# Open-Minded Electronic Learning: Towards Enabling Cost-effective Lifelong Learning

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## Abstract

Over the past 20 years, computers and the sharing of information have penetrated nearly every aspect of educational life. Indeed, the reliance on Computer-aided Learning has impact on the economic structure and the cost per learner. The demand for electronic learning (e-learning) today is rapidly growing worldwide with the demand simply over stressing the limited infrastructures and resources available. The developing countries are no exception to the same and demand for e-learning is relatively on the rise as well. In this paper, an attempt has been made to critically examine ideals of open source strategies for enabling such technologies and other resources available. The paper also provides key recommendations with regards to the steps that need to be taken to enhance the overall quality of the lifelong learning most especially for adults.

**Keywords**: Education, e-Learning, Open Source, Internet, Information Technology and Communication

## Introduction

The Information Technology (IT) has made a significant impact in many areas of teaching and learning. The IT revolution is going on and it is changing the very landscape of human existence. Computers and sharing of information that they facilitate have penetrated every aspect of American life. Indeed, reliance on computer increases every day, from shopping at grocery stores and filing taxes to driving an automobile and communicating with relatives and business associates (Johnson, 2000). The introduction of Personal Computers with application packages improved the way materials are presented to the students during lectures. Few years ago, the most significant teaching supporting tools were Computer Aided Learning (CAL), Computer Aided Instruction (CAI), Computer-Based Training (CBT) and online learning. These technologies made use of various forms of interactivity to engage the student in effective, and often novel, learning experiences, (Alavi, 1997; Leidner, 1996).

To describe e-learning, it can be defined as 'enhanced learning' that enables people to collaborate. The technology brings wealth of resources to learning and the opportunities to test and get feedback. It is practical, fun (interactive), and scalable that could be used and re-used with different approaches for different learning situations.

Bates (1995) highlights the following criteria for assessing the properties of different learning technologies:

- Access - how easy is it for learners to access the technology?
- Costs – what is the economics of using the new structure; the unit cost per learner?
- Teaching and Learning – what approaches to learning are appropriate; what are the pedagogical strengths and weaknesses of different technologies?
- Interactivity – what type of interaction does the technology support?
- Organization – what changes in the organization need to be made before the technology can be used successfully?
- Novelty – how new is the technology?
- Speed – how quickly can courses be mounted and updated with the technology?

Like the conventional learning methods, the applications of these new technologies require collaborative models in the managerial, pedagogical and technological improvement in access to learning. Although, there is a general agreement that the use of these technologies greatly improves access to learning, steps to standardize e-learning and framework for accreditation plus quality assurance must be taken seriously. With the economics of the technology, the objective of this paper is to suggest how the content developer can utilize open source, open format and open contents for information transfer. Open minded economic evaluation of the information transfer would however cover the gap in its costs or pedagogical advantage in the viability of the new methods to the traditional methods.

## E-Learning in Education and Lifelong Learning (LLL)

Like all other sectors, the education sector as well has not been able to remain isolated from the ongoing IT revolution. IT has virtually altered and redefined the educational and research landscape in academic institutions the world over. In this new era of IT, one of the most critical challenge that most of the educational institution have been confronted with is how to best educate students for what has been variously called the Knowledge Age, the Information Age, or, more recently the Digital Age (Shakya, 2002). The implications of these innovations are enormous and the implications of these have changed the entire perspective of education globally and IT has been the driving force behind such change (Fulton, 1999).

Going by the key figures in the recent years, percentage of participating sets of students in LLL could be outlined as follows:

- Percentage of adults: 15%
- Percentage of adults participating in e-learning 6,6% (EU 14%)
- Digital literacy 0,7 (EU 0,8)
- Digital divide gap index 45% (EU 53%)
- 58, 8% population aged 25 – 64 with secondary education qualification
- 52, 7% with low secondary education qualification.

