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Educational, Economical and Societal Impacts of E-learning

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Abstract: E-learning is the use of technology in learning. It involves the students to understand concepts rather than cram. eLearning also called educational technology can occur in or out of theclass. Educational technology is used by learners and educators in homes, schools, higher education, business and other settings. It can be used along with face to face learning. Technologies used in it offer learners control over content, learning order, speed of learning, media and time. eLearningis effecting education ,economics, society and many more. In the present paper I will discuss different eLearning Technologies and its impacts on education (students and teaching),economy and society.

Keywords: Digital divide, off the shelf education, multipath progress

I. THE IMPACT OF E-LEARNING ON EDUCATION, THE ECONOMY AND SOCIETY

The necessity to become capable in modern communications and information technologies and the need to improve the quality of their education sector, have driven manydeveloping countries and donors to sharply increase their investments in e-learning. Theimpact of these investments on learning, on the economy and on society has yet to bequantifiably documented, partly due to the recent nature of the programs, and partly due to the newness of the ICT research field. Most literature consists of what could be expected from e-learn programs.

A. Educational Impacts of e-Learning

Here we will discuss the impact of e-learning on educational systems, students and on the teaching practices.From an analysis of several international ICT integration plans (IETE, 2011), the long run adoption of ICT into education systems has been successful when done as an integral and holisticcomponent of education. Technology plans, whether they are at a national level or local level,need to address policy, curriculum integration, professional development, community engagement, infrastructure, and access. Today the approach is no longer simply puttingcomputers in the classroom and connecting to the Internet. Indeed, a critical area at the systemlevel to highlight is the academic aspects of technology as a tool for learning, integrated intoall aspects teaching and learning. Technology should become a student's intellectual partner, andthe focus should be on how students learn with technology (Peck et al. p.12). Understanding how students learn with technology emphasizes the process of how teachers teach with technology.

Before investing in new ICT programs, it is key to decide on the main goals of the program.Authors of the SITES report on South Africa (Howie, Muller, & Patterson, 2005) noted thatsecondary school principals reported the following goals for their ICT programs:

- To prepare students for future jobs
- To improve student achievement
- To promote active learning strategies
- To individualize student learning experiences
- To encourage more co-operative and project-based learning. To develop student independence and responsibility for own learning
- To give students drill and practice exercises
- To make the learning process more interesting and engaging.

These goals include using e-learning for more traditional efforts to improve student academicperformance as well as newer objectives related to the development of technical and social skills
important in the marketplace.

Impact of e-Learning on Students

It is expected that the most direct impact of e-learning would be on the learning achievement of students. The results of large, cross-national studies show that the effects on learning arecomplex and closely related to how the technology is used as an educational tool, and otherfactors. Putting technology into a school is not the simple solution to improving learning. Kozma (2005) notes "the most pronounced finding of empirical studies on ICT impact is that there is no consistent relationship between the mere availability of ICT and student learning".

Another author, Kulik (2003) conducted a meta analysis of studies to identify the impact of e-learning on student outcomes. He identified the following trends:

- Students who used computer tutorials in mathematics, natural science, and social science score significantly higher on tests in these subjects compared to students whodid not use computers. Similarly, students who used simulation software in sciencealso scored higher. However, the use of computer- based laboratories alone did notresult in higher scores.
- Primary school students who used tutorial software in reading scored significantlyhigher on reading scores. Very young students who used computers to write their own stories scored significantly higher on measures of reading skills
- Students who used word processor or otherwise used the computer for writing scoredhigher on measures of writing skill.

Studentswork in a many-to-manygroup situation. It is interesting to note that e-learning can also have a positive impact on less tangible aspects of learning, particularly student motivation. e-Learning affectsstudent attitudes towards technology, instruction, and subject matter. "Observations were made in a study in Kenya in which two randomly assigned physics classes used computer-based instruction, whereas a third equivalent group did not. At the end of the lessons, students in the computer sections had learned physics concepts better and expressed more positive attitudes about their physics learning" (Kulik, 2003).

B. Economic Benefits of e-Learning

The economic benefits of e-learning can be classified into two categories:

1) e-learning improving general education, which in turn has economic benefits;
2) e-learning creating a technology-immersed population with 21century job skills, which in turn createeconomic returns for a country investing in e-learning.

