urban circuit is an urban area, and the researcher had access to the schools, and most of the teachers were accessible as they all live within the town. The sample size was 20 participants chosen from four schools in the Katima Circuit. Nieuwenhuis (2007) defined sampling as "the process used to select a portion of the population of the study." The sampling approach was purposeful because purposive sampling decisions aim to obtain rich data sources for addressing the research questions. The sampling frame constituted qualified teachers with teaching experience of not less than 5 years and with a minimum Bachelor of Education honors degree.

This study used purposive sampling because our goal was to obtain data from experienced mathematics teachers. Of the many purposeful sampling strategies, criterion sampling Nieuwenhuis (2007) was most appropriate for selecting participants for this study. In criterion sampling, a predetermined criterion informs the selection of the participants. As a result, in selecting the participants in this study, we considered Junior Secondary School Teachers from Katima Mulilo Circuit in the Zambezi region, teaching mathematics in any of the grades Eight to Nine. Therefore, the study sample comprised teachers who have taught in Junior Secondary Phase for at least five years. We were convinced that these teachers were potentially rich sources of information for answering the research questions. The sample of 20 mathematics teachers from this phase was chosen to provide a broader understanding of the phenomenon. 5 teachers were chosen from each school.

Instrument

The researcher used an interview guide to obtain more data on the topic under study, learner-centered education. The teachers from each selected school in the Katima Urban circuit, Zambezi region of Namibia, had a face-to-face interview to obtain participant data. The face-to-face interview probed more on teachers' views regarding LCT and their roles in teaching mathematics education. In addition, teachers had an opportunity to share their experiences and challenges in implementing a LCT policy. The researcher used a semi-structured interview schedule and electronic recording equipment with the selected teachers to obtain data about their views and perspectives on the application and implementation of the LCT policy. The interview guide was based on the main research themes or research questions. The main questions related to the study research questions are the teachers' knowledge of LCT and learning, their views /understanding of LCT and learning, and the teachers' practices in mathematics classes.

Data Collection

The data collection instrument was a one-to-one qualitative interview of the participants. The researcher recorded the interviews using a Voice-recorder and transcribed the recordings verbatim. The data collection process began by seeking permission to carry out the study. The first permission letter was sent to the Regional Director to seek approval to conduct a research study in schools within the jurisdiction. The second letter was addressed to school principals to seek permission to conduct the study in their respective schools. In the letters, the purpose of the study was explained to both school principals and participants. The researcher maintained high standards of professional conduct and intellectual honesty. The participants consented before engaging in any form of participation in the study and were at liberty to withdraw at any time they felt so.

The researcher visited each of the schools selected, made a formal introduction, and explained the purpose of the visit. The school administration was then given time to identify a convenient time to facilitate the interviews. Permission was granted, and the researcher personally facilitated the interviews with the schools. The researcher spent time at each school involved in the study and was involved in all the proceedings of data collection. The teachers were interviewed outside their regular teaching hours. Instead, the participants were interviewed at their respective schools, which the researcher visited after making necessary arrangements with the school administration. The interviews were conducted in the teachers' offices to ensure privacy and confidentiality.

Data Analysis

The researcher created themes and codes from the transcripts and completed the data analysis. According to Cooper & Schindler (2003), data analysis involves developing summaries and looking for a system. O'Leary (2004) adds that the process of qualitative data analysis involves the use of inductive (discovering) and or deductive (uncovering) reasoning to generate and interpret relevant themes to achieve meaningful understanding. In this study, the variables influencing teachers' understanding, attitudes, and practice of LCT approach as understood by the respondents have been contextualized within literature and synthesized into the report to give an overall picture of the research problem.

Data were arranged in terms of research objectives. These included themes such as Mathematics teachers' understanding, attitudes, and practice of the concepts of LCT and the Challenges Mathematics teachers face in the use of the learner-centered methods of teaching in the classroom and strategies that can be used to mitigate challenges affecting the effective use of the learner-centered methods of teaching in schools. Data collected with a voice recorder was transcribed to internalize respondents' answers and ponder how they should be synthesized and incorporated into the research report. Creswell (2003) contends that qualitative research must simultaneously process data collection and analysis. Therefore, while transcribing from the voice recorder, the researcher simultaneously made notes based on respondents' answers which were later used to analyze data qualitatively.

Transcription allowed the researcher to write data in a conversational dialogue reflecting the views of the respondents and the interviewer. Although, according to O'Leary (2004), qualitative data can be explored for the words used, in this study, the researcher manually did data analysis as the research is qualitative, and the quality of words is significant in reaching deductions. An aspect of data analysis may entail using respondents' wording, as Creswell (2003) advocated. The researcher paraphrased respondents' wording to conform to the research style. Finally, the participants' views are presented verbatim as the findings to interpret past studies and relevant literature.

