E-Learning Readiness in Organizations. Case Healthcare Sector

Jeanne Schreurs and Ahmad Al-Huneidi
Faculty of Business Economics
Hasselt University
Campus Diepenbeek, Diepenbeek, Belgium
Jeanne.schreurs@uhasselt.be, Ahmad.alhuneidi@uhasselt.be

Abstract: E-learning is a good opportunity for organizations that deal with fast changing knowledge so we have also in the Healthcare sector, which its performance depends on the ability of healthcare professionals to have, update and interchange the knowledge fast. However based on the literature many health care organizations failed in adopting e-learning. A primary reason for this failure is the lack of assessment of organizational readiness for e-learning. To reduce failure risk, hospitals should assess their readiness for adopting e-learning to have a successful learning outcomes. In the literature we can find a variety of e-learning readiness and measurement models, some of them, in addition to Agfa Healthcare case are illustrated in this paper. Based on the literature, our research, and our experience in the case Agfa Healthcare, we developed an improved model to measure the readiness of organizations for e-learning, the improved model consists of three main parts: The stakeholders to be included in the survey, Model of indicators, and Questionnaire.

Keywords: E-learning, Readiness, E-Readiness, E-Readiness Indicators, Healthcare, Measuring Model, E-Healthcare.

Introduction

At the beginning e-learning was just uploading the traditional classroom instructional contents and materials to the internet. Afterwards it evolved to a real time and simultaneous interaction between learners and teachers, such as real time video or audio conferencing or instant messaging(Ahmad Al-Huneidi, 2011).

Companies are saving millions of dollars each year by reducing the cost of employees training by adopting e-learning instead of traditional learning. In addition, the level of communication and interaction between learners has been improved by using innovative ICT support tools, which increases the effectiveness of learning process and learning outcomes (J. Schreurs, A. Gelan, and G. Sammour, 2009).

The healthcare sector has a rich environment of a dynamic and upgraded information every second, which means that its performance depends on the ability of healthcare professionals to take up knowledge, interchange it, and update it in an interactive and dynamic environment. Online innovative ICT support tools can assist with the development of practical skills, with online demonstrations of practices assisting trainees by preparing them for their first experience in clinical training (Oliver Jones, Helen Saunders, Gary Mires, 2010).

Adopting e-learning without measuring organization readiness may end with cost overruns and failure. E-learning is just like any other major project should start with analysis, design, implementation and execution, management and following up, and continuous evaluation to be successful. E-learning readiness should be determined before organizations introduce e-learning to assure the maximum benefits of adopting it.

E-Learning Benefits and Barriers

Advantages such as asynchronous and synchronous interaction, just-in-time learning, and cost-effectiveness provide organizations with effective solution for learning process.

E-learning is a good opportunity for organizations that deal with fast changing knowledge. E-learning is integral part of the learning process. The major benefit of e-learning includes the ease of access to resources, given the limited access and availability to the hardcopy resources and a fast and dynamic changing in knowledge specially in sectors such as healthcare and Information Technology.

E-learning offers a lot of advantages some of them are(Ruba Jabri, 2009):

1- E-Learning reduces the costs: travel expenses and long time duration to train employees will be reduced.

2- E-Learning provides 24/7 services: it is the ability to access e-learning at anytime and as needed. Because e-learning applications are built on networks intranet and internet, which will enable organizations to operate globally.

3- Content is timely and accurate: because e-learning is web-enabled; information delivered on time and is up-to-date.

4- Reuse after learning: learners after they finish e-course, they need to go back and access it again after a while, and e-learning provides search facilities to search for certain information in the content. E-learning enables continuous learning after the training.

5- Scalability: if the infrastructure is available, e-learning applications can take from 10 to 100,000 participants with little added cost.

6- Knowledge sharing: e-learning enables communities and employees to share knowledge, and discuss it even after e-learning course, which will help to move towards organizational learning.

On the other hand, while there are valuable benefits in adopting e-learning, organizations are facing significant barriers which should be taken into consideration to eliminate its impact on e-learning process to have a successful learning outcomes.

Table 1 illustrates main barriers and their solutions (Sue Childs, Elizabeth Blenkinsopp, Amanda Hall, and Graham Walton, 2005).

