Research Journal of Education, Teaching and Curriculum Studies
Vol. 1 No. 1 (2023): ISSN (Online): 2958-8626
DOI: https://doi.org/10.58721/rjetcs.v1i1.381
Adequacy of Computer Technology Resources for Teaching Mathematics in Public Secondary Schools in Nakuru Town Sub-Counties, Kenya

Teacher's experience on the use of Computer Technology in Teaching Mathematics in Public Secondary Schools in Nakuru Town Sub-Counties, Kenya

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Article History
Received 2023-10-23
Revised 2023-11-13
Accepted 2023-12-29
Published 2023-12-31

Keywords
Computer Technology
Mathematics
Public secondary schools
Teaching experience

How to cite:
Kiprono, W. (2023). Teachers' teaching experience in the teaching of Mathematics and use of Computer Technology in Teaching Mathematics in Public Secondary Schools in Nakuru Town Sub-Counties, Kenya. *Research Journal of Education, Teaching and Curriculum Studies, 1* (1), 51-56.

Abstract
Classroom experience helps a teacher to understand the teaching environment. Effectiveness in instilling knowledge in students is through gaining experience in teaching. Teaching experience can be explained as a state of developing skills, training, and exposure that enables a professional teacher to be more effective while instructing. Classroom experience helps a teacher to understand the teaching environment. Effectiveness in instilling knowledge in students is through gaining experience in teaching. The use of computer technology enables a teacher to gain practical knowledge on actively engaging learners and establishing an interesting class experience. Despite this, teacher years of experience were found to be negatively associated with the amount of instruction especially when using technology with less experienced teachers achieving significantly higher scores. Existing literature shows that Computer Technology can enhance instruction if basic conditions of teacher experience are met. This paper establishes the efficacy of teachers' experience with the use of computer technology in teaching Mathematics This study employed descriptive research design. A sample of 10 Mathematics teachers, 10 Principals, and one CQASO was used. The data was collected using questionnaires and Lesson observation tools and interview schedules. Data collected was analyzed and presented in, frequencies, means, percentages, and tables. Qualitative data were analyzed thematically, transcribed, organized, and reported in a verbatim form where the researcher captured the spoken words of respondents during an interview while maintaining the exact words used. The findings show that the use of Computer Technology in the Teaching of Mathematics is more done by less experienced teachers.

Introduction

Globally, many Governments have invested in the use of Computer Technologies to improve teaching and learning in institutions (Kprono,2019). The rapid growth in the use of Computer Technologies has brought outstanding changes in the 21st century. Governments of the world have invested heavily in

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the provision of Computer Technological resources in schools. However, the use of Computer Technology in teaching and learning has been limited (Buabeng-Andoh, 2012). Teachers' teaching experience can influence the use of computer technology (Kiprono, 2019). Most studies show that teacher years of experience were found to be negatively associated with the amount of instruction, with less experienced teachers achieving significantly higher scores. This paper focuses on teachers' experience which in this study refers to the length of which a professional teacher has taught in the classroom since deployment in the station. Mathematics and science subjects (Biology, Chemistry, and Physics) for length of time have been known to be a thorn in the 'flesh' of most high school students in Kenya (Mogire, 2013). In the teaching of Mathematics, the goal is to ensure the understanding of the subject matter by all students. Mathematics is considered one of the most challenging and problematic subjects in the learning environment though it is one of the most important areas of science, given that mathematical skills and knowledge are important in everyday life, and there are also many mathematical applications in other subjects and sciences (Guido, 2018).

According to Mogire (2013), the use of Computer Technology is crucial in supporting the teaching, delivery, development, and enriching teaching experience of perceived difficult subjects like mathematics. Teachers are expected to focus on fostering the students' understanding of mathematical concepts and they should provide a quality education environment for them. Many students find it difficult to engage with mathematical concepts (Stipek et al., 2001). For learning to take place, students need to be actively engaged with the discovered concepts or objects – whether abstract or concrete (Liang & Sedig, 2010).