Results and Discussion

Respondents were asked to indicate their ages. Table 1 provides their responses. The age range of the respondents was between 25 and 45, as shown in Table 1. Most 75% of the respondents were below 40 years, while the remaining 25% were 41 years and above. The age of the teachers may have a bearing on the teacher's use of LCT methods. Government Gazette of the Republic of Namibia (1999) pointed out that some older teachers may not have adequate skills to use LCT methods because they were trained when teacher-centered methods were the order of the day.

By age, most respondents were trained as teachers after independence in 1990, meaning they were trained after the learner-centered curriculum or paradigm had been introduced into the teacher training colleges (Van Graan, 1998). Hence, they were expected to be able to use the LCT method in the classroom.

Respondents were asked to indicate their teaching experience. Table 1 shows their responses. The participants included teachers with varying years of teaching experience, specialized in teaching mathematics education, and graduates from various universities and teacher training colleges. The participants' years of teaching experience they were ranged from eight to twenty years, with 85% having more than ten years of teaching experience and 15% having eight to ten years of teaching experience.

The number of years in the teaching service could have a bearing on one's knowledge and practices of LCT methods. However, 85% of the respondents had taught for at least 11 years. This implies that these individuals were more or less newly trained teachers (in independent Namibia) who could have been exposed to LCT methods. Hence, they were expected to be able to use the LCT method in the classroom. However, the Government Gazette of the Republic of Namibia (1999) pointed out that in some schools, newly trained teachers were discouraged from using LCT methods by their principals who did not understand them.

On the other hand, among the 4 participants with 16 to 25 years of experience, 2 representing 10% of the respondents, had been teaching for over 20 years. This implies that these individuals could have been trained as teachers before independence in 1990 when teacher-centered teaching methods were the order of the day. However, the Government Gazette of the Republic of Namibia (1999) observed that some older teachers did not have adequate skills to use LCT methods.

Table 1
Demographic Characteristics of Respondents

Demographics		Frequency	Percentage
Gender	Men	12	60
	Women	8	40
Teaching experience	5 -10 years	3	15
	11 - 15 years	13	65
	16 - 25 years	4	20
Age	25-30	3	15%
	31-40	12	60%
	40-60	5	25%

Highest Professional Qualifications

Table 2
Responses on Teacher's Highest Professional Qualification

Highest professional qualification	Frequency	Percentage
Basic education teachers' Diploma (BETD) and an advanced certificate in Education (ACE)	17	85%
Bachelor of Education Honours degree (B Ed Honours)	1	5%
Master of Education (M Ed)	2	10%
Total	20	100%

Respondents were asked to indicate their highest professional qualification. Table 2 shows their responses. All the participants had professional teaching qualifications. 17 participants (85%) held a Basic Education Teachers' Diploma (BETD) plus Advanced Certificate in Education (ACE) as their professional teaching qualifications and 2 participants 10% held a Master of Education (M Ed) as their highest professional teaching qualification, and 1

participant 5% holds a Bachelor of Education Honours Degree (B Ed Honours) as the highest professional teaching qualification. Teachers who participated in this study are employed full-time and are professionally qualified teachers.

Therefore, by their qualifications, these individuals were expected to know LCT to teach because it had been incorporated into the curriculum of the teacher training colleges (Van Graan, 1998). LCT to teaching has developed into a significant part of in-service training in the form of workshops at regional and national levels, cluster workshops within regions, subject meetings, and classroom demonstrations for the benefit of teachers who might not have been exposed to it during their training (Van Graan, 1998). In light of this, teachers exposed to LCT methods should know the learner-centered methods of teaching and be able to use them in their classrooms.

Results Analysis by Research Questions

Research question 1: What are mathematics teachers' understandings of the concepts of LCT and LCT methods?

In order to respond to this question, themes were developed, including collaboration (role of both teacher and learner), benefits of LCT, and how LCT affects learner motivation. The primary theme from the data was teachers' experiences and understanding of LCT. This theme was divided into three sub-themes: understanding LCT, the collective role of teachers and learners in the teaching and learning process, and the benefits of LCT and learning. Understanding LCT in total, participants revealed that they understood LCT as teaching places the learners at the center of the teaching activities, involves various teaching methods, and assists all learners equally.

The first sub-theme dealt with collaboration between teachers and learners while implementing LCT. For example, one participant said, "Strategies such as asking questions, solving problems together, and participating in discussions are important." Twelve percent of participants claimed that "LCT is the involvement of learners throughout the lesson whilst the teacher acts as a facilitator." Four percent of participants agreed that collaboration in the form of what, how, and under what circumstances students learned was the main focus of LCT.

