

2016

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Recommended Citation

Mwapwele, Samwel D. and Roodt, Sumarie, "The extent of usage of mobile devices for learning outside the classroom in a secondary school in Tanzania" (2016). *CONF-IRM 2016 Proceedings*. 15.

<http://aisel.aisnet.org/confirm2016/15>

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65. The extent of usage of mobile devices for learning outside the classroom in a secondary school in Tanzania.

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Abstract

Secondary school students are labelled as bad mannered, and low achievers because of their extent of using mobile devices. Elder siblings and parents have not supported these students use of mobile devices. In some cases, students have had their devices confiscated. Little do parents know; their children are using mobile devices for learning outside the classroom. Students view using their mobile devices for learning to be compatible with using textbooks and that as they use the devices outside the classroom, they are supplementing their learning. When confused, they contact teachers for clarification. To understand the extent of secondary school student's use of mobile devices for learning outside the classroom in Tanzania, a single secondary school was purposively selected. A total of 202 students responded to questionnaire, and 20 students were interviewed by the researchers. The theory of diffusion of innovation was employed to provide an understanding of the phenomenon of interest. This research aims to debunk the myth on secondary school student's use of mobile devices, equip students staying far from schools, and with less resources evidence of a tool they can use for learning, provide a theoretical elaboration on usage of mobile devices for learning, and apprise the informal learning community.

Keywords

Consequences of student's use of mobile devices, Education, Extent of mobile device use, Mobile learning, Secondary schools in Tanzania, Technology enhanced learning.

1. Introduction

For years, the educational system in Tanzania has suffered from same problems. At secondary school level, problems are consistent. These include: lack of teaching aids (Kirono, 2014; Mushi, 1996 and Tungaraza, 2015) shortage of teachers (Bray, 1985; Mtebe, Mbwilo & Kissaka, 2016 and Wedgewood, 2007), and shortage of books and reading materials (Nyerere, 1985 and Tungaraza, 2015). We argued, mobile devices are able to assist in reducing the impact of these problems on secondary school students.

Despite two hundred percent increase in mobile device access in Tanzania between 1999 and 2012, and secondary school students owning mobile devices (National Bureau of Statistics, 2013 and Chambo et al. 2013) little research has been done to explain the extent of student's use of mobile devices for learning outside the classroom.

We identified that, student's use of their mobile devices for learning outside the classroom assists them in understanding concepts, and with content creation (Ahmed & Parsons, 2013 and Swan et al. 2005). Students learn at own pace outside the school premises. We argue, students spend more time outside school environment and hence understanding their use of mobile devices for learning is imperative (Ciampa, 2014 and Oblinger & Oblinger, 2005). Whether at a cafeteria, public transport, or even at home, students have the ability to use devices to learn something new, clarify concepts, or assist peers. For that, this research intends to answer the question; to what extent do secondary school students in Tanzania use their mobile devices for learning outside the classroom?

2. Literature review

Worldwide, students use mobile devices for learning outside the classroom at primary school, secondary school, and university (Jones et al. 2010 and Santos & Ali, 2012). In developed nations, children start using the internet at 8 years, mostly through computers and later mobile devices (Oblinger & Oblinger, 2005). African, and Tanzanian students are using mobile devices outside the classroom (Bappah, 2013 and Tungaraza, 2015). Mobile devices allow students to communicate to peers, and relatives using networks they have created.

Mobile devices offer certain benefits to students. Argued to assist in enhancing learning while outside the classroom and possibly, influence academic performance (Melhuish & Falloon, 2010). African students have adopted the use of mobile devices for learning outside the classroom (Bappah, 2013). Students view using devices outside the classroom compatible to using textbook. The compatibility is not to mean mobile devices replace textbooks, rather impact to life-long learning.

In terms of communication, apart from being taught in class, students in developed countries receive academic information from peers (Ciampa, 2014 and Tapscott, 1999). African students communicate to peers outside the class on what was taught in class and share their understanding (Bappah, 2013). They observe and learn from peers as they can relate to, share struggles with, and impact one another in learning.