Barriers	Solutions
Change resistance, Applications, e-learning materials development, and Lack of time.	Adopting open source applications, and provide a flexible e-learning program.
Managers need for cost effectiveness evidence, High costs of materials and courses, and Lack of grants.	Providing managers with evidence for the true costs of e-learning & associated cost effectiveness. Providing learners with cheap/free courses & materials.
Lack of hardware/software, technical support, and Lack of access.	Evaluation research is needed, and Providing an ongoing technical support and easy access to needed software/hardware.
Lack of guidance, interactivity & good practices, and Poor quality packages.	Adopting a national approach with standards, and quality assurance services. The design should be flexible, interactive, supported and easy to use. Implementing a Blended learning program.
Lack of training for trainers, and lack appropriate skills.	Providing IT skills training courses.

Table 1: e-learning barriers and their possible solutions

The Benefits of E-Learning in Healthcare Sector
The case of Catharina Hospital (R. Spanjers, A.-F. Rutkowski, R. Martens, 2004)

R. Spanjers, A.-F. Rutkowski, R. Martens (2004) did a research to describe the implementation and acceptance of e-learning in a hospital environment using mainly the Blackboard technology. The research has been applied on Catharina hospital, which is localized in Eindhoven(The Netherlands). The hospital offers education and facilitation for various professional trainings in cooperation with universities.

In addition to the Blackboard technology, other ICT support tools such as chat, email, and forum were used to support the communication among the nurses and with their instructor. The Blackboard technology allows combining synchronous such as chat sessions, in addition to asynchronous activities such as discussion forum.

In their research paper the authors present the design of the pilot run with the participation of 28 nurses taking a course in advanced electro-cardiogram interpretation. The pilot was set over a 6-weeks period that is required to take the traditional course. The full pilot was based on the concept of socially structured e-environment. This concept assumes that a well structured e-learning environment, supported by a balance of synchronous and asynchronous communication among e-learners, and reinforced by face-to-face social contacts amongst e-learners and with their instructor, will support efficient learning process. Therefore, the designed e-learning environment is supported with interactive ICT support tools to enhance the level of interaction amongst the participants and with the instructors.

As a follow up, a survey was built and distributed to the caregivers to gather opinions on the implementation of such technology at the hospital.

Research Results

The conclusion of the research pilot includes that a socially structured e-learning environment is important to support e-learning project. Participant should be free to choose their learning style that they prefer. In addition, social contact with learners and with their instructor is a major success factor for learning process.

The research also suggests that hospitals administrators should adapt e-learning technologies for teaching their employees in a way that suits their work and their learning preferences in a better way.

Are the hospitals e-learning ready?
E-Learning Readiness in Hospitals

Are the hospitals ready for e-learning? A study on the adoption of e-learning for public health nurse continuous education showed an affirmative intention towards adopting e-learning as their way of continuing education (Shu Yu et al. 2006).

However based on the literature many health care organizations failed in adopting e-learning/clinical ICT innovations. A primary reason for this failure is the lack of assessment of organizational readiness for e-learning and for adopting clinical ICT innovations.

To reduce failure risk, hospitals' administrators should assess their readiness for adopting e-learning carefully to have successful learning outcomes. They should assess the readiness of all the stakeholders included in the learning process for e-learning, which include: Head of the HR department or the Head of training department (if available), Head of the department sending staff members to be trained, or replaced by some (potential) candidate e-learners, e-trainers, and (potential) candidate e-learners.

The case of Agfa Healthcare
E-learning services of Agfa Healthcare for their customers, the hospitals, complementing their IT products

In collaboration with the company Agfa healthcare, a research has been done in UHasselt in 2008 to investigate the e-learning readiness of 10 Flemish hospitals being the customers of Agfa, (J. Schreurs, A. Gelan, and G. Sammour, 2009).

Agfa HealthCare is a leading provider of integrated IT solutions and state-of-the-art diagnostic imaging for hospitals and other healthcare centers.

Recently Agfa Healthcare provides e-learning services to its customers, the hospitals. All ICT solutions will be complemented with an optional e-learning component.

Measuring e-learning readiness of the customers of Agfa, the hospitals

Agfa is convinced of the advantages of using their e-learning solution for the hospitals, replacing the traditional classroom learning they offer now. But are the hospitals ready to change to an e-learning solution?
First the researchers selected the relevant criteria from their e-learning readiness measurement instrument.

The stakeholders were identified, being the doctor radiologist, the head of nursery of the department and the ICT director. They were asked to do a self assessment of their skills, motivation, experiences, and to evaluate the hospital ICT infrastructure to be used for e-learning. Also a judgment from AGFA in which way they are facilitating the e-learning application for the hospital was included.

The model of indicators used

An e-learning readiness measurement model has been developed and a self assessment questionnaire has been built on it. This questionnaire can be slightly changed to adapt the sector in which it is used.

