

# CONTINUOUS ADVANCES IN TECHNOLOGY FOR CONTINUING ADULT LEARNING

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## ABSTRACT

This paper is about a study carried out at a chemical production facility in Izmir, Turkey during 2005/6 using CNC Learning environment and Kolb cycle. The system has been tested with 12 chemists working in this factory. The training course was carried on in a web-based environment and also routine meetings with the instructors were held. The target was to increase competency and compatibility to new technological advances through creating a continuous learning and experimenting environment for all faculty members and especially for adults. It was observed that this method of learning and training was successful in enabling individuals at any age to become informed, capable and creative enough to cope with the demands of new economy and era. Hence, it can be concluded that using an CNC environment for LLL with a collaborative tool advances the performance and efficiency.

**Keywords:** Life long learning, adult education, ICT's, education technologies.

## INTRODUCTION

The rapid transition from industrial society and age to knowledge and/or information based society and economy is mainly driven by the dramatic improvements in information and telecommunication technology (ICT's), aided by advances in the tools of scientific inquiry and in the codification of knowledge. The consequence of these developments is the increase in the speed, quality and innovative side of production, which are more central to competitive success. Economic growth is increasingly driven by knowledge, and neither the countries nor the individuals can remain competitive without applying knowledge. As a result, since in all countries knowledge and applied intelligence have become central to economic success and personal and social well-being as well as being an increasingly important factor of production, the knowledge economy is characterized by advanced and sophisticated technology and the individuals need substantial advanced and continuing education in their occupations and careers. The need for a flexible and versatile workforce, one that is constantly learning and upgrading its skills, has led to a continual demand for courses in which employees at any age are re-trained and up-dated on a lifelong basis via a stronger and higher quality education. Therefore, more money and time should be invested in learning and while the public sector finances basic education, the private sector should make substantial contributions to lifelong learning and ensure basic skills for participation in the knowledge economy (math, analytical sciences, basic ICT skills, foreign languages, entrepreneurship and social skills).

Investment in human capital development in the form of education and training, heavy investments in R&D and life-long learning plays a crucial role in maintaining competitiveness in price-inelastic, upper spectrum markets, where products are differentiated more on the basis of quality and innovation than price. Hence, the quality of learning should be improved. This can be achieved via transforming learning from instructor-directed to collaborative modes, from rote memorization to developing analytical capacity, and from terminal education to lifelong learning.

### *LLL for Developing Key Competencies for the Knowledge Society and Economy*

The rapid economic and social change of society makes increased demands on the ability and readiness of individuals and organizations to analyze and handle new and complex situations. Creative abilities have gained increasing importance to face the challenges of the new world. In other words, learning and/or acquiring and developing competencies are of great importance.

LLL provides both human and social insurance against the uncertainty and unpredictability of the modern world. It provides a demand-driven, individual and continuous response and takes place in a context of partnership and collaboration. LLL requires major changes in the management and administration of education systems and institutions. Current information system no longer is sufficient for the new world as knowledge economy puts a high priority to outcomes as can be derived from the competencies and related skills and not much to qualifications.

Policy makers need information with predictive capacity. Hence, the value of measuring skills and competencies not education attainment has become a priority. Information and education systems should account for this and should focus on competencies. Therefore, a new information, assessment and education system, one that is based on LLL, should be developed to align education systems with needs of knowledge societies and economies, both in terms of marketplace and social values, to sustain economic growth, to build social cohesion and peace. (DfEE, 1997 and 1999) Steps should be taken to ensure that access to and ability to use and benefit from new technologies, i.e., ICT's, are broadened in institutions, work places and elsewhere. (Alexander, G.R., 1999)

## *New Technology and LLL*

The tremendous development in new technologies and ICT's will transform formal, informal and non-formal education and LLL. With the new technologies, the sources of information and misinformation are potentially greater. "...the information technology revolution is creating a new form of electronic, interactive education that should blossom into a LLL system that allows almost anyone to learn almost everything from everywhere at anytime." (Halal and Liebowitz, 1994, quoted in Kirkup and Jones, 1995) Therefore, social, cultural and economic changes require the LLL, citizenship and technology communities to collaborate. Electronic delivery of information and interactive communication fuels the resurgence of LLL. The new technology might attract those alienated from education generally and improve access to information and guidance. The adults benefit much from this opportunity. (CSO, 2000, pp57-58)

Instructors have the possibility of using a range of media and technologies and thus deploying the particular strengths of each to benefit their best effects. The content, methodology, systems and outcomes, which are critical to ensure that a citizenry prepared for this new world is being raised should be developed. Citizens of the global village should influence each other's work positively and hence recognize strength in diversity and publish the outcomes.

## *The Purpose of the Study*

The aim of this study has been to create a continuous learning environment and enable the faculty members to get used to adopting new technologies to their work so as to create new competencies and skills. In short, the target was to make research domain of every faculty member. For to accomplish this, we have established a training system in quest for the following:

- What are the opinions and attitude of the faculty members regarding the relation between new technologies, ICT's and LLL?
- How can dissemination of innovation in this faculty be improved?
- What should the status and responsibilities of the project managers, employers, industry and/or private sector and the government be?
- What are the opinions of the instructors about the system?
- What are the opinions of the employers about the system?
- Is the value placed on training sufficient to encourage faculty?

