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BEST PRACTICES IN USING EDUCATIONAL TECHNOLOGY BY OUT-OF-SCHOOL TIME LEARNERS

Dr. Thadei A. Kiwango

Lecturer, Department of Informatics,Institute of Accountancy Arusha, United Republic of Tanzania

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ABSTRACT

This paper identifies the best practices in the use of educational technology during out-of-school time learning. The study was conducted in Arusha, Dar es Salaam and Mwanza regions in Tanzania. A preliminary study was first carried out to establish actual practices in the use of educational technology among learners. Learners were asked to state the actual practices that they apply in using the educational technology. The most frequent perceived best practices were used as a benchmark in constructing a questionnaire which was later administered to the respondents from the research regions for them to rank the perceived best practices. The findings suggest that effective use of educational technology demands users jot down key ideas, pay due attention to the media, identify problem areas, and keep records of essential programmes for future reference. Additionally, learners have to adhere to the schedules, and avoid unintended programmes especially those forbidden by adults. These findings call for the joint efforts among educational stakeholders especially school administrators, teachers and parents to ensure that learners in both public and private schools actually embrace the best practices in the course of using Information Communication Technology (ICT) with a view to creating enabling OST learning environment among learners and ultimately improve academic performance. Furthermore, studies need to be done to find the best ways the findings of this study could apply to other countries and higher levels of education.

INTRODUCTION

The political will towards the support of educational technology in Tanzania is implicit in various relevant policies. The policies include, among others, the National ICT Policy 2016, and the ICT Policy for Basic Education (URT, 2016; 2007). The former, in particular, underscores the need to support education delivery through development and deployment of an electronic education system. This policy has subsequently made some institutions to use ICT and develop Out- of -School Time (OST) learning programmes through local media. The institutions include the Ubongo Ltd, the Tanzania Broadcasting Corporation (TBC), UNESCO-China-Funds-in-Trust (CFIT) and XPRIZE Project (Communication Network Initiative, 2014; Semwaiko, 2014). Whereas the CFIT project seeks to harness technology for quality teacher training in Africa, the XPRIZE Project promotes early learning through innovative technologies (UNESCO, 2017; WFP, 2017; UNESCO, 2018). Technology integration in the Tanzanian education system is also enabled through the use of ICT in teachers' colleges, secondary schools as well as inclusion of computer as a subject in schools. Technology integration in education has also surfaced as Education Management Information System (EMIS), the Tanzania Education Services Website, the Barclays Computer for Schools and the Computer Procurement and Refurbishment for Schools (Nyirenda, 2013).

It is also important to note that some OST learners abuse educational technologies as they may

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use the technologies for perpetuating risky behaviours. A survey conducted in South Africa, for instance, found that only 13.5% of the primary school and secondary school learners used educational technology for school-related activities (UNICEF, 2011). Such activities include chatting on social networks, which consumes about 30% of children's time. The survey also revealed that children spend 16% of their time for watching non-academic television programmes while 16% is spent on movies and hanging out with friends and playing computer games consumes 12% and 4% of their time respectively.

Similar findings have also been seen in Terzian, Giesen, and Mbwana (2009), whose study indicated that it is not enough to expose children to learning technology; rather, effective use of technology should be sought, especially by making learners perceive the practice positively. Similarly, Kiwango (2006) opines that inadequate availability and application of contextual framework for ICT integration may also hinder effective exploitation of ICT in Tanzania. Essentially, a contextual framework of ICT use prescribes the best practices for effective adoption of educational technology. This study is an attempt to establish the best practices for effective use of educational technology by OST learners in Tanzanian primary schools. The paper draws from a Thesis submitted for award of a doctoral degree of the University of Dodoma (Kiwango, 2018). The Thesis focuses on the development of a model to hasten technology integration for OST learning for primary school pupils in Tanzania.

LITERATURE REVIEW

Learning theories

This paper subscribes to some learning theories in an attempt to situate it in technology integration for OST learning context. One of the theories is behaviourism; the theory calls for the need to predetermine objectives to foster learning practices. In other words, behaviourism requires the behaviour of learner to be predefined; and that learning is perceived as a permanent change of behaviour (Huitt and Hummel (2006). This point of view fits in this work since it agrees with the idea of having the learning practices defined beforehand such that the learners' behaviour is consequeltly controlled. This is particularly important as the use of technology like television may attract unintended programmes especially for young children in primary schools. Therefore, defining and explaining what is expected of learners becomes equally vital. However, among the opponent of behaviourism is Boulding (1984), who thinks that human behaviour can only be changed through cognitive processes; the view which seems to be overlooked by behaviourists. This makes it imperative to review the Cognitive Theory as well.