In light of the above development, it will not be out of place to foster access to e-learning and raising participation of both adults especially and teens on e-learning thereby raising the quality of adult education to some extent. It is also worthwhile, taking into consideration the development of organizational potentials for e-learning and employability skills of underprivileged

groups. Emphasis should be focused on peoples' Universities where traditional national network are put in place for LLL involving more organizations. Establish policies for general education and programmes for raising educational level that are funded at least 30% by local communities/regions/state.

The collaborative model of e-learning, if employed, allow inclusion of organizations in regions with the large gap in Internet, and share knowledge, experiences and cost of all participating organizations at all stages. It serves as a motivator and a change agent. Another area is the development of initial education and in-service training in cooperation with accredited Universities. The practice, when fully implemented, will form the instructional design in Table 1:

**Table 1: Instructional Design**

| **Initial State** | **Transitional/Final State** |
|---|---|
| Time and place defined | Flexible time and place |
| Final assessment | Process assessment |
| Assessment is exam based | Assessment is individual efforts and progress based |
| Work with the whole group | Work with a small groups and individuals |
| Students reactive | Students proactive |
| Teaching approaches for "average student" | Teaching approaches for students with a different learning styles, motivations etc. |
| Individual culture | Collaborative culture |

In order to make the implementation a broad-based, there are three Information and Communication Technology (ICT) levels for assisting learning in various technological conditions for raising the quality of teaching and learning (Andreja, 2005). The three levels are:

- Offline interactive multimedia learning material
- Guided individual learning environment
- Collaborative learning environment.

The efficient use of any of the levels will transform the educational systems and practices in order to contribute cost-effectively to influencing change in the society.

## Planning an e-Learning Strategy

In planning an effective e-learning system, first, the pedagogy must be well defined looking at the approaches and methods to schooling, learning, and teaching. In order for effective approach, the following points need to be addressed:

- Need to address pedagogical issues
- Need to address student learning styles
- Need to consider students' motivational issues
- Need to consider stage in learning

- Need to consider discipline-specific learning approaches
- Need to consider teachers' approaches to learning etc.

The points, amongst others, are the initial considerations by the teaching and learning actors such as the learners, teachers, administrators, researchers, etc. Other active users are the remote users such as visitors, organization partners, etc. and other special requirements. More importantly, some user requirements may sometimes be in conflict or may be overlooked and that is why all groups should be engaged in the planning of the e-learning system. One needs to identify the requirements and explore how it can be achieved (Kelly, 2005). Since the technology is also tailored to special needs/requirements, some users with disabilities may have special needs that are to be addressed. Technologies, most times, are not available to everyone (that is not everyone has a Personal Computer (PC) or commercialized Operating System (OS) like UNIX). In such special needs, automated tools to access and process resources could be used.

In deploying the e-learning strategies, there are important issues such as re-sourcing, content creation, sustainability and deployment model. The re-sourcing is not cheap and critical decisions are to decide who pays, what is the rationale, using the open source or off the shelf etc. Deploying model issues could raise questions like purchase Virtual Learning Environment (VLE) or home grown development, migration from one to another, centralized or distributed and in-house or remote services. Emphasis should also be placed on the community sustainability from the angle of people, motivation, technologies and support. It is good to use a bottom-up approach development for the e-learning and the needs to plan for success in the organizational deployment so that it could work correctly and widely accessible.

## Planning e-Learning Contents

The analysis results of e-learning projects drawbacks are the digital divide, contents and evaluation. The aspect that is most accessible to correction is the contents with the objectives of anticipating and favour users' expectancy. It is important to make the content usable. The content must address the following items:

- Download time
- White spaces
- Size and fonts
- Bulleted and numbered lists
- Page length
- Depth
- Icons and colours

The usability of these educational contents must have the learn ability as its focus, that is, easy to learn. The online contents are in these categories:

- Text (News, Resources, Didactical Modules)
- Archives (Information, Links, Glossary)
- Hyper-multimedia items (Audio, Audio – Video, Animations)
- Forum (Meeting and discussion environments, source for new contents)

The content developer must be able to appreciate or differentiate the contents as it is applicable to users of the services. Some of the important aspects to be considered are to be realizable on web

and correct. It has been noticed that font choices communicate and transmit emotions. The choice of fonts/texts must be coherent with the knowledge of identifying that online reading is 25% slower (Anzalone, 2005).

