

Effect of User Interface on the Utilization and Efficacy of Educational Digital Content among Secondary Schools in Kenya

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Abstract

The quality of educational support materials utilized in schools contributes greatly to the quality of education that is delivered during an instructional process. In recent years, there has been rapid expansion in digital content development, dissemination and access in schools. Many initiatives geared towards development and provisions of digital content to schools in Kenya have been witnessed. However, little has been done to ensure that the educational digital content design aspect such as user interface is appropriate for the instructional process. This study therefore investigated the effect of the user interface on the utilization and efficacy of educational digital content among secondary schools in Kenya. The study was guided by three specific objectives including to: analyze the layout of the various components of educational digital content in secondary schools; examine the navigational tools in the educational digital content and assess the effect of user interfaces on the utilization of educational digital content in secondary school. A descriptive survey design was used for the study which involved fifteen Economic Stimulus Programme phase 1 secondary schools in Nairobi County. Three research instruments, that is, teacher questionnaire, learners' focus group discussion guide and digital content analysis sheet were used to collect the required data. The collected data was analyzed through descriptive statistics and presented in form of notes, tables, and figures. The study established that there were issues with interface and navigational tools in educational digital content user interface which affected content utilisation and consequently its efficacy. To address the design issues of the content, the study recommended that developers design appropriate user interfaces with adequate and standard navigational tools that will make educational digital content navigation and utilization easy for users.

Key Words: Digital content layout; Educational digital content; Navigation tools; User interface

Introduction

The relatively recent introduction of new technology into mainstream schooling has been widely expected to penetrate and transform teaching and learning across the curriculum (Omariba, 2016). Cuban's (2001) recent study of Californian pre-schools, high schools, and universities with long exposure to ICT confirms that (even in Silicon Valley!) use is not widespread or consistent. Classroom teachers are simply using the technology to do what they have always done, although in fact they often claim to have changed their practice. One possible reason for this is that classroom teachers have historically had little say in designing and implementing development plans for using ICT within their schools, and for defining its role within subject curricula. This is especially true in England and other countries with a centralized curriculum and a corresponding lack of professional autonomy. Imposed policy decisions and mechanical change models often appear unresponsive to teachers' perspectives and their workplace constraints. According to Olson (2000), such policy decisions and change models are highly politicized, and do not attend to the culture of classroom practice and the pivotal role of the teacher in effecting change. He suggests that integrating new technologies challenges teachers and, thus, requires innovators to understand and 'engage in conversations with teachers about their work culture, the technologies that sustain it and the implications of new approaches for those technologies' (p. 6).

Kerr's (1991) interviews and observations with US teachers who had successfully incorporated technology into their practice indicated that using it allowed 'obvious and dramatic' changes in classroom organization and management. However, technology was not the driving force in teachers' thinking and practice. As well as serving as a 'lever' through which teachers seek to make established practice more effective, technology appears also to act as a 'fulcrum' for some degree of reorientation of practice. Thus, some teachers studied had changed their ideas about their role and authority in the classroom, and others recognized the need for new teaching approaches and skills such as 'information literacy'. However, changes in teachers' pedagogical thinking were slow and measured. Kerr's evolutionary perspective on the processes of (enabling) cultural change throws a damper on the call by some for ICT use to drive radical change. This includes designing new approaches to knowledge acquisition, critical thinking, and creative problem-solving (Noss and Pachler 1999). The processes involved in creating new perceptions and objectives of teaching and learning deserve closer scrutiny.

Some insight may be derived from theories of mediated action which describe how cultural tools are used to extend learners' cognitive capability; they focus on the constraints and affordances which tools can introduce (Wertsch 1998). Using computer tools especially digital content helps to decontextualize learning, to make explicit that which is implicit, and to accentuate that which is often unnoticed. They uniquely offer new ways to express and make visible key relationships and structures within the subject matter (Noss and Hoyles 1996). The introduction of digital content has the potential to change the system of constraints and affordances which frame activities such as writing, mathematical problem-solving, and

scientific enquiry. For instance, Kenya has seen a rapid expansion in digital content development, dissemination and access in schools in recent years. According to e-Republic (2013), Education is in transition whereby schools are now shifting from books to digital curriculum materials and from pencils to devices. Digital curriculum materials allow learners and teachers to personalize and control their learning, giving them a wider range of teaching and learning options than a standard textbook would (Intel Corporation, 2013). In the education context, digital content refers to all materials or programs stored on an electronic or digital medium that can be transmitted or utilized for learning through computers, over networks and the Internet (Centre for Digital Education 2010). It comprises of text, images, sounds, animations, games and videos that have been digitised, or brought into a computer for the purpose of learning. By virtue of one vital feature, flexibility, digital media surpasses traditional media in their ability to meet diverse learners' desires in a variety of instructional contexts. With digital content and the right software and virtual tools, you can offer learners various options on how they obtain information and how they express their understanding (Cast, 2012).