From the participants' remarks, it became clear that respondents were aware of the importance of LCT in terms of definitions of the concept, teaching methods, and strategies, as highlighted in the theoretical framework. This can be linked to Piaget's principle that teaching methods play a crucial role in constructing knowledge.

Furthermore, this is evident from the teachers recognizing learners' participation and collaboration during lessons and the need for learners to be actively involved in their knowledge construction. This aligns with one of the principles of Vygotsky's constructivist learning theory, as he emphasizes social interaction and collaboration (Vygotsky, 1978). However, no participant mentioned that LCT involved teaching learners how to think, solve problems, evaluate evidence, analyze arguments, or generate hypotheses which are all learning skills crucial to mastering material in a discipline (Weimer, 2012). In addition, LCT focuses on learners' talents, interests, capacities, and needs (Seel, 2012). According to the constructivist learning theory, learners' knowledge construction depends, inter-alia, on their experiences, talents, beliefs, values, and reflection – aspects that should form the basis of LCT(Semple, 2000). According to research by Mtika and Gates (2010), policymakers and teacher training institutions need to be aware of the previous result, and teacher training institutions need to find appropriate solutions and feasible revisions to ensure that learners benefit from the advantages of learner-centered pedagogy.

The second central theme from the data was teachers' responses to LCT benefits. Again, this was divided into personal and individual attention and motivation. All respondents agreed that learners understood better when receiving personal and individualized attention. In their view, this was invaluable for learners. A common remark was that learners' "cognitive, emotional, physical development [is] promoted." One participant stated that LCT"develops learners to their maximum potential and caters to both the high achievers and those who experience learning difficulties." Respondents also pointed out that LCT addressed the individual needs of all learners. One participant argued that "it allows teachers to spot problem areas in the teaching and learning process." Most respondents testified that LCT entailed giving individual learners more opportunities and creating learner self-efficacy as indicated by one teacher."

Research question 2: How do mathematics teachers implement LCT methods in the classroom?

When asked whether they were learner-centered or teacher-centered, most of the teachers claimed to be learner-centered, while 10% indicated that they were teacher-centered, and the rest, which is 45%, indicated that they were both teacher-centered and learner-centered, depending on the situation. The use of LCT by teachers plays an essential role in the process of self-learning, encouraging a deeper understanding and promoting higher thinking skills. LCT approaches include the use of group work.

Teachers who described themselves as learner-centered indicated that their teaching practices in terms of activities included group work and group discussions. When asked why he thinks it is learner-centered, PT18 said:

> Learner-centered educator, especially in mathematics, because there is no way you can teach on your own and the learners are not practicing or doing the activities themselves. So I usually give a short example, then I give them work, whether they do it individually, one or two, to see if they are getting through or with me. So, whatever I explained, I would say it is learner-centered. Because mostly it is not easy for mathematics to teach like a content subject, and then you leave. So, it will force them to do practically to see whether they understand even if they do not write. So just by responding, you go along with them. You ask questions they answer. You are also with them while you are doing it, you can be standing in front, but then the questions will be on them to answer. What do we do next? What do we do next? So, they are the ones doing it.

When asked about the teaching methods, all teachers indicated that they used group work. According to Brown (2001, p. 177), group work is a generic term covering a multiplicity of techniques in which two or more students are assigned a task that involves collaboration and self-initiated language. On the other hand, Richards et al. (1985, p. 127) define group work as a learning activity involving a small group of learners working together. In conclusion, an effective teaching strategy is group work, an LCT approach that facilitates learning by sharing, responding, and communicating with other students. The term group work was generalized by teachers as the primary teaching method. Group work teaching methods include a game, role play, project, information gap, jigsaw, think pair and share, debate, inquiry, prioritizing, and fishbowl. Responses by teachers showed that they used group work-related strategies, as indicated by the response by PT2:

> I usually use, in most cases, group work. In this group work, I usually ensure that I mix the learners in their competencies. So, in a way, I will know that in one way or the other, cooperative learning will be applied in that group work because they are going to learn from one another. Moreover, those who know they will coach those who do not know who is a bit behind in how peer coaching will be applied.

This was echoed by PT1, who described his teaching approach as learner-centered and used group work. When describing the classroom activities in classroom PT1 indicated the following:

> Okay. The class is set up so that students sit in pairs or groups with a leader or organizer who can ask for input on a question or provide something that will encourage everyone to participate, put up the effort, and provide feedback at the end.