While there is widespread use of mobile devices for learning by secondary school students in developed nations, research in Africa on the matter is written either from courses taught or projects (Cloete, de Villiers & Roodt, 2009 and Mtebe & Raisamo, 2014). Generally, students in secondary schools in Tanzania use mobile devices for learning (Chambo et al. 2013 and Kafyulilo, 2014) and believe this can provide a relative advantage over peers.

Students understand concepts and retain better using audio, visual and graphical data than text on a ratio of 3:1 (Oblinger & Oblinger, 2005). Studies done in Africa depict student's use of audio, visual and graphical applications (Roodt, 2013). These tools, provide a good area for students to learn by trial while using the internet.

Rather than allowing circumstances to control students, the student centered learning approach allows students to acquire knowledge before class, and discuss during class times (Ciampa, 2014.) In African context, the approach allows students to switch roles with teachers (Vavrus,

2009). They impact one another as the teacher remains a facilitator. Using mobile devices, complex issue like lack of teaching aids, and shortage of reading material can be overcome as student's use mobile devices outside the classroom to learn.

The norm in developed nations allows students use of mobile devices for learning outside the classroom, and teachers embrace this (Ciampa, 2014). In Tanzania, student's use of mobile devices for learning has been perceived negatively, and creates unknown consequences to students (Kafyulilo, 2014). These consequences based on societies view of students use of mobile devices for learning, has led to lack of empirical data.

2.1 Diffusion of Innovation as applied to students use of mobile devices for learning

Beyond general use of mobile devices, little is known of the extent that secondary school students use mobile devices for learning outside the classroom in Tanzania (Kafyulilo, 2014). To understand this, deduction from the theory of diffusion of innovation (DoI) is necessary. Specifically, of two concepts, innovation, and social system as the adoption of mobile devices for learning outside the classroom is viewed to be a new phenomenon in the country context.

Innovation includes the following characteristics; observation, trial, compatibility, complexity, and relative advantage. Social systems are visible through norms, network interconnectedness, and consequences (Rogers, 1983). Excluding student's networks, getting a relative advantage, and consequences, no explanation is available on remaining characteristics based on empirical evidence from Tanzania.

Adoption of mobile devices is viewed as an innovation, and with that, it contains uncertainties (Rogers, 1983). Parents and teachers have myths, and are skeptical of student's use of mobile devices for learning outside classrooms. Providing the extent of student's use of mobile devices for learning is a contribution of this research through theoretical elaboration.

As an innovation, students have many reasons to adopt mobile devices for learning (Valente & Rogers, 1995). Among them; they believe it simplifies communication between them, and offers a relative advantage (Georgiev, Georgieva & Smrikarov, 2004), they view it as compatible to formal education, both intending on impacting lifelong learning (Dangel & Wang, 2008), they prefer to try and use audio, visual, and graphical information (Oblinger & Oblinger, 2005), they observe peers who have already adopted mobile devices. The more observable adopting an innovation is, the less the uncertainty, and the higher the rate of adoption (Rogers, 2003).

Diffusion is a social process. In that, the meaning of innovation is socially constructed (Valente & Rogers, 1995). The norms in the society have hindered understanding the extent of student's use of mobile devices for learning as little empirical evidence is available (O'bannon & Thomas, 2014 and Sahin, 2006). This has been from parents, and teachers alike. Despite the norms, students have created good networks that have allowed them to impact peers (Oblinger & Oblinger 2005). Students have suffered consequences as a result of using mobile devices for learning outside the classroom, this includes; linking use to decline in morals, being labelled as bad mannered, low achievers, and even prostitutes (Ito & Okabe, 2005 and Rogers, 2003).

3. Methodology

Literature depicts existence of multiple explanations on the extent of student's use of mobile devices for learning outside the classroom. We argue, this depicts no universal truth exists, and that data collection is a collaboration between the researchers, and students. This research uses a relativist ontology, and an interpretive epistemology (Walsham, 2006).

A single, purposively chosen secondary school was employed as the case study with the intention of appreciating the dynamics existing in the context. We conducted the research at the school premises after obtaining permission from the research representative (Lee 1989). The secondary school is situated in Dar-es-salaam which is the hub of the country (Kabanda & Brown, 2010). The school itself is a high performing school in the city.

Stated in section two, little empirical research has been done in this area, and necessitated using mixed method approach i.e. quantitative, and qualitative techniques for data collection to overcome shortfalls of each method. Triangulation was attained by starting data collection with questionnaires, following up with semi-structured interviews, and documenting everything as a participant observer (Creswell, 2003).