Development of digital content on Kenyan curriculum is one of Kenya's vision 2030 flagship projects (Government of Kenya, 2008). This task is undertaken by the Kenya Institute of Curriculum Development and other approved digital content developers. According to the Institute's website (August, 2013), one thousand and fifty secondary schools were issued with digital content in the year 2011/12 a process dubbed ESP-ICT phase I. Moreover, four hundred and eighty-six secondary schools were issued with digital content in the year 2012/13 named ESP phase II and an additional two hundred and ten for ESP III in the year 2013/2014. In every constituency, one teacher was trained as an ICT champion. The ICT champion has a key role of coordinating the training of other teachers on ICT integration in education.

There have been a lot of initiatives geared towards design, development and provision of digital content to schools in Kenya. The Intel newsroom (April 6, 2011), reported that Intel Corporation and Kenya Institute of Education, currently Kenya Institute of Curriculum Development, launched a joint project to roll out digital curriculum to Kenya schools on March 2011. The collaboration included developing, localizing and distributing digital content to Kenyan schools in order to transform how students interact with the learning resources and their teachers in the classroom. The content value was estimated at ten million dollars aimed at improving access and the quality of primary and secondary education through the effective use of information and communications technology (ICT).

Various policy documents in the education sector have given considerable attention to ICT integration in schools which include development, dissemination and utilization of digital content for instruction. Kenya promulgated a National ICT Policy in January 2006 that aims at improving the livelihoods of Kenyans by ensuring the availability of accessible, efficient, reliable and affordable ICT services. One of the objectives of this policy states that the government will encourage the use of ICT in schools, colleges, universities and other educational institutions in the country so as to improve the quality of teaching and learning (MoIC, 2006). On 12th September 2011, Kenya Institute of Education launched a Curriculum Digitization and

e-Learning Strategy (KIE, 2011). The new plan aimed to boost e-learning in public school and give a guideline on how it would be conducted. The strategy provides a blueprint on how learning using digital content like websites, DVDs and computers can be fast-tracked in Kenyan schools. The task-force on re-alignment of the education sector to the 2010 constitution recommended that ICT institutional framework needs to be strengthened to allow efficient integration of ICT in the entire education sector with enhanced ICT capacity at all levels.

However, most of these initiatives have concentrated on external factors like digital content development and dissemination to schools, ICT infrastructure and capacity building of teachers. Internal factors like digital content dissemination mode, user interface and multimedia elements have been ignored. These factors may affect digital content utilisation and effectiveness in the instructional process overturning the gains made in the development and dissemination of digital resources to schools. Consequently, it was found critical to study the effect of such factors on the utilization of education digital content in schools. Among these factors, only user interface in educational digital content was considered for the purpose of this study.

User interface is one of the factors that affect the utilisation and effectiveness of educational digital content during an instructional process. Multimedia content user interfaces combine different media such as text, graphics, sound, and video to present information (Najjar, 1998). User Interface varies greatly across different types of digital content and devices, for example, online services, e-books, tablet apps, iPad apps, smart phone apps, and cross-device apps. The increase of screen types and sizes makes user interface a front and centre issue for digital content (Dilanchian, 2012). An effective user interface creates modest advantage in the utilisation of digital content. According to Jisc Digital Media (2013), the primary goal of any digitisation project is to enable its users to have efficient and rewarding access to the content. The content may be excellently digitised and assembled, but if the user interface is poor, it is unlikely to be much used. University of Oregon (2013) identified various steps to ensure that digital content has a user friendly interface. These include: locating the primary navigation in an easily noticeable area, preferably next to the main body of the page; standardizing the appearance of the navigation to make it easy to discriminate this critical component from everything else on the page and grouping comparable navigation items next to each other. This is ideal because when learners encounter and accept a rebalancing of the system; this typically results in some modification of their strategies (Omariba, Ondigi and Ayot, 2015). The study reported in this paper considered various elements of the user interface in educational digital content. Among the elements considered included the arrangement of the components that make up the digital content, that is, content layout, navigational and support tools in the content. It also sought to find out from teachers and learners whether these factors affected their utilisation of digital content. The objectives of this study were therefore to: to analyze the layout of the various components of educational digital content in secondary schools; to examine the navigational tools in the educational digital content and to assess the effect of user interfaces on the utilisation of educational digital content in secondary schools.

Methodology

A research design is used to structure the research and show how all of the major parts of the research project work together to address the central research questions. It constitutes the blueprint for the collection, measurement and analysis of data (University of Southern California, 2015). This study used a descriptive survey design where information was collected without changing the environment. ESP-ICT secondary schools in phase I in Nairobi County were involved in the research. Teachers provided information by filling questionnaires while learners’ focus group discussions were held to obtain information regarding digital content availability and utilisation in the schools. The user interfaces of the digital content in the study schools were then analyzed by the researcher and the data recorded in the digital content analysis sheet. This data was then organized, analyzed and findings presented. Discussions, conclusions and recommendations were then made based on the results obtained.