This description indicated elements of LCT activities similar to group work. The responses indicate that teachers know the LCT approach's benefits and engage in LCT practices. Teachers indicated that they only acted as facilitators in class to help promote learners' use of their experiences and relate them to their learning. According to (Lim Ernest, 2014), learning is more meaningful for learners to relate their experiences to the new knowledge. Lim Ernest (2014) further states that the student-centered learning approaches also enhance the development of critical and analytical thinking skills that seem to be better developed than in the traditional setting (Brown, 2001).

However, most teachers were indifferent or unsure which method they used most and preferred. They indicated that they used both methods depending on the situation. For example, PT1, when asked, stated that:

> Resources are a critical component of the learner-centered approach, which is now implemented as one of the most successful strategies we can employ, especially when this epidemic strikes us. I will say that I am, I am both, depending on the situation where you find yourself. So, learners can because a learner-centered approach will empower them to study and do things independently. However, given the situation when learners are back at school, for you to cover enough content unless you resort to a teacher-centered approach so that you carry out the task that is at hand, is the syllabus that is in backlog from COVID-19 when it started, so we want to facilitate or teach with the learner-centered approach. However, sometimes situations dictate that we switch to a teacher-centered approach to cover enough work. However, we practiced a teacher-centered approach in 90% of teaching, the other 10% because of the situation, and you resorted to teacher-centered helping where understanding was lacking in case the instruction for the learner-centered approach was not very clear.

The responses from teachers indicated that they practiced LCT most of the time. However, most teachers shifted between LCT and TCT over time depending on the class size, topic, time, and learner abilities. The assessment of teaching practices employed by teachers is comparable to studies that found that, although teachers using LCT practices the majority of the time, they were still not putting all of its components into practice, including involving students in the evaluation of their work and creating lesson plans.

Research question 3: What challenges do mathematics teachers face in using LCT methods in the classroom? Challenges facing teachers concerning LCT, two sub-themes were identified from the analyzed data. The two sub-themes were consolidated as challenges in the classrooms where the participants practiced teaching. These challenges included learner-related problems (disciplinary problems and learner abilities) and a lack of resources.

All the participants agreed that classroom discipline remained a concern. They explained that they could not control the learners who disrupted classroom activities, so no learner support could be given. Even assessment was not always possible. The learners kept talking, laughing, walking around aimlessly, and making noises, even after being warned that such behavior would not be tolerated. One participant testified "I cannot imagine LCT in classrooms, as my mentor teachers all agree that they all experience out-of-control behavior of learners."

A second challenge, identified by all 20 participants, was teaching in overcrowded classrooms. The participants agreed that when a classroom has many learners sitting close to one another, the chatter becomes loud, and everyone has to shout to be heard. One participant declared, "Even the best teaching strategies have no effect in overcrowded classrooms."

On the other hand, another participant was convinced that LCT could only be successful in classrooms with fewer learners. The participants maintained that overcrowding impacted teaching negatively because individual problems could not be addressed in such conditions, especially in public schools. The above participant's responses reveal that teachers struggled to teach in overcrowded classrooms and that learner numbers usually determined the choice of teaching strategies, of which LCT was not one. For example, in one study reported in the literature, the participants indicated they were intimidated and unable to deliver satisfactory academic results (Imtiaz, 2014). Furthermore, under the constructivist learning theory, learning is rooted in making sense of real-life situations, such as LCT. Therefore, the mentoring teachers receive during their years of training should empower them to build knowledge of and tactics to instill discipline and manage overcrowded classrooms for LCT to come to life.

Time constraint was one of the challenges 51% of the respondents mentioned. The respondents mentioned that LCT was time-consuming. One participant admitted that she could not accommodate the LCT method due to time constraints. Another confirmed this by adding, "I cannot present my lesson on time if I pay attention to every learner in the classroom."

This finding links to the previously mentioned finding about disciplinary problems and overcrowded classrooms. Due to overcrowding, learners become unmanageable, and it is virtually impossible to enforce discipline. Chiphiko and Shawa (2014) also found that these issues were hindrances to LCT. Mtitu (2014) also reveals that facets such as the social context in LCT, teacher-learner relations, and the nature of the curriculum influenced LCT.

Learner-related challenges are related to the learners' poor command of the English language, which is used as means of teaching and learning. For example, one teacher indicated that one of the challenges included poor communication due to poor English skills. PT19 stated, "some of the challenges you will find are that some learners are too shy to present. In addition, some of the learners cannot be able to express themselves in English."

Another challenge related to learners is learners' lack of motivation to learn. PT8 had this to say concerning learner motivation:

> Yes, as I have stated earlier, here are our learners. I can say I do not know whether or not they know why they come to school. I do not know. Nevertheless, we find it hard because they do not want to do anything.