The cognitive theory of learning is interplay of the nature of the subject matter, the learners' conception of the subject matter and the mechanisms for cognitive change (Strauss, 1997). In this case cognitive change has to do with the development in the learners' cognitive schema, resulting primarily from teaching and learning process (Shawer, 2006). In the context of technology integration, the cognitive theory is relevant in that technology has to use methods that echo learners' cognitive abilities. However, the cognitive theory tends to ignore the role of the learners' environment. This makes it necessary to review constructivists' views as well.

Constructivists assume that learning takes place through by thinking and doing as mediated by participation in activities (Jonassen, Peck, and Wilson, 1999). This kind of learning demands limited guidance and motivation and application of the accrued knowledge in new situations (Kirschner, Sweller, and Clark, 2006). The use of constructivist methods makes learners self-motivated and committed to think critically (Juniu, 2006). Techno-constructivist describes the teaching and learning practices which are technology-driven as an attempt to improve the learning environment (McKenzie, 2000). It has been claimed that technology may facilitate constructivist teaching and learning (Rakes, Flowers and Casey, 1999). Moreover, Collins (1991) contends that technology-driven learning results in more autonomous and individualized instruction, culminating in active learning. Ideas from constructivism fit in the OST practices as learning takes place mostly in the absence of teachers' total control. Therefore, determination of the best practices is imperative in facilitating independent learning.

The Out-of-school Time learning

Out-of-School (OST) learning involves school activities conducted outside the school schedule. This could capture activities in which learners engage before school, after school, during vacations and weekends (Indianapolis Afterschool Coalition, 2002). According to Ashleigh (2010), effective use of educational technology in OST saves costs, cultivates independent learning and enhances morale for accomplishing and revising school assignments and contents.

Technology integration

Technology integration has been viewed as the use of technology in regular classroom and school management activities (George Lucas Educational

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Foundation (2007). According to Faulder (2011), technology integration entails application of technology to accomplish pre-defined learning outcomes. At a glance, these two outlooks tend to restrict technology to the classroom. However, Earle (2002) conceives of technology integration in broader terms; accordingly, effective technology integration captures technology content, technology tool and effective practices through which the technology content is delivered and applied. The conception of Earle (2002) is adopted in this work as it views technology integration as effective application of technology resources, in terms of technology content, technology tool and best practices.

ICT status for primary school learners in Tanzania

A study by Maro (2014) investigated the use of computers in public and private primary schools in Tanzania; whereby data was extracted from the Basic Education Statistics (BEST) for the year 2012. It was found that primary schools in Tanzania (which were by then about 180,987) had only 7,035 computers. A study conducted by Komba and David in 2016 in Morogoro Municipality found that 95% of 120 primary school pupils could use computer following the introduction of ICT in the school curriculum. This is an indication that Tanzanian primary school learner can master ICT facilities if given the opportunity to learn. This is supported by David (2012); who adds that regardless of previous experience with digital media, pupils can learn and use ICT within a limited time without even teachers' assistance. The assumption of this research work is that Tanzania pupils can make use ICTs in OST for academic ends if they are properly guided. This calls for sensitization and orientation of primary school pupils to best practices; and this is the main thrust of this work.

Private tutoring practices in Tanzania

In most developing countries, many students spend their OST time in private tutoring centres (Mark, 2003). In Tanzania, for instance, the practice is noticeable in both primary and secondary schools, even in the midst of the official ban imposed by the Ministry of Education (Mbelle and Katabaro (2003). One of the setbacks, however, is the observation by Osaki (2000) that some private tutors only give notes from books to learners; instead of making learners think and apply the gained knowledge in new and real life situations. Other challenges of private tutoring in Tanzania are identified by Astridah (2009) as under-qualification of teachers and abuse of tutoring time by learners. In particular, some tutors are business-oriented while also some learners use the window to engage in immoral practices.