Target population

This study targeted teachers and secondary school learners in the ESP-ICT phase I schools in Nairobi County. ESP-ICT schools were selected since they had digital content which was the key aspect of investigation in this study. The County has thirty-five ESP-ICT phase I secondary schools. Only fifteen of these schools were sampled since the study was resource intensive. It would not have been possible to involve all the thirty-five schools owing to the cost and time required to cover them. Form Three Biology learners were purposively selected for the study since they were likely to have interacted with digital content since the inception of the ESP-ICT project in 2010/2011. Teachers in these schools were also likely to have accessed and utilized digital content in their instructional process and were therefore considered appropriate for this study. Table 1 summarizes the number of schools involved in this study and their respective percentages. These percentages meet the recommended percentage of ten percent in statistical terms (Orodho and Kombo, 2002).

Table 1: Target schools and Digital content developers

SUBJECT	TOTAL NUMBER	PERCENTAGE
ESP-ICT Phase I Secondary Schools in Nairobi County	35	100
ESP Schools involved in the study	15	43

The sample and sampling procedures

According to Webster (1995), a sample is a finite part of a statistical population whose properties are studied to gain information about the whole. Purposive sampling was used to select ESP-ICT phase I secondary schools in Nairobi County. This is because digital content, which was a key resource required for this study, was likely to be available in those schools. A total of fifteen county secondary schools were then randomly selected from the ESP-ICT phase I schools in Nairobi County. Selection of fifteen schools out of the thirty-five ESP-ICT phase I secondary schools in Nairobi was necessitated by the limited

resources available for study since it was privately funded. Only county schools were sampled to ensure that the learners were of relatively equal ability. In the sample schools, the Form Three classes were purposively selected for the study. This is because most of the learners at this level were expected to have had a long period of interaction with digital content since ESP-ICT phase 1 schools were issued with digital content and provided with ICT infrastructure by MoE in the year 2012 when they were in Form One. Form One and Two learners had interacted with the digital content for a shorter time while most of the Form Four learners did not interact with the content while in Form One since the schools had not been provided with the digital content in 2011. Two form three teachers were then randomly selected among the teachers who had interacted with digital content in the schools to fill the questionnaires.

Research instruments (Instrumentation)

To obtain the required data, questionnaire for the teachers, learners' focus group discussion guide and the digital content analysis sheet were used. The questionnaire for the teachers and learners focus group discussion guide were used to gather data on the layout of components in the digital content they had interacted with. Data on the primary and secondary navigation tools and the impact of the user interface on utilization was also gathered using these tools. Digital content analysis sheet was used to record data obtained after examining the digital content available in the schools.

Data collection procedure

Research permit to carry out the study in schools in Nairobi County was granted by the National Commission for Science, Technology and Innovation (NACOSTI), a government agency in the Ministry of Education, Science and Technology (MoEST) in Kenya. During data collection, the study schools were visited and after obtaining permission from the school principals, two Form Three teachers selected through simple random sampling were requested to fill the questionnaire. Teachers gave information on the utilisation and user interfaces in the digital content they accessed in their schools. In addition, they gave their view on their preference in terms of digital content layout and navigational tools. Guided focus group discussion then took place with a group of eight learners randomly selected from the Form Three class. The learners were probed to give information on digital content utilisation. They were also asked questions on various interface elements such as the navigational tools and layout of content in terms of the voiceovers, graphics and text. The user interface of the educational digital content in the study schools was then analyzed and data recorded using the digital content analysis sheet. The data collected was collated, analyzed using descriptive statistics and presented in form of notes, figures and tables. Based on the obtained results, discussions, conclusions and recommendations were then made.

Findings of the Study

Layout of components of educational digital content

The way digital content is organized is very important and may determine its utilisation and even impact in the instructional process. Well organized content is much more easy to use, more interesting to the user and consequently have a greater impact in the instructional process. Patti (2005) noted that Multimedia

elements add complexity both to the screen and to the tasks that users need to perform. This therefore calls for a well-organized content in terms of the multimedia elements and navigational tools. Najjar, (1998) while describing the principles of educational multimedia user interface design pointed out that, the information being presented in one medium needs to support, relate to, or extend the information presented in the other medium. Several studies show that adding closely related, supportive illustrations to textual or auditory verbal information improves learning performance.

This study examined how different elements of the educational digital content were organized. To obtain this data, the multimedia elements in the content were classified into three categories that included *Graphics* (animations, illustrations, video clips and photographs), *sound* (narration and sound effects) and *text*. The researcher viewed the different types of digital contents available in the study schools and recorded the layouts on the content analysis sheet. From this analysis, it was observed that educational digital content in schools was organized in five different layouts. These included Graphics-sound-text, graphics-text-sound, sound-text-graphics, text-sound-graphics and all integrated layout. Most of the content analyzed (49.1%) had the text-sound-graphics arrangement while 19.7% had an integrated layout. It is only 7.1% of the content that had sound-graphics-text kind of arrangement. Figure 1 shows a summary of the Biology digital content layouts as observed during the analysis.

