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Impact of integrating smartphones in the teaching and learning of Mathematics in Chegato Cluster, Mberengwa district, Zimbabwe

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Abstract

Worldwide, the utility of smartphones in the teaching and learning of Mathematics has been greatly recognized and taken advantage of. This is mainly because of the precisions this technology can bring in the classroom. This study investigated the impact of integrating smart phones in the teaching and learning of Mathematics at secondary schools in Chegato Cluster in Mberengwa district, Zimbabwe. It also examined strategies that can be used to enhance the use of smartphones in these schools. The study used a mixed method approach where both qualitative and quantitative data was gathered and was used to answer the formulated research questions. Ten parents, 10 Mathematics teachers, 4 school heads and 40 learners participated in the study. The study found that the introduction of the competence-based curriculum by the ministry of Education in Zimbabwe, which is in solidarity with Education 5.0 calls for the use of smart phones in the teaching and learning of Mathematics which ensures that several modern skills are being acquired by learners in Chegato secondary schools. Learners in Chegato Cluster benefit by using smartphones to store soft copies of various Mathematics textbooks which are often scarce in hard-copy form. Learners also benefit from Mathematical applications that are installed in their smartphones. Teachers use smartphones as media in the classroom to enhance learner-understanding of the concepts. Again, in Chegato, the use of smartphones has exposed learners to various Mathematical technological skills that help in the learning of Mathematics and has the potential of improving the pass rate. School heads and teachers acknowledged that the availability of smartphones in the schools has greatly assisted “O” level Mathematics learners to accomplish their tasks.Strategies that can be used to enhance the use of smartphones in secondary schools include the use of individualised student passwords which are controlled and monitored by the school administrators to ensure that the activities of each learner on the Internet can be tracked and any attempts by learners to visit undesirable sites are detected. Also, the use of software applications, such as Mikrotik Hotspot Blocker, can be used to block learners from accessing unsavoury Internet sites. The study concluded that though challenges such as lack of technological resources and some teachers’ negative attitudes towards the use of smart phones affect Chegato Cluster, most participants found it helpful to use smartphones in the classroom because the gadget expose learners to new and better ways of dealing with Mathematical concepts. The study finally calls for all the involved parties in the cluster and beyond to actively take up their responsibilities facilitating the use of smartphones for the benefits of the learners.

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Background of the study

In their daily lives, the digital natives are interested in using technologies especially smartphones (Uihak, 2021). Experts in educational technologies expect that most learners can use smartphones in both formal and informal learning environments (Gunter & Gunter, 2015). However, the majority of Mathematics teachers employ non-technological pedagogies, despite the fact that learners often interact with mobile smartphone technology. This is generally the situation in Zimbabwe. To worsen the situation, there is some prohibition against the use of smartphones in the classroom. This is especially true for Mission schools and the majority of public institutions in the country (Herald, 2015). Parents and teachers opposed the then minister of education in 2015 when he suggested allowing smart phones in the classroom. Some ministers also expressed outrage at the minister's remarks (New Zimbabwe Newspaper, 2015). In Zimbabwe, both parents and teachers frequently argue against smart phones on the grounds that they can reduce the quality of work produced and cause distractions between the teacher and learners. The situation is slightly improving towards accepting the smartphone use.

Technology is a part of everyday life and the ministry should reconsider the policies governing its use. Teachers must receive training on how to guide their learners in using their smartphones responsibly in the classroom (Karsenti, 2015). Aggravated by this situation, Barnwell (2016) investigated people's opinions regarding the use of smartphones in high school classrooms. He discovered that those in favour of the use, make the case that smartphones have a wealth of information at their disposal and have the potential to close academic achievement gaps between learners. Additionally, the phone has the potential to act as a great equalizer by providing learners from various socioeconomic backgrounds with the same device. The position that some teachers are not well versed in technological use does not change the fact that learners are now growing up in a digital environment and are expecting their teachers to help them (Common Sense Media, 2016).

The fear of those who are against the use of smartphones by learners in the classroom are not without substantiated facts. Some studies have shown that smart phones can seriously hinder a child's ability to study if they are not properly supervised (Kahari, 2013). The smart phone has earned the reputation of being a distractor in the classroom since most

learners disregard its educational potential in favour of social media and gaming (Barnwell, 2016). Again, smart phones can sometimes have a negative effect on learners' academic performance because most teenagers use them more for pleasure than for learning (Stanford University Study, 2014).

