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Chronicling the Experiences of Mathematics Learners and Teachers on the Usage of Guided Discovery Learning (GDL) in Enhancing Learners' Academic Performance

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ABSTRACT

South Africa has been battling with the poor performance of learners in Mathematics for a long time, with the Eastern Cape province being the worst-performing province. The Department of Education and other educational stakeholders have embarked on a journey of searching for solutions. Some of these include the use of Information communication technologies (ICT), code switching, intervention programs (IP) and the use of different learners centered approach to teach Mathematics, to mention a few. Hence, this present study investigated how the guided discovery learning strategy can be used to enhance the performance of Grade 10 learners in Amathole West district, Eastern Cape Province, South Africa. Underpinned by an interpretivist paradigm and qualitative research approach, the study employed a participatory action research. A convenient sampling technique was used to select 19 Grade 10 Mathematics learners and 2 Mathematics teachers at a rural school in Eastern Cape Province. Data were collected using interviews, observations, and document reviews and these data were analysed using thematic analysis. Research findings revealed that while some factors such as evaluation methods, time limitations, and insufficient motivation may impede the optimal implementation of Guided Discovery Learning, this instructional strategy is beneficial in the cultivation of critical thinking and problem-solving abilities, which in turn enhances mathematics learners' academic performance. Based on the findings, it was recommended that mathematics teachers should promote the utilisation of technology and multimedia resources to support learners in their visualisation and exploration of mathematical concepts in the use of GDL to enhance mathematics learners' performance.

KEYWORDS

Guided discovery learning; learning; mathematics; performance; strategy; department of education.

INTRODUCTION

Mathematics is a field of study that encompasses concepts such as numbers, formulae, structures, forms, spaces, quantities, and their transformations. It is a subject that is popular for giving a foundation of scientific and technological knowledge (Abiodun et al., 2021). Mathematics skills are important in understanding other various streams of discipline like engineering, sciences, and social sciences, including arts, and their roles also spread to business enterprises (Mazana et al., 2019). Mathematics is part of our everyday life, and children obliviously use Mathematics to arrange their environment, mostly when playing games (Şeker & Metin, 2022). Due to the importance of Mathematics in all disciplines, Mathematics is seen as a getaway to many professions. However, the performance of learners in Mathematics in South Africa is alarmingly bad, and the pass rate keeps on worsening (Kibirige & Maake, 2021; Olawale, 2022). According to Kibirige and Maake (2021), Grade 12 learners in South African schools fail to perform at the level that will give them a chance for university entry. Throughout all the investigations and research that was conducted about the poor performance of learners in Mathematics, arguably, only a few studies have come up with solutions to what teaching and learning strategies can better improve the performance of Mathematics learners in South Africa (Abari & Ikyule, 2021). However, researchers such as Said, et al. (2019) suggested the use of Guided-Discovery Learning as one of the most effective methods of enhancing learners' performance because this strategy allows learners to search for information with the assistance of their teacher. It also encourages them to be self-dependent because the teacher guides and acts as a mentor to the learners instead of spoon-feeding them. Hence, it becomes paramount to examine the experiences of Mathematics teachers and learners on the use of GDL in enhancing learners' academic performance.

LITERATURE REVIEW

The effectiveness of using GDL in enhancing the performance of learners in Mathematics

Mathematics is believed to be the most important subject in our education; hence, Mazana et al. (2019) stated that mathematics is important because it spreads to other educational streams. Despite its significance in our education, it is one of the only few subjects with a high rate of underperformance of learners. Similarly, Kibirige and Maake (2021) shared that learners fail to perform at a level that will guarantee them a chance at university entry. The causes of poor performance in Mathematics are believed to be a negative attitude towards mathematics, and a lack of Mathematics background, to mention a few (Makondo & Makondo, 2020; Khalo et al., 2022). However, in Indonesia, Pratiwi et al. (2020) argued that the main cause of the poor performance of learners in Mathematics is the lack of problem-solving skills in learners and that is precipitated by the irrelevant teaching strategies that are used to teach Mathematics. As a result, Pratiwi et al. (2020) motivated the use of teaching strategies that will allow learners to construct their knowledge and enhance their performance in Mathematics.