It has also been found that students who attend private tuition fail to think analytically since the teacher has to do everything for them; including the assignments given in regular classes (Astridah, 2009). Despite the outlined weaknesses, private tuitions have become such fashionable in developing countries that even the imposed restrictions have failed to stop the practice. This is partly attributed to the impact they have especially with regard to performance in examinations (Mark (2003).

It is the assumption of this work that the weaknesses associated with private tuitions could be mitigated by use of educational technology during OST learning which could assist learners to learn at home. In order for this to bear the expected outcomes, determination of the best practices is a pedagogical imperative. The best practices are expected to guide the OST learners to exploit educational technology at affordable costs and favourable environment.

METHODOLOGY

Study location

This paper draws from a research work conducted in Arusha, Dar es Salaam and Mwanza regions in Tanzania. The three regions represent the popular cities in the country, whose population was found to be well versed with relevant technology including decoders and televisions (Lamudi, 2015; TCRA, 2013). It was, therefore, expected that the respondents in such cities would be more conversant with educational technology and therefore in a better position to participate to the study. Kelly (2013) supports that the population in urban and peri-urban than in rural areas are more acquainted in the use of technologies.

Specifically, Meru District Council (Arusha), Kinondoni Rural (Dar es Salaam) and Misungwi District Council (Mwanza) were investigated as peri-urban districts. According to NACTE (2014) Kinondoni Rural is a peripheral area surrounding Kinondoni District whereby it is regarded as equivalent to a peri-urban district. It was considered that the three peri-urban districts have moderate socio-cultural and economic conditions that could represent the Tanzanian majority instead of typical rural or urban conditions. The use of the three regions was useful to reflect the varied socio-cultural conditions that might cascade from them.

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The preliminary study

It was necessary to capture the perceptions of stakeholders since the study aimed at defining the contextually best practices in the use of educational technology. To capture the stakeholders' perceptions, a preliminary study was a key starting point. The preliminary study was to be carried out in a school that already used educational technology for instructional pursuits, and a typical one was located in Arusha. It was thought that the use of educational technology in regular learning practices would hearten learners to use technology even during OST learning.

The preliminary study involved 27 (3 best pupils in 3 classes with 3 streams each) best performing pupils from class four to six. The selection was based on the pupils' performance in the latest semester examinations. The assumption was that the best performers were likely to have been more involved in learning activities during regular and OST; and that they could as well make more use of educational technology. Thus, such pupils were expected to be more conversant with educational technology and hence in a better position to respond to the study. Pupils in the upper classes were thought to be more experienced in using educational technology than pupils in lower classes. However, pupils in class 7 were not involved in the preliminary study since by then they had completed their studies.

The participants were instructed to list their preferred practices for the use of educational technology. The most frequently listed practices (at least by 50%) were compiled to form a list of the perceived best practices from which a questionnaire was constructed. The questionnaire was validated through experts' opinions and literature review as well. After that, the questionnaire was administered to the participants in the study regions for them to rank their preferred practices based on the Likert scale.

Primary schools learners as main participants

The primary school pupils constitute a group considered most prone to technology abuse (UNICEF 2011) probably owing to their low reasoning capacity. Therefore, the best practices were envisaged to provide them with some kind of guidance on the use of educational technology during OST learning. The preference of primary school pupils was also motivated by the assumption that young learners need to cultivate positive attitudes towards the use of educational technology early enough for them to embrace educational technology in future. Additionally, poor academic performance among primary school pupils has been reported (IIEP, 2010; Sumara and Katabaro, 2014); where the use of educational technology was also expected to address this challenge.

In the actual study, 11 best day schools were purposefully chosen each from the 11 Divisions of the three Districts. Misungwi District Council was partitioned in four administrative divisions while Meru District Council was divided into three divisions. As for Kinondoni Rural District, the researcher was assisted by the District Chief School Quality Assurance Office whose field officers had knowledge and practical experience of the area and the locations of the respective schools, in splitting it into 4 approximately equal geographical divisions. The divisions were therefore regarded as equivalent to the administrative divisions of the other two districts. The narrowing of districts into divisions was intended to capture the socio-cultural diversity of the regions. The basis for selection of such schools was the results of the 2015 NECTA Primary School Leaving Examination (PSLE).

The best school from each of these 11 divisions was purposively selected. Moreover, the best three learners in each class (irrespective of number of streams) from class 5 through 7 were included on the basis of the latest examination results. There were 92 pupils who responded to the administered questionnaire. Learners in best schools were thought to be active in OST learning and so they were likely to have more insights on OST learning as compared to poor performers. It was envisaged that best performers would be able to translate their conventional study experiences into the digital world. For that case, they were better positioned to share their perceptions of the best practices in the use of educational technology during OST learning.