## **METHOD**

This study has been carried out in the training center of a private establishment during 2005/6. To support the training and learning needs of this course, a web-site and virtual study center have been developed. Each of the 12 faculty member was expected to make extensive use of this virtual study center.

## *Subjects*

The education system was tested in two courses. The general credits of the attendants have been calculated and grouped in an ascending list. The attendants all had BSc in chemistry and were between the ages 24-35.

## *Materials and Procedure*

Kolbe cycle as proposed by Squires was tested. (Squires, 2000) The seminars used a suite of advanced collaboration tools to create a globally, distributed networked learning environment. The learning environment includes both synchronous and asynchronous components (all tools are cross-platform and participants may use Windows or Mac operating systems). Each faculty member is expected to use the collaboration suite consisting of a material, which is a highly interactive and collaborative system with the following components:

### Synchronous Tools:

#### *Illuminate™*

- Real-time audio/video and PowerPoint slides;
- Real-time questioning and polling of students;
- Real-time multi-media courseware

#### *Presence Awareness: MS Messenger™*

Virtual Meetings, office hours and counseling (audio, video and text communication)

### Asynchronous Tools:

### WebCT

- Threaded e-mail-based discussions
- Attached documents, sound files, images, etc.
- Sharing documents and group file space
- Planning events
- Managing the syndicate calendar
- Access to Digital Libraries
- Simulations

The attendants were assigned meetings twice a week with the instructor(s). Sessions were between 45-50 minutes. All attendants had the opportunity of offering their views and opinions when developing the course content. The attendants could communicate with each other and work in teams.

### Using the System

The attendants were encouraged to be active explorers by using Web for information searching and document creation via Virtual Learning Environments. The Virtual Field Course and simulations were employed to obtain an open-ended environment based on photos and demos of fieldwork and GIS systems designed to provide computer-based support for fieldwork and a visual environment and the case for exploring spatially referenced information were used. Printed texts were given a different and complementary role with more reflective, discursive material, encouraging the attendants to make links between their programming work and theories introduced in the training. Feedback is provided by questioning the learner making a mistake and by quiet material linked with videos which summarize and test out material taught. Then in the later stages of the Kolb model, CMC and e-mail was used to support interactions which encompassed a wide range of scenarios. Reflection, theory building and practical application were provided. One-to-one debates with the instructors and the peers, small group discussions and tea works, co-counseling were also provided via CMC.

## RESULTS

At the end of the course the attendants were offered a survey as an opinion poll for to determine the efficiency and suitability of the system employed in training, which was a mix of synchronous and asynchronous activities and exploited CNC Learning Environment.

The test, which was offered to the attendants, the mean scores and the relative standard deviations for the responses were presented in Table 1. This poll is formed in grade credit scale type questions, consisting of 7 aspects, with 5 indicating *The Most* and 1 *The Least*.

The results indicate that the group had a positive opinion about the system. Both groups shared the opinion that the system improved their ICT and organizational skills and provided them new analytical numeric and computing skills. Whereas the opinion of Group II, which received a course with more emphasis on conventional chemical syllabus, regarding their gain of new skills for continuing professional development and improving their ability to understand/evaluate the views of others, was less positive than that of Group I.

Table 1. Attendant Opinion Survey

Questions Asked	M	sd
1. I could improve my ICT skills	3.42	0.81
2. The training enabled me to improve my analytical and problem-solving skills.	3.83	0.83
3. I could improve my organizational skills (i.e. time management)	3.00	0.86
4. I could improve my interpersonal skills	3.75	1.06
5. I gained new skills for continuing professional development.	3.58	1.08
6. This training enabled me to deal with abstract problems in a more concrete way via simulations and thus increased my creativity.	4.08	0.79

7.This system enabled me to have a reasoning point of view.	3.58	0.90
8.This system should continue to be used.	3.92	0.79
<b>Total item score</b>	29.16	7.03

#### *Presenter(s)/Instructor(s) Opinion*

In the light of the findings, the new technologies and LLL have severe impacts on each other. The CNC learning environment employed for creating a continuous learning environment had advantages and disadvantages.

The advantages of CNC learning environments

- The attendants could investigate the situation from their desktop, and thus make much better use of their time.
- The simulations used enabled the attendants to make better links between a personal grasp of the details of what is to be learned, and the theoretical accounts and models of the discipline. Simulations also helped attendants to visualize and use their imagination and improve their understanding and at the same time provided authentic learning task via offering them an active role in working with models not just by trying to memorize them.
- Since computing is an essential part of the activities in the production facility, the materials used had highly positive impact on adults' learning.
- Real time events, which were introduced, created added motivation and social bonding.

The disadvantages of CNC learning environments

- It is difficult to match exactly the diversity of the needs and the time they are wanted.
- Since the quality of prior educational and learning experience impact on further study the benefit driven from the course was different for each individual.
- The access to information and awareness is inversely proportional to the age of the adult learner.
- Some of the attendants get hooked and spend more time online than the program would or is designed to require.

### **CONCLUSIONS**

The results of the study showed that:

- The synergies between new technologies and LLL have great impact on education and the institutions for education.
- Due to the growing integration between learning and commerce, education is not a distinct activity anymore.
- The global market requires a customer and research oriented e-education program.
- This system enabled the members develop holistic approach to issues and thereby increased the efficiency and profitability of the production. Hence, the ones (employers) who have invested money into this education activity benefited more than they invested.

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