According to Bustos (2020), guided discovery is a strategy where a teacher provides learners with examples of a certain problem and assists the learners in finding out the rules and approaches to solving that problem themselves. Hence, GDL is seen as one of the most effective strategies that could be used to enhance the performance of learners in Mathematics. Many studies have been conducted about the effectiveness of using GDL to enhance the performance of learners in Mathematics. For instance, a study conducted by Said et al. (2019) investigated the use of the Guided-Discovery Model in Mathematics subject. The findings of the study revealed that GDL is an effective strategy that should be used to improve the cognitive ability of learners and also help them understand Mathematics quickly. Similarly, Maarif (2016) posits that GDL is effective because it improves learners' Mathematics analogical abilities. Supriadi et al. (2018) agreed with Maarif (2016) in a study that compared Project-based learning with GDL. The study's findings indicate a discernible disparity in the mathematical aptitude of students who received instruction through Problem-Based Learning (PBL) compared to those who were taught using GDL. The individuals who received instruction via GDL had a notable aptitude in Mathematics, thereby substantiating the efficacy of employing GDL as a means to augment learners' performance in this subject. As a result, the GDL approach is widely recognised for its effectiveness in promoting active learning, collaboration, and engagement within the classroom setting. This aligns with the findings of Adeniran and Lambaya (2022), who discovered that learners taught using both the traditional technique and GDL exhibited superior performance in the post-test when instructed through GDL compared to those taught using the traditional method.

According to Adeniran and Lambaya (2022), GDL is a more efficacious instructional approach. This is attributed because GDL promotes active student engagement during classroom activities, hence reducing the likelihood of errors. According to Akanmu and Fajemidagba (2013), it can be inferred that an effective approach to teaching Mathematics is to use a learner-centred and interactive instructional method. As such, educators are encouraged to employ pedagogical approaches that offer valuable learning opportunities to students, irrespective of their abilities.

Similarly, Win and Aung (2018) shared that teaching Mathematics using GDL develops higher-order thinking skills, and students get the ability to solve Mathematics problems. Furthermore, Adeliaa and Surya (2017) revealed that it is important to use GDL because it enhances problem-solving ability. GDL strategy also has the advantage of improving the performance of learners in Mathematics. The statement is cemented by Okwute (2015), who investigated the effect of the Guided-Discovery Method on the Mathematics of Low and High averted secondary school students. The findings revealed that learners from low averted levels performed significantly better. It was then concluded that GDL has the advantage of improving the performance of underperforming learners in Mathematics.

THEORETICAL UNDERPINNINGS

This study was guided by the constructivist theory propounded by Jerome Bruner in 1960. Bruner derived discovery learning theory from contemporary studies in cognitive psychology (Neber & Heinz, 2012). Bruner's discovery learning theory has two defining characteristics; the first one is the use of a learner-centred approach, where learners use existing knowledge and experiences to construct new knowledge (Johnson, 2019). The second characteristic is the amount of guidance learners should receive from their teachers. In this theory, teacher guidance emphasises building students' reasoning ability and connecting it to their everyday experiences (Johnson, 2019). A basic concept of discovery learning is that a teacher should allow learners to construct their knowledge by themselves; a teacher should only guide the learners in the right direction. Bruner suggested that teachers should provide learners with enough material to analyse so that they can derive formulas and rules and draw a deserving conclusion (Wen, 2018). Through discovery learning, the teacher gives learners a chance to become problem solvers, scientists, historians, or mathematicians. The teacher encourages learners to gain experiences by practising activities that allow them to discover mathematical concepts and principles for themselves. Furthermore, Jerome Bruner emphasises the active participation of each learner in the classroom and acknowledges the fact that children have different abilities (Johnson, 2019).

Thus, the implication of this theory to this study is in discovery learning as a learner-centred approach that allows learners to construct new knowledge using existing knowledge and their daily life experiences. The guided-discovery learning strategy is about discovering new knowledge using life experiences. It is an active approach that helps learners solve Mathematics problems independently (Kasmiana et al., 2019). Also, this theory is relevant to this study because it emphasises the role of a teacher as a mentor in the class. In GDL, the teacher acts as a mentor that guides learners into finding solutions. The teacher just gives learners directions and instructions and allows them to come up with solutions independently (Johnson, 2019).

Problem Statement

Poor performance of learners in Mathematics has been a global concern that has forced developing countries to participate in different initiatives that are meant to bring positive change (Mabena et al., 2021; Mosia & Matabane, 2022). South Africa is one of those developing countries that has embarked on the journey of searching for positive results in Mathematics. However, the problem of underperformance of learners in Mathematics persists. The poor performance of learners in Mathematics is evident in matric results for the past three years, as shown below.