Concepts from the theory of diffusion of innovation were used to create questions employed on the questionnaire, and interview. Concepts adopted and used were; relative advantage, observability, trialability, compatibility, complexity, norm (only on interview), network interconnectedness, and consequences (only on interview). Data analysis techniques that were employed included descriptive statistics for quantitative data, and thematic analysis for qualitative data. All interviews were coded as S#, where S stands for student, and # represent the number of respondent i.e. S5 to be student number 5.

Data was collected at once and as such the timeframe for this research was cross-sectional (Rogers, 1983). After normal class times, and with their permission, all grade 12 (202) students were given a 2 paged questionnaire that was self-administered. Grade 12 students are argued to be in constant communication as they prepare for national examination (Katapa & Swilla, 1999). From the same group, 20 (4 top performing) students volunteered for semi-structured interviews and were informed of all relevant ethical issues. As DoI studies depict, one none adopter was interviewed.

Data collection was conducted in three weeks in April and May, 2015. Questionnaire distribution and collection for all grade 12's took one hour, and interviews took 25 to 40 minutes each. Students requested to mix languages, for that, the researchers asked them questions in English or Swahili, and allowed them to answer in, whichever language they deem fit. The researchers, converted all discussions to English during transcription.

We loaded all questionnaire data into Epi Info 7 for descriptive statistics with the intention of understanding frequency distributions, as depicted on the table below. All interviews were transcribed on Atlas.ti 7, nonsystematic codes were applied based on the DoI concepts, and themes were analyzed with an intention of offering theoretical elaboration. During thematic analysis, co-occurrence was used to depict relationships between concepts.

4. Findings and discussion

Data depicts a broad understanding of some aspects that students agreed in relation to their use of mobile devices for learning outside the classroom, in some areas, differences in understanding, and application emerged. We argue, the table provides a snapshot of student's understanding and communication of their use of mobile devices.

No	Concept	Characteristics and aspects	Frequency			
			Yes	No	Missing	Total
1	General use					
		1.1 Search for information	124	78	0	202
		1.2 Socialize	144	58	0	202
		1.3 Recreation	151	51	0	202
		1.4 Academic	131	71	0	202
2	Innovation					
		2.1 Compatibility	171	25	6	202
		2.2 Observability	161	31	10	202
		2.3 Relative advantage	192	6	4	202
		2.4 Complexity	115	82	5	202
		2.5 Trialability				
		2.5.1 Students used google for learning	148	50	4	202
		2.5.2 Students used YouTube for learning	88	111	3	202
		2.5.3 Students used camera or video on device for learning	63	135	4	202
		2.5.4 Student who have used maps for learning	65	133	4	202
3	Social system					
		Network Interconnectedness				
		3.1 Call a friend to ask for a solution(s)	141	58	3	202
		3.2 Receive a call to offer a solution(s)	132	67	3	202
		3.3 Send SMS to ask for a solution(s)	131	69	2	202
		3.4 Receive an SMS to offer a solution(s)	134	66	2	202
		3.5 Use instant message to ask for a solution(s)	87	113	2	202
		3.6 Receive an instant message to offer a solution(s)	87	112	3	202

Table 1: Frequency distribution of student's use of mobile devices between Jan and April.

Generally, outside the classroom, we noticed students use mobile devices to socialize, search for personal information, for recreation, and for academic reasons. Student use devices to search for ongoing political discussions, to assist sick relatives in searching for details on dietary requirements, and search for sports information. Chambo et al (2014) and Kafyulilo (2014) support these findings.

S10 "I use my device for accessing gaming applications, social networks, reading e-books (these are novels and any other books that I can download, not necessarily for school work), and searching the internet for learning new things."

Actual student's use of devices for learning outside the classroom.

We observe that students are using mobile devices in diverse ways. Mobile devices assist students to reach one another instead of physically meeting, observe one another and decide on devices to buy based on peer's advice, search for information on the internet, and using search engines to assist them in understanding subjects and teachers better. At the same token, the language used, and unreliability of information on the internet, has made students to infer to teachers for clarification. To offer a theoretical elaboration of concepts from DoI, characteristics available are discussed to provide insight into the application of the theory in the empirical situation.

