The Impact of E-Learning to Enhance Quality of Education: The Case of Adama Science and Technology University

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ABSTRACT

E-learning is the use of Internet technologies as well the pedagogical approach of advancing the scalability of knowledge and performance. Due to the fastest growth of Information Communication Technology, the impact of E-learning for the contribution of quality education become vital, leading to a great paradigm shift for Ethiopian higher educational institution in general and Adama Science and Technology University in particular. This study examines the impact of e-learning to enhance quality of education through implementing it as a blended learning approach for boosting the learning teaching process within the academic settings. This study also confirms that the application of e-learning in ASTU extensively facilitates e-learning as a tangible asset to build up the students' intension and perception to technology as well as fostering the quality of education via assisting them to improve their learning knowledge and skills by accessing their particular courses' materials online 24//7. By using the secondary data a source of information to conduct the analysis, the study verified that, the application of e-learning trainings for Instructors and delivering their own courses on the e-learning platform have contributed a lot for positively influencing both stakeholders achieving the prospective successes and significant effects on improving the momentum of providing greater access to the students, enhance an institution's reputation and enrich the teaching and learning experiences.

*Keywords***:** ASTU, e-learning, e-learning Portal, Quality of Education, MOODLE

1.   INTRODUCTION

The increasing influence of globalization and the emerging information society, set new requirements for all areas of social life, including to higher education. E-learning [1] became an important instrument in the new Higher Educational Environment in the digital age which creates student-centered learning and educational practice, offering new more flexible learning methods. In the advancements of the 21st century, integrating the learning-teaching practices to the latest information and communication technologies would be indisputable to achieve high results in learning and educational process. Ngaia, Poonb, & Chana [2] stated that E-learning system supports external collaborative activity (i.e. domestic students can consult with foreign students) rather than internal collaborative activity (i.e. two domestic students consult each other in physical space), which makes it an effective web-based technology. E-learning system is a capable system for educational systems, especially for interactive activities which is increasing among students all over the world for improving their knowledge [3].

The ASTU's e-learning center is established with the goal of enabling departments in all schools of the University to apply e-learning in their teaching and learning process primarily in their regular programs and later proceeding to expand it to extension programs. Being the pioneer of e-Learning in Ethiopia, initiated on October 15, 2009, ASTU's e-learning center still maintain its e-learning technology leadership in the nation by accomplishing a lot in terms of e-learning promotion, training and implementation in ASTU. The center so far has exerted its tireless efforts to promote e-Learning on various occasions to create wide range awareness about e-Learning in the minds of various stakeholders both in ASTU and outside. Demonstrations during meeting sessions, ASTU's Research Park inauguration ceremony, BPR workshop, during city day programs in Hawassa, Adama, Bahirdar, and presentations in national conferences in Addis Ababa University, Bahir Dar University, UK and USA are some to quote. Regarding training, the center has been providing e-learning training to ASTU's communities, pool attendants and especially to the instructors. Outside ASTU, e-learning center delivered e-learning training to Hawassa University instructors. The center even moved onto providing training to Sudanese University professors and U.K Professors. **[4]**

Figure-1: Former E-Learning Activist's Distributions In Ethiopian Universities

2. PROBLEM STATEMENT

According to the survey of this study, a deep investigation and observation has taken place on the entire trends of the center's activities and finally come up with the following major reveled challenges.

2.1 Problems related to ICT Pools and Class Delivery

Limitation of ICT Pools is to provide the e-learning training to students across all the departments of each school due to students-class ratio assumes that five ICT centralized Pools with nearly 80 PCs for about 17,000 students. Even among these PCs, some of them are completely out of order, have no internet connection, frequent failure of operating system as well as some demanding application software like flash player, adobe player, internet downloader etc. The pools also are not well organized with multimedia kits, frequent power interruption since there no UPS batteries or a standby generator, appropriate Lab assistants; for example the lab attendants have no ICT background in their qualification and poor lab usage scheduling.

2.2 Problems Related to Instructors

Absence of rules, regulations and policies regarding the Intellectual property rights of lecturers related to e-learning in the University, to implement it as a learning teaching strategy in the curriculum. Lack of motivation and awareness about e-learning approaches and even some of them come up with resistance due to expectations of compensation and incentives by considering preparing of their course materials and implementing of the learning-teaching processes as an additional tasks.

2.3 Problems Related to Students

Majority of students come from rural side of the country, have lack of interest and frustration to work on the platform particularly during at start up sessions due to lack of basic computer skills and experience to e-learning technology.