Table 1 below shows the comparison of the results of gateway subjects from 2019 to 2022. The evidence of poor performance in Mathematics, as shown in the table below, revealed that the pass rate of Mathematics in 2019 was 54.6%, which declined in 2020 to 53.8%, and increased in 2021 to 57.6% and then declined in 2022 to 55%. The Mathematics pass rate has never reached 60%, as it is the only subject that is achieving below 60% pass rate.

Table 1.

Comparison of senior school learners results of gateway subject from 2019-2022

Subject Description	2019	2020	2021	2022
Accounting	78.4%	75.5%	74.7%	75.4%
Agricultural Sciences	74.6%	72.7%	75.4%	75.8%
Business Studies	71.0%	77.9%	80.5%	76.7%
Economics	69.3%	68.8%	67.9%	71.5%
Geography	80.5%	75.3%	74.3%	81.3%
History	90.0%	92.1%	89.5%	88.2%
Life Sciences	72.3%	71.0%	71.5%	71.5%
Mathematical Literacy	80.6%	80.8%	74.5%	85.7%
Mathematics	54.6%	53.8%	57.6%	55.0%
Physical Sciences	75.5%	65.8%	69.0%	74.6%

***Source**: National Senior Certificate (NSC) Examination Report 2022*

The table above indicates variations in learners' performance across gateway subjects from 2019 to 2022. Arguably, while learners excel well in all other gateway subjects such as life, geography, agricultural science, and many more, Mathematics seems to be very challenging for most learners. Olawale et al. (2021) argued that In South Africa, poor performance in Mathematics is a serious concern, although having strong Mathematics skills is essential for being a democratic citizen, as many decisions made by citizens need complex computations to some extent. Thus, to enhance learners' Mathematics performance, the government has implemented various measures, including a Mathematics, Science, and Technology (MST) sector plan, a National Strategy on Learner Attainment (NSLA), and other interventions by subject advisors and school management and governance developers (SMGDs) in different education districts, among others (Olawale, 2021). However, debatably, learners' inadequate performance may not exclusively be attributed to learners but should consider the undemocratic behaviours of high school Mathematics teachers, which stem from their training at teacher training institutions (Olawale et al., 2021; Olawale, 2022). As such, Makondo and Makondo (2020), Mabena, Mokgosi, and Ramapela (2021), and Chand et al. (2021) investigated the causes of the underperformance of learners in Mathematics. The research findings from the study revealed

that negative attitudes towards Mathematics, a lack of proper teaching and learning of Mathematics in the lower grades, home background, and, most importantly, the traditional teaching methods were some of the reasons for learners' poor performance. Thus, to enhance Mathematics learners' performance, this study investigated the experiences of Mathematics teachers and learners on the use of GDL to enhance learners' academic performance.

Research Question

What are the experiences of Mathematics teachers and learners on the use of GDL in enhancing learners' academic performance?

RESEARCH METHODS

Underpinned by the interpretivism paradigm, the study employed a qualitative research approach. According to Kivunja and Kuyini (2017), the interpretivism paradigm is the way of understanding the world of human experience, and the main purpose here is to study how humans see and understand the universe. The qualitative research approach is about making generalisations grounded on asking questions, making observations, and reading case studies or documents (Kelly, 2017). Qualitative research was found suitable for this study because it allows the researchers to gather in-depth information and use different forms of data collection instruments such as interviews, observation, and document analysis. This study also employed participatory action research because it allows reflections, theories, and practices to be brought together by researchers to come up with practical solutions on how to enhance Mathematics learners' performance (Morales, 2016; Hendricks & Olawale, 2023). A convenience sampling technique was used to select twenty-one (21) participants for this study, which were 19 Mathematics Grade 10 learners and 2 Mathematics teachers from a selected government-owned community-based school in Qanda in Middledrift, Amatole West District, Eastern Cape Province, South Africa. The senior secondary school admits over 250 learners every year from Grades 8 to 12, and the school has put itself on the map for achieving above 70% on the National Senior Certificate (NSC) matric results continuously in the past 3-5 years.