The editorial style must be brief and easy with effective sentence at the beginning of the paragraph and one idea per paragraph. The copyright that prevents people from copying other works does not really exist on Internet. Internet is a free environment and a collaborative one. Another area that could solve the copyright issue is the open source – knowledge sharing by using free documentation license (GNU FDL license).

Archives, an important aspect of the content, come from external sources and news reviews that must be authenticated. The links to the archives must be well organized with constant checks and upgrade. The primary aim is to be used as an instrument to activate collaboration that can initiate discussion stimulus.

Learning Objects (LO) are used as powerful solution that includes complete lessons that can be re-used. The standardized ones are the solution to interoperability.

## E-Learning and Pedagogy

The advent of e-learning increases the pedagogical richness in education from presentation (teachers); to practice (student); to communication (group); to interaction (real world); and to collaboration (community) (Logofatu, 2005). E-learning has also brought about the transformation from old pedagogy to a new one. Table 2 shows the transition from old to new pedagogy.

**Table 2: Pedagogy Transition**

| **Old Pedagogy** | **New Pedagogy** |
|---|---|
| Compulsory | Voluntary |
| Teacher-centered | Learner-centered |
| Minimal learner control | Education as freedom |
| Training for life | Assimilation of learning with life experience |
| Convergent thinking | Divergent thinking |
| Rote learning | Active learning |
| Depends on educators learning | Depends on learners need for learning |
| Imparting information | Opens vista for continuous learning |

According to Logofatu (2005), there are different pedagogies in e-learning. They are:

- Learning as a process for acquiring information;
- Learning as a process for acquiring information and processing experience;
- Learning as a process for acquiring information and processing experience that affects a long-term change in the consciousness of the learner;
- Learning as a process for acquiring information and processing experience in which the learner integrates new information and experience into his/her current knowledge base;

- Learning as a process for acquiring information and processing experience in which the learner perceives, selects and integrates new information and experience into his/her current base, thereby changing it;
- Learning as a process for acquiring information and processing experience, in which the learner selects and constructs knowledge that is useful and appropriate for him/herself and in turn uses this to drive and determine his/her own continuous learning process;
- Learning that becomes an individual process of interaction between the individual and his/her environment, in which the subjective reality of the learner is actively constructed.

## Open Source and e-Learning Resources

Open source simply means that collaboration is open to all and the source code is freely shared. The ideals of open source are to share the goal, work and result. This is made possible when developers can read, redistribute, and modify the source code for a piece of software. Other areas that are relevant to open-minded development of e-learning are the open format and open content. Open format means that files (documents) can be written, read and understood within any program, platform and OS. The format is public and fully specified, not proprietary or copyrighted. Open content can be used in infinity of ways, restricted only by the imagination of the user. One of the most significant uses is to support instruction and helping people to learn.

The open external resources for e-learning must be checked with the following criteria amongst others:

- Accuracy: is the content clear or reliable?
- Authority: is the author qualified?
- Objectivity: does the information show bias?
- Currency: is the page dated? If so, when was the last update?
- Coverage: how in depth is the material?

In enhancing teaching, external resources like rare data, latest research, expensive multimedia and international experts can be searched by using high quality Internet resources for learning, teaching and research.

## Resource Sharing in an Open Source

In the recent years, huge increase in distance education was due to the emergence of Internet and World Wide Web (WWW) for distribution on the Internet. However, the use of multimedia and the immediate interactivity that computers connected to the Internet afford has led to the creation much richer learning environment (Bauer, 2005). These new technologies enhance communication between different learners, between learners and teachers, and to a certain degree also between learners and the computer that serves the content. Individual needs of the learners can be created in the learning environment.