Ashburn and Floden (2006) assert that Computer technology is important in teaching Mathematics, this calls for emphasizing it noting that tools that instantly relate the graphical and symbolic representations of mathematical expressions can help make understanding goals more accessible to students. "Simulations that make abstract concepts visible and manipulable can help students comprehend the nature and applications''. Notwithstanding this perception, performance in national examinations in the subject was still low. This fact is illustrated by the persistent poor performance of most of the students in the subjects. The dismal performance, according to most researchers could be attributed to teachers' experience in teaching (Ogembo, 2012). This could be attributed also to abstract concepts in the subject. The use of computer technology in teaching abstract concepts would make it easier for learners to understand (Mwalongo,2011). This study sought to assess the influence of teachers' teaching experience on the use of Computer Technology in the teaching of Mathematics On theorizing on the use of technology in Mathematics education, this research adapts the Tutor-Tool-Tutee notions, the White Box–Black Box idea, the idea of Microworlds and Constructionism, and the Amplifier–Reorganizer duality. It focused on specific concerns related to using computer technology in teaching.

Teachers' Teaching Experience and Use Computer Technology in Teaching Mathematics

According to Kiprono (2019), using computer technology in teaching is a complex process hence one can encounter a lot of challenges. A lot of factors affecting the use of Computer Technology in schools have been revealed which resulted in minimal use, hence leading to the capability deprivation of teachers to effectively deliver curriculum and to receive quality education using Computer Technology. These were grouped into personal, social, and environmental factors. Teachers' teaching experience is widely linked with computer technology in classrooms. In an examination of teaching

using computer technology in Italy, results showed that both personal theories of teaching and the level of experience with technology play a major role in how teachers use computer technology (Mahdi, Hassan; Al-Dera & Abdullah, 2013).

A lot of research showed that the use of Computer Technology in schools is limited, some showed that teaching experience influenced the successful use of Computer Technology in classrooms (Wong & Li, 2008) while other research reported that teachers' experience in teaching did not influence their use of Computer Technology in teaching (Niederhauser & Stoddart, 2001). Teachers' teaching experience is one of the important factors that influence the use of computer technology. Teachers are a great asset in education for dynamic evolution though some studies claimed that experienced teachers were less ready to use Computer Technology in their teaching, this poses the question of why. What length of teaching experience is likely or does the use of Computer technology in teaching Mathematics remains an unanswered question (Kiprono, 2019). Thus, this study established teachers‟ teaching experience on the use of Computer Technology in teaching Mathematics in secondary schools in Nakuru Town Sub-County Kenya.

In a survey of almost 3000 teachers, Russell, O'Dwyer, Bebell, and Tao (2007) argued that the quality of Computer Technology use was related to the teaching experience, but no distinction has been shown as to which level of teaching experience use of computer technology while teaching as opposed to the other. This study was set to establish the influence of teachers' teaching experience on the use of Computer Technology in teaching Mathematics. Baek, Jong & Kim (2008) also claimed that experienced teachers are less ready to use Computer Technology in their teaching and that teachers with less experience in teaching were more likely to use Computer Technology in their teaching than teachers with more experience in teaching. On the contrary, Lau & Sim (2008) conducted a study among secondary school teachers in Malaysia, and their findings showed that teachers with more teaching experience regularly use Computer Technology in the classrooms more than teachers with less teaching experience. This has left a gap as to which category uses Computer Technology in teaching Mathematics.