The previous section has identified the first step in showing these benefits from e-learning, namely that these technologies will result in better educational outcomes. This section looks at the next step in the value chain, examining the long term economic reward of those educational investments. In particular, it will explore the mechanisms through which this will result in a higher quality and more productive workforce.

E-learning is key component of the large challenge of educating the next generation of workers for a new, knowledge-centered economy. Once graduates are prepared for such jobs,the positive effect of their education on the national economy will be apparent after the economyhas generated employment opportunities for them. This is often the challenge in developing countries needing to create jobs while educating awork force to fill those positions.

1. The Economic Benefits of Education

It is now generally accepted in the economics literature that a more educated workforce will create greater economic output (Kozma, 2005; Sianesi& Reenen, 2005). The new focus ison the exact mechanisms for why this link occurs. In general, two approaches have been used tomodel this relationship. The first is to treat labor as just one of many inputs into an economicproduction function, and then study whether an educated worker creates more production than an uneducated worker. The second is a two stage process that initially examines the effect of aneducated laborer innovating and making the production function more efficient, and thenexamines if production has increased as a result of these more innovative processes. These twoapproaches are expressed in greater detail below.

Historically the first approach described above was the most popular for modeling educationand economics: classify the worker as another input into a production process. For example,acountry's Gross Domestic Product (GDP) could be measured as a function of its totalworkforce, number of factories, available natural resources, etc. Then a researcher could study the benefits of education by examining whether an educated workforce, when plugged into thisproduction function, results in greater GDP. Although it may be used to model"human capital" just like any other form of capital, it does show positive results in the benefits of education.

The alternative model for examining human capital unpacks the role of human capital tobetter understand how education workers are more innovative and hence have a greater effect onoutput. For example, a well educated worker will presumably discover more efficient production means or create entirely new categories of production.

2. The Economic Benefits of a High Tech Workforce

Beyond the basic challenges of creating an educated workforce, it is important to align the educational outcomes with the demand for future jobs. In a globalized, knowledge-based economy, this requires a workforce that has a strong background in the sciences, engineering, and information technology. A large and growing body of research shows that such a hightechnology (high tech) workforce will create substantial economic benefits. For example,Lichtenberg (1995) reported that one Information Technology (IT) worker can be substituted forsix non-IT workers.

When examining the linkage between technology and economics, the first question is why a high tech worker creates greater economic outcomes. In general, technology has been found tocontribute to economic growth in three ways (Oyelaran-Oyeyinka and Lal 2005):

1)Technology creates new types of goods to be produced. This means that the actual act of producing technology goods and services is an increase in GDP, in much the same waythat producing any good or service affects GDP.

2)Technology goods and services are more efficient substitutes for other types of goods andservices. A classic example is market discovery mechanisms using mobile technologies. One can discover market and price for some product or service without going to there which save money and time.

3)Technology is a special capital input, producing economic spillovers (UNCTAD, 2007).Information technology in particular exhibits properties of non-excludability, whereknowledge learned by one individual or firm can create benefits for non-participating third parties

In sum, a knowledge-based economy is a growing economy. Technology investment resultsin greater GDP. Greater GDP results in more technology investment. This results in a virtuousfeedback loop. This result tends to hold for a variety of different definitions of ICT, includingtraditional land-line telecommunication, mobile phone investments, and broadband Internetaccess.

ICTs in education can reduce the costs of education per student by increasing the relative economic benefit of investment in education. ICTs can have differential economic benefits byimproving how instructional methods are delivered. ICTs can deliver instruction in a moreefficient, less expensive, or more accessible way (Clark, 1983). For example, e-readers can allow children to access to thousands of books at relatively cheap price once the reader hasbeen purchased. In addition to direct economic benefits, some believe ICT can even enhance thequality of education by supporting student understanding as well as helping them to developskills needed to create knowledge (Kozma, 2005)

C. Societal Impacts of e-Learning

The impact of access to education on different members of society can be significant. Beyond the improved skills, income and employment effects on graduates,other impacts of education include improved health and wellbeing, particularly among girls andwomen. This section on societal impacts briefly considers these types of impacts of educationgenerally on society in developing countries, and then considers more closely the relationshipbetween e-learning and society—particularly how the societal context can affect the ability of elearningprogramsto provide their potential benefitsamongall students. Societalaspects such asbeingin a rural location, a femalestudent or speaking a different language can all affect access toanduse of e learning programs,and their success.

