

A Survey of the University Students' Perspectives about Using Digital Technologies in Education: Zimbabwean Case

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Abstract

This study investigated the perspectives of university students on the use of digital technologies as tools for teaching and learning. Digital technologies are an essential asset for academic institutions as they can support strategic teaching and learning objectives for education institutions. Studies have shown that limited use of digital technologies could lead to a second order digital divide. This problem negatively impacts the Government and university efforts and initiatives of increased technological investment. There is therefore a need to uncover and obtain a deeper insight into university students' perspectives due to the sparse literature discussing this problem within the Zimbabwean context. Quantitative data on student perspectives was collected using 100 questionnaires administered to students at a single university of technology in Zimbabwe. Although the findings concur with existing literature that students highly value the integration of technology into their learning process, there were issues that appeared to be peculiar to the surveyed environment. For example, the surveyed students professed disappointment with the current traditional teaching methods despite the high availability and accessibility to digital technologies within the institution. They indicated their frustration emanating from the disconnection between commonly used teaching methods and the digital technologies effective for teaching and learning.

Keywords: digital technologies; perspectives; students; teaching and learning; university.

Introduction

Digital technologies are information and communication technology (ICT) that include computers, learning management systems (LMS), digital media such as wikis, blogs, social media and podcasts. They commonly refer to a broad collection of technologies which capture, process, store and transmit information in digital form. Digital technologies can be both hardware-based devices such as computers, mobile devices like smart phones, game consoles, video and audio players, and software-based applications such as web applications, blogs, wikis, social-networking sites, and chat sites. In addition, Groff (2013) identifies video and image sharing, simulations, games and gamification, handheld and tablet computing, digital cameras, scanners, virtual environments, augmented reality and wearable technologies as emerging digital technologies available for use in higher education. Table 1 depicts some common digital technologies which have proved to benefit the teaching and learning practice. These benefits include the capability of digital technologies to facilitate a more student centric as opposed to instructor centric approach to teaching and learning. Digital technologies engage and empower students, promote peer learning and creativity. The students who integrate digital technologies in their learning have been found to develop better literacy and communication skills than those who do not. More so digital technologies enable students to keep abreast with the latest technologies and thus bring returns on the costly technological investments.

Table 1: Examples of digital technologies

Digital Technology Example	Definition
Learning management systems (LMS)	Computer programs that aid e-learning through the formation of course content (Leon & Teasley, 2009)
A blog, or weblog	Online diary where entries are normally written/displayed in reverse sequential order and in addition to text messages, postings can include photos, links, video and audio (Baltaci-Goktalay, 2010)
Wiki	A web site design and authoring tool that permits a group of people collaboratively to add or edit web site content (Bajt, 2011)
Podcast	A series of digital-media (audio or video) files which are circulated over the Internet using syndication feeds for playback on mobile devices (MP3 players or iPods) and computers (Bajt, 2011)
Gamification	Deterding, Dixon, Khaled, & Nacke 2011) defined Gamification as the use of game design elements in non-game contexts.
Augmented Reality (AR)	Augmented reality (AR) is a variation of Virtual Reality which completely immerses a user inside a synthetic environment such that the user cannot see the real world around him (Kaufmann, 2003)

From a higher education perspective, digital technologies can assist with better management and administration of university activities and afford educators and students to create an environment that enables different types of social interaction. They also facilitate an increased access to information and overcome some challenges related to the time and place constraints associated with teaching and learning. Students can also take advantage of digital technologies to demonstrate their creativity in knowledge creation. The portability, ubiquity and low costs of digital technologies can enhance communication abilities and interactivity, enabling the Zimbabwean university students to be technologically savvy like their digital native counterparts as well as prepare them for survival in an information-rich digital society. In accordance, Johnson, Adams, Estrada, & Freeman (2013) posit that today's workforce requires university graduates to possess communication and critical thinking skills that can be fostered through technology-enabled learning.