Regarding teaching learners with different abilities, one teacher indicated that he used remedial classes, peer tutoring, and group work to assist slow learners, although he lamented time constraints. On the other hand, PT17 indicated that differentiated teaching required more time:

> So, it takes time. However, the other part is that it does not only need one approach. It sometimes needs compensatory teaching, and remedial teaching will also be involved there because you still need to check around and see those dragging behind and then focus on them as the lesson continues.

Most teachers indicated that most learners have poor understanding and comprehension of mathematics, attributed to a negative attitude and poor mathematical background. In addition, they indicated the lack of basic mathematics concepts and lack of participation. PT11 stated that when asked about challenges in using LCT:

> Sometimes it is difficult. You try to ask learners. Sometimes they can have positive ideas, but the problem is that some learners are always scared of participating fully simply because they are shy. They fear these friends may laugh at me if I say.

Research question 4 scrutinized what can be done to use LCT methods effectively. Regarding suggestions or recommendations to mitigate implementation challenges, teachers made the following challenges and recommendations, as captured in Table 3 below.

Table 3
Challenges the Respondents Face in Implementing the Learner-Centered Method of Teaching and the Recommendations They Made During the Open-Ended Interview

Challenges	Recommendations
Lack of Resources	
Time constraint	a) Monitor and provide support to learners. b) Manage time more effectively. c) Organize extra lessons to cover the syllabus. d) Give limited time to learners to do their class
Teaching materials and resources.	a) Improvise and use practical examples for learners to visualize. b) Do more demonstrations, case studies, role play etc.
Learner Related	
Learners lack self-confidence.	a) Motivate and encourage passive learners to participate. b) Move around the classroom, point at shy learners to participate, and give learners an individual task. c) Give shy learners leadership positions such as group leaders. d) Identify the capable learners to do activities in the class.
English language barrier	a) Correct learners' use of English without embarrassing them. b) Use of simple words learners can easily understand.
Learners' lack of knowledge and reluctance to participate	a) Give learners more responsibility in doing more reading. b) Review the teaching method and make it more interesting. c) Give learners a copy of the syllabus to familiarise themselves with the aims and objectives of the curriculum.
Learners with different abilities	a) Give remedial lessons to learners with learning difficulties. b) Use a differentiated learning approach.
Discipline and lack of control of learners in overcrowded classes.	a) Monitor learners' activities and tell them to keep quiet.

Significant Findings of the Study

1. Teachers understand the LCT approaches adequately due to the inclusion of learner-centered concepts in the training curriculum. Findings indicate that 73% of participants understood LCT as a teaching method in that learners are at the center of the teaching activities and that it involves using a variety of teaching methods that facilitate learner participation and involvement, taking into consideration different learning needs of learners. Findings also indicate that teachers understood the benefits of LCTs, such as giving learners a greater insight into learning content, stimulation of different aspects of development, improved performance, motivation, and feelings of trust and value.
2. Teachers indicate that they engaged in LCT and used group work and cooperative learning as typical methods. According to teachers, cooperative learning involves active learning through involvement, thus allowing learners to solve problems, answer questions, formulate questions of their own, discuss, explain, debate, or brainstorm during class. As a result, all teachers identified cooperative learning as a standard method.
3. All the participants agreed that classroom discipline and control were a problem and were mainly due to overcrowded classrooms. Participants agreed that despite their eagerness to implement LCT, challenges due to the high learner-centered ratio made it difficult to use learner-centered methods that required more time and resources. 51% of respondents indicated that time was one of the challenges, as LCT was time-consuming. Emphasis on meeting individual learners learning needs is one of the tenets of LCT. However, with a large number of learners in public schools, this is not possible.
4. Findings indicate that the government must support schools and teachers with sufficient resources to implement LCT. In addition, more classrooms and teachers must be provided to reduce teacher-learner ratios to implement LCT, and teachers need more teaching materials and improvement in their skills and knowledge as well as the use of technology.

The above results indicate a lack of practical plans in implementing government policies and the underlying reason for poor performance in Namibian schools, not only in mathematics. Therefore, the government must strive to improve the quality of education by investing more in school infrastructure, teacher training, and teaching materials.

Conclusion

Based on the findings, it could be concluded that mathematics teachers have enough training and knowledge on the benefits and teaching approach of LCT due to the inclusion of LCT methods in teacher education and other training workshops. Findings also indicate that most teachers used some LCT methods during their teaching. However, although they indicated learner-centered methods, some teachers agreed that they also used teacher-centered methods, especially in larger classes, when the concept was complex and the time was limited.

These findings indicate that LCT may be the preferred method that allows learners to control the teaching/learning process. However, they were challenges in its implementation. Such challenges were identified as overcrowded classrooms, lack of resources and time, and lack of learner confidence and ability. Further, it can be concluded that the mathematics teachers practiced LCT approaches such as cooperative learning and other inductive teaching approaches in their classrooms.