2.4 Problems Related to the Digital learning environment

Since the university focuses on Science and Technology courses, the old legacy of the MOODLE's version has not yet supported the new features of its succession updates, lack of on job training for the e-learning experts which are also few in number for adopting further authoring tools to suit the demand of engineering course matters as well as the e-learning center has no audio-video studios to record and edit lectures and finally uploads them as additional course materials on the platform. It has neither Content Development Center nor High Quality e-lecture Halls. Lastly the center has no facility to conduct a video conferencing to other universities in and out of the country.

3. METHODOLOGY

This research paper is the first in kind, for the e-learning center of the university and one of the author is an e-learning expert here for past two years. Secondary source of information is gathered from the center's quarterly reports, thorough investigation, and observation, various consecutive meetings with the lecturers, senior management bodies, some expatriates, ICT directorate, ICT Team Leaders, Lab Technicians, Lab attendants, attending meetings, experience sharing programs with others local universities and even students during the authors demonstrations, classes and providing trainings for instructors during training sessions.

In addition the former archived documents are revised from the portal's feed backing forwarded to Instructors and students.

4.   FINDINGS AND DISCUSSIONS

Being the founder in e-learning integration as a blended learning approach and implementation in Ethiopia in October 15, 2009, ASTU's e-Learning /e-Teaching was primarily established under the School of Pedagogy and Vocational Teacher Education and taking the lead of expanding its services with the aim of enabling departments across all the schools of ASTU applying e-Learning as a new learning- teaching approach in the regular and as well as later on proceeding to the extension programs. After the unit has been re-established in July 2012, it then officially became a center and has been made to be directly accountable to the Vice President for Academics of Adama Science and Technology University.

Even though the unit then after called the center has provided unstructured and random training for local instructors specifically to their respective courses for more than 3 years, all the attempts were not centrally administrated, supervised and supported by the senior bodies of the university. And for that reason, evaluating the old trend of its succession training delivery and other relevant activities, the recent staff members of center has deeply discussed the detail of the former e-Learning training trends and its legacy approaches to a new strategic approach which demands a timely reporting schemes and close relation with the university's senior offices in regarding to the development growth of the center's services various dimensions.

Therefore, since the old legacy of providing e-learning training has been theory dominated, the new upcoming e-Learning training packages and approaches put more inclination to provide practical sessions than theoretical contents in order to enable the instructors or trainees to internalize the realm of the e-learning technology as well as to successfully implement their respective courses on the e-learning portal. In other words, the training will build a balance between theory and practice where theory will consume 20% of the total training effort, sample practical session consumes 30% and real course session consumes the remaining 50% respectively. **[5]**

4.1 Contents of the Theoretical Framework of the Training Package
(i)   An Overview of e-Learning (Introduction and e-Learning for Quality Education)
(ii)   E-Learning in ASTU, Cooperative Learning and,
(iii) Active Learning, Continuous Assessment

This session of the training is expected to consume 20% of the total training time and is expected to be delivered in Conference Hall considering all trainees in one syndicate.

4.2 Practical Exercise on e-learning Platform
With the view to practically implement the courses on ASTU e-Learning Platform the practical session of the training will be delivered in two parts as explained below:

(i) Sample Practical Demonstration /Training course Room

This part of the training is so vital for trainees to more understand the role of their students on their course room and get the gist of students activities so that later in the implementation stage it will be easy to coach students and motivate them to freely be receptive to e-Learning. The sample practical demonstration exercise will be held on e-Learning Training course room developed including all the templates:

❖   Learning Materials (Training PPTs)
❖   Additional Materials (Videos, eBooks, websites, leaflets, schedule…..)
❖   Learning Activities (Forum ,Assignment ,Online trial quiz and online quiz (to be treated as quiz ,mind and online final examinations)

The templates in this course room will be a model for the real course practical implementation where the trainees will exactly develop their own courses duplicating the templates.

(ii) Real Course Development /Practical Sessions on Trainee's Own Course Room
This part of the training is concerned with developing the trainees' own courses on ASTU's e-learning portal where they will be enabled to upload their course materials, create and administer additional activities on the portal.

