INNOVATIVE FACTORS AND CHALLENGES IN INTEGRATING TECHNOLOGY IN EDUCATION FOR GLOBAL DEVELOPMENT

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Abstract:

Implementation of ICT in schools in Ethiopia is a recent activity that has occasioned a lot of interest. However, there are many challenges that hinder efficient implementation including the cost of infrastructure, electricity, teachers' skills, and leadership. This study discovered how these challenges influenced the implementation of ICT in school. Advantages and disadvantages of ICT in school are identified. In conclusion, we have put solutions that how these developing countries like Ethiopia overcome the problems relating to the perfect implementation of ICTs to provide better educational opportunities to their students.

Keywords: challenges, education, ICT, infrastructure, Technology

1. Introduction

Rapid developments in Information and Communications Technologies (ICTs) have become the most basic building block of modern industrial society in a very short time. Mastering information technology and understanding basic skills and concepts of ICT are now highly regarded by many countries (Daniels, 2002; Rampersad, 2011). This in turn has had an impact on educational and training needs, both in terms of the content and the delivery of educational and training services, but also there has been increasing pressure on decision-makers to acquire new technologies. Simply providing access to ICT is not going to radically change education systems for the better. A clear picture of what education should be seeking to achieve is the need for ICT to be utilized to its full potential within education systems. In order to make successful use of ICT in enhancing the reach and quality of teaching and learning, policymakers need to be aware of how ICT can be of the best value in their country's education system and need to develop a supportive policy environment and framework at the national level for the integration of ICT into their education systems. Nowadays ICT has been increasing at an amazing rate in instruction among teachers across the world.

1.1 ICT Integration in Education

Technology integration is viewed as the use of computing devices such as desktop computers, laptops, mobile devices, tablets and the Internet in schools for instructional purposes (Hew & Brush, 2007). Technology can be used for other school management activities such as managing school information and communicating with students and parents. In this research, we will focus on ICT integration in education for facilitating delivering the knowledge without

the boundary of geographical area. Developed countries provided more learning opportunities to eliminate the gap made among the students who needed to access the internet at home, school, and every place. In Ethiopia there is no like this full implementation of ICT in education sectors. Hence the current study aimed to fill gap and find solutions for the following research questions:

- What are issues and challenges (materials, training, attitudes, support, conditions) that affect the use of ICT in a developing country's teaching-learning process?

- To what extent does Ethiopia's education policy apply ICT in the education sector?

- What are the advantages and disadvantages of implementing ICT in education?

1.2 Objectives of the Study

The main objective of this study was to discover the integration of ICT in teaching-learning and survey the issues and challenges affecting its implementation in the Ethiopian Education sector.

1.3. Advantages and disadvantages of technology in education

Although the education system has always been strongly influenced by innovations, the explosion of new technologies caused tectonic shifts in the way the teaching process is carried out in school.

Many technology supporters believe that changes in the education system can only go forward due to incredible growth in the number of inventions that are continuously changing the description of existing professions. In this regard, many believe that abandoning traditional classroom education altogether is almost certain in the near future, noting that traditional education will not be able to adequately prepare students for the new challenges and demands of the real world. Considering the arguments of both sides, we will present a list of advantages and disadvantages of technology in education below, and explain how it impacts today's students.

1.3.1 Advantages of technology in education

With the introduction of a wide range of devices and the Internet, students got the opportunity to make the learning process much easier and more interesting. With the introduction of mobile phones, tablets, and computers, students are now able to do something they should have been able to do long ago – to learn actively and productively. For the first time, students can access a subject/teaching unit with eagerness thanks to applications, videos, simulations, and digital books that make the learning process much more engaging. Moreover, having the opportunity to dig deeper into an area that interests them allows them to potentially recognize their interests and talents, and maybe even their future profession.

Key merits of technology in education:

Provides access to information from a diversity of sources

In addition to the fact that students approach learning with more eagerness and productivity, they also have the opportunity to access the most current topics and research, which is something their ancestors could only dream about. Instead of going from library to library, dragging a pile of books with them, they are just a few clicks and well-defined queries away from accessing information that can give them additional insight into the topics they are covering at school. So, this practice not only enables students to have modern education, but it also teaches them how to approach the search for information and read complex professional literature.

Teaches the digital reading ability

We all know that young people cannot acquire the level of skill demanded by today's corporate world in computer science classes. By implementing technology as an integral part of education, students are given the opportunity to keep up with learning trends and acquire technological/digital skills that are highly sought after in the 21st century. This form of learning is most helpful for students who don't have access to modern technology at home, which could also potentially reduce the social gap between digitally literate and illiterate people. ICT can be used to train students in skills that they will need in further education and as an ongoing learning process throughout the rest of their lives and for their future jobs

Reduces educational costs

With the introduction of technology in education, resources have become more accessible, which resulted in declining tuition fees, the need for books and their price, as well as the reduced need for school supplies. The introduction of e-books has made things easier for low-income families, and helped students to approach learning on equal terms with their peers, without parental pressure for high performance arising from large investments into their child's education. In addition, another positive side-effect of using e-books in education is the fact that they indirectly contribute to the reduction of deforestation, which is one of the major environmental problems.