Research Methods

A descriptive research design was used to obtain data on the Influence of Teacher's Teaching experience on the use of Computer Technology in Teaching Mathematics. The qualitative data were statistically analyzed to describe trends in responses to questions. The study population consisted of 25 principals, 60 Mathematics teachers, and 1 CQASO from 25 public secondary schools. The sample size for the study involved 10 principals, 10 SMASE-trained Mathematic teachers, and 1 County Quality Assurance and Standard Officer (CQASO), forming 24.4% of the study population which is in line with Kothari (2014) who recommends that a population less than 1000, a 20 % is adequate to form a representative of the sample. This study determined the relationship between the dependent variable which was the use of Computer Technology and the independent variable which was Teachers' teaching experience. The researcher employed purposive sampling techniques based on teachers who had trained with SMASE and they were all included in the sample. Those not trained with SMASE were excluded.

Teachers' Experience and Use of Computer Technology in Teaching Mathematics

In this study, teachers' experience in teaching Mathematics was categorized as follows: 1 year and below, above 1 to 2 years, above 2 to 3 years, and finally, 4 years and above. Teachers were assigned

points based on the number of years they had taught. The teachers who had taught for 1 year and below were awarded 1 point; above 1 year to 2 years, 2 points; above 2 years to 3 years; 3 points and for 4 years and above; 4 points. The interpretation for this teaching experience was as follows points, mean less teaching experience, 3 points mean moderate teaching experience and 4 points indicate more teaching experience in this study. This interpretation is presented in Table 1.

Table 1: Score Points and its Interpretation

Interpretation

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Score points	**Interpretation**
1-2	Less experience
3	Moderate
4	More experienced

Table 2 presents information on teachers' teaching experience in the use of computer technology

Table 2: Teachers' Teaching Experience in Teaching Mathematics

(n =10)

Teaching Experience	**No of Teachers**	**Total points**
Below 1 year	2	2
Above 1 to 2 years	4	8
Above 2 to 3 years	3	9
4 years and above	1	4
Overall mean points	**10**	**2.3**

Table 2 has information on teachers' teaching experience in the use of computer technology. These findings showed that 6 teachers had up to 2 years of teaching experience, 3 teachers had 3 years of teaching experience, and 1 teacher had 4 years of teaching experience. According to the research findings of this study, the majority of teachers had 2 years of teaching experience and therefore had less teaching experience. The average mean point for teachers' teaching experience was 2.3 as indicated in Table 2 showing that less experienced teachers use computer technology more than experienced teachers. This finding is concurrent with Baek, Jong, and Kim (2008) who claimed that experienced teachers are less ready to use computer technology in their teaching. This is confirmed by 1 respondent who had 4 years of teaching experience. The findings were strengthened by the majority of principals who during their interview were asked to state which level of teaching

experience teachers use computer technology and results showed that 6 out of 10 principals gave their view that less experienced teachers use computer technology more than more experienced teachers. From these findings, it is clear that less experienced teachers, young teachers middle-aged teachers, teachers who have taught for a shorter length or newly employed teachers are willing and enjoy using computer technology in teaching. This can be concluded that teachers with less teaching experience do use and enjoy computer technology in teaching mathematics more than experienced teachers. This finding concurs with (Wong & Li, 2008) who suggested that teaching experience influences the successful use of computer technology in classrooms. These findings also agree with Jong and Kim, (2008) who claimed that experienced teachers are less ready to use computer technology in their teaching. This is confirmed by 1 respondent who had 4 years of teaching experience which in this study was the highest level of teaching experience.

The analyzed data on teaching experience and as shown in Table 2, showed that 6 teachers had up to 2 years of teaching experience, 3 teachers had 3 years of teaching experience, 1 teacher had 4 years of teaching experience.

According to the research findings of this study, the majority of teachers had 2 years of teaching experience and had more points of using computer technology in teaching. The study findings showed that teachers' acquaintance with computer-based resources, technical applications, technological errors associated with computer technology use, the nature of the curriculum, and students' characteristics are contributing factors to the use of computer technology in teaching. It can be concluded that less experienced teachers use computer technology while teaching more than experienced teachers. This finding agrees with Baek, Jong & Kim (2008) who claimed that experienced teachers are less ready to use computer technology in their teaching.