These teaching strategies were seen as being helpful to students because they allowed for interactive teaching where Math teachers responded to students' questions and occasionally let the students teach each other (peer tutoring) during the lesson. They also encouraged students to ask questions, respond to other student's contributions, and participate. Finally, it can be said that even though the mathematics teachers were aware of the concepts behind LCT, they had not yet fully embraced each of the methods in their classrooms or incorporated them into their daily work.

Recommendations

The following recommendations are made:

1. Mathematics teachers should use all the different learner-centered methods of teaching likes: including group work method, discussions, question and answer methods, independent inquiry methods, peer tutoring, practical and experimentation method, discovery method, field trips, project work, and simulations to cater to individual learners' needs and to maximize learner participation in the teaching and learning process.
2. The Ministry of Education should provide mathematics teachers with enough resources like mathematical equipment and teaching aids. This could encourage them to use various learner-centered methods of teaching.

3. A reduction in the teacher-learner ratio can maximize the time allocated for teaching Mathematics through building more classrooms and recruiting teachers, as well as the use of after-school remedial classes and, most crucial, the involvement of parents in learners' education.
4. Continuous training and development of teachers in LCT methods through in-service training and workshops. Teachers can utilize the integration of informational technology in planning and teaching.

References

Ahmed, K. A. (2013). Teacher-Centred versus LCT style. Ain University of Science and Technology College of Education. *The Journal of Global Business Management, 9*(1).

Ali, S. S. (2019). Problem based learning: A student-centered approach. *English Language Teaching. Canadian Center of Science and Education, 12*(5), 73–78. https://doi.org/10.5539/elt.v12n5p73

Amakali, A. (2017). Primary teachers' perceptions and implementation of learner-centered education in the Namibian primary classroom: A case study. *Global Educational Research Journal, 5*, 679–689.

Awases, C. (2015). *Secondary school Geography teachers' understanding and implementation of learner-centerededucation and inquiry-based teaching in Namibia* [Unpublished master's thesis]. Stellenbosch University.

Awe, G. A., & Kasanda, C. D. (2016). The perceptions and practice of LCT in Namibia. The case of Physical Science teachers in the Omusati education region. University of Namibia. *Namibia CPD Journal for Educators, 3*(1), 30-45. http://hdl.handle.net/11070/2160

Barkley, E. F., Cross, K. P., & Major, C. H. (2005). *Collaborative learning techniques: A handbook for college faculty*. Jossey-Bass.

Bhusumane, A., & Nkhwalume, A. (2019). Rhetoric versus reality of postmodernism in mathematics education: The challenges of implementing learner-centered pedagogy in Botswana General Certificate of Secondary Education Mathematics Curriculum. *Philosophy of Mathematics Education Journal, 2019*(35), 58.

Brown, D. (2001). *Teaching by principles an interactive approach to language pedagogy*. Longman.

Cain, C. M. (2020). *Understanding the use of LCT strategies by secondary educators* [Unpublished doctoral dissertation]. Walden University.

Chin'anga, L. C. (1999). *Teaching styles and the acceptance of pupils* [Master's dissertation, University of South Africa, Pretoria]. UNISA Institutional Repository. http://hdl.handle.net/10500/16501

Chiphiko, E. (2014). Implementing learner-centered approaches to instruction in primary schools in Malawi. *Mediterranean Journal of Social Sciences, 5*(23), 967–975. https://doi.org/10.5901/mjss.2014.v5n23p967

Cooper, D. R., & Schindler, P. S. (2003). *Business research methods* (8th ed.). McGraw-Hill.

Creswell, J. W. (2003). *Research design. Qualitative, quantitative and mixed methods approaches* (2nd ed.). SAGE Publications.

D'Mello, S., Lehman, B., Pekrun, R., & Graesser, A. (2014). Confusion can be beneficial for learning. *Learning and Instruction, 29*, 153–170. https://doi.org/10.1016/j.learninstruc.2012.05.003

Darsih, E. (2018). LCT: What makes it effective? *Indonesian EFL Journal, 4*(1), 33-41. https://doi.org/10.25134/ieflj.v4i1.796

Devika, P. (2021). *Learner-oriented teaching. https://devikapanikar.com/learner-oriented-teaching/*.

Dewey, J. (1938). *Experience and education*. Kappa Delta Pi.

Ebert-May, D., Derting, T. L., Hodder, J., Momsen, J. L., Long, T. M., & Jardeleza, S. E. (2011). What we say is not what we do: Effective evaluation of faculty professional development programs. *BioScience. American Institute of Biological Sciences, 61*(7), 550–558. https://doi.org/10.1525/bio.2011.61.7.9

Ernest, P. (1994). *Constructing mathematical knowledge: Epistemology and mathematical education*. The Falmer Press.