Provides better insight into student performance

In the past, teachers had to spend considerable time evaluating the overall academic performance of each student, which proved to be very impractical, especially in large classes with a greater number of students. Unfortunately, many students never succeed in correcting the wrong steps in learning that can help them improve their performance, and potentially discover their talents of affinities. However, with the introduction of digital technologies and the Internet, a teacher's job of analyzing student performance and providing guidelines and advice has become much easier, which is a win-win situation both for teachers and students. Specifically, thanks to platforms that collect data on student performance in class, tests, and assignments, teachers have clear insight into the areas in which students struggle for. Moreover,

teachers are now able to modify lessons based on insights into the performance of individual students, or class as a whole.

Boundary less Learning

Technology in education has allowed students to gain control over their learning, but it also provided flexibility to teachers in transferring knowledge to students. Namely, this practice is only possible in schools that support hybrid (blended) learning, i.e. a combination of synchronous real-time learning, and asynchronous learning where students can listen to a lecture when they choose (Etana Fikadu, 2020). Listening to a teacher giving a lesson in real-time provides students with a stronger sense of belonging, and allows them to socialize with their peers, same as face-to-face interaction with the teacher. On the other hand, more independent students who are confident in their own time management and commitment management skills can learn whenever they feel like it. It can provide access to information and communication outside the classroom

Teachers have more credibility from the technology

Teachers are sometimes hesitant to use technology in the classroom because they are unsure of what a student might have at home. Giving homework assignments that require computer access to a student without that technology at home would be a waste of time. There can also be pushback from parents who are uncomfortable giving their kids additional screen time for learning. When you can introduce these elements to the classroom and have children learn there, then you can overcome the socioeconomic barriers that are sometimes in place for low-income families.

ICT Enhances Academic Performance

Student performance and ICT integration have been topical for some time now as far as research and discussions are concerned. There is a rapid change in the student's performance when ICT is used in the teaching environment (Fathima, 2013). While ICT has been used in various ways to support teaching and learning, some of the literature point to the fact that little evidence exists supporting the claim that ICT has transformed education (Twining & Henry, 2014). Most findings obtained indicate that the use of ICT improves the quality of education and the performance of students.

1.3.2 Disadvantages of technology in education

Any technology has its own disadvantages. The area covered by the applicability of ICT in education will have the following problem.

1. Dependence on Technology: more students are relying on technology for their memory but the less you use your memory, the poorer it becomes. People don't bother learning to spell because they use a spell-checker, or need a calculator to perform minor addition or subtraction.

2. Reliability of Information – Anyone with access to a computer and an internet connection internet can start a blog or post something up on a website, so just because something's on the

web doesn't mean it's reliable. A prime example of this is the open-source encyclopedia, Wikipedia, although considered a good.

3. **Lack of job security** – Experts in a wide variety of fields believe that ICT has made job security a big issue since technology keeps on changing nearly every day. This means that individuals need to be constantly studying or at least keeping up with changes in their profession if they want to feel secure in their jobs to be secure.

4. Health issues: people today are so obsessed with technology that they forget to care about their own health. This affects their health in different ways. They have eye-sight problems, obesity, insomnia, and a lot more. Some people cannot sleep without using their phones. Some cannot focus on their studies as they have a habit of checking their phone every now and then.

5. Overriding Cultures - While ICT may have made the world a global village, it has also contributed to one culture consuming another weaker one. For example, student can get different style of culture adapting from internet and they may forget their own culture.

6. Privacy - Though information technology may have made communication quicker, easier, and more convenient, it has also brought along privacy issues. From cell phone signal interceptions to e-mail hacking, people are now worried about their once private information becoming public knowledge. Source of information it is not recognized by academic institutions as a trustworthy reference.

7. Computer viruses, worms, Trojans, malware, spam, phishing- any or all can cause chaos and disrupt our daily lives

8. Lack of experience - hard for teachers to use with a lack of experience using ICT tools in context of Ethiopia.

1.4 Challenges and Solutions to Implementing ICT in Developing Countries

Many researchers agree with the idea that ICT's role is to be a reliable tool to improve the quality of life and this reduces the economic gap between developed and developing countries. Applying ICT to schooling is an urgent task for developing countries to implement. However, there are challenges that the developing Countries is facing and these make the 'Digital Divide' continue not only between countries but also within countries (Parliamentary Office of Science and Technology 2006). The hurdles are mainly divided into four categories; a lack of financial resources, poor access to the internet, limited trained teachers, and lack of policy (Gulati 2008; Ruth & Shi 2001).

Economic problem

The main issue, which almost all developing countries like Ethiopia face, is how to deal with the scarcity of financial resources. Resources in the developing world are always scarce so they have to be spent mostly on basic supplies such as food, housing, roads and currently going political instability. In a sense, investing in ICT for schooling might be regarded as a long-term issue which means adopting ICT in the education system is relatively not an urgent issue considering the serious poverty in the countries. This results in a vicious circle between scarcity

of funds and under developedness. When it comes to the controversy of the priority of investment between basic services and ICT, both might be linked in the case of education. One piece of good news about cost is the cost of hardware is decreasing rapidly. The price of PCs and peripherals is reduced to half of the original price every two years. Because of this, the salary of the IT professionals who can teach the new technology is the biggest burden on education budgets and it is followed by software related costs.