Furthermore, for students to compete effectively in this digital age, they must have diverse digital skills. Emerging digital technologies like cloud computing, mobile learning, big data and social networks can enable academic institutions in Zimbabwe to capitalize on new opportunities to improve efficiency and effectiveness and achieve quality education. More so, there is evidence in literature that students who engage with appropriate digital technologies can positively impact society (Johnson, Adams, Estrada, & Freeman, 2014). It is on this premise the study sought to understand the Zimbabwean university students perspectives about of such technologies since the latter's affordances are not yet realised. It is paramount to establish such perspectives since the delays in the integration of digital technologies in education tends to widen the existing second order digital divide, a problem discussed in the next section.

Problem Statement

Technology-based teaching and learning is not visible in higher education institutions, particularly in the developing nations. Despite the widespread adoption and high access to digital technologies, their use for learning and teaching in Zimbabwean universities is yet to be realized across programs and institutions (Mbengo, 2014). Contrary to the management, decision and policy makers' technological initiatives, an insignificant number of people, in Zimbabwean higher learning institutions, is fully embracing the affordances of the digital technologies into the curriculum. The problem is rather usage than access since current studies indicate that even among universities with both high availability and accessibility; use of digital technologies in teaching and learning is still at its infancy (Bhuasiri, Xaymoungkhoun, Zo, Jeung, & Ciganek, 2012). Nevertheless, the influential causes of the low uptake have a minimal documentation. It is on his basis that the study sought to establish and document the Zimbabwean university students' perspectives about digital technologies, a phenomenon that has had a narrow focus in developing nations' context (Mbengo, 2014). In a bid to establish these perspectives, the subsequent key questions require to be answered through this study:

1. What are the university students' perspectives about digital technologies in education?
2. Which digital technologies do students own and for what purpose do they use them?
3. What digital technologies do students consider useful for teaching and learning?

The current generation of university students is affectionately considered the digital natives (Prensky, 2001). The knowledge about the students' digital technology choices, concerns and priorities could assist university management, decision and policy makers to make informed decisions about technological investments from which technological returns could be realized.

Globally the university students have developed an inherent ability and reliance on technology across all contexts of their lives (Corrin, Lockyer, & Bennett, 2010). The answer to the preceding questions are therefore necessary for making technological investments that favor the students' needs. Li and Ranieri (2010) argue that mere access to digital technologies does not translate to effective use in the learning context, hence the need to establish students' view point about what and how digital technologies should be integrated in education. In their study, Kennedy, Krause, Gray, and Judd (2006) indicated that university students seldom use the various digital technologies at their disposal to support learning. According to Echenique (2014) university students' use of digital technologies for learning is influenced by a range of factors such as subject-specialty more than individual characteristics, differences in technology access or expertise. This is an observation acknowledged in a study by Selwyn & Facer (2014) hence the aim and objectives of this study as discussed in the following section.

Objectives

The study aimed at establishing the perceptions and concerns of university students about digital technologies in teaching and learning. Although a well-researched phenomenon, little has been done with a focus on university students in developing nations (Mbengo, 2014) such as Zimbabwe. Much of the existing literature relates to the developed world, a context with students of differing experiences and expectations about digital technologies from those in the developing world. For instance, Minocha (2009) examined the use of social software with respect to UK students' learning and engagement aimed at uncovering both the benefits and the challenges students experience from using the digital technologies. Little is known about how relevant the benefits and challenges are with regard to the developing world context. It is on this background that this study sought to fill this gap in literature through the establishment of the evidence-based view of the Zimbabwean students' technological perspectives. The aim is to contribute this body of knowledge for the benefit of the relevant researchers as well as the university management, decision and policy makers.