4.1 Compatibility of using mobile devices and supplementing textbooks

Supported by quantitative data, we argue that, students use the internet as an alternative source of information. Students use their devices to search for solutions for homework, assignments, and projects given at school. This depicts compatibility to traditional education system, both impacting life-long learning. Rochadel, Silva, Silva, Luz, & Alves (2012) argue, and argue for the need of using mobile devices for learning that is “compatible, not antagonist, with the way that people learn” (p2).

S10 “For example, a teacher would summarize some information in class. When you go and use the internet, you will gain more knowledge by looking at pictures and videos. Let’s take Biology, the teacher has drawn a picture of a cell, I would go to the internet and check on a video to understand its reality.

We acknowledged students concerns especially with the use of the internet. During interviews, a student mentioned the necessity of following syllabus based textbooks as those are focus of examinations.

S17 “In other cases, some materials on books are well explained for example in History, if you go to the internet you will find different answers as that is subjective to the way the person perceived that historical information, and explanations differ.”

4.2 Observability of students use of devices and its influence to decision making

We learnt students observe peers, siblings, and even in some cases parents as they use their devices and learn from them. Quantitative data supports this by depicting student’s behavior of relying on friends. They value their input when making decisions on what device to purchase. This gives them the upper hand of buying a familiar device. We note, students are willing to assist when they see peers struggle. Students identify with peers by reading comments they have written on internet sites. This is supported with research from Ciampa (2014) and Ito (2005).

S19 “On the internet, you get pictures, you see people's comments about the topic you are reading. You can even see its origin (source).”

4.3 Relative Advantage obtained from using devices

We identified students gain relative advantage from using devices for learning. Using quantitative data, students depict their belief on the relative advantage they acquire. They search for information and acquire knowledge, they compare their learning to peers not using devices, and state they (students using mobile devices) learn better. They argue that using mobile devices, they can discuss with peers. Nguyen, Barton & Nguyen (2015) depict same findings on a systematic literature review on the use of iPad.

S17 “Of course, there are other points that a person who only uses textbooks will need to read a number of other books to understand. As I use the internet, I will get more points. I will get access to pictures that explain better, example on maps it’s easier to understand using apps. It’s also flexible while learning instead of carrying exercise books and moving from one place to another and write, while on the internet, you just download notes and its flexible learning.”

4.4 Students experience of complexity on using mobile devices for learning

Quantitative data depicts serious concerns on the complexity brought by mobile devices for learning. During interviews, students mentioned a number of complexities they face while using mobile devices for learning. These include; language issues, device compatibility, and academic content concerns. This is observed in research work by Seong (2006) and Kroustallaki et al (2015). We argued, these complexities can be reduced by offering students more information on effective ways of using mobile devices for learning.

S9 “Some ideas that I find on the internet using my device are beyond my level, beyond what I am being taught, and hence, they get me confused.”

We identified controversy during an interview, a student stated they struggle with the English language used in one of the textbooks. This we believe enlighten, and encompasses the need for revisiting textbooks to ensure the language used is simple, and concepts are well explained.

S3 “Sometimes you will find that on a textbook they have summarized or by using complicated language and I don’t understand, so I decide to google and I get an understanding from that.”

4.5 Students trial of using mobile device for learning

With the help of quantitative data, we identified that students try to use certain applications and websites through their mobile devices for learning. Students visit Google, and YouTube to get better explanations through content shared by others. They use their devices to record audio, video, and take pictures that they share with peers. They depict their trialability by even using map applications on their devices. In their research, Chambo et al (2013) and Furió, Juan, Seguí & Vivó (2015) conquer with these findings.

S8 “I have shared a video that I found on YouTube to my friends on WhatsApp.”

4.6 The norm in a typical secondary school in Tanzania

In a typical secondary school in Tanzania (and a number of African countries), teachers assume the role of parents when students are at school. Teachers in secondary schools condemn student’s use of mobile devices even outside classrooms. We noticed this prevalent in our study. As participant observers, we heard teachers telling students not to use mobile devices even at home, as they access inappropriate material and waste time. They insist, this might lead to examination failure. Those staying at boarding facilities (at the school), are not allowed to have mobile devices until end of term. While this is part of school rules (policies), we believe these measures are strict. Kafyulilo (2014) and Tapscott (1999) conquer with identification of these norms in schools. Campbell (2006) argues “it is important not to lose sight of the constructive uses of the technology in educational contexts” (p287).

