

E-LEARNING IN KNOWLEDGE-BASED SOCIETY

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Abstract: The new training technologies can help improve the quality of the teaching and learning process, reduce training time and costs and compensate for the lack of training opportunities. One of the most prominent technologies is the development of Internet - leading to the development of e-learning. In the knowledge-based society, training stresses on individual learning and innovation to meet the restructuring of the industry. The Continuous Learning Centre (CLC) has demonstrated the success of the Internet learning and has been a pioneer in this area in Hong Kong. The experience and future development of CLC will be shared in this paper.

Knowledge-based Society

Evolution of economy

1. The evolution of economy from the dominance of Agriculture to Industry and to Information has developed social values and created wealth for human being. In the past, career relevant education starts with first formal academic degree and last until or beyond retirement. Nowadays, the rapid change in both employment patterns and society has made undergraduate education seem less important in the span of working life while Continuous Learning has become increasingly important. The future lives in a knowledge-based economy in which the amount of knowledge and our capacity to store and retrieve it is ever increasing, but the period for which particular pieces of knowledge are relevant or valuable is decreasing. Continuous Learning is partly an answer to the knowledge explosion, but even more as a facilitator of career change as old industries diminish and new ones grow. Continuous Learning is the necessary part in maintaining the growth and making progress in society. It should be in a form of systematic maintenance, improvement and broadening of relevant knowledge and skills. The development of these qualities is necessary for the successful carrying out of professional duties throughout a career. The Continuous Learning includes any activity that extends or updates knowledge, skill and judgement and enables knowledge workers to be more productive, understand and apply advances in technology, face changes in career direction and better serve the community.

New Challenges of Learning

2. Training is used to emphasize on mass teaching of production skills, which meets the needs of the high growth of industry in the past. Nowadays training stresses on individual learning and innovation to meet the restructuring of the industry. The paradigm of education shifts not only from skills to innovation, but also in many dimensions such as, from passive to active, from one way to interactive, from mass to individual, from standardized to diversified etc. On top of these, people would prefer to learn anytime anywhere convenient to them.

3. Companies and organisations must continuously and quickly train and update the skills of their employees to keep pace with the changes in the knowledge-based society. Traditional classroom training methods simply cannot keep up with the vastly increased speed and flexibility needed to meet training and education requirements for businesses running on Internet Time. Classroom training is expensive and organisations are under pressure to lower training costs by more efficiently delivering training.

New technologies used for learning

4. In the fast changing world, the intelligent use of new technologies plays a vital role in providing knowledge and skills to re-train and upgrade workforce so that they can adapt to evolving job opportunities and economic restructuring. The new training technologies can help improve the quality of the teaching and learning process, reduce training time and costs and compensate for the lack of training opportunities. One of the most prominent technologies is the development of Internet in recent years. Indeed the Internet is contributing to major transformations in the way people live, learn, work and interact around the world. Virtual workplace, virtual classroom, virtual library, virtual school and virtual community are becoming more pervasive.

5. In order to compensate the lack of training opportunities, one example is to make use of the satellite to broadcast the training to classrooms over the world. However, satellite broadcast is only one way. To complete the loop of interactivity, Internet can be used to send questions and video motion from each classroom equipped with Internet and camera. In turn, the questions asked be broadcast to every classroom through satellite so that every trainee knows who and what the questions asked.

E-learning

Definition of E-learning

6. E-learning provides and education opportunities that remove time, place and situational barriers. It can assume many forms but they all have common thread : the physical separation between a student and an instructor for most cases. E-learning is a knowledge and information infrastructure that leverages the power of the Internet to provide timely, effective training and education in an increasingly fast-paced and rapidly changing world. E-learning includes content delivery in multiple formats, management of the learning experience, and a networked community of learners, content developers and experts. It provides faster learning at reduced costs, increased access to learning, and clear accountability for all participants in the learning process.

Why e-learning

7. The driving forces of e-learning are many. First, more and more work can be done from home with PC and Internet links. According to the survey, about 30% of the companies in USA are set up at home. The figure is growing continuously. Second, people spend less time in travelling to attend class. They can do the learning anywhere. Third, Enterprises need to increase training opportunities to their employees while maintaining cost control. Fourth, the pace of innovation will be very rapid in the information world. Fifth, the business world is ever speeding up which requires rapidly transfer of knowledge and update skills. Sixth, the web server centralizes all contents of training titles, which are easily updated, customized and maintained. Seventh, the life long learning is becoming part of the life which is leading to a great demand in training and learning and eight,

traditional training class is too slow and cannot meet the overall demands in training. Lastly, Internet provide learning anywhere anytime. These driving forces unleash the e-learning.