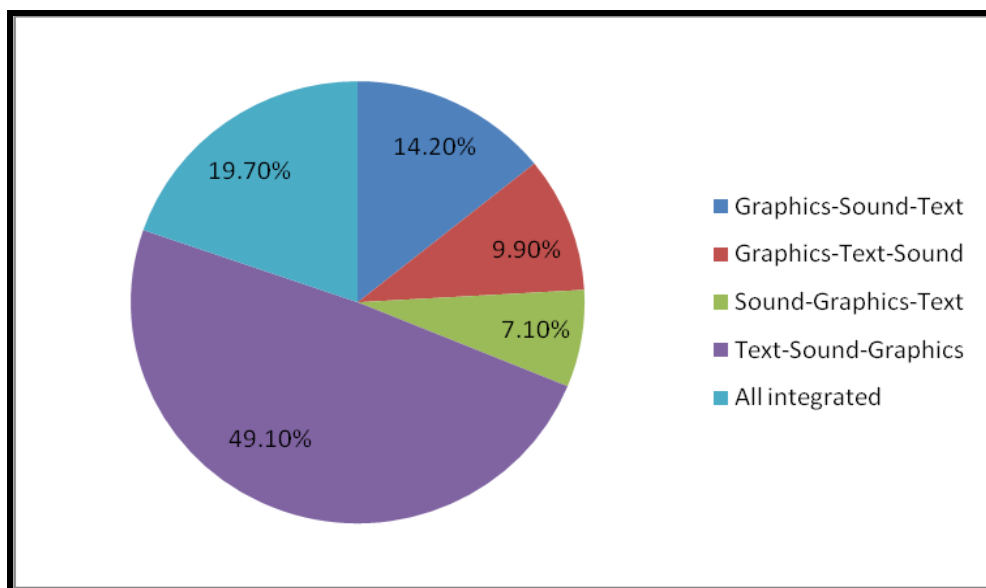


Figure 1: Digital content layout from data obtained using analysis sheet

On the questionnaire, teachers were also asked to indicate the type of layout in the educational digital content they had accessed. Nearly half of the teachers (46.1%) were of the view that the content was arranged as Text-Sound-Graphics while only 7.7% had accessed content with Sound-Graphics-Text kind of layout. A small number of teachers (22.2%) indicated that they had accessed educational digital content with an all integrated layout. Figure 2 summarizes the layout of the content as indicated by teachers.

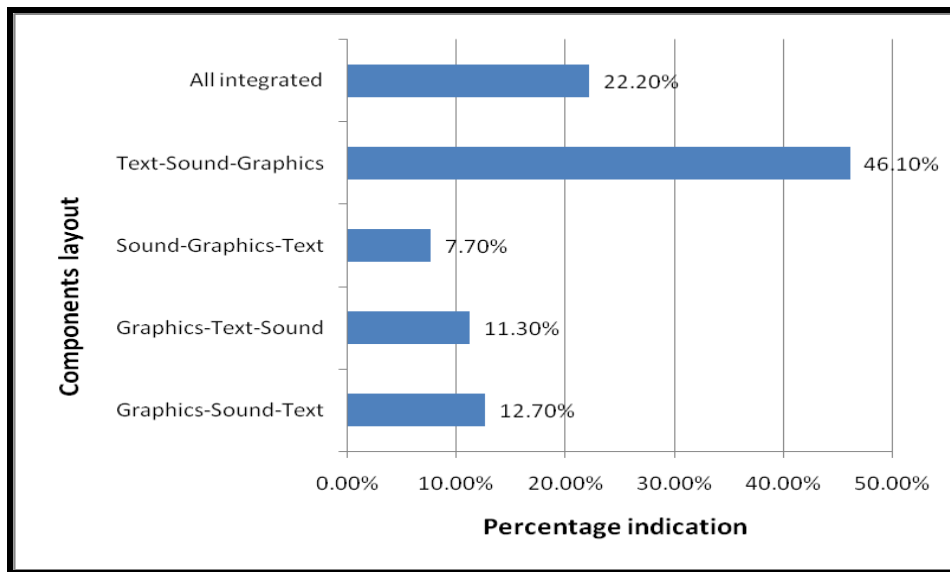


Figure 2: Digital content layout as indicated by teachers

Learners were also probed for their view during the guided group discussions. Nearly half of them (48.9%) indicated that the digital content they had accessed had a Text-Sound-Graphics layout while 20.4% had accessed content with all the elements integrated. Only 7.7% of the learners had accessed digital content with Sound-Graphics-Text kind of arrangement. Figure 3 shows learners’ opinion on the Biology digital content layouts

