

A MODEL FOR CONTINUOUS EDUCATION THROUGH PERIODIC ADAPTIVE E-ASSESSMENT

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Abstract

The paper proposes a model suitable for adult education based on periodic use of adaptive e-assessment applications. The model facilitates professional competences development, which is the key factor for achieving the competitive advantage in knowledge society. Technological boom placed e-assessment in an important position among today educational elements. An intelligent option of electronic evaluation is the adaptive e-assessment. Based on computer adaptive testing principle, it is considered to be a self-directive learning tool: the users receive new challenges through each test item, establish their own knowledge road. Adaptive e-assessment offers a competitive environment, where the adult is stimulated to continuous improvement: the gained knowledge depends on self actions. The proposed educational model can be used for training to obtain certifications awarded by professional associations, but also to achieve performance in high academic programmes.

Keywords: continuous education, e-learning, e-assessment, competences development

Introduction

The knowledge economy is more than an economic jargon, an umbrella for expressions such as “the increase in the value chain”, “the achievement of the added value”, it represents a set of fundamental changes in the economy, but also in people’s mentality. There are many definitions of the knowledge economy, the most intuitive being the one that describes it as the economy that is based on creating, evaluating and exchanging knowledge. The need for continuous development of individual knowledge is commonly accepted by both European public forums and private firms. According to the European Council, every global citizen has to be equipped with IT skills, foreign languages, technological culture, entrepreneurship and social skills [Commission of the European Communities, 2005, p. 3]. The European Union has established a few priority fields of the new economy, as the knowledge economy is called by some specialists, among which the development of electronic Europe can be found. The main lever in the process of “social inclusion and universal access to technology” [Jitaru, & Pribeanu, 2006] or of economic e-development is the ITC industry. The

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industry of the information technology is a powerful instrument for the economic development, the increase in competitiveness, the improvement of our living, the professional improvement of the ones involved in the work process, the achievement of performance in the public sector. Five causal chains that capture the essence of what ITC means for the new economy have been identified [Meijaard, 2001]: the organizational and market processes, the characteristics of the assets, the social and cultural processes and first of all, learning and innovation will be influenced. The opportunities for innovation in education and the knowledge management will lead without doubt to the economic recovery.

As a consequence of the changes from the new economy, the educational processes have also undergone metamorphosis: the focus on the higher education and on educating the already employed professionals increased. The importance of the learning process was given credit not only by schools and universities, but also by the organizations [Dragomirescu, 2006]. Due to the technological explosion, e-learning has reached an important position among the education instruments of today. The fact that it offers flexibility, mobility, adaptation makes it the perfect candidate for the educational processes in the continuous training. The focus on the education in the current society is fundamental: one may note an “unprecedented dissemination of the knowledge towards all the citizens by new means, by using the Internet in priority and the electronic book and the use of the learning methods by electronic procedures (*e-learning*)” [Draganescu, 2001].

When talking about knowledge and learning in a professional environment, the concept of competency has to be taken into account [Lundin, 2005, p. 15]. As this concept has aroused the interest of many researchers, there are many definitions available in the literature. Competency is defined as ‘the degree to which individuals can apply the skills and knowledge associated with a profession to the full range of situations that fall within the domains of that particular profession’ [Lysagh, & Altschuld, 2000, p.95] or, shortly, as the combination between knowledge and ability to apply that knowledge [Turner, 1996, p. 4]. Competency can be considered from two perspectives, according to Suikki: the theoretical and the operative perspective [Suikki, Tromstedt, & Haapasal, 2006, p. 723-728]. From the theoretical perspective, competency is a structure that facilitates a certain behavior. From the operative perspective, it is the ability to manage ‘complex unpredictable situations’, a combination between knowledge, skills, attitudes, strategic thinking. The immediate effect of competences possession should be reproduction of knowledge and competency or competent behavior. In order to achieve the competitive advantage, the business environment requires continuously new competences.

The current paper proposes a model for continuous education, which aims to improve professional competences and to make adults more attractive for

organizations. The model is based on current use of e-assessment services, a necessary feature of every e-learning application. The model is presented in the framework of informatics tools used in education. The applicability of the model for advanced master programmes, MBA programmes or professional certification processes is also provided.

Competences Development through Education

As a consequence of quick changes, organizations ask for ‘adaptable pre-trained workers’ and for employees ‘to be more involved in self-directed ongoing development’ [Garofano, & Salas, 2005, p. 281]. As learning means the ‘gaining of knowledge, understanding or a skill’ [Garofano, & Salas, 2005, p. 282], the workers from knowledge society develop their competences through learning: ‘employees need to take greater personal responsibility to ensure their skills are current and marketable’ [Garofano, & Salas, 2005, p. 282].