It is vital to make informed decisions concerning technology-enabled education if returns on the costly technological investments are to be realized. More so the appeal of digital technologies in universities varies with the context. In this regard, Kennedy, et al., (2006) concludes that technological experiences are vital to informing university decision and policy formulation that can transform the way education is delivered. A consideration of students' technological concerns and priorities is vital since most developing countries seek to achieve quality education using scarce resources (Aiammary, 2012). Therefore, simply focusing on adopting digital technologies without a proper operating model or framework can result in failure (Conole, de Laat, Dillon, & Darby, 2008) that deprives learning institutions of anticipated returns. This study therefore sought to establish the students' viewpoints about digital technologies in education. The other objective was to determine the Zimbabwean students' technological choices and priorities as opposed to those of their worldwide counterparts' perspectives reviewed in proceeding section.

Related Work

Despite many studies demonstrating levels and patterns of technology access and use in education, researchers are still concerned about the underutilization of digital technologies in universities (Noguera, 2015; Johnson, et al., 2013), a persisting trend since the 1990s (Dimaggio & Hargittai, 2001). For example, Echenique (2014) examined the use of new digital technologies in teaching and learning in higher education and the findings show that in the

developed world students use a variety of digital technologies and recognize their value as teaching and learning tools

Conole, de Laat, Dillon, & Darby (2008) carried out a series of in-depth case studies on students' use and experience of technologies and their findings demonstrate that technology is at the heart of all aspects of university students' lives and students use technology to support all aspects of their learning processes. These authors' findings show that students appreciate digital technological tools and find them appropriate in teaching and learning in a variety of ways, depending on individual needs and preferences ranging from directed study, resource discovery, preparation and completion of assignments, communication and collaboration, presentation and reflection.

Likewise Liaw, Huang, and Chen (2007) as well as Corrin, Lockyer, and Bennett (2010) explored the learners' attitudes toward e-learning system usages, and found that learners have abundant computer related experience in digital technologies such as browsers and electronic mail. They then concluded that university students believe that e-learning environments are an efficient learning tool and expect teachers to satisfy their learning needs that are technology based.

The study by Jones, Blackey, Fitzgibbon, and Chew (2010) indicate that at universities there is more use of educational technologies such as Power Point, Virtual Learning Environments and Wikis. They also reveal that social networking software is valued by university students as an ideal tool that assist both the students and educators to reflect on their learning and teaching practice.

On the contrary, an investigation by Margaryan, Littlejohn, and Vojt (2011) on the extent and nature of university students' use of digital technologies for learning and socializing show that students use a limited range of established technologies with the use of collaborative knowledge creation tools, virtual worlds, and social networking sites very low Kennedy, et al., (2006) reported that while most students regularly use established and available digital technologies such as email and Web searching tools, only a small subset of students use more advanced or newer digital technologies such as such as augmented reality, games and simulations.

The reviewed literature demonstrates that university students generally appreciate the value of digital technologies as demonstrated by the wide use of such technologies in social aspects of students' lives. The main concern depicted in literature is the limited integration and disconnect between educational technologies and teaching and learning practice. University students are frustrated by popular traditional teaching methods that are without technology. They feel that the limited integration of digital technologies in teaching and learning robs them of the affordances enjoyed by their counterparts in the developed world. This practice in the relevant learning institutions interferes with the students' technological abilities. The universities appear to have failed to set up a conducive environment that promotes students' use of digital technologies in the learning process. With this background, the subsequent section discusses the methodology used to collect and analyze data from Zimbabwean university students about their perspectives with regards to digital technologies in education.

Methodology

The research drew data from one of the sixteen universities in Zimbabwe. The choice of this university case was influenced by the institution's mission to produce technologically competent human resources and a workforce that is compliant with the current digital society' labor market requirements. A survey method was employed for faster and easier access to collected data. After an approval of an ethical clearance application, one hundred questionnaires were administered to both full-time and part-time undergraduate students who were randomly selected from all the faculties. The students voluntarily participated in the survey and the anonymity of the participants was maintained with no disclosure of identities. Eighty-four questionnaires were returned, achieving an 84% response rate. Of the returned questionnaires, eighty-two questionnaires satisfied the data cleaning process with two questionnaires discarded for missing and incomplete data entries and outliers.