The content development stages for the implementation of the practical sessions of training package is shown in the figure 2.
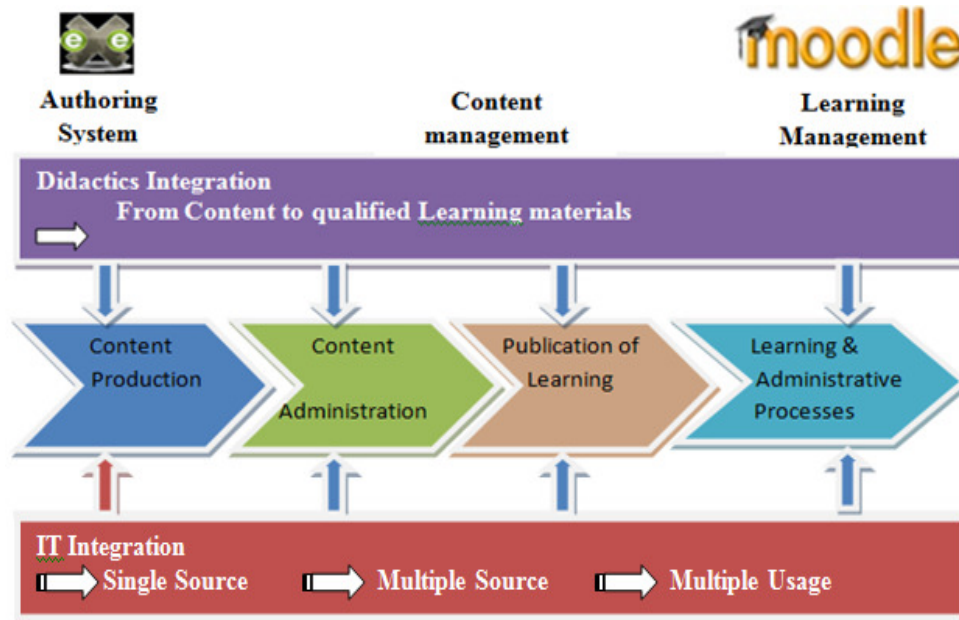
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Figure-2: Partially adopted Content Process Model in ASTU's e-Learning Center

5. RESEARCH IMPLICATIONS

Regarding the new strategy of providing trainees for local instructors, the following results become chronicled as a promising momentum for the center's future perspective regarding providing trainings for the rest of professionals in all departments. The center delivered 1st round e-learning training to 20 instructors coming from 5 schools in ASTU main campus in February, 2014. Sixteen courses were delivered to a total number of 940 students across 16 departments via e-Learning portal. As a result of these 23 forums, 10 online trial quizzes, 7 online quizzes and 3 online final examinations were given to students. Keeping the momentum, the center provided the 2nd round training to 15 instructors in August 2014.

This training was designed with the main goal of creating access to e-Learning by all departments in the 5 schools in ASTU main campus and the aforementioned instructors have already uploaded their course materials on ASTU's e-learning portal and have thought their students in a blended learning approach. Even though the second round training was successfully provided to those 15 instructors and 827 of their students across 15 departments, the recent transformation of the university as a National Science and Technology University which is going to be accountable to the   Ministry of Science and Technology of Ethiopia

merges a new organizational structure as well as a curriculum revision disregarding the consideration of the e-learning strategy which was going to be implemented on the upcoming second semester of the university's academic year of 2014/15.

Therefore, the implementation of the second round training would become engaged to be suspending for a semester and expected to be applied in the coming new academic calendar of the university considering the new structure of the university and its full focus on science and technology courses across all departments of each school. Finally, the ASTU's e-learning-teaching center has been expected to be relatively in a better position than other governmental universities in Ethiopia pertaining to delivering and implementing with a total of 72 courses recently available on the portal serving about 5356 users registered out of which 108 are instructors 5 are administrators,3461 are students ,and the rest are guests. So far the center has totally given 32 online trial examinations, 20 online mid examinations, 15 online final examinations, 57 forums and 15 assignments. The recent trend of conducting trainings and way of e-learning processes is shown on the picture below and the processing cycle depicts how is used in ASTU within each point of the education process and powerfully coordinates the learning teaching processes.

Figure-3: Delivering e-learning in ASTU

Considering the above trends of the overall activities of the e-learning center, the findings draws a conclusion regarding the potential impact of e-learning to significantly affect ASTU's learning teaching standards. Identifying the actual impact that e-learning programs have had on students, teachers and schools is, however, difficult. Because of the newness and diversity of the programs and the complexity of factors affecting outcome, measuring e-learning's impact is an emerging science. **[6]** Nevertheless, some direct and indirect outcomes can be discerned. They are presented below by e-learning's impacts on students and teachers.