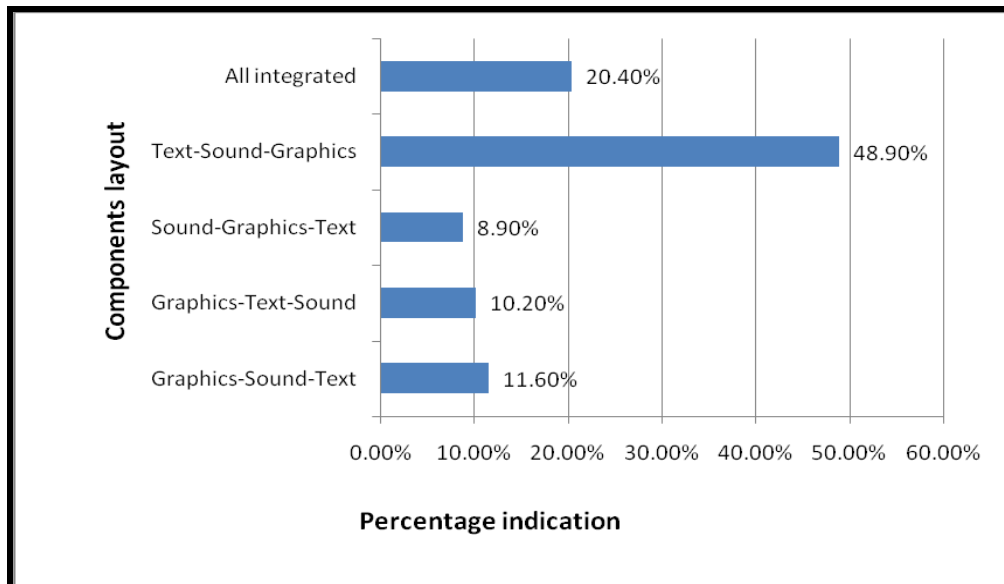


Figure 3: Digital content layout as indicated by learners

From these results, it can be observed that most of the digital content in the schools had the Text-Sound-Graphics layout. Only a small number of the content had an integrated kind of arrangement. Although teachers and learners presented different figures for different layouts, the trend is clear. Content with Text-Sound-Graphics layout is the most common while that with Sound-Graphics-Text is the least common.

According to the cognitive theory of multimedia learning, human information processing system has two separate channels with limited capacities. SEG (2008) observed that when information is presented using both channels, the brain can accommodate more new information. Sweller (2005) also argued that when information is presented using both the visual and the auditory channels, working memory can handle more information overall. This means that content that presents visuals such as graphics and voiceover at the same time may be more effective for the instructional process as compared to the one that presents each element at a time. As such, the content that had all elements presented in an integrated way is likely to be more effective in the instructional process than the other layouts. Nugent (1982) obtained the highest learning levels when she presented information via combined text and pictures or combined audio and pictures compared to the same content presented via text alone, audio alone, or pictures alone. Developers therefore need to improve the layout of educational digital content by ensuring that the multimedia elements are integrated while taking care to avoid cases of cognitive overload. This would be achieved by ensuring that qualified and experienced content designers and developers are involved in the digital content development process. Patti (2005) pointed out that determining when to use multimedia and designing good multimedia require real consideration and benefits from a team of people with instructional design, graphic arts, information architecture, and usability skills.

Primary navigational tools of the digital content

Navigational tools are very important in any interactive digital content since they enable the user to manipulate the content. Najjar (1998) noted that consistent-looking and consistently placed navigation elements clarify what to do next. Jisc digital Media (2013) pointed out that digital content interface should be designed in such a way that when using the content, it is always clear where you are and where you can go next. The user needs to be fully in control of their navigation and use of the content. Mayer et al (2003) also noted that learners learn more if they are able to control the pace of the presentation. It is therefore very critical to have proper navigational tools in any interactive digital content to enhance usability and learning. The researcher therefore viewed the Biology digital content in schools to ascertain whether it had primary navigational tools that would enable the user to navigate through and easily utilize it while having full control. Among the navigational tools considered included play, pause, stop, next, previous and exit buttons. In addition, the form in which navigational tools were presented was considered. Most of the content viewed (78%) had the basic navigational tools such as play, pause and stop. Within the content that had navigational tools, 40.4% of the navigational buttons were presented in text, 42.1% icons and 17.5% was a combination of icons and text. Where presentation was by icons, they varied from content to content making navigation a bit difficult. It is only 22% of the content that appeared to lack some basic navigational tools.

Teachers were also asked to give their opinion on the navigational tools available in the digital content they had interacted with. Majority of them (78.48%) indicated that digital content they had accessed had the basic navigational tools. They also indicated that among the content with basic navigational tools, 48.75% of the buttons were presented in text form, 40.28% were iconic while 10.97% had a combination of icons

and text. The types of icons used were differed from content to another. Table 2 gives the details on the navigational tools in Biology digital content as indicated by teachers.