From the brief background given above, it can be said that, ICT can be given a trial in the teaching and learning of Mathematics. Precautions should be taken to monitor the student users so that they get the advantages of such tools, for it is not easy to deter the use of smartphones among the youths (Uihak, 2021).

Statement of the Problem

Mathematics pass-rate is expected to increase when learners comprehend what they learn. However, in Chegato Cluster, the pass-rate in Mathematics is found to be generally low; Africa Press (2023) asserts that pass rate for Ordinary Level Mathematics in Zimbabwe has been going down over the past 4 years except in 2021 when it went up slightly. Most probably, COVID-19 pandemic contributed much to this scenario. All the same, low pass-rate in Mathematics deters learners from furthering their studies in different academic fields (Chand, 2021) since Maths is one of the key entry-requirement to most tertiary courses. Some educationists therefore call for an integration of technology, which has influenced many people’s aspects of life, of which the teaching and learning of Mathematics is no exception (Huang, 2020). This study therefore focused on the use of smartphone on Mathematics learning in Chegato Cluster, Zimbabwe using the following research questions:

Research Questions

1. What are the benefits of using smartphones in the teaching and learning of Mathematics at secondary school level in Mberengwa Cluster?
2. Which strategies can be used to enhance the use of smartphones in these schools?

Literature Review

Technology integration today has undergone advances, reshaped our society and fundamentally altered how people think, work and live (Ghavifekr & Rosdy, 2015). This is mainly because the use of ICT in education has an enhancing effect. ICT integration in schools, specifically in the classroom, is crucial since learners are accustomed to technology and learn better in a technology-based environment. This is due to the fact that technology in education makes a significant contribution to the pedagogical elements, where the usage of ICT results in successful learning with the aid and support of ICT elements and components (Jamieson-Procter et al., 2013).

It should be however noted that technology and smartphones are not seen as a replacement for good teachers but as supplemental add-ons for improved teaching and learning. ICT integration in education is essential because, with the aid

of technology, teaching and learning may take place not only in a classroom setting but also when teachers and learners are physically apart. In Zimbabwe, the introduction of education 5.0 encourages the use of smartphones in the 21st century as a way to assist learners in improving their performance.

Benefits of using Smartphones in Teaching and Learning Mathematics

Literature shows that mobile technology has a positive impact on learners (Raghunath et al., 2018). This is because, mobile geometric properties, graphing detail, algebraic expression transformation and other related tasks can all be easily handled by smartphones. Technology might even lessen the time spent on laborious calculations and help learners concentrate on more crucial mathematical aspects. Appropriate use of smartphones may therefore greatly contribute to the clarification and correction of widely held negative beliefs about this phenomenon. The existing research has also underlined how contemporary technology might fulfil learners' ubiquitous educational demands while simultaneously saving money using technology (Johnson, 2019).

As technology spreads, more people are interested in adopting mobile devices to support teaching and learning (Kearney & Maher, 2019). The use of smartphones in teaching and learning Mathematics has becomes more essential in this technological era. Such devices assist learners in different areas when learning Mathematics, at the same time, they are very portable and have affordable prices as compared to other gargets such as laptops. In Mathematics, there are several essential topics which normally challenge learners and teachers but this hiccup can be alleviated by use of technology. A study found that mobile learning in Mathematics had an impact on 21st-century skills like problem-solving, communication, creative thinking and collaborative involvement (Sedaghatjou & Rodney, 2018).

Mathematics is one of the most crucial subjects in education which helps learners develop an array of skills which include critical thinking and problem-solving abilities in a variety of contexts such as trade, technology, engineering and other natural sciences. Mathematics teachers therefore need to teach learners properly so as to avoid high failure rates (Chand, 2021). New methods of delivering education have emerged as a result of the growth of ICT as well as the adoption of digital tools and skills even at school levels. A pattern of electronic learning foundation between teachers and learners has emerged (Bader, 2012).