For this study, data was collected through face-to-face semi-structured interviews, formal observations, and document reviews. This makes it possible for the researchers to use triangulation of data sources to validate the findings from the study. For ethical considerations, consent was sought from the University of Fort Hare to conduct this research. The consent was sent to the school to ask for permission to conduct the research. The gathered data were kept confidential and private. Besides, pseudonyms were used to protect the identity of Mathematics learners and their teachers. Information that could disclose the identity of the participants was not used. Similarly, participants were given a choice to either participate or decline to do so in the research.

Data Analysis

According to Dawit (2020), data analysis is the changing of the gathered raw data into useful facts and concepts that can be interpreted either qualitatively or quantitatively. Due to the

qualitative nature of the data, thematic analysis was used to analyse the data. Thematic analysis is the process of finding patterns or themes in qualitative data (Maguire & Delahunt, 2017). As such, the first step was that the researchers carefully read all the data, meaning the answers from the interview were read, and data collected through observations and document reviews were thoroughly read. Then, data from the interviews, observations, and document reviews were organised thoroughly for easy understanding. After that, the researchers searched for themes in the data. Then, the information derived in the preceding step was reviewed, and the researchers identified the absence of what the theme was about. In the last step, the researchers wrote down all their findings, that is, reporting what was found in the data in relation to the research question.

RESULTS AND DISCUSSION

This study examined the experiences of Mathematics teachers and learners on the use of GDL in enhancing learners' academic performance. The results and discussion of the results were presented under the following themes:

I. Importance of GDL in enhancing the performance of Mathematics learners.
II. Challenges of using GDL to enhance the performance of Mathematics learners.

Table 2.

Code representing the research participants.

Participants	Codes
Mathematics teacher 1 & 2	MT1 & MT2
Mathematics learner 1,2,3,4,5,6,7,8….19	ML1…….ML19

Importance of using GDL in enhancing the performance of Mathematics learners

To understand how effectively the GDL strategy can be used to enhance the performance of learners in Mathematics, learners and their teachers were interviewed. The learners were asked, “How effective is GDL in enhancing your performance in Mathematics?”. In turn, the Mathematics teachers were asked, “How effective do you use GDL to enhance the performance of your learners in Mathematics?”. The research findings revealed that all participants had similar opinions on the effectiveness of using the GDL strategy, as the majority of the participants believed that GDL is a highly effective approach because it promotes active engagement, deep understanding, and the development of essential skills and attitudes towards the subject. For instance, a participant said:

This strategy is effective because it gives us a chance to ask for more information from our peers. If I don’t understand you [the researcher] when you are teaching, perhaps, I will understand better when hearing it from other learners, so in today’s class, I got that chance. I can say that today’s class gave us a chance to share our ideas, and I also became more interested in finding solutions to the problem and sharing the solutions with my friends. (ML1)

Another participant added:

All of us were engaged in the learning; we all participated and came up with our ideas. We were forced to be serious in class and listen carefully because we knew that we were going to come up with ideas and solutions. So, the GDL strategy allows us to participate in the class fully, and it forces us to take responsibility for our learning. Also, we were able to think and make use of the things that are outside the school and how they relate to the teaching and learning of Mathematics – this makes the teaching method very interesting. (ML 2)

Similarly, another participant claimed that:

When you were teaching using this strategy, you gave us all a chance to participate in the class, and we got the chance to think out of the box. All of us had to think because you made it clear that everything is supposed to come from us. So, this allows us to develop a sense of ownership and confidence in our mathematical abilities. (ML7)

To add to what the learners already said, their teacher agreed with them on the effectiveness of using the GDL strategy. He opined:

By understanding and utilising GDL effectively, you can enhance the performance of learners in Mathematics in many ways, for instance, task design, adaptive learning where learners will interact with each other during the lesson and get the chance to share ideas, and formative assessment. (MT1)

Furthermore, another Mathematics teacher alluded:

This learning approach is very good, and it is capable of improving learners' performance because it allows the learners to actively participate in their learning process and make meaningful connections with the mathematical concepts being taught. As a result, this teaching strategy promotes a positive attitude towards Mathematics and encourages learners to explore and enquire about mathematical concepts more independently. (MT2)