The survey questions were designed on the background knowledge that students' use of digital technologies is normally influenced by digital technology affordability, availability and accessibility. In addition, other questions sought to establish the demographic data, students' digital skills and competence, level of education, subject area and mode of study. The questions were easy to answer as students were mainly required to choose answers provided in the form of a 5 point Likert scale. There were a few open-ended questions for further elaboration. The collected data were analyzed using the Statistical Package for Social Sciences (SPSS) and the subsequent findings were obtained.

Findings and Discussion

Through our investigation, we obtained the underlying findings towards answering the questions asked in the preceding section. Regarding the question on the perspectives of students about the use of digital technologies in the teaching and learning, the results concur with the existing literature since the Zimbabwean students' value of technology based teaching and learning was very high. The students indicated that digital technologies are convenient and flexible tools that could enhance their learning activities as indicated in Table 2. Table 2 is a depiction of the value attached to the e-learning system tools by the students. Only 31% of the participants found the e-learning system tools not useful while 58% consider them very useful.

Table 2: E-learning portal by subject area

"Subject Area specific use of the institution's e-learning system"						
			portal			Total
			Not Useful	Somewh at useful	Very Useful	
Subject Area	Engineering	Count	6	2	17	25
		% within Subject Area	24.0%	8.0%	68.0%	100.0%
		% within portal	23.1%	22.2%	34.7%	29.8%
		% of Total	7.1%	2.4%	20.2%	29.8%
	Languages, Education	Count	3	2	5	10
		% within Subject Area	30.0%	20.0%	50.0%	100.0%
		% within portal	11.5%	22.2%	10.2%	11.9%
		% of Total	3.6%	2.4%	6.0%	11.9%
	Natural Sciences	Count	4	0	1	5
		% within Subject Area	80.0%	0.0%	20.0%	100.0%
		% within portal	15.4%	0.0%	2.0%	6.0%
		% of Total	4.8%	0.0%	1.2%	6.0%
	Creative Art and Design	Count	3	0	6	9
		% within Subject Area	33.3%	0.0%	66.7%	100.0%
		% within portal	11.5%	0.0%	12.2%	10.7%
		% of Total	3.6%	0.0%	7.1%	10.7%
	Business	Count	10	5	20	35
		% within Subject Area	28.6%	14.3%	57.1%	100.0%
		% within portal	38.5%	55.6%	40.8%	41.7%
		% of Total	11.9%	6.0%	23.8%	41.7%
Total	Count		26	9	49	84
	% within Subject Area		31.0%	10.7%	58.3%	100.0%
	% within portal		100.0%	100.0%	100.0%	100.0%
	% of Total		31.0%	10.7%	58.3%	100.0%

The surveyed students also revealed that the digital technologies are capable of improving their academic performance, as evidenced by Figure 1.