Conclusion

The findings of this study clearly show that teachers who are less experienced, young teachers, middle aged teachers, teachers who are fresh from university, and newly employed teachers are willing and enjoy using computer technology in teaching. The majority of teachers had 2 years of teaching experience and had more points of using computer technology in teaching mathematics. It can be concluded that teachers with less teaching experience do use and enjoy computer technology in teaching mathematics more than experienced teachers who have taught for the same length of time. This is confirmed by 1 respondent who had 4 years of teaching experience which in this study was the highest level of teaching experience.

References

Ashburn, E. A., & Floden, R. E. (Eds.). (2006). *Meaningful learning using technology: What educators need to know and do*. Teachers College Press.

Baek, Y., Jong, J., & Kim, B. (2008). What makes teachers use technology in the classroom? Exploring the factors affecting the facilitation of technology with a Korean sample. *Computers and Education*, 50(8), 224-234.

Buabeng-Andoh, C. (2012). Factors influencing teachers adoption and integration of information and communication technology into teaching: A review of the literature. *International Journal of Education and Development using ICT, 8*(1). Open Campus, The University of the West Indies, West Indies. Retrieved July 25, 2023 from https://www.learntechlib.org/p/188018/

Guido, R. M. D. (2018). Attitude and motivation towards learning physics. *arXiv preprint arXiv:1805.02293*.

Mogire, M. W. (2013). *Factors Affecting Use of Computers in Teaching and Learning Mathematics in Secondary Schools in Kisii Central District, Kisii County, Kenya* (Doctoral dissertation, Doctoral Dissertation, Kenyatta University).

Kiprono, W. M. (2019). *Assessment of Factors Influencing Use of Computer Technology in Teaching of Mathematics in Public Secondary Schools in Nakuru Town Sub-County, Kenya* (Doctoral dissertation, Maseno University).

Kuvuuka, M. (2013) Factors Affecting Information Communication Technology Integration in Teaching and Learning in Public Secondary Schools in Mutito Constituency, Kitui County Kenya. *Unpublished Master's Thesis*. University of Nairobi.

Lau, B., & Sim, C. (2008). Exploring the Extent of ICT Adoption among Secondary School Teachers in Malaysia. International *Journal of Computing and ICT Research*, *2* (2), 19-36.

Liang, H. N., & Sedig, K. (2010). Can interactive visualization tools engage and support pre-university students in exploring non-trivial mathematical concepts? *Computers & Education*, *54*(4), 972-991.

Mahdi, H. S., & Al-Dera, A. S. A. (2013). The Impact of Teachers' Age, Gender, and Experience on the Use of Information and Communication Technology in EFL Teaching. *English Language Teaching*, *6*(6), 57-67.

Mwalongo, A. (2011). Teachers' perceptions about ICTs for teaching, professional development, administration, and personal use. *International Journal of Education and Development using ICT*, *7*(3), 36-49.

Niederhauser, D. S., & Stoddart, T. (2001). Teachers' instructional perspectives and use of educational software. *Teaching and teacher education*, *17*(1), 15-31.

Ogembo, J. G., Ngugi, B., & Pelowski, M. (2012). Computerizing primary schools in rural Kenya: Outstanding challenges and possible solutions. *The Electronic Journal of Information Systems in Developing Countries*, *52*(1), 1-17.

Russell, M., O'Dwyer, L. M., Bebell, D., & Tao, W. (2007). How teachers' uses of technology vary by tenure and longevity. *Journal of Educational Computing Research,* 37(4), 393-417.

Stipek, D. J., Givvin, K. B., Salmon, J. M., & MacGyvers, V. L. (2001). Teachers' beliefs and practices related to mathematics instruction. *Teaching and teacher education*, *17*(2), 213-226.

Wong, E. & Li, S. (2008). Framing ICT implementation in a context of educational change: a multilevel analysis. *Journal of School effectiveness and school improvement,* 19 (1), 99-120.