Research findings on the importance of GDL in enhancing the performance of learners in Mathematics reveal that the strategy could be effective because it provides learners with the chance to come up with their ideas. The strategy encourages learners to participate in the learning process, and it gives learners a chance to share information with each other in the class and debate their ideas. In addition, GDL is said to be important because it brings life to Mathematics. These findings are similar to those of Hidayati et al. (2019), who stated that guided discovery learning helps learners develop self-esteem, self-motivation, and the ability to transfer knowledge, and limit, or avoid memorising. Therefore, given that learners are responsible for their learning, they can solve Mathematics problems creatively through discovery (Hidayati et al., 2019). The Curriculum and Assessment Policy Statement (CAPS) documents for Mathematics (10-12) document also emphasise Mathematics modelling in the curriculum. The Department of Education (2011) also postulates that real-life concerns should be integrated into all parts of teaching and learning of Mathematics when applicable and examples should be actual, not made up. Similarly, Mathematics teachers should consider contextual considerations such as health, social, economic, cultural, scientific, political, and environmental concerns whenever possible (CAPS, 2011). According to Agus and Fitriani (2019)

and Hidayati et al. (2019), GDL is one such strategy capable of ensuring that learners acquire and apply knowledge and skills in ways that are meaningful to their lives.

During observations, it was evident that using GDL to teach the exchange rate in Grade 10 was effective because learners were more interested and involved in the lesson, and they were more confident in their ideas. This promoted their performance in the classwork that was given. They all passed the classwork and were able to explain everything to the teacher and their classmates. This corroborates the findings from both interviews and observations, which revealed that the use of the GDL strategy is effective in enhancing the performance of learners in Mathematics since the strategy promotes learner involvement and inclusive learning. This resonates with the constructivist theory of Jerome Bruner who emphasised the active participation of each learner in the classroom and acknowledged the fact that children have different abilities (Johnson, 2019). This is why Adeniran and Lambaya (2022) argued that the GDL strategy is highly effective in promoting active participation in the classroom because learners are encouraged to explore and discover concepts on their own with the guidance of the teacher providing support and directions. Similarly, the findings from this study corroborate with that of Akanmu and Fajemidagba (2013), who stated that the GDL strategy is effective because the strategy is learner-centred, and the approach fosters curiosity, critical thinking, and problem-solving skills, which in turn leads to increased engagement in classroom participation and learning process. Yuliani and Saragih (2015) agreed with the above authors when they stated that GDL helps learners to understand Mathematics concepts better and improve their mathematical critical thinking. Suryanti et al. (2020) also said that GDL improves both basic and integrated science processing skills in learners, especially high-order thinking skills. Furthermore, Suryanti et al. (2020) shared that using GDL makes learning easy and entertaining for learners.

Challenges of using GDL in enhancing the performance of Mathematics learners

To understand the challenges teachers and learners face when teaching or learning using the GDL strategy, learners and teachers were interviewed. Learners were asked, “What are the challenges you experienced when taught Mathematics using GDL strategy?”. In turn, the teacher was asked, “What are the challenges you experience when teaching Mathematics using the GDL strategy?” The research findings revealed that the strategy presents many challenges, such as the lack of high-level concentration from learners, time constraints and varying student abilities, as well as resources and materials. For instance, a participant said:

The strategy consumed a lot of time, and it took time for us to understand what you were doing and come up with the right information because we did not have enough information about the topic, and this sometimes made it difficult for us to explore answers and make connections even when we thought we had an answer. (ML 3)

Concerning the above, the Mathematics teacher stated that:

There is limited time available for learners to explore and discover concepts on their own because as a teacher, you need to step in more frequently to provide guidance and instruction,

which sometimes limits the amount of self-directed discovery and reduces the effectiveness of the strategy. (MT 2)

Another participant revealed that:

When you got into the class, you did not give us information about the topic; you only gave us hints that required us to come up with our information, which was very difficult for us. So, in conclusion, I could say that this strategy did not allow you as a teacher to give us enough information. So, because of the lack of information, we were really confused, and this got us more frustrated and less interested. (ML 19).

Similarly, another participant added:

It is a good thing that our Mathematics teacher wanted us to find answers to the tasks ourselves, but sometimes you get distracted by other students when thinking about the solutions. Sometimes, I even get confused because I don't know exactly what is expected of the teacher, and it therefore becomes very difficult to stay focused. (ML 16)

The Mathematics teacher's response corroborates the views of the above learner stating that:

When employing this type of teaching strategy, learners find it very difficult to stay focused and motivated to explore and discover mathematical concepts on their own. Another problem is that it is very challenging to assess because the traditional form of assessment does not accurately measure learners' abilities, and these learners have varying levels of mathematical abilities. (MT1)

The research findings on the challenges encountered in using GDL in the teaching and learning of Mathematics revealed that the strategy is so time-consuming that sometimes a teacher runs out of time before s/he can finish the lesson. This time constraint increases the pressure on both the teacher and the learners to cover a certain amount of content within a limited timeframe, which eventually results in teachers using a structured and directed approach to learning instead of GDL. Similarly, the findings revealed that this approach does not adequately cater to learners with different abilities, and this makes it challenging for teachers to guide and assess students learning and progress in a guided learning environment.