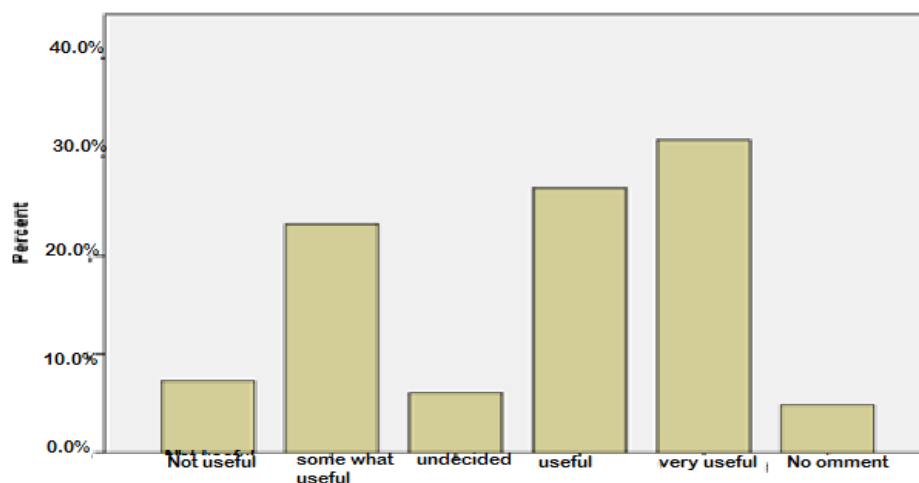


Figure 1: Value of social media in the learning practice

In Figure 1 it is clear that social networking sites are very common among Zimbabwean university students. For example, less than 10% of the surveyed students regarded these networks as useless tools for teaching and learning while the rest find them useful in education. According to the surveyed students, digital technologies are valuable tools for communicating with both lecturers and with each other. They also indicated that these technologies are desirable features that facilitate access to learning material and course content. The students' sentiments are summarized in Table 3 showing how appreciative they are of social media sites.

Table 3: Subject area-based usability of social networking technologies

		Social networking			Total
		Not useful	Somewhat useful	Very useful	
Subject Area	Engineering	4	8	12	24
	Languages, Education	0	4	6	10
	Natural Sciences	1	1	3	5
	Creative art and Design	0	2	7	9
	Business	5	9	20	34
Total		10	24	48	82

Table 3 depicts that of the eighty-two surveyed students; only ten students indicated that the social networking sites are not useful learning tools, with the students from business and engineering finding them very useful. These positive views are further augmented in the open ended questions. For instance, one of the students elaborated the benefits drawn from digital technologies in education as follows: "It is of paramount importance because reading a hardcopy textbook is harassing than reading a soft copy at times due to poor network connections, this may lead to use of digital technology not being seen as helpful."

In answering the question on students' perspectives about the digital technologies, the participant rated them very highly and would be very excited if they learning practice could be driven by these technologies. Table 4 has evidence to this regard.

Table 2: Students' perceptions about digital technologies in education

	Not useful	Somewhat useful	Undecided	Useful	Very useful	Not applicable or Missing value
	%	%	%	%	%	%
Internet search engines	0.0%	3.7%	0.0%	24.4%	63.4%	8.5%
Search for journals	2.4%	7.3%	3.7%	26.8%	52.4%	7.3%
Use recordings or videos area of study	4.9%	11.0%	4.9%	26.8%	48.8%	3.7%
Use social networking sites students on your courses (e.g. Face book)	7.3%	23.2%	6.1%	26.8%	31.7%	4.9%
Wikipedia	7.3%	15.9%	3.7%	31.7%	30.5%	11.0%
Web-based bibliography tools	6.1%	18.3%	4.9%	36.6%	23.2%	11.0%
Use web-based document (e.g. Google Docs)	3.7%	15.9%	4.9%	35.4%	36.6%	3.7%
Free educational content (e.g. i-Tunes)	7.3%	19.5%	2.4%	29.3%	35.4%	6.1%
Twitter	31.0%	26.2%	7.1%	10.7%	11.9%	13.1%

Table 4 is demonstrative of the digital technologies most common among the Zimbabwean students. The most popular and preferred technologies include search engines and journals for research purposes as well as the recorders and networking sites. WhatsApp, Wikipedia and You Tube are also among the most-used technologies by the Zimbabwean students. This could be attributed to the high availability and accessibility of the technologies and the devices compatible with them. Figure 2 demonstrates this observation. Of priority concerning students' learning is the search engines used as the primary source of information. 60% of the surveyed students also confessed to using YouTube to both share and view lectures notes from sources external to their institution.