Power fluctuation/insufficient: In Ethiopia there no fixed electric power even for other standard community life. So, the strength of power currently the country using is not comfort for installation of ICT infrastructure education sector.

Limited internet service provider

Ethiopia have limited internet service provider. The service cannot cover all villages in the countries. Access to the internet is highly limited in remote areas, and relatively poor infrastructure in such like developing nations such as supply of electricity makes this worse. Low infrastructure is the fundamental problem for developing countries to deal with and it might take a long time and huge funding to improve. Low literacy rates also hinder locals in remote areas from accessing information through the internet and due to the dominance of English on the internet; non-English speaking local people are isolated from the benefits of using internet (Parliamentary Office of Science and Technology 2006).

Lack of trained computer professional and confidence

Another challenge of implementing ICT in education systems is a lack of trained teachers (Gulati 2008; Kozma 1999). When it comes to practically applying ICT, which is new to traditional teachers, many may not know how to deal with it and sometimes they are reluctant to accept new technologies in their classrooms. Thus, tutors who can train these teachers about new technology and IT professionals who can technically install and maintain the system are needed.
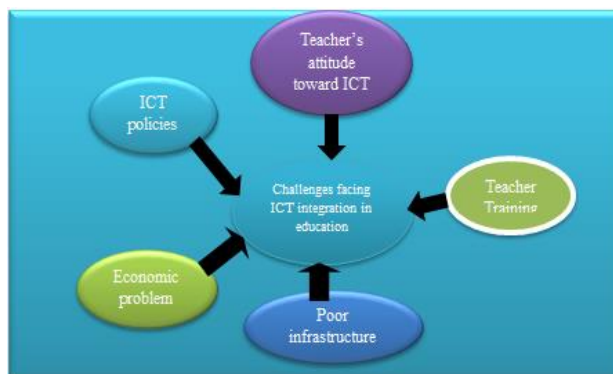
Lack of policy

The governments in developing nations need to liberalize markets and cut taxes on the ICT industries. For the reasonable and affordable pricing, market liberalization should be accomplished. Cutting taxes also help in increasing affordability resulting in spreading ICT accessibility (Parliamentary Office of Science and Technology 2006). When it comes to policy advice, Gulati (2008) especially focuses on investing in infrastructure. These actions will help boost sustainable technology enhanced schooling. The government pushes the price of ICT infrastructure is decrease any student will buy and run with technology

Teacher attitudes and beliefs

Teacher attitudes and beliefs about educational technology have also been shown to affect the implementation of ICT tools (Alshumaimeri, 2008; Saleh, 2008). It is generally assumed that as long as there are adequate technological resources, enough technical training, a supportive policy, and a favourable environment, the implementation of ICT will occur automatically (Lim and Khine, 2006). Research studies nonetheless reveal that without the right teacher

attitudes towards educational technology, ICT implementation may be a big failure (Tezci, 2009). To change negative attitudes towards educational technology, and to reduce resistance to change, professional development programs for teachers can be of great value. It is therefore important for learning institutions to understand how educators view the use of technology is very important in the context of education.

The challenges to integrate ICT in education are summarized as following model.

1.5 The status of ICT in Ethiopia this time

The ICT infrastructure in Ethiopia is very much under developed even when we compare with countries at similar development stage in Africa. In particular:

➢ The number of computers in the country is still low in spite of the continuous fall of prices of computer equipment. This is not only due to the limited purchasing power of the population but also because computers are considered as extravagance items.

➢ Even on hand computers are highly underutilized. More and more organizations are tried to allocate budget to buy computer accessories and sometimes provide training for their staff. But very few allocate sufficient fund for software and for consultant's fees. For this reason, the majority of the computers in the country could not give more service than an ordinary typewriter. For example, it is quite common for a government organization to use the allocated budget just to buy the "latest PC" without knowing what it is going to do with it.

➢ Very little is done to develop ICT human resource, professionals, awareness creation and etc.

Conclusion

To sum up, Ethiopia, as one of the poorest countries in the world faces a number of economic, social and political problems that continue to adversely affect the quality of life of its population. Due to this fully integration of ICT is at all school is not possible till now. The implementation is hindered by several factors, including inadequate management and organizational support, inadequate training, negative teachers' attitudes towards educational technology, cultural factors, and insufficient infrastructure. Other hindrances include lack of ICT policy, lack of a justification for the need of ICT in education, and lack of progressive

evaluation and lack of curriculum review. No single element is adequate to guarantee quality teaching, but the presence of all the elements increases the possibility of successful implementation of ICT in schools. Generally, the country follows the policy of developed country and tries to allocate enough budgets for the implementation of ICT in education.

Recommendations

There should be follow up mechanisms of ICT integration in school.

✓ The government should give attention to expand ICT infrastructure.

✓ The government should support training for instructor and staff.

✓ Further research can be conducted regarding instructor'sperception, student attitude and parent attitude.

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