Well-designed digital learning activities in Mathematics can be a powerful tool for learners for quick and effective learning. As a result, schools, especially at secondary level, cannot wish away technology, particularly in the form of smart phones. Degraff (2014) talked of young digital natives whose lives and perspectives are dominated by technology. A survey by Pew Research Center in Washington D.C found 73% of American teenagers either owning or having access to a phone while nearly 90% of secondary school learners owning smartphones (ACBC News, 2015). The situation is different in Zimbabwe especially in rural areas where a proper smartphone is hard to come by.

Wong and Li (2008) argue that many studies have been done on the usage of smartphones, and some of them have shown how well technology can be used in classrooms. Giordano (2007) found a strong correlation between teachers' teaching experience and smartphone use. Currently, smart phones with additional features for Internet browsing, SMS and email services, and the use of software for solving Mathematical problems are very common (Drijvers & Paul, 2012).

Using mobile devices in the classroom can give various teachers real-world experience, training possibilities, and intellectual stimulation (Chiu & Churchill, 2016). There are numerous mobile apps that can be downloaded and used for learning Mathematics, including Operation Math, Sushi Monster, Quick Math: Arithmetic and Times Tables, Pet Bingo by Duck Duck Moose, Meerkat Math HD, Math Flash Cards, 10 Monkeys Multiplication, Math Monsters-Bingo, Math vs Zombies, YodelOh Math Mountain (Burns, 2014), Math Tricks, Maths Formulas Free, and more. math, math flash cards, complete math, math dictionary, math expert, graphing calculator for GMAT math flashcards, graphing calculator, geogebra, geometry pad, math way, free geo Mathematics.

Smartphones make possible assessment-cantered learning as well by enabling the provision of continual feedback throughout the learning process; it also provides prompt feedback, thus, a motivating factor that can at times be lacking in traditional modes of education (Geddes, 2004).

Strategies to Effectively use Smartphones in Teaching and Learning Mathematics

A number of strategies can be employed in order to maximise the usefulness of smartphones in the classroom. In situations where cost represents a significant barrier to learning, for instance, in the rural areas where environmental and infrastructure challenges hinder other learning modalities, particularly e-learning, m-learning presents great opportunities, smartphones can be used. This mobile technology is much less cost-prohibitive than other technologies such as computers and broadband connections that are necessary for eLearning (Visser & West, 2005).

Mobile phones also facilitate community-centred learning, meaning learning that the learner deems valuable because of its relevance to the surrounding social context, such as mLearning, which facilitates learning that can be used to achieve socio-economic goals that respond to problems such as those related to health or family care confronting the surrounding community (Sharples et al., 2007).

Constructivist learning is one of the typical approaches adapted in Mathematics studies that employ technology (Li & Ma 2010). Its application to mobile learning literature is just as prominent as it is in Mathematics learning. Through active learning activities (Wijers et al. 2010), immersion in real-world settings (Sommerauer & Müller 2014), and learner-generated context, mobile technology enables constructivist learning. Furthermore, mobile devices offer tremendous instruments for supporting social constructivist pedagogy since they are inherently social collaboration and communication technologies. The technology and supporting pedagogy must be taken into account for effective technology integration. In integrating technology for Mathematics, Drijvers (2012) noted that pedagogical design, the role of the instructor, and the educational setting are essential components.

The New Curriculum in Mathematics (2015) emphasizes the need for technology in the classroom, but there is still debate over whether schools have Wi-Fi, what policies apply to smartphones there, and other issues of a similar nature that prevent the expected level of use of mobile learning techniques. Undoubtedly, the development of proper planning for the use of instructional processes for the development of pertinent learning strategies is required before mobile learning can be adapted. According to the aforementioned writers, teachers can use smartphones to show learners how the ideas they

are learning in math or STEM classes can be applied to real-world situations. An educator made a little video in the dairy section of the grocery store, offering the real-world problem of determining what would be the best deal rather than providing her learners a worksheet to solve problems. The teacher gives the learners the task of choosing a cheese brand and size based on the prices and specials displayed on the shelves. With a smartphone, it's simple to record recordings of situations like these that occur outside of the classroom and publish them on YouTube (The New Curriculum in Mathematics, 2015).