RESULTS

Participants were asked to rank the practices they considered best to accelerate the integration of educational technology in their OST learning. They were required to indicate whether they strongly disagreed, disagreed, neutral, agreed or strongly agreed. The results are presented in the following sections.

Writing down main points

Table 1 shows the results pertaining to writing down main points as a best practice in using educational technology.

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Table 1: Writing down main points

Region	Responses (%) Strongly disagree	Disagree	Neutral	Agree	Strongly disagree	Total
Arusha	15.8	0	0	42.1	42.1	100
Mwanza	12.5	18.8	6.3	21.9	40.6	100
Dar es Salaam	8	16	8	32	36	100

Source: *Adapted from Kiwango (2018)*

The findings showed that 42.1% of pupils in Arusha strongly perceived and perceived writing down main points as the best practice, and 40.6% of those in Mwanza strongly perceived the idea as the best practice. For the case of Dar es Salaam, 36% of the pupils strongly perceived the practice as essential. These findings imply that writing down key points is among the best practice presumably because it serves as reference.

Concentration when using educational technology

The perceptions of pupils on concentration as a best practice are summarized in Table 2 below.

Table 2: Concentration when using educational technology

Region	Responses (%) Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Total
Arusha	0	0	5.3	26.3	68.4	100
Mwanza	3.1	0	0	21.9	75	100
Dar es Salaam	4	4	8	48	36	100

Source: *Adapted from Kiwango (2018)*

On the basis of the statistics in Table 2, 68.4% and 75% of pupils in Arusha and Mwanza respectively, strongly agreed that concentration on educational technology is among the best practices. As for Dar es Salaam, the practice was agreed by 48% of the respondents. Only between 0% and 4% of the respondents in the three study regions disagreed with the idea as the best practice. Thus, it could be concluded that most learners would concentrate on presentation made through educational technology to enhance their understanding.

Noting difficult areas

Pupils in the study were also asked to state the degree they agreed with noting down difficult areas as a best practice in educational technology. The findings are as presented in Table 3 below.

Table 3: Noting Difficult Areas

Region	Responses (%) Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Total
Arusha	0	5.3	0	36.8	57.9	100
Mwanza	6.3	15.6	3.1	18.8	56.3	100
Dar es Salaam	0	8	12	32	48	100

Source: *Adapted from Kiwango (2018)*

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The findings indicate that those who strongly agreed with the practice of noting difficult areas were between 57.9% and 48%. The findings also show that only 8% to 15.6% of pupils in the three regions disagreed with the practice. This suggests pupils would note down problem areas and deal with them later. This could probably allow them ample time to consult reference sources for better understanding of the subject content.

Recording important programmes for future use

Respondents were also to indicate the extent to which they agreed with recording programmes for future reference as a best practice. The findings are presented in Table 4 below.

Table 4: Recording important programmes

Region	Responses (%)					Total
	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	
Arusha	0	5.3	5.3	36.8	52.6	100
Mwanza	0	15.6	6.3	25	46.9	100
Dar es Salaam	6.3	8	12	28	52	100

Source: *Adapted from Kiwango (2018)*

With reference to the findings in Table 4 above, between 52.6% and 46.9% of the respondents strongly agreed that recording important programmes for future use was among the best practices. On the contrarily, neither pupils in Arusha nor in Mwanza strongly disagreed with the practice whereas 6.3% of pupils in Dar es Salaam strongly disagreed with the practice. It is thus logical to conclude that respondents in the three regions gave credits to the practice of recording important programmes for future revision.

Setting and following timetable for using educational technology

Regarding the practice of setting and following timetable as a best practice, the results appear in Table 5 below.

Table 5: Setting and following timetable for educational technology use

Region	Responses (%)					Total
	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	
Arusha	0	5.3	0	31.6	63.2	100
Mwanza	3.1	15.6	3.1	15.6	62.5	100
Arusha	0	0	16	28	56	100

Source: *Adapted from Kiwango (2018)*

The findings in Table 5 indicate that between 63.2% and 56% of the pupils in the study regions were in strong agreement with the idea of setting and following timetable for educational technology as a best practice. On the other hand, between 0% and 3.1% of the pupils strongly disagreed with the idea. These findings mean most pupils were in agreement with the need to have a fixed time table for learning through educational technology.