Table 2: Navigational tools in digital content according to teachers

Navigational tools	Percentage (%) availability		Form of presentation (%)		
	Yes	No	Text	Icon	Text & Icon
Play	79.1	20.9	51.3	38.7	10.0
Pause	80.6	19.4	45.6	43.1	11.3
Stop	79.1	20.9	47.2	40.7	12.1
Next	77.4	22.6	48.9	41.3	9.8
Previous	76.7	23.3	50.3	39.0	10.7
Exit	78.0	22.0	49.2	38.9	11.9

Learners were also asked to give their opinion on the navigational tools during the guided group discussions. Majority of them (78.57%) said that the digital content they utilized had the basic navigational tools. Most of these tools (72.83%) were provided in text form, 13.87% were icons while 11.03% was a combination of icons and text. The icons varied from content to content. The details of the navigational tools as observed by the learners are given on table 3.

Table 3: Biology digital content navigational tools according to Learners

Navigational tools	Availability		Form of presentation		
	Yes	No	Text	Icon	Text & Icon
Play	77.9	22.1	50.3	38.1	11.6
Pause	81.3	18.7	46.1	42.9	11.0
Stop	79.4	20.6	46.9	41.0	12.1
Next	78.0	22.0	50.0	41.5	8.5
Previous	76.9	23.1	50.1	38.9	11.0
Exit	77.9	22.1	48.9	39.1	12.0

Appropriate digital content for teaching and learning needs to be interactive and easy to navigate in order to have a positive impact in the instructional process. Interaction is a mutual action between the learner, the learning system, and the learning material (Fowler, 1980). Najjar (1998) argued that an interactive user interface may allow learners to control, manipulate, and explore the material or periodically asks learners to answer questions that integrate the material. An interactive user interface appears to have a significant positive effect on learning from multimedia content (Fletcher, 1989, 1990; Stafford, 1990).

If digital content is not easy to navigate and use, then its level of interactivity is low which in turn reduces the utilisation and impact of such content in the instructional process. Interaction may improve learning because it encourages learners to elaborately process the learning material (Walker et al. 1983). From the results obtained on the navigational tools, it can be observed that most (78%) of the digital content viewed by the researcher had the basic navigational tools. This means that most of the Biology digital content in the

schools was interactive and therefore had the potential of bringing positive impacts in the instructional process if well utilized.

However, a small percentage (22%) of the digital content lacked basic navigational tools which are essential to the utilisation of the content. Content that lacks basic navigational tools such as play, stop and pause makes the user unable to control it. According to SEG (2008), multimedia presentations are more effective when the learner has the ability to interact with the presentation, by slowing it down, starting or even stopping it. In addition, the format of the navigational tools was not standard in Biology digital content. Some navigational tools were given in text form, others iconic while some were presented in a combination of text and icons. This can make the content more complicated to users since one had to learn how to navigate the different types of digital contents available in the school. University of Oregon (2013) argued that for digital content user interface to be friendly, the primary navigation should be easily noticeable and standardized in appearance. The navigation tools should be easy to distinguish from other components of the content. Digital content developers need to consider coming up with *standard navigational* tools that will be used across all the educational digital content. These will make navigation of digital content easy since once you learn how to navigate through one type of content, you can easily navigate any other digital content. Engaging professional software engineers and content designers in the process of Biology digital content development could help achieve this.

Secondary navigational tools of the digital content

Support tools are very important in the utilisation of digital content. They help the user to easily search the parts of the content they are interested in, seek help in case they have difficulties using the content or even easily get the meaning of certain technical terms used in the content. Some of the support tools used in digital contents includes help, search and glossary. The digital content in schools was analyzed to ascertain whether it had such buttons. It was established that most of the content (88.3%) lacked these support tools. In some cases, they were provided but were inactive meaning they could not be used. In the few cases where these buttons were provided, 70% were in text, 11.3% iconic while 18.7% combined icons with text. In their questionnaire, teachers were also asked to indicate whether support tools were present and how they were presented in the digital content. Only 10.9%, 16.1%, and 9.4% of the teachers indicated that the Biology digital content they had interacted with had active search, help and glossary buttons respectively. Among the content with support tools, an average of 72.26% had presented them in text form, 14.10% was iconic while 13.63% combined the icons with text. Figure 4 gives a summary of the forms in which support tools in Biology digital content were presented.