The developed questionnaire has been used to measure the e-learning readiness of the hospitals. A set of statements have been developed based on the self assessment quality questionnaire.

For e-readiness we focus on the enabling aspects of the EFQM model. It is about the situation before the activity e-learning will be set up, as the following:
Resources:
- Info about the portfolio of e-learning courses.
- Learning portal delivering access to learning system:
  - ICT aspect.
  - Supporting and facilitating learning system functions.
  - Maintenance of the facilities.
- Physical environment for online learning in the organization.

Management: Investing in e-learning activity:

- Investing in company ICT infrastructure for e-learning.

Learners characteristics:

- ICT experience level of learner in using computers and computer applications.
- Motivation of learner : being prepared to learn in this new way.
- Take care for the Learning style of learner.

Learning processes and courses:

- e-learning activities:
    - Progress in the course.
    - Presentation of the course.
    - Personalization of the e-learning process/ course.
    - Self-management by the learner.
- Support of the learner:
    - Support in ICT issues.
    - Online support.

To measure the e-learning readiness, an instrument has been built, consisting of 80 statements. The respondents have to answer the question:

do you agree with the following statements?

The answers are (1 to 4):

1: Not at all.

2: Somewhat.

3: Yes I agree.

4: Yes I fully agree.

Results of the survey

The results of the questionnaire were quite homogeneous for the different hospitals. Some of these results are:

Learners' characteristics:

Learners accept e-learning only when a lot of conditions are fulfilled. Most employees don't have or have only limited experience with e-learning (1.0), although most of them work regularly with pc and have knowledge of the standard packages. All of them use the specialized healthcare systems daily (4.0). The nurses have a good experience with word-processing (3.5) and all have less experience with PowerPoint software.

Resources including the facilities for e-learning:

People of the hospitals are aware that the current situation of the ICT infrastructure is often not sufficient to meet the requirements. We see the problem of incompatibility between the systems (2.5), the online systems are not fulltime available (1.75), the learners have no personal multimedia PC (2.0) and no e-learning room is available (2.25). Some additional investments are required.

Management:

Management is willing to invest in the required updates of the users systems and even in the replacement of them (3.5). Investments in network infrastructure is also possible (3.0). Less interest can be seen on point of implementation of an own learning management system (2.5).

Learning processes and courses:

The learning objectives must be clear (4.0), a summary of the course must be included (3.75) and an overview of the course topics must be there (4.0). A good design and motivating style is important (3.5). Personalization must be an option via a flexible selection of the modules (3.0) and the availability of additional learning content (3.25).

E-Learning Readiness, Assessment & Measurement Models

In the literature we can find a variety of e-learning readiness and measurement models, some of them are listed below. However, Rogers (2003) points out that every system (i.e., organization, culture, country, individual) has its own norms that can be effective in diffusing an innovation in its system.

1. Bekim Fetaji and Majlinda Fetaji (2009) have developed the following 7 e-learning indicators to measure organizational e-learning readiness: Learners' education and cultural background, learners' Computing skills, learners' learning preferences, the quality of e-learning content, viable learning environment and its e-learning logistics, learners' motivation, students' attitudes toward technology.

2. Khalid Al-Osaimi, Abdulmohsen Alheraish and Saad Haj Bakry (2007) have developed e-readiness assessment STOPE approach, which has 5 main categories: Leadership, Technology, Organization, People, and Environment. In addition, each of these categories is divided into a number of a more detailed sub-categories.

3. Chapnick, S. (2000) has developed an instrument for assessing organizational readiness for e-learning. She lists 66 factors in question format and grouped them into 8 categories: Psychological, sociological, environmental, human resources, financial readiness, technological skill (aptitude), equipment, content readiness. For each stakeholder group, a different combination of factors is examined. However, this model provides a simplified way of determining whether e-learning can be implemented successfully, and if so, what strengths are on your side. If not, what obstacles must be overcome and addressed?

4. Li-An Ho, (2009) presented a model consisting of 4 main categories that should be measured to assess organizational readiness for e-learning; which are: e-learning system quality, technology readiness, learning behavior, and learning outcome.

5. Chai Lee Goi and Poh Yen Ng (2009) have developed the following factors that should be measured and evaluated to successfully adopt e-learning: Organizational factors(Technical infrastructure, Management support for training, and Clearly defined change leadership strategy), General factors(Adult learning principles, Clearly defined learning outcomes, Pretest option, Clearly defined learning pathways, and Assessment), and Cognitive factors(Access to useful help facilities, User control of screen information, Simple user interface, Access to presentation of complex information, Appropriate use of multimedia, Avoidance of redundant information).