There are many explanations in the literature for adults engaging in learning activities, once they graduated a formal education institution. Huggins identified three motivational factors for adults to participate in a learning activity: possible outcome, learning opportunity and external factors [Huggins, 2004, p. 38]. The outcome has two directions: the individual and the environment in which she/he works. According to Huggins’ study, the adult who starts a learning activity wants to develop, to improve his confidence, to progress, to be good at his job or he prepares himself for a promotion. The learning process is regarded as a personal challenge, in most cases. As previous mentioned, to be competent implies a context, a community. Most adults participates at learning activities to support colleagues, ‘to be an effective member of the team’ or ‘to pass the knowledge on to other members’ [Huggins, 2004, p. 42]. Other researches underline the monetary and non-monetary benefits of education. In the second category, the following benefits are mentioned: carrying out more interesting and stimulating tasks, increased job stability and autonomy, healthy working conditions, more appropriate tasks [Fabra, & Camisón, 2009, p. 600 – 610]. Demirel simply points out the fact that adults have to engage themselves in learning activities, because of the ‘necessity to cope with change’: adults have to permanently renew their life perspective, their conduct and values [Demirel, 2009, p. 1710]. A lot of studies so far indicate education in 21st century as a necessary continuous process [Shi, & Tsang, 2008, p. 187 - 217), [Demirel, 2009, p. 1710], as a key element to survive in knowledge society: “Among individual characteristics, education becomes a key-element. It offers the key to attaining a position in the labor market and provides individuals with access to well-remunerated and non-alienating jobs.” [Fabra, & Camisón, 2009, p. 601]

The importance of learning in adults' life is also proven by the variety of trainings held in firms and organizations [Marimuthu, Arokiasamy, & Ismail, 2009, p. 265-272] and by various tools meant to develop employees skills or to fill knowledge gaps [Delcea, & Dascalu, 2009, p. 115-117]. Selection for suitable learning activities for competences development has, without a doubt, a tremendous impact on firm well being [Kröll, 2007, p. 1-10] and, as well, on individuals' well being: "There is sufficient empirical evidence that show non-monetary returns on educational investment improve people's well being and quality of life." [Fabra, & Camisón, 2009, p. 601]

A learning process turns out to be good when the degree of transformation made possible through that process is high or the degree of competences increases. There are ways to evaluate adult education programs: there are formative ways (programs are evaluated with regard to the consistency between the program plan and implementation) and summative ways (programs are assessed in terms of their outcome) [Shi, & Tsang, 2008, p. 187 – 217].

E-assessment Role among Informatics Tools Used in Adults' Education

As participating at face-to-face courses might be quite time consuming for an individual engaged in economic activities, the use of e-learning tools became a well-spread solution for adults' education. This practice complies with the effort of digital economy to raise the accessibility level of information systems. Also, a web-based tool is a 'low cost and accessible tool for the dissemination of knowledge' [Stergiou, & al., 2009, p. 827].

Evaluation plays an important role in education, as it can improve the learning process itself [Waters, & McCracken, 1997]. Frequent testing increases the quantity of knowledge assimilated by students/ trainees, but makes it difficult for the trainers/ professors to correct the exams. The solution to this problem was brought by electronic testing. A computer-based test can be developed in an e-learning platform as a service (Moodle [Al-Ajlan, & Zedan, 2007], SinPers [Bodea, 2007]) or as a stand-alone system, taking into account some form of knowledge organization, specific to its target domain

In order to build efficient assessment services, the place of these types of services into the holistic approach of an e-learning platform has to be defined: they are commonly seen as parts of the LMS macro component of an e-learning application. The LMS is one of the three main components of an e-learning platform: LMS (Learning Management System - manages the relations trainee-content, trainee-trainer, has functions for recording the trainees, administration and delivery of the courses, record of the trainees' progress, communication at the level of the system users), LCMS (Learning Content Management System - administrates the content of the web sites,

with everything that this administration involves) and the virtual environment (a set of tools for distributing training contents and for providing interaction) [Colace, De Santo, & Pietrosanto, 2006]. Student management actions, course management actions, student activity monitoring and tracking, reporting and assessment are parts of a LMS. Still, the assessment service has to work with learning objects which are managed by the LCMS.