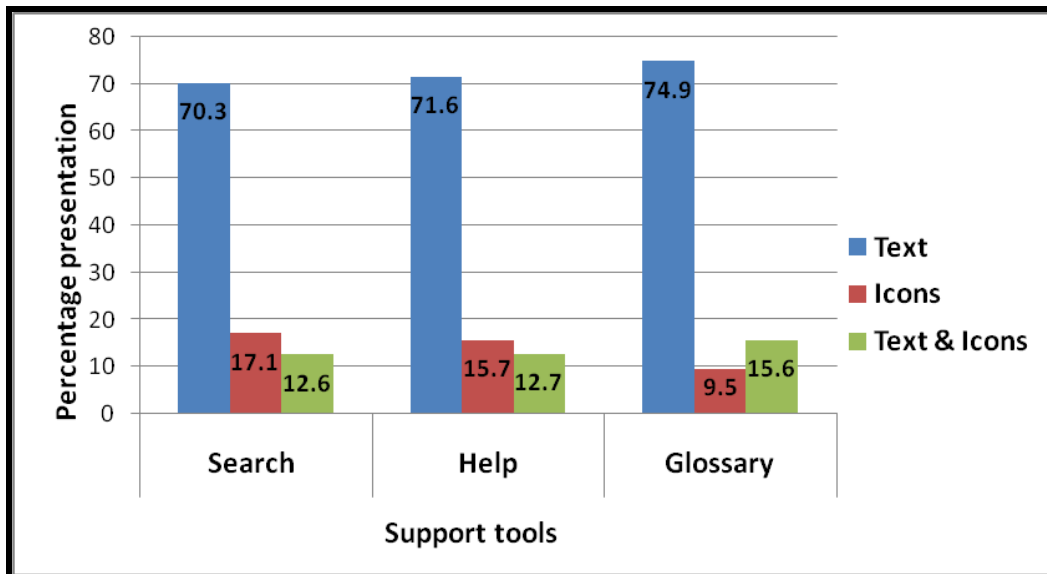


Figure 4: Support tools in digital content as indicated by teachers

During the guided group discussions, learners were asked whether there were support tools such as search, help and glossary in the content they utilized. They were also asked about the forms in which tools were presented in the content. Most of the Biology digital content that learners had interacted with lacked active search, help and glossary buttons. It is only 9.1%, 11.9%, and 10.1% of the learners pointed out that the Biology digital content they had interacted with had active search, help and glossary buttons respectively. Among the content with support tools, an average of 72.83% had presented them in text form, 13.87% was iconic while 12.97% combined the icons with text. Figure 5 gives a summary of the forms in which support tools in digital content were presented based on the learners' view.

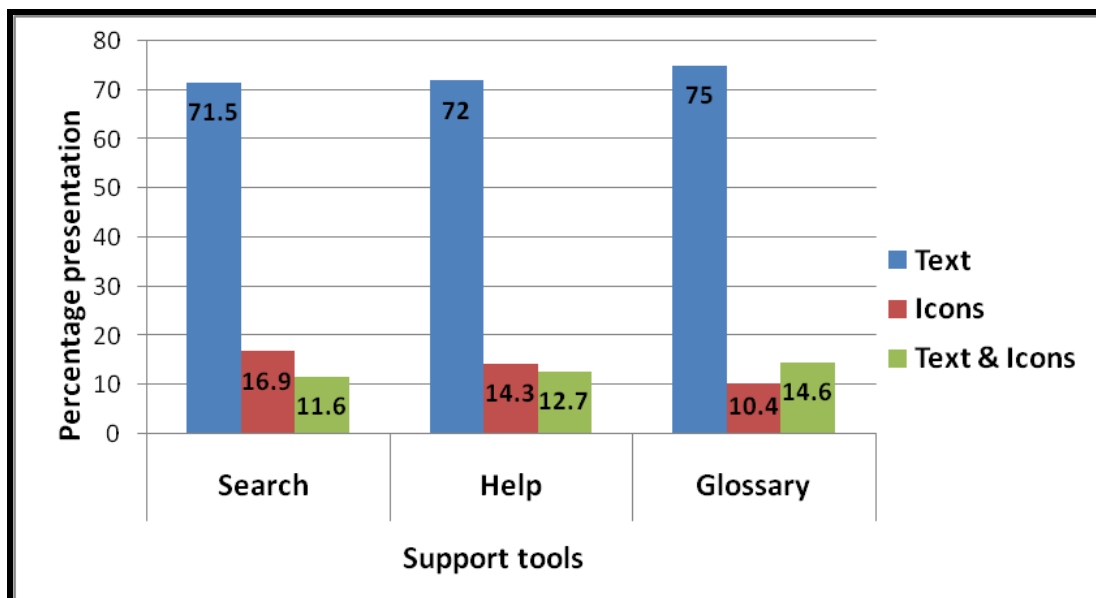


Figure 5: Digital content navigational tools as indicated by learners

Digital content needs to have support tools such as the search, help and glossary. These tools make the content easy to utilize. Mayer and Sims (1994) and Mayer and Chandler (2001) observed that learners

enjoy and use multimedia content more effectively when they are given the ability to control and manipulate the it. Navigational tools should also be presented in a form that makes them easily recognized by the user. According to University of Oregon (2013), digital content user interface is friendly when the navigation tools are easily noticeable and standardized in appearance. Digital content that lacks such support tools may not be attractive to teachers and learners. In addition, use of unfamiliar icons for secondary navigation tools may make the content unfriendly to the user. This may reduce the level of utilisation by both teachers and learners. As a result, the benefits that come with the utilisation of digital content may not be realized. Digital content developers should therefore ensure that support tools are incorporated in their content during development to make it easy to utilize. It would also be important to consider developing standard buttons for the support tools in all the educational digital content. This would reduce the time spent by learners and teachers trying to understand the ever changing buttons used by different developers in different digital content.

