Original Research Article

Technology integration for out-of-school time learning: The roles of teachers

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This study investigated the roles of teachers towards technology integration for out-of-school time (OST) primary school learners. The study was conducted in three peri-urban districts of three regions in Tanzania, which are; Mwanza, Arusha and Dar es Salaam. Teachers of 11 best schools one from each division of these districts were purposeful selected as respondents. The study used a multi case study design with mixed approach. The study began with a preliminary study at a school that used educational technology in teaching where the experiences of the respective teachers in encouraging pupils to use educational technology in OST were solicited. These experiences were the basis for constructing the questionnaire that was administered to 83 teachers of the 11 schools. The Results of this study revealed that, among other things, the use of digital tools as teaching aid and communication tool by teachers encourages pupils to use the educational technologies at OST. It was concluded that, full participation of teachers as champion of technology integration is vital to hasten technology integration in OST. Government and other stakeholders are recommended to facilitate the capacity building that equip teacher with skills and knowledge necessary for OST educational technology integration.

Key words: Out-of-school time, technology integration, primary school learners, primary school teachers' roles.

INTRODUCTION

According to Indianapolis Afterschool Coalition (2002), out of school time learning involves a wide range of activities that are learned before school, after school, on weekends and during vacations. George Lucas Educational Foundation (2007) defines technology integration as the use of technology resources in daily classroom practices, and in the management of a school. Similarly, Jolene (1999), defined technology integration as the process of organizing the goals of teaching and learning and the technology into a coordinated, harmonious whole. Vikashkumar (2005) views technology integration as a powerful tool for enhancing learning environment, where learners are motivated and given the opportunity to be engaged with instructions in and outside the class rooms; supplementing teachers' instructions in classroom; increasing access to teaching and learning resources; and facilitating school administrative duties like record-keeping and analysis. More insights concerning the roles of teachers towards the

integration of educational technology for OST learning is definitely an undertaking that deserves attention, particularly in a society like Tanzania where challenges such as unsatisfactory pass rates in primary school education (Sumra and Katabaro, 2014) is a genuine concern.

Literature firmly supports the role of teachers in transforming the teaching and learning processes through technology. Miller (1988) asserts that teachers are at the forefront as leaders when it comes to influencing the teaching-learning process inside the classroom. Cuban (2001) argues for inclusion of teachers in the decision making process alongside the policy makers as from the start as a step towards securing their trust and commitment to the ICT integration. Byron and Bingham (1998) maintains that a leadership is the single most important factor affecting the successful integration of technology at all levels. According to them, schools which

have made the significant progress in technology integration are those whose teachers are energetic and committed leaders.

Researchers have currently attempted to study technology integration within school environments in Tanzania. Those studies include a study by Mgaya (1994) on the history of educational technology integration in education system, and a study by Nyirenda (2013) on government based project for educational technology integration in schools. With regard to OST learning practices, several studies have concentrated on the effectiveness of private tutoring in Tanzania. Amon and Joviter (2003); and Mark, (2003), for example, studied the trends and government positions on private tutoring. Studies by Astridah (2009), and Osaki (2000), dealt with the impact of over-dependence of private tutoring on students' development and achievements.

Despite several research findings on technology integration drawn from classroom settings, and studies on the trends of private tutoring in Tanzania, little has been done to explore the roles of primary school teachers towards technology integration in the contexts of OST learning. Primary school teachers are considered as leaders in education system and their roles in bridging the in-school and OST learning contexts is inevitable. The awareness of the roles of teachers in educational technology integration is essential to envision relevant strategies for their capacity building. This study investigated the roles of teachers for successful educational technology integration in Tanzanian primary schools in the context of OST learning.

METHODOLOGY

Study Design

This study is based on multi case study design. The objective of the case study method is to locate the factors that account for the behavior-patterns of the given unit as an integrated totality (Kothari, 2004). Kothari (2004) identified major steps in case study design as; recognition and determination of the status of the phenomenon to be investigated or the unit of attention, collection of data, examination and history of the given phenomenon, diagnosis and identification of causal factors as a basis for remedial or developmental treatment and determination of remedial measures. The case study research is a very useful method as it allows expanding and generalizing theories by combining the existing theoretical knowledge with new empirical insights (Yin, 1994).