One of the most well documented impacts of education on society is that of improved health.

As statedin the Goal (UNICEF 2011),

"Educating girls for six years or more drastically and consistently improves their prenatal care, postnatal care and childbirth survival rates. Educating mothers also greatly cuts the death rate of children under five. Educated girls have higher selfesteem, are more likely to avoid HIV infection,violence and exploitation, and tospreadgood health and sanitationpractices to their familiesandthroughouttheircommunities.And an educated motheris morelikely to send her children toschool."

Additional impacts that particularly post-primary education has been shown to have include reducing poverty, delaying marriage of girls, and increasing decision making power. Secondaryeducation plays a crucial role in preparing for a life-long learning perspective. These are all important reasons why governments in Africa have recently been heavily investing in universalprimary school education and in expanded secondary school education.

The education provided by these secondary schools however, may not be accessible to all segments of society or all regions of a country. Access to e-learning has been found to reflect this access to education and to ICT generally in the wider society. Research has shown that a gap in access to ICT exists between countries, and an even larger gap exists within countries betweenurban and rural areas, between men and women, and between rich and poor. This has beentermed the digital divide, defined as "*the gap between those with regular, effective access todigital technologies, in particular the Internet, and those without."*

Thissection describes some of the current patterns and implications for impacts on e-learning.

1. The Rural-Urban Divide

The global digital divide is a term used to describe the gap between well connected and poorly connected nations, while at the national level, there is often a strong urban-rural divide. Indeveloping countries, most Internet users gain access through public access points like Internet

cafes. The divide is thus closely related to geographic proximity of venues with technology toaccess the Internet.

A statistical analysis analyzing the factors behind digital inequality within and betweenAfrican countries found that differences of access and use could explained by five factors:

1) differences in the technical devices that people use to access the Internet,
2) location of access,
3) the extent of one's social support network,
4) the type of activities the device is used for, and
5) one's level of skill

(Oyelaran-Oyeyinka and Lal 2005).

It concluded that although infrastructure is a critical factor, the social context, education and technical knowledge of the individual user are also key. The study also found a strong correlation between Internet access and nationaleconomic development, although the causal link (whether the Internet led to development or viceversa) was not clear.

Another technical challenge that has prevented e-learning from being offered in rural areas has been the lack of reliable electrical power. Meanwhile, e-learning technologies, whether small handhelddevices or projectors, requireelectrical

power. In thesesituations, it is critical to design an efficient, low-power e-learning system. Different solutions to provide power off the grid include solar panels, diesel generators, and geo-thermal and wind energy. Solar is often used.Commercial and specially designed systems are now available for recharging small batteries tolarge systems that power a computer lab or an entire school. Initial costs for solar can be high,though they are declining. Like the Internet, providing electrical power to underserved areas canrequire a significant initial investment and some continuing costs.

Despite these challenges, e-learning technologies have the potential to significantly improveaccess particularly to science and math education for rural or otherwise disadvantaged schools.These schools often are not able to attract or retain science and math teachers because the schools are in undesirable, isolated rural locations. e-Learning would provide these teachers and students otherwise unavailable access to ICT knowledge and skills, as well as improvededucational content. Currently, however, most e-learning opportunities tend to be in urban areasdue to the infrastructural and other challenges of rural areas.

2. Culture and Language

e-Learning has the potential to play a transformative role in a society. Culture, however, can play an important mediating role affecting how technology and e-learning approaches areadopted and adapted, and how successful they are in actually improving learning. The potentialtransformative role of e-learning often runs against educators' preferences for teaching infamiliar ways that do not affect life in classrooms. Educators tend to use e-learning approaches inculturally familiar ways that may reduce their effectiveness.

Educators from different societies are incorporating and using e-learning technologies in different educational cultures. Although the cultural differences can be subtle, understandingthem can help explain the constraints and alternatives for e-learning. Zhang (2007, 2010)conducted analyses comparing Eastern, especially Chinese, and Western pedagogical culturesand how they affected their e-learning preferences. His findings are summarized below.