8. In 1996, Internet training occupied less than 10% of total training requirements while Instructor-led training took up 80% of the pie. In 2000, it is forecast that Internet training and Instructor-led training takes 35% and 55% respectively. By 2002, traditional classroom training and e-training share equal training opportunities. According to Aberdeen Group study on e-learning in the enterprise, November 1999, already, more than 70% of corporations offer their employees computer or web-based training options. And 60% of institutions of higher education now offer online learning courses. Within a few years, that number should increase to 90% in corporate government, higher education settings. Tremendous growth is expected in the future of knowledge-based society.

Cons of e-learning

9. The increase in the popularity of e-learning in many corporations, governments, and higher education institutions are due to the fact that e-learning can be highly effective at teaching at much lower cost than traditional training. Technology cost decreases, high travel costs, flexibility are driving e-learning to proliferate. However, every coin has two sides. The drawbacks of e-learning include extra workload, lessened personal life, a lot of struggles, web limitation and high production cost.

Extra workload

10. Many instructors find E-learning courses often take more time to prepare and deliver than traditional classes. The extra workload is often not accompanied by any compensation. While this is being done on the good will of the instructor, that's not a solid foundation. Apart from all the IT/WEB/Multimedia skills to be grasped, one of the biggest parts of the work is the e-mail with students. In the classroom, there might be four or five eager students asking the questions. With an online course, there often are responses and questions almost from all students. For both the instructor and students, an online course is writing-intensive. All the coursework and feedback is given to students online. In a recent NEA survey ([National Education Association](#) of the United States – USA's largest teachers' union), 53% of the participants said on-line learning courses take more time to prepare for and deliver than traditional classes. 83% of the participants said they contact their students at least once a week by e-mail, and often communicate more frequently than that. All these take more time than traditional classes.

Probably one's personal life would be lessened

11. For the learner, perhaps the ultimate goal of lifetime learning is to improve one's quality of life. The anytime, anywhere nature of enterprise e-learning however blurs the line between work and after work. Though corporate competency could be increased by its employees' learning effort, probably one's leisure or personal life would be lessened.

Until its maturity, a lot of struggles and efforts

12. Technology is not a panacea and can only improve and increase learning when applied to meet specific educational goals and objectives. One key is to focus the use of technology on clear outcomes rather than allowing the tools of computers and Internet to become the ends. It takes time

to figuring out how to incorporate the technology into goal specific learning. E-learning is still in its evolution phase. Until its maturity, a lot of struggles and efforts would be needed.

The WEB limitation

13. The Internet today is slow and no speeds guarantee. PC is not reliable and the WEB is even more unreliable. One would find himself totally lost if the learning was disrupted by broken link or computer hang. On-line virtual classrooms with real-time audio and video could be very time wasting and frustrating if the learning was disrupted. Even for non-real-time self-paced learning that could tolerate the net, a lot of time could be wasted solely on waiting for information transferring through the net. Putting the learning materials on a CD ROM is often much better than delivering through the WEB.

High Production cost of courseware

14. The production of courseware requires both the skills of IT and the knowledge of the subject to be delivered. It is not easy to find such person especially the IT workforce is shortage. The cost of making such courseware is high yet the contents are not necessary effective and meeting the learning objectives.

Comparison of classroom and e-learning

15. Although the traditional classroom method is in many ways still the best way to train employees, it is generally slower than technological change. Although e-learning solutions allow enterprises to cut costs and improve training services for employees, and staff gain access to the latest training materials at their desktops when they need them, it is generally lack of interaction (face to face) and self motivation. In summary, the comparison of classroom and e-learning is tabulated as follows.

	Classroom	E-learning
Size of audience	Limited size of audience. Constrained by the training place	No limit of audience size. Increase training opportunities
Travel – overhead of training	Congregate trainer and students in one location. Expensive due to travel and lost opportunity costs	Virtual learning delivery eliminates travel expenses and minimizes lost opportunity costs
Flexibility	Constrain classroom and fixed time	Any where, anytime
Cost	High unit cost	High setup cost, low unit cost
Different level of trainees	Trainees are of different level of knowledge which impose difficulty in teaching	Trainees study the e-learning on their own pace
Access of experts	Difficult or expensive to get access to experts	Easy access to experts
Training contents	Generalised training	Personalized learning curricula
Fast pace	Difficult to keep training up to date	Rapid deployment and continuous evolution
Training on demand	Trainees are expected to absorb large quantities of information whether or not all information is relevant	Just-in-time modular training providing only necessary information
Interaction	Real life interaction (face to face) promote learning	Virtual interaction may not be attractive
Motivation	Trainer and class team motivate learning	Need self motivation which may end up with excuse of no time for training
Learning behaviour	Everybody gets used to classroom training	Need time to get accustomed to e-learning