To counter what Mavhunga (2016) purported that smart phones can be quite distracting to some learners in the classroom, there is need for clear policies to regulate their use. Strategies that can be used to enhance the use of smartphones in secondary schools also include the use of individualised student passwords which are controlled and monitored by the school administrators to ensure that the activities of each learner on the Internet can be tracked and any attempts by learners to visit undesirable sites are detected. Also, the use of software applications, such as Mikrotik Hotspot Blocker, can be used to block learners from accessing distasteful Internet sites.

Research Methodology

This study used a mixed method approach where both quantitative and qualitative strategies were employed. The quantitative was used for its usefulness in providing data with statistics, calculations and figures while the qualitative aspect helps in exploring human memories, experiences and perceptions with regards to the use of smartphones in teaching and learning Mathematics. These two strategies complemented each other in this study, influencing the coming up with reliable and valid research results.

Research Sample

The sample of this study consisted of 10 Mathematics teachers, 4 headmasters, 40 learners and 10 parents, totalling 64 respondents. Teachers, Headmasters and parents were conveniently focusing on participants who had a potential of supplying vital information to answer the research questions of the study. Learners were randomly sampled using the hat system, that is, all the 40 learners who picked from the hat pieces of paper with “P” written on them, became participants.

The table below shows the sample for the study and how data was solicited from them.

Description	Schedule
Interview (Heads)	4
Interview (Parents)	10
Questionnaires (Teachers)	10
Questionnaires (Learners)	40
Total	**64**

Interviews were deemed necessary for school heads mainly due to their low number. Parents were also interviewed in order for both the researchers and the parents to be able to explain in full and at times in vernacular the concerns at stake. Learners did well with questionnaires due to their large numbers while the 10 teachers gave their focused contributions through the same tool.

Data Collection and Analysis

Researchers sent questionnaires to teachers and learners via a variety of channels, including WhatsApp, email and face-to-face. Following completion of the survey, the respondents send back the questionnaires. Concurrently, interviews were conducted with the parents and the school heads. With their consent, their responses were recorded using a smartphone. This was done to avoid any form of data loss.

Since data was collected using both quantitative and qualitative methodologies, both quantitative and qualitative data presentation and analysis took precedence. Researchers assured data completeness, validity and reliability by manipulating a multidisciplinary approach in data collection so as to embrace every piece of information worthy of the study. Quantitative data was analysed using descriptive statistics and findings were presented through the use of tables and graphs. When collecting qualitative data, the researchers, as instructed by Burns (2013), laid aside what they already knew about the use of smartphones in Mathematics education and focused on the participants' experiences, giving them leeway to express themselves. Collected qualitative data was thematically analyzed. The deductive analysis method was used to attach meaning to the collected data.

Since the study sought information from the informant, ethical considerations were at stake. The researchers mainly considered confidentiality and the right to consent. Questionnaires had no names of respondents being written on them and their responses were kept secret and was solely used for this study.

Research Findings

Demographic Data of Respondents

In an endeavour to clarify the integration of smartphones in teaching and learning Mathematics in the Chegato Cluster, interviews and questionnaires were administered to the participants accordingly. The table below shows the demographic structure of the respondents.

Description	Schedule	Administered	Percentage rate%
Interview (Heads)	4	4	100
Interview (Parents)	10	10	100
Questionnaires (Teachers)	10	10	100
Questionnaires (Learners)	40	30	75
Total	64	54	81.2