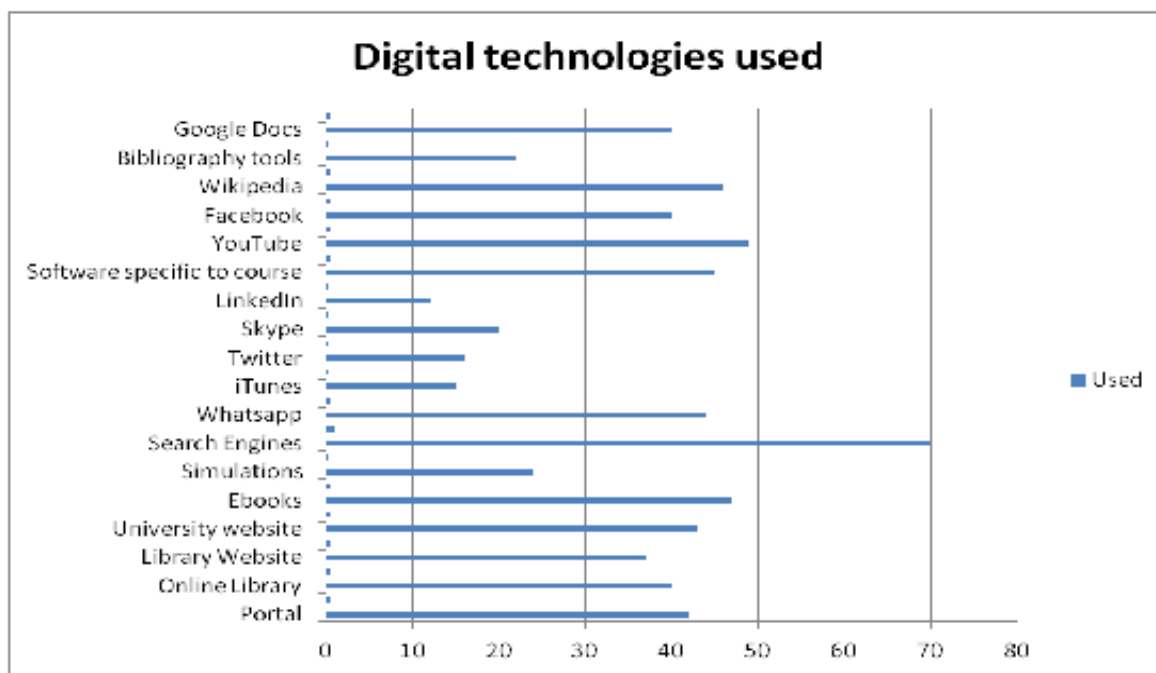


Figure 2. Common digital technologies among students

Figure 2 shows the common digital technologies for use by Zimbabwean university students in their learning. Interestingly, though, the use is concentrated on a limited selection of these technologies such as search engines at 70%. Social media like twitter, Facebook and WhatsApp have limited use in academia probably due to the idea of separating learning from social activities.

Table 5 shows that research activities are the fundamental purpose for technology use with 89% of students in favor of this use. These results can be attributed to the flexible, bring your own device (BYOD) practice where students are free to use their digital devices and software within the institutional premises.

In answering the question regarding the purpose of using digital technologies, Table 5 shows that Zimbabwean students use such technologies as tools for finding information. They also use them for downloading audio and video files, which they then listen to and watch respectively. These could be both for entrainment and learning purposes. It is clear that the Zimbabwean students rarely use digital technologies for citing purposes as evidenced by only 25% of the participants. More focus is on documentation, presentation, e-mail and collaboration activities. This shows that students integrate such technologies despite the low uptake by their lecturers.

Table 3: Common uses of digital technologies among students

Variable		Number	Percent
Find Information	no	9	10.7%
	yes	75	89.3%
Audios and Videos	no	23	27.4%
	yes	61	72.6%
Insert citations	no	59	70.2%
	yes	25	29.8%
Collaborations	no	39	46.4%
	yes	45	53.6%
Free sources	no	30	35.7%
	yes	54	64.3%
Communication with Instructors	no	36	42.9%
	yes	48	57.1%
Email33	no	32	38.1%
	yes	52	61.9%
Writing Documents	no	17	20.2%
	yes	67	79.8%
Presentations	no	18	21.4%
	yes	66	78.6%
Creating videos	no	44	52.4%
	yes	40	47.6%
portal	no	15	17.9%
	yes	69	82.1%

These results demonstrate that students focus on digital technologies that support their learning. As indicated in literature, the students' digital technology preferences are highly determined by both task completion and academic performance. For instance, in Figure 3, simulation technologies are mostly used by the students enrolled in the engineering courses as they find them handy in completing practical tasks unlike the arts and natural sciences students who have less need for this application.