5.1 The impact of e-learning on student achievement:

It is complex and mediated by a range of other factors affecting achievement. It is clear, however, that:
i.) Their effectiveness is closely related to how the technology is used as an educational tool. Students learn best with e-learning when interactively engaged in the content. Using technology can motivate students, particularly under-achieving students, to learn.
ii.) Teachers report that tutorials in subjects such as engineering and science significantly improve student performance. The Mavis type tutorial and the word processing software play a significant role in order to improve the students writing skills.

iii.) Providing technology on its own has little impact on achievement. Substantial effort must be put into infrastructure, teacher training, curriculum development, assessment reform, and formative evaluation.

5.2 The effect of e-learning on teachers and teaching parallels that of students.

It includes:
i.) The pedagogy often shifts from a teacher - centered classroom environment to a more learner - centered environment, allowing more effective use of technologies.
ii.) Teachers report that they gain confidence, self-esteem and renewed motivation in e-learning environments.
iii.) There are significant barriers to teachers in developing countries that need to be overcome including their lack of ICT skills and ICT-related pedagogical skills.

6. BARNETT'S FRAMEWORK REGRADING QUALITY IN HIGHER EDUCATION

One of the contemporary thinkers of higher education and total quality management, Ronald Barnett (1992) says "Quality in higher education demands the establishment of an institutional culture, not so much a matter of total quality management but rather one of total quality care, in which each professional is seized of his or her responsibilities and takes care over all his or her own professional efforts"**[7].**
According to him, quality should be seen as a process of critical dialogue within an institution, where course teams accept ownership and facilitate student engagement towards learning and development, and there is a self-critical culture of continuous care for the students' quality course experience.

Barnett suggested that there are four core activities that take care of quality in higher education: (1) teaching and learning; (2) student assessment; (3) staff development and experience that is central to quality higher education. The ideas of Barnett are depicted below in the figure. Beyond this, the activities within 'auxiliary belt' are important but have less direct bearing on the quality of student experiences **[8].**
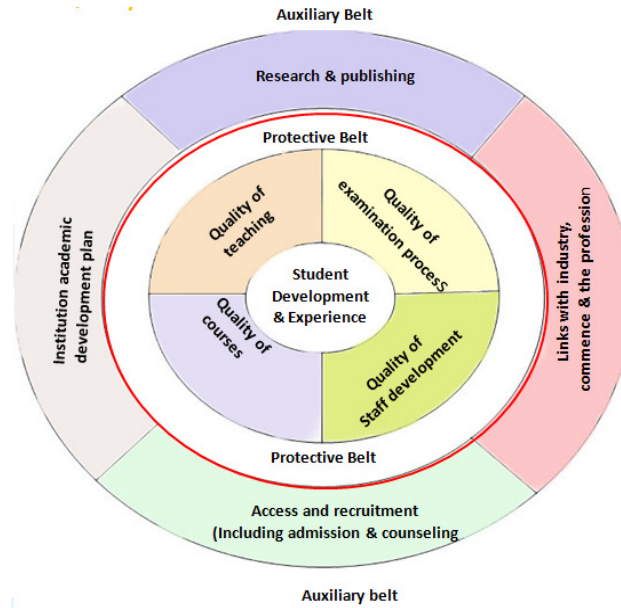
Figure-4: Barnett's Quality Framework

Table1: Description About The Contents Under Protective Belt

Protective Belt	E-Learning realizing protective belt of BQF
Quality of Staff Development	• Updating staff with latest platforms
Quality of Course	• Reach in multimedia • Carefully designed and developed courses • Simultaneous contents and labels
Quality of Teaching	• Ubiquity…anywhere ,anytime • 24 /7 access to course materials • Active learning –student centered approach • Suitable for cooperative learning • Supplement face-to-face learning • Online support • Acquainting students with technology
Quality of development	• Less time for preparation ,and correction • High level of security (3 level) • Suitable for continuous assessment • High level of creating minimization • Immediate feedback • Automatically generated statistics

7. FUTURE WORKS

Studies on effective integration of technology in education show the opportunities e-learning provides to help increase student engagement, motivation, and attendance—key requirements for learning. The potential for e-Learning to improve performance on core subjects and foster the development of radical skills in mature and emerging economies depends on the schools ability to model student-centered, highly personalized learning environments. **[9]** .