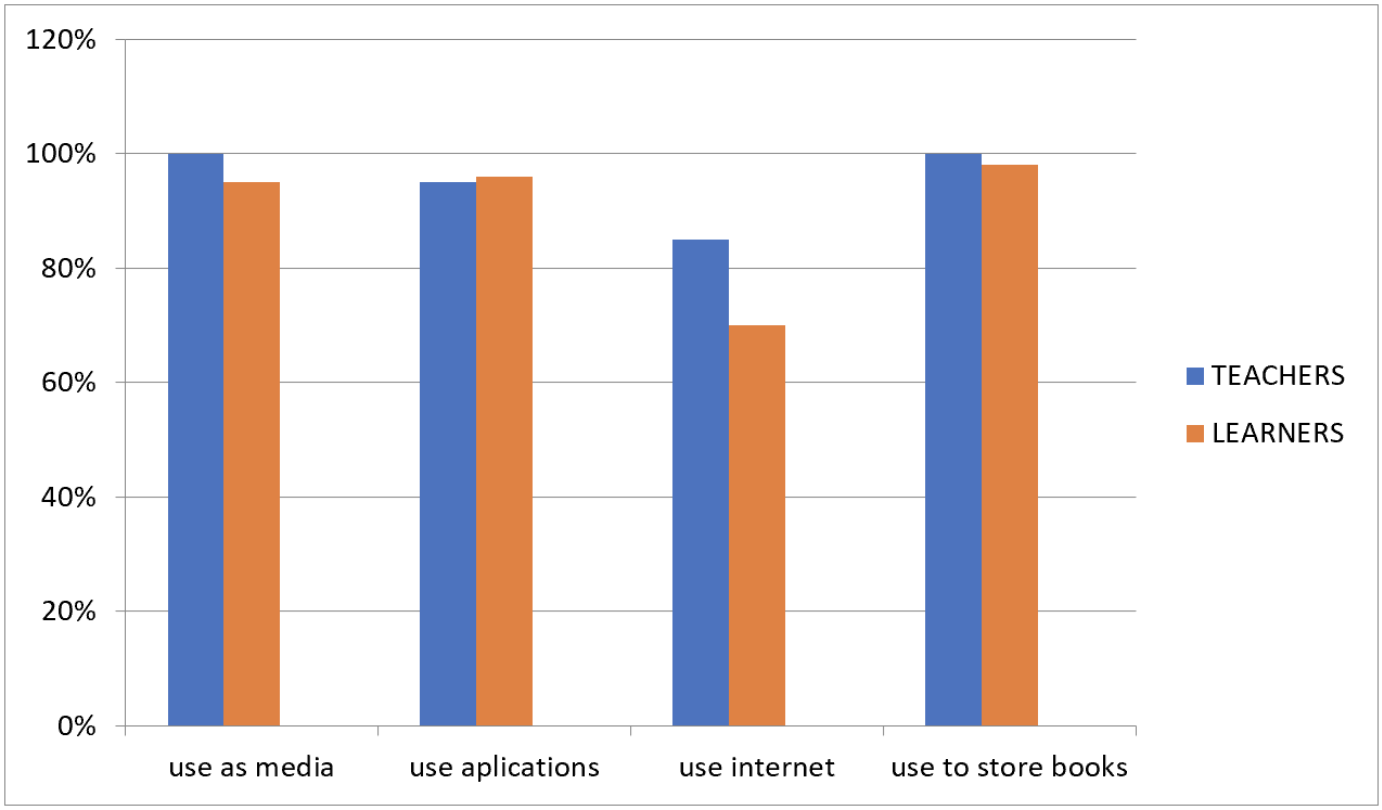
The interviews show that all expected participants, that is, 4 school heads and 10 parents, were interviewed, which gives a 100% response rate for both groups. Again, all the Mathematics teachers returned questionnaires to the researchers. However, 30 learners, out of 40 managed to retain questionnaires due to failure to complete answering the questions. Chung (2022) argues that an excellent response rate is 50% or higher, so the above results are considered good representatives of the population.

Benefits of using smartphone in Mberengwa Cluster in the teaching and learning of Mathematics

The respondents generally agreed that smartphones are of benefit to the teaching and learning of Mathematics in Chegato Cluster. In justifying their use, most of the learners and teachers said that they benefited in diverse ways including being accessible to useful resources. With smartphones, a number of learners were able to connect to the Internet, and as such, they could access learning materials such as pdfs, journals and other useful materials. Moreover, most of the learners were using their smartphones for research purposes, especially when doing their Continuous Assessment of Learning Activities (CALLA). This finding concurred with Raghunath et al. (2018) whose study revealed the mobile technology had a positive impact on learners. Considering that most of both the teachers and learners have access to smartphones, they have embraced the advantages that are embedded in the gadget.

Smartphones also played a pivotal role by covering up the gap of textbook shortages in the schools by storing soft copies of various Mathematics textbooks as said by both the teachers and the school heads. This has eased the shortage of text books in the cluster. Teachers in Chagato Cluster said that they were also benefited by using smartphones as media and sources of learning materials, a finding similar to that by Zhong, Saad and Ahmad (2022) whose teacher-respondents indicated that they found employing smartphones in their Mathematics teaching being beneficial to them.