An Improved E-Learning Readiness Measurement Model

Based on the literature, our research, and our experience in the case Agfa Healthcare, we developed an improved model to measure the readiness of organizations for e-learning, the model consists of three main parts: The stakeholders to be included in the survey, Model of indicators, and Questionnaire as the following:

The stakeholders to be included in the survey are:

- Head of the HR department or the Head of training department (if available)

- Head of the department sending staff members to be trained, or replaced by some (potential) candidate e-learners.

- (Potential) candidate e-learners.

Model of indicators:

Facilities and infrastructure for e-learning

- User ICT infrastructure

- Internet connectivity

- Learning management system

- E-learning room

Management

- Willingness to invest in e-learning implementation

- Learning time for staff

Organization of e-learning function/ department

- Informing about available e-learning courses

- Organization of the e-learning activity

- Preparatory training in use of computers

- Preparatory training in use of e-learning system

Learners characteristics

- Learners have ICT skills

- Learners have internet experience

- Learners are motivated to take e-learning courses

- Learners prefer their own learning style

In case the organization has already implemented e-learning, but experiences problems on point of adoption, we have an additional set of indicators that can be measured by asking questions to the staff members e-learners:

E-learning course and process

- E-learning course content
- E-learning course presentation
- Progress in the course
- Level of personalization
- Support and help
- Evaluation of the learning results
- Tracking of the participation in the e-learning course

Questionnaire

The main question of the questionnaire is: evaluate the status of the following aspects about the organization of e-learning in your organization.

Answer with 1, 2, 3, or 4:

1: You do not agree, OR It does not exist or It is very limited available, OR The situation on that point is bad.

2: You agree somewhat, OR It is available but rather limited, OR The situation on that point is not sufficient.

3: You agree, OR It is available, It exists, OR The situation on that point is OK

4: You fully agree, OR It is implemented on a good way, OR The situation on that point is excellent.

Short questionnaire: In a short questionnaire the set of indicators of the model are used as statements which have to be evaluated.

Long questionnaire to become more detailed insight in the problem: For each of the indicators one or more statements are formulated to become more detailed info about more aspects linked with the indicators.

This model includes all the stakeholders of e-learning process to have a better measurement of organization's e-readiness, in addition it could be adapted to suits organization's sector and e-learning process status, in which more statements could be added or some statements could be deleted.

Conclusion

This paper shows the importance of e-learning for healthcare sector, which it's performance depends on the ability of healthcare professionals to have, update, construct and interchange the knowledge fast. E-learning environment provides healthcare sector with a dynamic and interactive environment, where they can interchange, construct and share the knowledge rapidly and when needed. E-learning environment provides learners with lifelong learning, time saving, info diversity, flexible in time and space, self-regulatory learning, cost-effectiveness, less impact on family duties and life.

However, based on the literature many health care organizations failed in adopting e-learning/clinical ICT innovations due to lack of assessment and measuring their e-readiness. In this paper we stress the importance of measuring organization's readiness for e-learning in order to exploit the benefits of e-learning and have a successful and effective learning outcomes. In the literature we can find a variety of e-learning readiness and measurement models, some of them are presented in this paper, in addition to Agfa case which has been done at Hasselt University.

Based on the literature, our research, and experience in Agfa Health care case, we developed an improved e-learning readiness measurement model, in which we include all the stakeholders of e-learning process and the important indicators of e-readiness. Based on our results some additional drivers are identified to improve the e-readiness of the organization. E-learning readiness requires a team effort from the organization as well as from the supplier of e-learning solutions, from trainer as well as from the learner. The proposed model could be adapted to suits organization's sector and e-learning process status.

References

Ahmad Al-Huneidi, 2011. Master thesis, *Constructivism Based Blended Learning in Higher Education*, Hasselt University, 2011.

Aydin, C.H. & Tasci, D. (2005). *Measuring readiness for e-learning : reflections from an emerging country*. Educational Technology & Society, 8 (4), 244-257.

Bekim Fetaji and Majlinda Fetaji, (2009). *E-Learning Indicators: A Multidimensional Model For Planning Developing And Evaluating E-Learning Software Solutions.* South East European University, Tetovo, Macedonia, Electronic Journal of e-Learning Volume 7, (1 - 28).