The ASTU's e-Learning center has designed Strategic Plan of giving 206 courses via e-Learning portal for the coming 5 years starting from 2015 academic calendar of the university marked the commencement of implementation of the strategy by training instructors across 5 schools in ASTU. This future plan is highly expected to alleviate the aforementioned challenges of e-learning practices in the university in collaboration with a Korean upcoming project which ASTU has already signed the agreement with the Korea International Cooperation Agency (KOICA).

Since KOICA has been established for an Official Development Assistance (ODA) to enhance the effectiveness of South Korea's grant aid programs for developing countries by implementing the government's grant aid and technical cooperation programs, ASTU's e-learning center would be one of the beneficiaries from the project to fulfill its demanding effort to expand the e-learning practices to enhance quality of education through a blending learning styles. And with this regard, the center will continue to train instructors in every semester and the trained instructors will be made to implement e-Learning afterwards. The project entitled, "The Project for Educational Quality Improvement of Adama Science and Technology University through ICT Integration PMC service." Regarding the scope of Educational environment and Quality Improvement of Adama Science and Technology University the project has two goals: **[10]**

i.) To Improve Achievement of National Economy Development Plan through Cultivating Science and Technology-focused Advanced Human Resource, and
ii.) To improve Education Environment and Reinforce Education Ability with ICT.

7.1 The apportionment of the project

It also has focused on three special divisions which encompasses the following:

i.) Providing the Project Management Consultancy (PMC) on the following areas:

✓ Teaching and Learning Design and Skill Transfer
✓ e-Learning Contents Production and Library Material(e-book) Development
✓ ICT Infrastructure Building Consultation
✓ System Design and Development Consultation
✓ Project and Result Management

ii.) Providing System Development Services including the following potential areas as follows:

✓ MOODLE (Modular Object Oriented Dynamic Learning Environment) based e-Learning System Development Support
✓ Basic Management System Upgrade and Additional Development
✓ Electronic Library Data Interactional Solution Development

iii.) Providing Equipment Supplies for the following two special areas.

✓ ICT Infrastructure Equipment Set up and Manage Training
✓ Teaching Equipment Set up and Manage Training

7.2 Expectation from KOICA

In order to enhance quality of education through e-learning in the near future binds the following solutions one by one.

i.) Solution for a challenge of e- Studio Building

Goal: A High quality contents produce through 1e-Learning producing environment (Contents Production Room for one person) and holds the following equipment's like: Live Switcher - Real-time Field Recording Device, Authoring SW, HD Camera, Line Audio Mixer, Tablet Monitor, PGM Monitor, Chroma-key Screen, Instructor PC, etc…

ii.) Solution for a challenge of Up-to-date Classroom Building

Goal: Holding conference with other University and Country through Video Conference System and Various e-Learning Contents production environment (Equip mobile contents production environment through Any cast).

Part 1: Classroom
▪ Electronic Lectern system, Lecturer PC, PGM monitor, HD camera, Sound system, LCD projector, Electric screen and Microphone,

Part 2: Control Room
▪ Live switcher, Audio mixer, C/R monitor speaker and record VCR

iii.) Solution for a challenge of e-Learning Contents Draw up and Development

Goal: Implementation of four steps on e-Learning Contents Development and Management Ability Reinforcement.
Step 1: Flagship Open Course Ware OCW (7 Types) for e-Learning System managing ability reinforcement through strategic, core OCW development
Step 2: High Quality Contents (49 Types) to improve education environment through high quality e-Learning Contents production by Authoring Tool.
Step 3: Additional Material for Blended Learning (147 Types) to improve Blended Learning Teaching through digitalized teaching material
Step 4: e-Learning Contents Production and Training Support includes: e-Learning Contents production, managing and Up-to-date learner-focused teaching method (Blended Learning, Flipped Learning etc.) ability reinforcement.

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CONCLUSION

The findings of this research paper summarizes the significance of the application of e-learning as a supporting technology tool has already become granted and emphasized for the right implementation upon the next five consecutive years anticipating the attainment of quality education in the learning environment of ASTU. And as a result of this ASTU will become the first university in the country using high quality educational contents to deliver online courses to students for their academic performance and achievements in the Science and Technology fields. Lastly the study does not mention about the details of the courses' which are already uploaded on the e-learning portal, annual budget issues, comparative discussion about the students achievements, the performance report about the instructors up on implementing their courses and the implementation of the five year strategic plan of the KOICA project and other information which would be kindly granted for the next researcher.

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Authors' Brief

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