The graph below shows a summary of what both teachers and learners used smartphones for in the cluster.



Bar Graph 1. Teachers and learners smartphones utility

Source: Primary data (2023)

The graph above shows that over 90% of the learners and 100% of the teachers usually store their Mathematical books on their smartphones, which help those learners in the cluster, considering that the schools are in the rural areas where textbooks are an acute challenge that normally affect the success and pass rate of the learners. The shortage of textbooks was then resolved by smartphone usage, which becomes a portable library where learners can look for information from it any time they wanted. This finding on using smartphone to store information was also Realized by Ahmad (2020) who summed it as “smartphones facilitate learners' ability to communicate, interact, engage in discussion, store educational information and record the lesson”. The introduction of smartphones made learning environments adorable, which was once acknowledged by one of the parents, who said that their children were generally improving in studying alone at home and they usually give them time to interact with their phone, where the textbooks are stored.

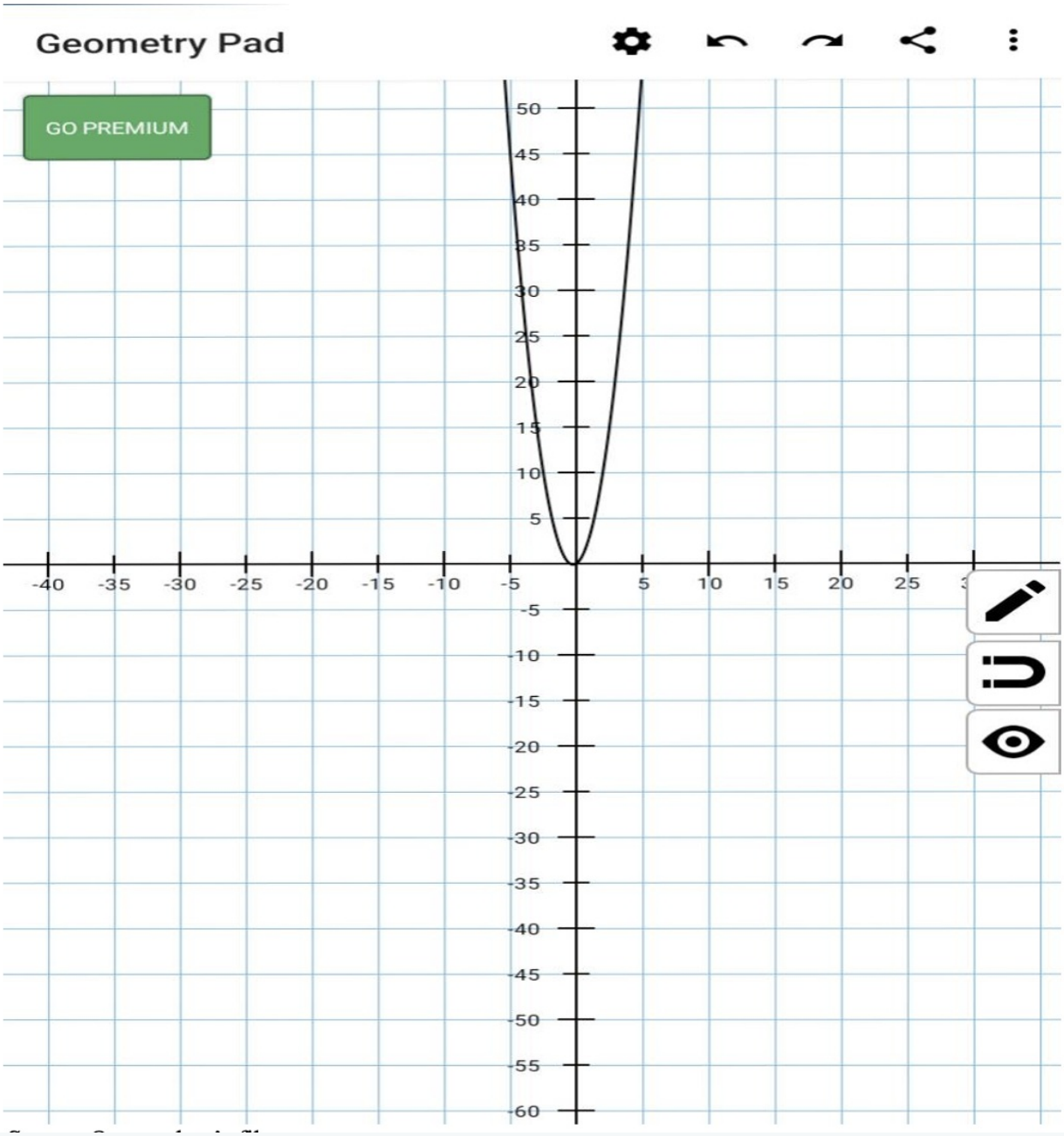
Learners were also able use different working methods in different textbooks stored as soft copies in the smartphones and get further explanation of the concept through tutorials.Learners concurred that smartphone can improve understanding because someone can be alone researching and it gives adequate information and use of applications that show the working. These findings are in line with what Fabian (2018) put across, that the presence of smartphones offers a fresh viewpoint on studying Mathematics.