User interface and the utilisation of educational digital content

There are various aspects of digital content user interface that may affect the level of its utilisation and effectiveness in the instructional process. Some of these aspects include the layout of the content, navigational tools and the support tools in the content. During this study, teachers were asked to indicate whether the layout affected their utilisation of educational digital content. More than three quarters of teachers (92.3%) indicated that their utilisation of digital content would be affected by its layout. In the guided group discussion, a similar question was posed to the learners. An overwhelming majority (94.6%) were of the view that the way digital content is organized affected their utilisation of the content. Teachers and learners argued that the layout of the content enhanced the understanding of a concept. This is especially true if the multimedia content has the right layout that utilizes the two channels of learning. SEG (2008) observed that by using multiple channels of the working memory, multimedia content can increase the likelihood that information will be effectively integrated into the long term memory and not lost. In this regard, content that promotes better understanding of concepts will tend be utilized more by learners and teachers and has positive impact on the teaching and learning process.

Teachers and learners were also asked to indicate whether navigational and support tools provided in the digital content affected their utilisation of the content. Majority of the teachers (90.7%) and learners (96.5%) held that navigational and support tools would affect their digital content utilisation level. They gave the following reasons:

- Navigational and support tools make it easy to navigate through the content and therefore they utilized digital content with better tools more than digital content that lacked such tools.
- These tools give the user full control of the digital content, that is, you can control the pace of the content to facilitate understanding of a certain concept. In addition, you can start, stop, pause or even exit the content at any point.
- The help button gives them an opportunity to get assistance whenever they face difficulties making it easy to use such content.

- Support tools such as search makes it fast and easy to use the content since you can easily search the topic, subtopic or even a concept that you want to cover easily.
- Glossary helps them to easily get the meaning of technical terms used in the content without necessarily having to look for dictionaries.

This observation is supported by some scholars. According to Mayer and Sims (1994), multimedia content appears to be more effective when learners have the ability to start and stop it at their own will and are able to manipulate it such that they learn at their own pace. Mayer and Chandler (2001) also argued that when provided with the ability to interact with the multimedia content by being able to control it through navigation tools, learners seem to enjoy the experience more and perform better when tested on the content. Stafford (1990) statistically analyzed 96 learning studies and concluded that interaction was associated with learning achievement and retention of knowledge over time.

Learners are more interested and enjoy using digital content with good navigational tools as suggested by Mayer and Chandler (2001). This increases utilisation levels of that particular digital content. Utilisation of the digital content has an impact on various aspects of the instructional process such as understanding of a variety of concepts, content retention, learners' motivation and even their attitudes as suggested by various scholars. Alfar (2009) observed that multimedia material help learners remember & transfer their knowledge. Clark & Craig (1992) suggested that multimedia materials offer motivational advantages in a learning process. Well-designed multimedia material can enhance motivation, learning, and transfer (Patti, 2005). Teoh and Neo (2007) accentuated that Studies demonstrate that students who learn from multimedia have superior self-esteem and motivation. Consequently, the rate of content retention in multimedia learning exceeds that of traditional means. When learners are engaged in learning, the likelihood to retain information and sustain the learning process increases. Better and easier understanding of concepts, high content retention and improved learners' attitude and motivation will consequently lead to better syllabus coverage and improved scores by learners' in the assessment tests. It can therefore be concluded that the user interface employed by educational digital content has an impact on its utilisation and effectiveness in the instructional process.

Conclusions

This study found out that most of the educational digital content had text-sound-graphics layout which is less preferred by users. A layout where text, sound and graphics are harmonized (all integrated layout), is more favoured by most users. It is generally agreed that the integrated layout enables more information to be processed by the human brain since different elements such as visuals and sound are presented together. The variation of navigational tools from content to content, disparity of the icons used for navigational tools and lack of secondary navigational tools in some content made it difficult for users to navigate through the digital content. These aspects of the digital content contributed to its low utilisation levels by some teachers and learners in the study schools. In addition, these aspects made the content less effective during the instructional process. It can therefore be concluded that the user interface (layout and

navigational tools) of the educational digital content affects its utilisation and effectiveness in the instructional process.

Recommendations

From the findings of this study, it is evident that the digital content that had been accessed by teachers and learners had a text-sound-graphics layout. This was further verified by the analysis of the educational digital content done by the researcher. According to the cognitive theory of multimedia learning, human brain can process more information if different elements such as visuals and sound are presented synchronously and therefore an all integrated layout would be the best. Teachers and learners had difficulty in navigating the digital content. The variation of navigational tools from content to content, disparity of the icons used for navigational tools and lack of the navigational tools in some content made it difficult for users to navigate through the digital content. Most of the respondents indicated that their utilisation of digital content would be affected by the content layout and navigational tools.

It is therefore recommended that digital content developers ought to ensure that an all integrated layout is used when developing educational digital content. To ensure that navigation of educational digital content is easy for users, navigation tools with standard formats should to be provided. Moreover, it is important to ensure that all education digital content has the appropriate and adequate secondary navigational tools. As a result, utilisation and effectiveness of educational digital content would be improved.

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