Study Location

This study was conducted in three peri-urban districts of three regions in Tanzania, which are; Mwanza, Arusha and Dar es Salaam. These regions were selected based on the fact that, as the three largest cities in Tanzania, they create

the contexts in which parents, pupils, and teachers were assumed to be more aware and sensitized in issues of educational technology. The use of educational technology has been found to be more advanced in urban and peri-urban areas than in rural areas (Kelly, 2013).

Dar es Salaam, Arusha and Mwanza are the leading cities with internet service providers including Vodacom Tanzania, Tigo and Airtel Tanzania Broadband (Lamudi, 2015). According to the survey by the TCRA (2013), Dar es Salaam, Mwanza and Arusha are the top three regions in the ownership of a decoder and television. The availability of internet connections and television indicate that a good percentage of the population is sensitized on ICT issues. Thus, such stakeholders were expected to be in a better position to provide rich experiences and opinions regarding the use of educational technology. The Misungwi district council (Mwanza), Meru district council (Arusha) and Kinondoni rural (Dar es Salaam) as peri urban districts, were selected for investigation in this study. Based on NACTE (2014), Kinondoni District of Dar es Salaam is categorized as Kinondoni Town and Kinondoni Rural District whereby Kinondoni Rural covers the peripheral surrounding Kinondoni District. In the same categorization of NACTE, this study regarded Kinondoni Rural as equivalent to a peri-urban district and hence selected it for investigation.

The peri-urban districts were thought to have moderate living conditions between rural and urban areas and thus represented the conditions of the majority in Tanzania. Since the study was intended for testing the integration of educational technology, a purely rural setting could not suit the experiment as such an area could have suffered a lack of reasonable infrastructure to support the educational technology use in OST.

Research Approach

A mixed research approach (qualitative and quantitative) was used in this study. According to Collins (2003), a research can be approached qualitatively, quantitatively or both quantitatively and qualitatively (mixed approach). A mixed approach (qualitative and quantitative) was used in this study. Quantitative approach relies on measurements which tell us how often a phenomenon behave in a certain way but they do not adequately answer the question "why?" (Charoenruk, 2012). Johnson and Turner (2003) argued that the fundamental principle of mixed methods research is that multiple kinds of data should be collected with different strategies and methods in a way that reflect complementary strengths. Qualitative approach will be necessary to show the feelings and opinions of informants in relation to the teachers' roles. Quantitative approach will be used to present the data extracted from structured questionnaires by using the descriptive statistics.

Sampling Procedures and Sample Size

The current study involved a total of 83 respondents, and

most of the participants were purposively selected. The sampling procedures that were deployed in the current study are shown in the subsequent sections.

Selection of primary school Teachers

The unsatisfactory performances in primary school education in Tanzania (IIEP, 2010; Sumra and Katabaro (2014) would partly be addressed through the use of relevant educational technologies, which this study is advocating for. Furthermore, it is important to inculcate the attitude and best practices of technology use right from the earlier ages. Therefore, primary school level was selected as a focal point for this study on the basis of these reasons. Specifically, the best day schools in each division of each of the selected research districts were selected for investigation. The 2015 Primary school National examination results were used to determine the best schools.

Geographical Clustering of the Selected Districts up to 11 Divisions

Cluster sampling was used to categorize the selected districts to 11 geographical divisions. In this case, Misungwi and Meru districts councils were clustered in their 4 and 3 divisions respectively. Following the fact that the Kinondoni rural District was designed by NECTA to facilitate the works of the education officers, the researcher was assisted by the District education officers (Assistant Chief district quality control Officers) who had experienced with the functioning of this categorization, to geographically split the location into 4 approximately equal units.

Selection of School for Preliminary Investigation of the Stakeholders' Preferences

Criterion and convenience sampling was used for selecting a school for preliminarily investigating the teachers' roles towards the use of educational technology by OST learners. The selection targeted a primary school that the use educational technology in classroom teaching. Given the fact that the school was using television and DVD in classroom teaching, it was reasonably assumed that the pupils would have been enticed to make use of educational technology for OST leaning. In this case mathematics which is among the challenging and core subject was used as a target subject so that in case of any advantages that may be directed to the target subject in the course of the study, would contribute in addressing such challenges. Therefore, mathematics teachers and class teachers from class one to six were selected as respondents.