During observation, it was noticed that the teacher was confused during the class, as he did not know how to assist each learner, given that learners' ability levels differ. Similarly, majority of learners in class posed a significant challenge to the teacher as s/he was unable to provide the required guidance, assess learning activities, and keep the learners focused and motivated all through the lesson. Therefore, given the significant benefit of GDL in the teaching and learning of Mathematics, it is evident that the GDL strategy poses challenges to both Mathematics teachers and learners because most of the participants (Mathematics teachers and learners) are unaccustomed to cultivating independence in the pursuit of knowledge.

The findings from the study were similar to those of Lubis et al. (2019), who argued that low problem-solving skills, which are attributed to the traditional teaching methods employed by Mathematics instructors, contribute significantly to the challenges of using GDL. Similarly,

Akanmu and Fajemidagba (2013) posited that one of the major challenges that hinder the use of GDL is the time constraints in the classroom setting, which hinders students from fully realising their maximum potential. The authors further argued that the proficiency of students in time management directly correlates with the quality of their learning outcomes and their overall potential for academic success. As such, teachers are encouraged to promote a sense of independence among students, given that students who exhibit independence in their learning are those who actively engage in the process of optimising their educational options and capabilities (Akanmu & Fajemidagba, 2013). Therefore, teachers should play a crucial role in facilitating student motivation through the use of effective learning practices, given that emotions and motivations have a significant role in Mathematics teaching (Lubis et al., 2019; Adeniran & Lambaya, 2022). This is why Khasanah et al. (2018) stated that GDL is an inductive learning model that aligns with the principles of constructivism philosophy. Constructivism is a theory that proposes that learners build knowledge based on their experiences (Johnson, 2019). This theory is linked to educational methods that encourage learning through hands-on activities or active engagement. Therefore, in constructivist teaching where GDL is implemented, Mathematics teachers must act as facilitators of learning, encourage learners to take responsibility for constructing their understanding and facilitate learners learning by providing them with thought-provoking questions that aid in the acquisition of mathematical concepts.

CONCLUSION

This study examined the experiences of Mathematics teachers and learners on the use of GDL in enhancing learners' academic performance. Research findings revealed that although assessment, time constraints, and a lack of motivation may hinder the effective use of GDL, the strategy has numerous benefits. This includes the development of critical thinking and problem-solving skills, allowing learners to take full ownership of their learning which boosts their motivation and confidence, and the application of real-life scenarios in learning mathematical concepts, which makes the content more relevant and meaningful to learners and, in turn, enhances their academic performance. Based on the findings, it was concluded that the use of guided discovery learning is an effective strategy in enhancing the academic performance of Mathematics learners because it fosters a deeper understanding of mathematical concepts and promotes long-term retention of knowledge. In addition, this strategy also encourages learners to develop important skills such as persistence and resilience, which directly impact the performance of learners positively. Therefore, the study recommends that Mathematics teachers should encourage enquiry and critical thinking by making use of open-ended questions and problems that encourage learners to think critically and explore mathematical ideas on their own. Similarly, Mathematics teachers are encouraged to foster collaborative learning to help learners build on each other’s ideas and learn from one another. Lastly, the use of technology

and multimedia resources should be encouraged to assist learners in visualising and exploring mathematical ideas in new and more engaging ways.

Limitations

The limitations of the study were caused by two major factors: the language barrier and the unconsciousness of the use of the GDL strategy in teaching and learning in Mathematics classrooms. Firstly, the school is in a deep rural area, therefore, learners are unfamiliar with the use of English when asking questions, and that presented a challenge for the researcher during the interview because sometimes learners did not understand the questions properly and interpreted the questions wrongly. To avoid those misunderstandings and enhance better communication, the researcher decided to address the interview questions both in isiXhosa (local language) and English. Secondly, the researchers noticed that the teachers were unused to using the GDL strategy, so they were trained on its use for several weeks. They were also allowed to make use of the strategy while the researchers observed and thereafter asked them questions about the phenomenon under investigation.

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