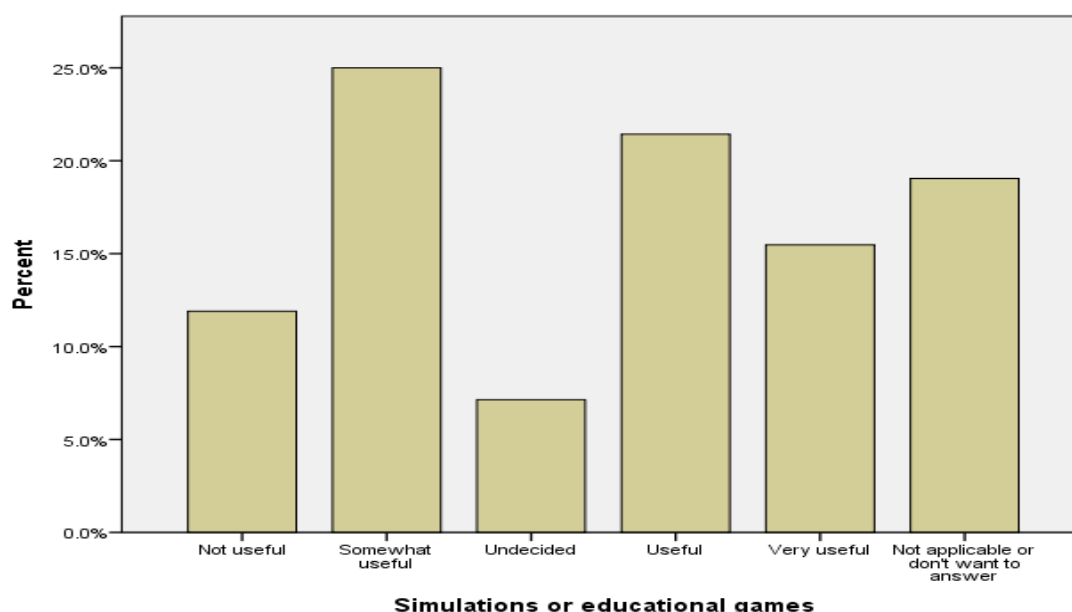


Figure 3. Course-related technology preferences

These findings also show that the university students' digital technology preferences are dependent on the capabilities of multiprocessing and discovery-based learning. Our research findings are contrary to the contention in literature that use of digital technologies by students is mostly influenced by age, giving rise to the digital natives and digital immigrants' debate. According to this research, there are minimal differences in digital technologies usage across age. However, it seemed gender shaped the use of certain digital technologies such as social networks and library websites.

Our findings also reveal that availability, accessibility and affordability were not the major determinants of using the digital technologies in learning. The findings have evidence of the affordability, availability and accessibility of the various digital technologies to the students both personally and institutionally. However, the results also show a gap between access to and use of such digital technologies as Facebook, twitter, Google docs and WhatsApp for learning purposes. This second order digital divide is puzzling considering the widespread access, affordability and availability of such technologies to the students. More so, the uptake of such digital technologies as iTunes, Web-based e-learning portal and the citation tools are not as common among the surveyed Zimbabwean university students as they are to their counterparts in the developed nations. This is evidenced by the 2.111 coefficient against a 0.184 value for twitter technology. It can thus be concluded that the popularity of the digital technology is rather consistent with environmental and institutional context than the general notion of age as stipulated in Prensky (2001).