   Teachers were asked to mention the actual roles that they play in motivating their pupils to use educational technologies during OST. The practices that appeared more frequently (by at least 50% of the respondents) were compiled to form the list of the proposed roles. This list formed the list of options from which the research

questionnaire was constructed. Thereafter, the questionnaires were administered to the class teachers and mathematics teachers of the three research districts to find out their consensus on the solicited roles. The design of the questionnaires adapted the Likert scale technique whereby the respondent was supposed to rank her/his perception with respect to each practice.

Criterion Sampling for 11 Best Schools

Criterion sampling was used to select the first best day-schools from each of the 11 divisions (i.e. 1 school x 11 divisions = 11 schools). Teachers from these schools were approached to provide their suggestions on the preferable best practices in relation to the use of educational technologies for OST learning. It was reasonably assumed that most of the outperforming day scholars were more likely to study during OST than the less performing scholars. Since one of the reasons for enquiring from teachers was to learn the best preferred practices from successful stakeholders, the outperforming schools were therefore, the best to learn from.

Criterion sampling for teachers of the Best Schools

Inquiry about the perception of the teachers' roles in encouraging OST learners to make use of educational technology was done to class teachers and mathematics teachers of the best schools (i.e. 2 teachers × 7 classes/streams × 11 schools = 154 teachers) . However, it was noted that, apart from the fact that some of teachers taught mathematics in more than one class, several of them were both the mathematics and class teachers. Thus, a total of 83 teachers were available for the study.

RESULTS

The study sought to establish the extent to which teachers were willing to facilitate their learners to utilize educational technology in OST. The teachers of the three regions of the study indicated how they support the proposed practices as presented in the subsequent sections.

Using digital tools as teaching aids

The questionnaire responses established that 58.8% of the teachers in Arusha agreed, 23.5% disagreed, and 11.8% remained neutral about the need of using the digital tools as teaching aids. In Mwanza, 40.9% of teachers strongly agreed, 27.3% strongly disagreed and 13.6% agreed on the practice. In Dar es Salaam, 58.3% agree, 16.7% strongly agreed, 12.5% disagreed, 4.2% strongly disagree, and 8.3% remained neutral on the practice. This implies that the majority of teachers were aware of the acceptable teaching practice of using the teaching aids and that were eager to make the subject matters easily understood.

Communicate to parents on pupils' academic matters

The study established that, 64.7% of teachers in Arusha strongly supported the idea of using ICT to establish communication with parents, 29.4% just supported whereas in Mwanza, 36.4%, supported, 27.3% opposed, and 22.7% strongly opposed. In Dar es Salaam, 62.5% supported, 25.0% strongly supported, and 12.5% remained neutral on the practice. These results, therefore, meant that most teachers from the three regions were enthusiastic to cooperate with parents to ensure the improvement of OST learning.

Use digital tool to communicate to pupils regarding academic issues

The study established that 29.4% of teacher in Arusha disagreed, and 23.5% remained neutral with the idea that they should use digital tools to communicate to pupils on academic matters while, 11.8% strongly agreed with the practice. In Mwanza, 40.9% disagreed, and 27.3% strongly agreed, 18.2% strongly disagreed, and 4.5 remained neutral. In Dar es salaam, while 54.2% agreed, and 16.7% remained neutral on the idea. The results indicate that the majority of teachers in Mwanza and some of teachers in the other regions did not support the idea of communicating to pupils digitally, perhaps because they thought that they could communicate to students during the school hours or during OST through their parents.

Assisting pupils with materials to learn about the use of digital tools

The study established that in Arusha, 41.2% agreed, 29.4% strongly agreed and 11.8% disagreed on the practice of providing pupils with digital educational tools or programmes for learning. In Mwanza, 54.5% agreed, 22.7% strongly disagreed and, 13.6% disagree with the idea. In Dar es Salaam, 54.2% agreed, 16.7% disagreed, and 12.5% strongly agreed with the idea. While majority of teachers in Arusha and Dar es Salaam were willing to assist their pupils with materials to learn about educational technology, some of teachers in Mwanza were not willing to do so, perhaps because they thought that it was the responsibility of parents to do so, and they were afraid to be shouldered with such responsibility.