The statistical graph above also shows that all the teachers that responded to this study in the cluster and more than 90% of the learners used smartphones as media. One teacher proudly said that, through the use of smartphones, she was able to brighten her lessons with minimum effort for the better comprehension of her learners. This finding is similar to that by

Zamuri (2020) who asserted that smartphones as learning media encourages learners to be active within the instructional process. Another teacher explained that the media that he used could be shared with the learners and they can go through the media even after the lesson. “This can help the learners to discover a new and develop their own simpler ways of generalizing the concept” he added. In Chegato Cluster, teachers were happy for the move made by the Ministry of Education on the introduction of smartphones at schools because almost everyone has access to different books found on the Internet and they can read at their own time.

Most of the learners agreed that smartphones were crucial for conducting e-learning lessons and for researching educational information including related online videos. Learners were very supportive with decisions because most of them were not able to meet physically with friends to discuss challenging tasks given to them by their Mathematics teacher work on. The more learners interact with the smartphones, the faster the transfer of information. This was highlighted by the learners that smartphones can provide quick communication and make them updated on the current mathematical concepts and issues, national and international. This finding is similar to what Sedaghatjou and Rodney (2018) who Realized in their study that mobile learning in Mathematics had an impact on 21st century learners such as problem solving, communication, creative thinking and collaborative involvement.

The researchers observed a Mathematics class in session at one of the schools and realized that smartphones are capable of containing more than one mathematical application, most probably, depending on the storage of that phone. They saw learners only entering details of a Mathematics question and receive feedback on how the concept is tackled. At one school under study, learners were successfully using geometry pad to draw parabolas as one shown below.



Source: One student's file

This utility of smartphones in the classroom was also Realized by Crompton and Burke's (2015) whose survey of smartphone learning in Mathematics showed that there was a growing interest in the effectiveness of mobile technology, with 75% of 48 studies reporting positive learning outcomes.

Parents were also supportive of the integration of smartphones in the teaching and learning of Mathematics. They acknowledged that it helped keeping their children busy most of the time as they liked to interact with their smartphones. They also emphasized that the new curriculum that has been introduced by the Ministry of Primary and Secondary Education required their children to be wide readers, so they bought data for them to browse their tasks on the Internet and get quality information. A number of parents exposed their technological knowhow by stating that the Internet is rich with useful materials for mathematical learning. Such response from parents, support McQuiggan et al (2015) who

realized increased educational success due to the increase in use of smartphones.

Interviews with school heads showed that they were all in favour of using smart phones in the teaching and learning of Mathematics for they argued that smartphones have the ability to improve the performance of learners. Just as the teachers had said, the school heads also admitted that learners can improve their understanding through some Mathematical applications that are installed on their smartphones. One knowledgeable school head said, “Smartphones can be successfully used by the teachers as an effective teaching tool in the classroom for the better comprehension of learners on mathematical concepts”. He went on to say that teachers can also take the advantage of related videos and photos and YouTube channels that depict real-life situations. Another school head argued that schools cannot run away from the use of smartphones in this technological era for it helps learners to improve their understanding, as it is recommended in the education sector. These school heads seemed to concur with Polydoros (2021) who purported that the utilization of mobile technologies in the classroom create engaging and innovative new environments that benefit learning.