Contrary to the documented literature, the Zimbabwean students expressed dissatisfaction with the service provision of the IT infrastructure, campus computers, bandwidth and Wi-Fi. The students argued that the available institutional infrastructure is out of date and the computers are old, such that their specifications no longer satisfy the students' educational requirements. They also complained about the slow internet connectivity and low bandwidth, which make it impossible to download the learning material from such current and advanced technologies as YouTube. Table 3 is a representation of the low uptake of the electronic learning system currently deployed at the institution, which can be attributed to underutilization by the lecturers.

The students were also dissatisfied with the lecturers' irregular approach to using the available digital technologies especially the implemented LMS tools. The Zimbabwean students expressed their disappointment in the current teaching methods without digital technologies, which they felt deprive them of the technological affordances currently enjoyed by their counterparts in developed nations. The Zimbabwean learning institutions confirm the observation in Kolikant (2010) that educators have failed to build on students' technological abilities. On the contrary, Paul, Baker, and Cochran (2012) show that the trend in the developed world is toward increased use of such technologies as social networking sites; Facebook and LinkedIn by academics, to communicate and deliver instructional content. Below is an extract of students' views in this regard. One student expressed discontent with the technological conditions at the university by saying, "The institution is depriving us from using and embracing the technologies by slow internet speed."

Consequently, the current gap between availability and use referred to as the second-order digital divide is existent in higher education environments in Zimbabwe. This divide is demonstrated in the lesser use of digital technologies for teaching and learning practice. The second-order digital divide problem could be attributed to institutional factors more than either technological or individual student factors. This observation is also confirmed in Kennedy et al., (2006, p. 413) that "Universities are still ill equipped to educate a new generation of learners whose sophisticated use of emerging technologies is incompatible with current teaching practice."

The contribution from this research has therefore been to inform the digital divide researchers on the role played by the institutional context in either enabling or constraining the use of digital technologies in teaching and learning. Evidence from the survey shows that there is nothing wrong with the digital technologies owned by the students as they found them both useful and usable; there is nothing wrong neither with issues related to individual students as they have access to and the capacity to use the digital technologies on their own apart from the influence from the lecturers. However, the findings are useful also to both the university management and policy makers such that their future ICT policy development and choices of digital technologies should rather be bottom up than top down and should be driven by the students, who are the intended beneficiaries of such technologies. The available and accessible digital technologies should improve and enhance students' learning and academic performances. The full utilization of these available and accessible digital technologies is bound to prepare the current generation of university students for survival in the current digital society (Aiammary, 2012). Furthermore, it will equip these students with the digital skills required in the 21st century labor market (Prensky, 2001). It is therefore the duty of university management and policy makers to ensure that their students neither lag behind nor are deprived of the digital technology affordances currently enjoyed by the students attending university in the developed nations. The institutions need to devise the technological implementation models that address the perspectives, priorities, choices and concerns of students.

Conclusion

Through this research, it was clear that digital technologies are affordable, available and accessible to the Zimbabwean students and can be embraced in teaching and learning practice. Nevertheless, a second-order digital divide persists in Zimbabwean learning institutions despite the widespread access to several digital technologies. This divide robs the current generation of students from the affordances enjoyed by their counterparts the world over. There is evidence that Zimbabwean students highly perceive the digital technology tools in learning as

indicated by the widespread ownership of such technologies as smartphones, computers as well as the widespread use of social networking sites, search engines and YouTube to search for information. There is therefore a need for learning institutions to channel their resources towards facilitation of an increased utilization of both the existing and future digital technology investments.

Future Research

Despite these findings being based on a single university case in Zimbabwe, the results have an implication on learning institutions of similar situations where a paradox of the second-order digital divide exists. For a more informed view on students' perceptions about digital technologies, future studies can focus on multiple cases with a longitudinal background to enable the provision of a more generalizable view that represents the perceptions of students across institutions and environments. In addition, such studies should also incorporate both quantitative and qualitative data for the presentation of both valid and reliable results.

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