Teach the pupils how to use educational tools

The study further established that 47.1% of teachers in Arusha strongly agreed and 47.1% agreed that they should teach their pupils how to use digital tools. It was also established that 27.3% of teacher in Mwanza strongly disagreed and 18.2% agreed with the idea. In Dar es Salaam, 62.5% agreed and 16.7% strongly agreed on the practice. While the majority of teachers in Arusha and Mwanza agreed with the idea of teaching pupils how to use technology, the majority in Mwanza disagreed. May be the

teachers in Mwanza were afraid that if primary school pupils are taught about how to use technology, they may abuse the knowledge by making a negative use of it.

Warn pupils to avoid negative use of ICT

In Arusha, 64.7% of teachers strongly supported and 35.5% just supported the idea that warning pupils to avoid negative use of ICT is a best practice. In Mwanza, 54.5% strongly agreed, and 22.7% agreed with the idea. On a similar practice, 58.3% agreed, and 16.7% strongly agreed with the practice in Dar es Salaam. Generally, the majority in the three regions were aware of the impacts of negative use of technology on youngsters' behaviour and academic performances, and so they were prepared to warn them accordingly.

Tell pupils advantages of using ICT for learning

The study further established that 58.8% of teachers in Arusha strongly agreed and 41.2% agreed that they should tell pupils the advantages of using ICT for learning while in Mwanza, 50.0% of teachers strongly agreed, and 31.8% agreed and 9.1% remained neutral. In Dar es Salaam, 58.3% agreed, and 25.0% of teachers strongly agreed with the practice, while 8.3%, disagreed with the practice. The findings indicate that the majority of teachers in the three regions thought that if pupils are well sensitized about the advantages of technology, they would regulate themselves by replacing its negative use with positive ones.

Give pupils home work that need the use of ICT

It was established that, in Arusha, 29.4% of teachers agreed, 23.5% disagreed and 17.6% strongly agreed that they should give pupils home work that needed use of ICT. In Mwanza, 36.4% of teachers agreed, 36.4% strongly disagree, and 18.2% disagree on a similar practice. In Dar es Salaam, 45.8% of teachers agreed, 20.8% strongly agreed, and 16.7% disagreed on the practice. While majority of teachers in Dar es Salaam agreed with the practice, some of teachers in Arusha and majority of them in Mwanza were not willing to give homework that require their pupils to use the educational technology. One may think that the teachers in Dar es Salaam assumed that their pupils had access to technology, while teachers in Mwanza were uncertain of whether their pupils had access to education technology at their homes which they could use for attempting the homework.

Encourage parents to facilitate their children with digital learning materials and facilities

The study established that, in Arusha, 41.2% of teachers supported the idea that they should encourage parents to facilitate their children with digital learning facilities, 23.5% remained neutral, and 17.6% strongly supported the practice. On the other hand, 40.9% of teachers in Mwanza

Table 1. Summary of Teachers' Facilitation Perceived Best Practices

Practice	Opposed (%)	Supported (%)	Supported-Opposed (%)
Telling pupils advantages of proper use of digital tools	7.2	88.4	81.2
Warning pupils to avoid bad use of digital tools	8.7	84.1	75.4
Using digital tool to communicate academic issues to parents	12.1	80.2	68.1
Teaching pupils how to use digital tools	19.9	69.9	50.0
Providing pupils with materials for learning about digital issues	25.0	67.0	42.0
Encouraging parents to buy digital tools for children	26.4	62.7	36.2
Using digital tools as teaching aid	27.0	63.2	36.2
Giving pupils homework which needs use of digital tools	36.3	51.5	15.2
Using digital tools to communicate academic issues to pupils	42.9	42.2	-0.7

Source: Field Data (2017)

just supported the idea, 31.8% strongly opposed, and 9.1% opposed the same idea. Also, in Dar es Salaam, 54.2% supported, 25.0% strongly supported, and 20.8% opposed the practice. The findings indicates that, despite of the opposition of some of teachers, majority of them were willing to cooperate with parents in boosting the use of technology for educational pursuits. They realized that the shortage of teaching and learning facilities which their school might have suffered from, would be lessened through the efforts of parents

SUMMARY OF THE RESULTS

The summary of the findings is presented in Table 1. It was established that, teachers supported all of the proposed practices, with an exception of the practice of using of technology to communicate academic issues to pupils. However, the difference between the supporting and opposing percentage was insignificant.