Strategies that can be used to enhance the use of smartphones in these schools

The study revealed some emerging themes on what can be done to enhance the use of smartphones in the schools and these are: enhancing technical knowhow for teachers, software applications, user friendly environment, activity monitoring and policies and resource mobilisation.

The study exposed that the majority of the teacher respondents had some smartphones, however, there was need for these teachers to receive the necessary training in order for them to be able to supervise and regulate their learners' usage of smartphones in the classroom. This information came from some of the teachers themselves as well as the learners. The learners echoed that some teachers needed training on how to use smartphones as teaching tools because they had noticed some struggling teachers who were not familiar with the gadget. The learners also urged for the call for workshops to teach learners on how to use their devices wisely. The effective use of smartphones therefore calls for both teacher and learner skills.

The study also exposed that there are some pop-ups, such as pornographic materials and other undesired blogs, which interrupted with the smooth running of learners’ activities at school. From the collected data, some teacher respondents suggested that the school may use child lock to block all notifications that are not related to education as a way of helping learners focus on their learning activities. The reviewed literature also suggested for the use of Mikrotik Hotspot Blocker software applications to block learners from accessing unsavoury internet sites and monitor learners’ behaviour as Hosokawa and Katsura (2018) suggested. This showed concern and care from the teachers about their learners and the researchers concluded that the schools should be informed of the many advantages of using smartphones for academic purposes and be advised on solutions, to allay their fears of possible abuse of the device.

For successfully learning using smartphones, teachers and school heads said that there was need for school as well as class policies to guide the learners on how the use their smartphones in order to create a user-friendly teaching and

learning environment. These policies are mainly for monitoring learners' activities and deter learners from visiting unwarranted websites. The researchers understood these teachers' suggestions basing on what they gathered from the learners themselves on how they visited unworthy websites and concurred with Nelson (2016) who suggested that involving learners in policy making can greatly improve the situation.

Since the learners, parents, teachers and school heads seemed to agree on the usefulness of smartphones in the teaching and learning of Mathematics, they all gave practical suggestions on resource mobilization. Some parents felt that they were responsible for their children's welfare, hence some of them bought the needed gadgets. Those who could not afford were calling for the school and the government to do so. Some school heads had received some smartphones from the well-wishers and were happy about it and were determined to conduct more rigorous fund-hunting for that cause. The researchers were shown some dilapidated gadgets in the name of smartphones. This problem of gadgets unavailability was also recognized by Cha et al. (2020) in a study that many schools in the developed world lack the necessary infrastructure for technological applications.

The strategies given above, when properly employed, has the potential of enhancing the use of smartphones in the schools.

Conclusions

The study concluded that teachers and Ordinary Level learners benefit in variegated ways through the use of smartphones in the teaching and learning of Mathematics at secondary school level in Chegato Cluster, for instance, for conducting e-learning lessons and researching educational information. It can also be concluded that the Smartphones' portability enables extending the study period and location in various settings. Again, the decision by the ministry of education to permit the use of smartphones in schools is well-received by the learners, parents and teachers since it facilitates learning and enables the more daring learners to expose the education system to new ideas. Such understanding of the involved parties of the utility of smartphones in the teaching and learning of Mathematics opens wide the doors for their uses in the classroom. Although there are hiccups, such as the risk of using mobile devices in distracting or unethical ways by learners, there are always effective ways of controlling smartphones use by learners.

Recommendations

This study recommends that teachers should learn to appreciate more in the use of smartphones. This can be achieved by attending workshops on related skills for Mathematics teachers so as to empower them with the necessary technological skills. On the part of learners, seminars should be done on the importance and proper use of smartphones as well as how they can be rightfully integrated in schools. The responsible ministry should make the academic use of smartphones mandatory at secondary school level and make it part of the education policy as a way of encouraging the use of smartphones in schools. This is against the background that some schools, especially boarding schools, are alleged to be prohibiting learners from bringing to school and using smartphones. Parents also need to be called on

gatherings where they informed of the changes and new needs at school. This can prepare them to fund their children when such needs for gadgets arises. Finally, donations from the government and well-wishers should be sourced for and there is need for the equi-distribution of such donations according to need.

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