Estes, C. A. (2004). Promoting student-centered learning in experiential education. *Journal of Experiential Education, 27*(2), 141–160. https://doi.org/10.1177/105382590402700203

Government Gazette of the Republic of Namibia. (1999). *Commission on Education, Culture and Training: Application of Commissions Act, 1947 and Regulations*. Author. https://www.lac.org.na/laws/1999/2059.pdf

Holliday, A. (2006). Native-speakerism. *ELT Journal, 60*(4), 385–387. https://doi.org/10.1093/elt/ccl030

Imtiaz, S. (2014). Exploring strategies for English language teaching of Pakistani students in public sector colleges. *Research journal of English language and literature, 2*(2), 247–253. http://www.rjelal.com/2.2.14/247-253.pdf

Jacobs, G., Renadya, W. A., & Power, M. (2016). *Simple, powerful strategies for student-centered learning*. Springer.

Jaworski, B. (1994). *Investigating mathematics teaching: A constructivist enquiry*. Falmer Press.

Kapenda, H. M. (2008). *Translating policy into practice: Aspects of learner-centered classroom practices in mathematics in Namibia secondary schools* [Doctoral thesis, University of the Western Cape]. UWCScholar-ETD Repository. http://hdl.handle.net/11394/3645

Kapenda, M. H. (2011). Practices of Learner-centered Mathematics Curriculum in Senior Secondary Schools in the Khomas region. *A journal for the Namibian educational Research Association, 11*(1), 65–80.

Katukula, K. M. (2018). *Teaching methods in science education in Finland and Namibia* [Unpublished master's thesis]. University of Eastern Finland.

Kumaravadivelu, B. (1991). Language-learning tasks: Teacher intention and learner interpretation. *ELT Journal, 45*(2), 98–107. https://doi.org/10.1093/elt/45.2.98

Ministry of Education, Arts, and Culture. (2016). *National curriculum for basic education*. National Institute for Educational Development. https://www.nied.edu.na/assets/documents/05Policies/NationalCurriculumGuide/National_Curriculum_Basic_Education_2016.pdf

Mizuko, I., & Horst, H., Bittanti, M., Herr-Stephenson, B., Lange, P., Pascoe, C. J., & Robinson L. D. (2008). *Living and learning with new media: Summary of findings from the digital youth project.* The MIT Press. https://doi.org/10.7551/mitpress/8519.001.0001

Mtika, P., & Gates, P. (2010). Developing learner-centered education among secondary trainee teachers in Malawi: The dilemma of appropriation and application. *International Journal of Educational Development, 30*(4), 396–404. https://doi.org/10.1016/j.ijedudev.2009.12.004

Mtitu, E. A. (2014). *LCT in Tanzania: Geography teachers' perceptions and experiences* [Unpublished doctoral thesis]. Victoria University of Wellington, New Zealand.

Mungoo, J., & Moorad, F. (2015). Learner-centered methods for whom? Lessons from Botswana junior secondary schools. *African Educational Research Journal*, 161–169.

Ndirangu, C. (2017). Teachers' attitude towards implementation of the learner-centered methodology in science education in Kenya. *Educational Research and Reviews, 12*(20), 996–1007.

Nguyen, K. D., & McInnis, C. (2002). The possibility of using student evaluations in Vietnamese higher education. *Quality in Higher Education, 8*(2), 151–158. https://doi.org/10.1080/1353832022000004340

Nieuwenhuis, J. (2007). *Introducing qualitative research*. Van Schaik Publishers.

Nonkukhetkhong, K., Baldauf, Jr., R. B., & Moni, K. (2006). *Learner centeredness in Teaching English as a foreign language. https://www.researchgate.net/publication/37618900_Learner_Centeredness_in_Teaching_English_as_a_Foreign_Language_Teachers'_Voices*

Nsengimana, T., Sylvain, H., & Védaste, M. (2017). Mathematics and science teachers' understanding and practices of learner-centered education in nine secondary schools from three districts in Rwanda. *Rwandan Journal of Education, 4*(1), 55-68.

Nunan, D. (1989). *The learner-centered curriculum*. Cambridge University Press.

O'Donnell, A. M., Hmelo-Silver, C. E., & Erkens, G. (2006). *Collaborative learning, reasoning and technology*. Routledge.

O'Leary, Z. (2004). *The essential guide to doing research*. SAGE Publications.