Avoiding the use of technology for programmes that compromise academic performance

Pupils in the study also indicated their perception on the avoidance of abusing educational technology as best practice. Results are summarized in Table 6 below.

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Table 6: Avoidance of bad technology use

Region	Responses (%)					Total
	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	
Arusha	0	15.8	0	36.8	47.4	100
Mwanza	3.1	0	0	40.6	56.3	100
Dar es Salaam	0	12	4	40	44	100

Source: *Adapted from Kiwango (2018)*

The results in Table 6 above suggest that 47.4% of pupils in Arusha, 56.3% in Mwanza, and 44% in Dar es Salaam strongly agreed that it was worth avoiding the use of educational technology for non academic pursuits. While 3.1% of pupils in Mwanza strongly disagreed with the idea, none of them in Arusha or Dar es Salaam had the similar outlook. This suggests that a good number of pupils in the study regions knew the impact of technological abuse on their academic performance; and this kept them safe against risky practice. As the findings show, however, some pupils could still use educational technology for non academic ends, presumably due to the influence of peers.

Not using programmes forbidden by adults

Pupils were also required to show the degree to which they agreed or disagreed with the need to avoid forbidden technology programmes as a best practice. Results are presented in Table 7.

Table 7: Avoidance of forbidden programmes

Region	Responses (%)					Total
	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	
Arusha	5.3	5.3	5	26.3	57.9	100
Mwanza	6.3	0	0	9.4	84.4	100
Dar es Salaam	0	0	8	24	68	100

Source: *Adapted from Kiwango (2018)*

The results show between 84.4% and 57.9% of the pupils were in strongly agreement with the practice of avoiding forbidden programmes. However, 5.3% of pupils in Arusha and none of them in the other two regions disagreed about the practice. This is an indication that a good proportion of pupils would use digital technology as directed.

DISCUSSION

It has been shown in this study that effective use of educational technology demands that learners write down key points, and also concentrate on the technology. Similarly, they should also note down difficulties, record important programmes for future use, set and follow the set timetable. Moreover, learners should avoid abusing educational technology, while avoiding use of forbidden programmes. The findings are in agreement with the existing body of knowledge as established in different studies. For example, Rowntree (1982) found that taking notes is essential as pupils interact with educational technology as it helps them to extend the span of attention as opposed to mere watching. Similarly, taking notes makes learners pay due attention to the technological content; while also enhancing memory (Kesselman, 1982). According to Rowntree (1982), notes should be organized in such a way as to ease review and reference. Alexandra (2005) claims that children do possess agronomies through which they communicate with one another, and this also subsumes hidden messages; and so they should be encouraged to take notes to capture more materials.

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Taking notes can be extended to include recording difficult areas and this demand active concentration as learners should first understand the content before they take notes or locate problem areas. In the course of concentration for the sake of recording difficult areas, the learners automatically develop better understanding of the content. It has been found that concentration on educational technology presentation positively correlates with learning effectiveness. For instance, Solomon (1984) claims that learners who concentrate on technology seriously expend more mental effort and engage in active processing. This is to say, to foster OST learning, learners need to be guided to concentrate as they are using the educational technology.

The findings also win the support of the existing learning theories. For instance, constructivism requires the learner to actively engage in learning. It has been evident in the findings that learners have to be actively involved in several activities as they interact with educational technology in the context of OST learning. For example, learners have to set and follow the timetable, write down key points, and identify problem areas. Moreover, they have to record important programmes for future reference.

CONCLUSION AND RECOMMENDATIONS

The findings of this study have shown that successful technology integration in primary school demands a clear definition of best practices so that learners become actively and effectively engaged. This should go hand in hand with co-operation between teachers and parents; for example, in terms of frequent home assignments by teachers; and supervision of parents and guardians for instance in ensuring that the timetable is closely adhered to, concentration on technology, and taking notes as well. Thus, this paper calls for a joint efforts among the educational stakeholders especially school administrators, teachers and parents to foster the best practices towards the use of educational technology so as to create a conducive environment where the learners can harness the benefits of this technological oriented century. In terms of further studies, focus should be on the way to customize and use the recommended best practices outside Tanzanian and in higher levels of education.

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