The challenges that however face the creation of the rich online content is the time required to create the media-rich learning environments. However, in order to achieve the same richness in content, the re-usable learning resources or free open source software can provide a platform for individualize testing and eventual adoption. These supplements can be customized, as they are very numerous on the net that covers so many subject areas. This method will afford an average College or University teaching professional simply to have more time to maintaining an active research program or family life.

# Evaluating ICT in Education and Open-minded e-Learning

In the process of evaluating the new structures, the e-learning can not be evaluated in isolation. The ICT in the society and education have to be evaluated before evaluating the e-learning resources and their uses. In the context of educational questions, what is the product and what is the process? Is it qualitative or quantitative? Is it a means to an end rather than an end in itself? All these questions need objective answers.

The simple process that could help in answers to those questions is to:

- Identify the purpose of the evaluation
- Work out some other questions
- Decide who should be asked
- Determine the sources of data to be used
- Collect and analyze the data
- Report
- Plan for change

To buttress the points raised, excerpts from Internet are analyzed inTable 3 for the vote on acceptability of new technology in Quick vote CNN.com; Table 4 that shows the polls carried out for relevant of ICT in Education and e-learning by World Education Market:

**Table 3: Vote on New Technologies in Education**

| **Items** | **Percentage Vote** | **Number of Votes** |
|---|---|---|
| Personal Computer | 18% | 17517 |
| Satellite | 3% | 2636 |
| Silicon Chip | 24% | 23715 |
| Walkman | 0% | 122 |
| World Wide Web | 20% | 19715 etc. |

**Table 4: Polls on ICT in Education and eLearning**

| **Questions:** What could be the impact of ICT on the Educational model? | **Percentage Polls** |
|---|---|
| The educational model will not change, it will be primarily based on classroom education | 0% |
| The educational model will change slightly to more individual based education in classroom setting | 40% |

| | |
|---|---|
| The educational model will change dramatically to a fully individual/team based educational model with a teacher as coach/mentor | 60% |
| **Question:** By when do you see e-learning becoming a "reality" in schools, higher education, or life long learning contexts? | Percentage Polls |
| Already here | 41% |
| 2003-2005 | 58% |
| 2005-2007 | 0% |
| 2007 or later | 0% |

# Recommendation

After reviewing the various implementations of e-learning, it was found that there are numerous areas of concern that need corrective actions. The limited resources were not properly channeled and utilized and there are misplaced priorities.

It is therefore recommended that:

1. open source for the content should carry the largest percentage of content development
2. incase of low bandwidth, offline multimedia materials can be utilized
3. all users requirements must be taken into consideration in planning e-learning strategies
4. collaborative efforts should be intensified
5. evolvement of standardization in the content development
6. Set up across borders collaborative efforts to achieve standardization, optimization of cost/benefit ratio, avoidance of duplication of resources etc.
7. Organize seminars, conferences, exhibitions to promote awareness among adult learners and the community
8. Maintain a central pool of open-source resources for streamlining maintenance support activities on the basis of cost effectiveness.

# Conclusion

The e-learning revolution is fast making significant impacts in the global thinking in the educational sectors. It is transferring resource-based economics to knowledge-based economics. It can easily manage a large groups spread all over the country. At present, the demand for e-learning is growing day by day. An important factor to be considered is how to achieve the entire goal at the best cost-effective way. These and more could only be achieved by emphasizing the use of open-minded approach in planning and deploying e-learning infrastructures.

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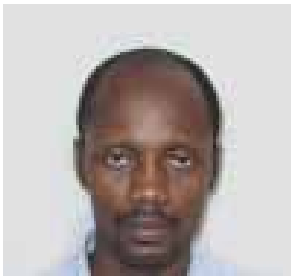
# Biographies



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