Office of Educational Technology. (2017). *Reimagining the role of technology in education: 2017 national education technology plan update*. https://tech.ed.gov/files/2017/01/NETP17.pdf

Oliver, B. (2007). They cannot take a trade on you-Varying perceptions of job security over 50 years at the Midland Railway Workshops. In. In J. Kimber & P. Love (Eds.), *The time of their lives: The eight hour day and working life* (pp. 153–168). Australian Society for the Study of Labour History.

Otukile-Mongwaketse, M. (2011). *Implementing inclusive education in Botswana primary school settings: An exploration of teachers' understandings of curriculum, curriculum adaptations and learners who have learning difficulties* [Unpublished doctoral thesis]. University of Exeter.

Pedersen, S., & Liu, M. (2003). Teachers' beliefs about issues in the implementation of a student-centered learning environment. *Educational Technology Research and Development, 51*(2), 57–76. https://doi.org/10.1007/BF02504526

Pham, T. (2010). Learning approach at Vietnamese higher education institutions: Barriers under layers of casual layered analysis (CLA). *Journal of Futures Studies, 15*(1), 21–38.

Prapaisit de Segovia, L., & Hardison, D. M. (2008). Implementing education reform: EFL teachers' perspectives. *ELT Journal, 63*(2), 154–162. https://doi.org/10.1093/elt/ccn024

Ramli, F., Shafie, N., & Tarmizi, R. A. (2013). Exploring student's in-depth learning difficulties in mathematics through teachers' perspective. *Procedia – Social and Behavioral Sciences, 97*, 339–345. https://doi.org/10.1016/j.sbspro.2013.10.243

Richards, J., Platt, J., & Weber, H. (1985). *Longman dictionary of applied linguistics*. Longman Group Limited.

Robert, C. (1995). *A conceptual paradigm for developing learner-centered spaces* (ED395562). ERIC. https://files.eric.ed.gov/fulltext/ED395562.pdf

Roh, K. H. (2003). Problem-based learning in mathematics (ED482725). ERIC. https://files.eric.ed.gov/fulltext/ED482725.pdf

Schreurs, J. & Al-Huneidi, A. (2011, September 21-23). *Development of a learner-centered learning process for a course* [Paper presentation]. 2011 14th International Conference on Interactive Collaborative Learning (pp. 256-263), Piestany, Slovakia. IEEE. https://doi.org/10.1109/ICL.2011.6059586

Seel, N. M. (2012). *Encyclopedia of the sciences of learning*. Springer. https://doi.org/10.1007/978-1-4419-1428-6

Semple, A. (2000). Learning theories and their influence on developing and using educational technologies. *Australian Science Teachers Journal, 46*(3), 21–28.

Seng, E. L. K. (2014). Investigating teachers' views of student-centered learning approach. *International Education Studies*, 7(7). 143-148. https://doi.org/10.5539/ies.v7n7p143

Simkin, M. G. (2005). An experimental study of the effectiveness of collaborative testing in an entry-level computer programming class. *Journal of Information Systems Education, 16*(3), 273-280.

Tudor, I. (1996). *Learner-centredness as language education*. Cambridge University Press.

Van Graan, M. (1998). Learners-centered education: Equal to group work? *Reform Forum, 8*, 2–5.

Van Wijk, E., & Harrison, T. (2013). Managing ethical problems in qualitative research involving vulnerable populations, using a pilot study. *International Journal of Qualitative Methods, 12(*1), 570–586. https://doi.org/10.1177/160940691301200130

Vavrus, F., Thomas, A. M., & Bartlett, L. (2011). *Ensuring quality by attending to inquiry: Learner-centered pedagogy in sub-Saharan Africa*. UNESCO-International Institute for Capacity Building.

Vygotsky, L. S. (1978). *Mind in society: Interaction between learning and development*. Harvard University Press.

Weimer, M. (2012). *Five characteristics of LCT*. 1-5. https://home.miracosta.edu/rfrench/documents/effective-teaching-strateg.pdf

Weimer, M. (2013). *LCT five key changes to practice*. https://dl.icdst.org/pdfs/files3/0f6bb93d3308e7f5a279830e33485a61.pdf

Weinberger, E., & McCombs, B. (2001). The impact of learner-centered practices on the academic and non-academic outcomes of upper elementary and middle school students (ED458276). ERIC. https://eric.ed.gov/?id=ED458276

Wingfield, S. S., & Black, G. S. (2005). Active versus passive course designs: The impact on student outcomes. *Journal of Education for Business, 81*(2), 119–123. https://doi.org/10.3200/JOEB.81.2.119-128.

Wurdinger, S. D. (2005). *Using experiential learning in the classroom*. Scarecrow Education.

Zeichner, K., & Dahlström, L. (2000). *Democratic teacher education reform in Africa: The case of Namibia*. Westview Press.

Received: 21 February 2023
Revised: 11 April 2023
Accepted: 30 April 2023