The operation of CLC

Establishment of CLC

16. The CLC was approved a grant of HK\$3,202,000 for 3 years from July 1997 to July 2000 under the Industrial Support Fund (ISF) of Industrial Department. It is set up by the EDTTC in collaboration with the Electronic Engineering Department of the Hong Kong Technical College (Chai Wan) and Electrical & Communications Engineering department of the Technical College (Tsing Yi). The Centre was launched at 2 December 1998 and it was operated very successfully in the past years. The income of the CLC up to 15 July 2000 exceeds the original budget by 75%. The CLC is not only self-financed but will continue to grow in the years to come.

Services of CLC

17. The Continuous Learning Centre offers 4 types of service. First, the course materials of the Electronic Design Technology Training can be accessed on the Web. Second, the Centre is equipped with interface software to realize CAD anywhere anytime on the Internet. The CAD service over Internet is the first of its kind offered in Hong Kong. It greatly improves the flexibility and convenience of practical learning such as real-time simulation. Third, the CLC provides interactive training courses with embedded tests on the Internet. Fourth, it provides library services of borrowing computer-based training and titles, which can be made reservation over the Internet. The establishment of the CLC is timely and rides on the wave of e-learning – Internet enabled

learning. By eliminating barriers of time, distance, and socio-economic status, individuals can now take charge of their own lifelong learning.

Combined Classroom and Internet Training

18. The Internet-based training provides knowledge in introductory level. Trainees acquire new concepts of new knowledge on his/her own pace. However, they may not easily master the know-how and application of knowledge through self-study. Classroom, group or mentor training with discussion and hands-on would compliment the Internet training to build up the in-depth skills and knowledge. Since Internet training is on self-pace, it brings trainees to the same level of basic knowledge before attending the class. Trainers immediately find that the audience are at similar level of knowledge, which allows them to conduct the class efficiently. The Internet training allows unlimited user access and reduces the cost of training per user. The classroom training could then concentrate on hands-on exercise, laboratory experiment, key point discussion, problem solving and professional examination preparation. The learning behaviour of the workforce nowadays may not get used to the learning through computer and always lack of motivation. Classroom training not only drives the trainees to study on Internet before coming to the class but also synchronise the learning progress. The e-learning and classroom training are of synergy with each other.

19. Because of the compliment advantages, the combined Internet and Classroom training is expected to be developed as one of the main stream of learning mode in the future. The iMCSE course launched by the Continuous Learning Centre of Vocational Training Council is the first of its kind in Hong Kong. It demonstrates both advantages of the Internet and Classroom training, which received encouraging response in the society.

20. The CLC established by the Vocational Training Council has demonstrated the success of the e-learning and has been leading the training industry in Hong Kong. Its four services of learning attract many engineers and technical supporting staff to participate in cyber training. The CLC is indeed riding on the wave of e-learning and its future development is full of opportunities.

Future Development

Opportunities of e-learning

21. In the knowledge-based society, as the demand of knowledge and training is ever increasing. It is forecast that the e-learning and business opportunities in development of e-learning will grow tremendously in the years to come. The CEO of Cisco Systems, John Chambers, declared in a 16 November 1999 keynote address to COMDEX that e-Commerce exploded over the past two years, the stage is now set for e-learning to become the second wave in Internet-based applications. According to a recent Merrill Lynch report, the education and training industry is a \$706 billion market. The curriculum materials and certification segments of this market total \$21 billion. These figures are for the United States only, but industry leaders expect the rush to prepare students for the Internet to be a worldwide phenomenon.

Future development of CLC

22. In today's fast-paced culture, organizations which implement e-learning will provide their work force with the ability to turn change and knowledge into an advantage and competitive edge. The next move of the CLC is to provide training to companies in setting up a company-wide e-learning infrastructure and in skills for creating e-learning component contents which are part of the value chain of a company's business.

CONCLUSION

23. The increase in the popularity of e-learning in many corporations, governments, and higher education institutions are due to the fact that e-learning can be highly effective at teaching at much lower cost than traditional training. Technology cost decreases, high travel costs, flexibility are driving e-learning to proliferate. However, the drawbacks of e-learning include extra workload, lessened personal life, a lot of struggles, web limitation and high production cost. The CLC has demonstrated the success of the e-learning with its four services. The future development of e-learning is full of opportunities.

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