Although there are major differences between Eastern cultures and African cultures, there areseveral similarities in their educational systems and teaching styles. Adapting e-learning for anAfrican pedagogical culture may lead to similar experiences to those in Eastern countries.Zhang's work provides insights into what cultural factors affect e-learning approaches, and what to consider in designing e-learning programs.

He found that Western learning culture tends to be more learner-centered, activity-focused,and individualized. Western students and educators tend to attach importance to questioning andcriticizing information presented by an instructor. Technology is more likely to be content-openand used as a productivity tool (e.g. word processing, simulations, Internet research, graphics and

spreadsheets). Easterners tend to favor collectivism. This cultural tradition, together with social factors suchas centralized political systems and rapidly growing populations, have shaped a group-based,teacher-dominated, and centrally organized pedagogical culture:

Culture of Examination:

- Education is regarded as an essential way to compete for higher social statuses;
- The performances of learners, teachers, and schools are largely defined according to exam scores;
- Preparation for high-stake exams poses tremendous pressures to learners, parents, teachers, and administrators.

Centralized Educational System:

- Central governments design and execute policies and standards for school finance, curriculum, textbooks, assessment, and teacher preparation;
- Teachers are required to teach uniform content, often based on the standard pace in reference to official teachers' guides.

Language, too, can affect the design of e-learning programs and their success, particularly when the software, learning materials and Internet is in a language in which students andteachers are not strong.

3. Gender and e-Learning

ICT can be a strong change agent. In uprisings and pockets of challenge throughout the world we have seen the impact of ICT and social media to coordinate and communicate political and social movements. Access to ICT can empower social and economic development, as well asprovide employment and grow the economy. But where are females in the mix? There iscurrently a digital divide between groups in society, and women in developing countries areoften "within the deepest part of the divide" (Hafkin& Taggart, 2001). There is already evidence that gender inequities are being replicated in schools with girls using computers and the Internet less than boys (Olatokun 2008).

What makes educational technology suitable and attractive to females? From a landmark study by the American Association of University Women, and from ours and other's research(Heeteret al., 2009), it has been found that girls have definite preferences for how they chose tolearn with and about technology. For instance, girls prefer collaborative community ways oflearning how to use technology, they like to have order and instructions to guide them, theyprefer to learn about a subject of interest and then learn to use the technology as a tool ratherthan it being the focus of study, and finally they prefer to learn from female role models.

According to Sanders (2005) who wrote "Lessons Learned in 22 Years of Working with Teachers about Girls in IT", approaches that are successful in teacher training workshopsregarding the sensitive subject of gender bias in education include,

I. Diffuse resentment of teachers (who may think you blame them for the gender gap).Explain and emphasize the universality of gender bias, and that it is often inadvertent.
II. Use local data when possible
III. Stress the importance of teachers finding out about gender bias themselves (rather than take the presenters word on it) through mini-assignments such as observing eyecontact of teachers with girls and boys.
IV. Repeated training sessions are better than a one-time approach. Follow up is essential.Development happens over time.
V. Reward teachers who do gender work. Rewards could include access to and trainingwith technology, continuing education credit, drawing for a gift certificate, etc.
VI. Be explicit. Have the teachers tell the class what they are changing to ensure genderfairteaching.

e-Learning is thus being introduced into educational systems in which girl students are often participating less than boy students. Access to and use of ICT technologies in the wider society is also gender-imbalanced in many developing countries. Nevertheless, introducing e-learningtechnologies into schools has the potential to assist girl students to improve their ability toparticipate and thrive in schools, and their new knowledge of computer technologies willcertainly place them in a stronger position in their adult lives.

V. CONCLUSION

Governments and donors in developing countries realize the critical importance of education for economic and social development. The short history of e-learning programs in developing countries has provided some key lessons in what activities work, and what produce sustainable programs. Many of the programactivities that are successful are centered on the teacher: strong teacher training and professionaldevelopment, mentorship, networking, and support to integrate e-learning pedagogicalapproaches into classroom practice and curriculum. The e-learning approaches need to bedesigned to fit the local situation and needs, for example content needs to be not only contributeto the curriculum and in the local language, but it also need to reflect cultural norms.

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