S2 “They decided that, boarding students are so favored than day scholars. When a day scholar is caught with a phone, they can be paraded during morning assembly, or expelled from school. But for boarding students we are told when we finish form IV (grade 12), we shall be given our phones.”

S7 “Some of the teachers at school, have stated that we are spending most of our time on the internet and we forget our studies which leads to failure. Our commerce teacher has been the leader in this. He is about 50 years old.”

4.7 Application of network interconnectedness among students

Quantitative data provides a descriptive understanding on student's use of mobile devices for learning. Students call, send SMS's, and instant messages to one another to either ask for answers, or provide answers to peers. They use their networks to assist one another. They communicate, and assist even friends in different school. Ciampa (2014) and Oblinger & Oblinger (2005) noted of this in their studies.

S2 "I have a sibling in another secondary school. They are usually given homework to do during school holidays, so if my sibling doesn't know what to answer, he contacts me and asks for solutions. I end up recording myself (inferring to voice note), and send to him as the solution."

4.8 Consequences students face as results of using mobile devices for learning.

We identified that, the perception on student's use of mobile devices for learning is negative. These views come from either elder siblings, or parents, and have had consequences on students. We also noticed a myth that parents and siblings have on student use of mobile devices. Siblings, or parents, assume students chatting instead of studying and have made critical decisions towards them, including confiscating devices (Kafyulilo, 2014 and Tapscott, 1999).

S14 "I was told, I do not study, and I am forever playing on my phone, by my parents. There were other times when they decided to confiscate my phone. They return the phone when my study time is done."

S18 "It was like, I was googling about literature review for the project, and I ended spending a lot of time on my device searching for information on literature review, but my sister thought for all that time I was chatting to friends and not reading. What unfolded is that she confiscated my phone for a short time and returned it."

We also noted that, when students communicate, there are times sending messages to one another creates disruption to the receiver, and discomfort to parents. We argue, perhaps, this is where parents and teachers, find ground for confiscating mobile devices. We also believe, as depicted by the elaboration below, before decisions are made, students should be enquired on their use of mobile device.

S5 "There have been times that I chat to my friends till 01:00am and my mom found me doing that. I was chatting to a friend in relation to project work and this was during school holiday."

Empirical evidence depicted that the use of mobile devices as an innovation has been adopted by secondary school students. They embrace the relative advantage it offers, they observe peers, they believe it is compatible to traditional educational system, they have tried it, and we argue, complexities can be reduced by offering students effective ways of using them for learning. We believe, if only the social system was stable, students would benefit from their mobile devices.

Using their networks, students try to overcome lack of teaching aids, and shortage of books and reading materials in schools by assisting one another in learning. We understand that, the norm, myth, and lack of understanding on actual student's use of mobile devices has caused certain consequences on students. While these depict teachers, siblings, and parents love to them, we urge they take a reflective view (especially outside the classroom) of their actions and support

students by offering them effective ways of using mobile devices for learning than punishing them. The use of effective ways of using mobile devices for learning to students outside the classroom is supported by informal learning community (Oblinger & Oblinger, 2005).

5. Conclusion.

To answer the question posed for this research, the adoption of mobile devices for learning outside the classroom, has assisted students to a better extent in understanding concepts, in communicating to one another, in searching for information on the internet, and equipping them with skills they can employ for lifelong learning. This offers a theoretical explanation on using DoI in education, particularly, at secondary schools with lack of teaching aids, and shortage of resources.

These students following a student centered learning system, will be capable to search for information in the near future, whether at university, work, or in businesses they will create. It opens doors for self-reliance that African presidents and researchers have been calling for. It also allows them to be independent in decision making, and provides better explanations to the informal learning community.

The networks that these students have created are enormous. One can only imagine that if this is at ordinary level, then they will expand at every level of life. It becomes imperative for future researchers to investigate reasons leading to parents, teachers, and elder sibling's views on student's use of mobile devices. There is also a need to study the reliability of websites that student's access using their mobile devices.

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