As shown in Table 1, since the scores for supporters (42.2%) and these who of oppose (42.9) were almost equal, it implies that there were other teachers who were enthusiastic of taking the advantage of communication technologies to communicate important issues to pupils during their home time or vacation. Even if the opponents may have thought that they would communicate to pupils during school hours, or do the same via their parents during OST, the supporters of the practice went extra miles and realize that there may be a need of communicating directly to learners for certain issues. A teacher for example, may need to remind her or his pupil to use the technology or work on the long vacation assignment, and this may have more impact if a teacher talks direct to the pupil. Sometimes, some pupils may be living with parents or guardian who are not competent with some of academic issues, and so they may not be able to intermediate the communications between the learners and teachers. This will again necessity the teacher to communicate direct to the learner. Therefore, given the enthusiasm of the other teachers whose scores was almost equal to the opponents of the practice, and given the consideration that circumstances may oblige the teacher to communicate

direct to pupil during the OST, the practice was considered not to be neglected.

Furthermore, it can be learned that teachers were more supportive to tasks that hold responsible the third party. In this case, talking to pupils about the positive use of technology (81.2%) and effects of its negative use (75.4%) were averagely prioritized by teachers. On the opposite hand, teachers seemed to relatively assign less weight to practices that were thought to demand more commitments from them. These include: giving pupils homework which needs use of digital tools (15.2%) and using digital tools as teaching aid (36.2%). One may be tempted to think that, these who opposed the practice were afraid of the time demand. Sometimes, preparing a class that is attached with technologies as teaching aid or preparing and marking of homework is time demanding and teachers may have been afraid of it.

DISCUSSION

Contrary to the traditional teaching where a teacher teaches there and then, the nature of the interventions of teachers on OST learning as proposed in this study as shown in Table 1, mostly advocate for a teachers to play the facilitation than teaching roles. The shifting of teaching to facilitation role of a teacher is also supported by the theory of constructivism. In the constructivist classroom, students interact with the environment and create their own interpretation of the world instead of being mere recipients of information transmitted to them by the instructor (Jonassen, 2000). The term 'techno-constructivist' has been used to describe teaching-learning activities that integrate technology into the curriculum so that it complements and redefines instructions (McKenzie, 2000).

Rakes et al. (1999) supports that technology can provide a vehicle for accomplishing constructivist teaching practices. They reveal that the amount of technology available, the level of technological skills of the teachers, and the use of technology are directly related to the use of constructivist methods in the teaching and learning process. Similarly, Collins (1991) asserts that, technology-rich learning allows more autonomy and individualized

instruction and active engagement by the learner. Thus, instead of merely teaching, a primary school teacher should encourage and inspire the pupils to independently utilize the educational technology. By so doing, learners will build interest on technology, and independently expedite efforts that are enough for new discoveries and embracement of innovation spirit.

CONCLUSION AND RECOMMENDATIONS

This study intended to investigate the roles of teachers in hastening technology integration for out-of-school primary school learners. It was found that the roles that a teacher can play to encourage pupils to use the educational technologies include: using digital tools as teaching aid; using digital tools to communicate academic issues to parents; using digital tools to communicate academic issues to pupils; providing pupils with materials for learning about digital issues; teaching pupils how to use digital tools; cautioning pupils to avoid bad use of digital tools; telling pupils about advantages of proper use of digital tools; giving pupils homework which needs use of digital tools, and encouraging parents to buy digital tools for children.

The presentation and discussion of the finding above concludes that full participation of teachers as champion of technology integration is vital to hasten technology integration in OST. The application of technology by primary school learners for educational pursuits is vital to address the challenges of unsatisfactory performance in Tanzanian primary school education. It is therefore recommended for the responsible educational stakeholders to build the teachers' capacity for technology use, and sensitize them to influence their pupils to apply educational technologies during OST. Further studies are important to explore and suggest what should be done to motivate teachers and schools in general to embrace the educational technologies for the betterment of pupils and the country at large.

Conflict of interests

The authors declare that they have no conflict of interests

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