Bernhardt et al., J.M.Bernhardt, C.W.Runyan, I.bou-saada and E.M.Felter. (2003). *Implementation and evaluation of a web-based continuing course in injury prevention and control*. Health promotion Practice 4(2) (2003), pp 120-128.

Bonk, C. J. (2002). *Online training in an online world*, Bloomington, IN: CourseShare.com.

Bowles M. (2004): *Relearning to e-learn:* strategies for electronic learning and knowlzdge, Melbourne University Press.

Chapnick, S. (2000) *Are you ready for e-learning?* Learning Circuits: ASTD's Online Magazine All About ELearning.

Fiona Concannon, Antoinette Flynn and Mark Campbell (2005), *What campus-based students think about the quality of benefits of e-learning*, 36 British Journal of Educational Technology, Vol 36 No 3 2005, 501–512.

Hawksley, R. & Owen, J. (2002). *Going the distance: Are there common factors in high performing distance learning?* (ERIC Document Reproduction Services No. 464231).

Khalid Al-Osaimi, Abdulmohsen Alheraish and Saad Haj Bakry (2007), *STOPE-based approach for e-readiness assessment case studies*, Department of Electrical Engineering, King Saud University, Riyad, Saudi Arabia, INTERNATIONAL JOURNAL OF NETWORK MANAGEMENT Int. J. Network Mgmt 2008; 18: 65–75 Published online 5 June 2007 in Wiley InterScience (www.interscience.wiley.com) DOI: 10.1002/nem.657.

Li-An Ho, (2009) *The antecedents of e-learning outcome: An examination of system quality*, technology readiness and learning behavior, Department of Educational Technology, Tamkang University, 151, Yin-Chuan Road, Tamsui, Taipei Hsien 251, Taiwan, R.O.C. Adolescence. 01/2009; 44(175):581-599.

Meg Wise, Jeong Yeob Han, Bret Shaw, Fiona McTavish, David H. Gustafson, (2008). *Effects of using online narrative and didactic information on healthcare participation for breast cancer patients*, Patient Education and Counseling 70 (2008) 348–356.

Oliver Jones, Helen Saunders, Gary Mires (2010). *The E-learning revolution in obstetrics and gynaecology*, Best Practice & Research Clinical Obstetrics and Gynaecology 24 (2010) 731–746.

Penina Mungania (2003). *The Seven E-learning Barriers Facing Employees*. University of Louisville.

Rogers, E. M. (2003). *Diffusion of innovations* (5th Ed.), New York, NY: Free.

Ruba Jabri, 2009. Master thesis, *The integration of knowledge management and e-learning to provide enhanced learning solutions in the workplace*. Hasselt University, 2009.

R. Spanjers, A.-F.Rutkowski & R. Martens. (2004). *Proceedings of the Tenth Americas Conference on Information Systems*, New York, August 2004.

Sarantos Psycharis. (2005) *Presumptions and actions affecting an e-learning adoption by the educational system. Implementation using virtual private networks*, Eurodl (http://www.eurodl.org/materials/contrib/2005/Sarantos_Psycharis.htm)

SCHREURS, Jeanne; GELAN, Anouk & SAMMOUR, George (2009) *e-Learning readiness in organisations. Case healthcare*. International Journal of Advanced Corporate Learning, 2(2). p. 34-39. [cat: A1].

Schreurs, J.; Husson, A.M.; Merison, B.; Morin, E. & Van Heysbroeck, H. (2008) *SEVAQ: a unique multi-functional tool for assessing and improving the quality of e-courses.* In: International Journal of emerging technologies in learning (iJET), 3(1).

Shu Yu, I-Ju Chen, Kuei-Feng Yang, Tze-Fang Wang, Lee-Lan Yen: *A feasibility study on the adoption of e-learning for public health nurse continuing education in Taiwan.* Nurse Education today, Vol 27, Issue 7, 2007, pages 755-761.

Sue Childs, Elizabeth Blenkinsopp, Amanda Hall, and Graham Walton. (2005) *Effective e-learning for health professionals and students—barriers and their solutions.* A systematic review of the literature—findings from the HeXL project, Health Information & Libraries Journal, Volume 22, Issue Supplement s2, pages 20–32, December 2005.

Victor S. Sierpina, Mary Jo Kreitzer, Alastair J. Cunningham, William G. Elder, and Geza Bruckner, *Innovations In Integrative Healthcare Education: A Healing Journey For Cancer Patients In Ontario And An Oline Interdisciplinary Cam Course For Allied Health Students In Kentucky*, Education, EXPLORE July/August 2007, Vol. 3, No. 4.