There are some stringent problems in conceiving assessment services. The main issues in the e-testing services, with direct impact over the trainees are: question management, noting and transmitting the results, but also the elements of graphics and interface in exposing the tests. The engine to any evaluation test is represented by the questions. In order to be imported in different platforms, the questions must have a standardized format. The types of questions available in the classical tests are reliable also in the automatic tests (questions of multiple choice type, of true/false type or with short answer), except for the questions that need a free answer. Yet, an attractive type of questions available only in e-testing is represented by the hot spot questions. To conclude, the main specific problems for assessment services (both to the ones integrated in e-learning platforms and the stand-alone ones) can emerge from:

- creating the questions (conceptual units of the tests);
- creating the tests (the algorithms for selecting the questions);

An Educational Model based on Adaptive E-assessment

The proposed model

The authors propose an educational model for adults, based on periodic assessment. The fact that the e-assessment tool can be seen as a learning tool, not just an examination tool, complies with other researchers' opinion, that 'learning from errors is a promising method', just like problem-based or task-based education methods [Stergiou, & al. 2009, p. 827–838]: "Oser and Spychiger claim that every error includes the chance to learn from it, if learners can view it as learning occasion. Therefore, learners have to identify the error and understand the correct solution by comparing the incorrect solution systematically with the correct one. The tutor's feedback is of great importance." [Stergiou, & al. 2009, p. 829]. The model is synthetized in (Figure 1): after answering at test questions, the users of an e-assessment application have the possibility to return to the incorrectly answered questions: in this way, the impact to knowledge creation process through the e-assessment is maximized. By inserting an adaptive behaviour to an e-assessment application, the users can get always challengeable questions: for example, if the user answers incorrectly to one question, the next one will be easier, more suitable for the user's knowledge level. If the user answers

correctly to one question, the next one will be harder, so he/she can't get bored during the test. Also, statistical methods have to be applied in order to obtain comparable results between a user who answered easier questions to other who answered more difficult ones.

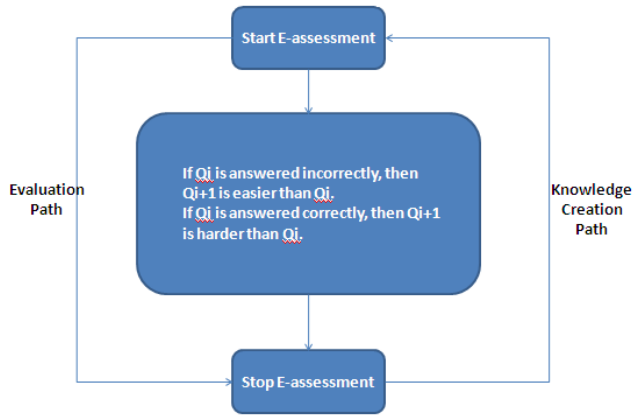


Figure 1. Education model based on E-assessment

The application of the proposed model

The model is suitable for certification processes held by professional associations ([Bodea, & Dascalu, 2009a, p. 11], [Bodea, & Dascalu, 2009b, p. 68]), but also for MBA programmes or advanced masters. The major benefit brought by the model to adults' education can be seen in firms' business performance [Dascalu, Delcea, Coman, Palaghita, Vintila, & Bobe, 2010, p.2404]. The extensive use of e-testing tools in enterprise environments can be identified in (Figure 2), also: the e-testing is seen as a tool applicable in knowledge strategies.

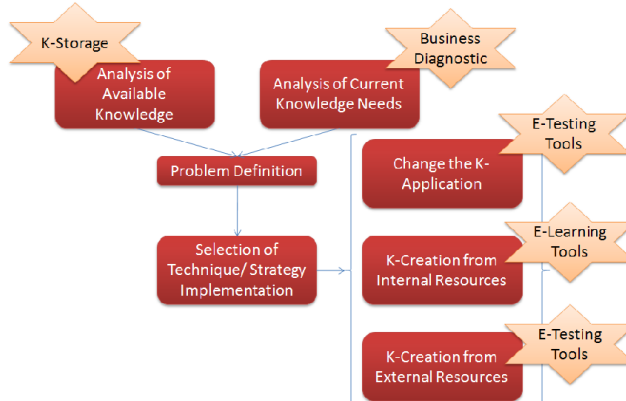


Figure 2. Enterprise K-Strategies Tools [Delcea, & Dascalu, 2009, p. 116]

Conclusions

The current paper underlines the benefits of an education model based on periodic adaptive e-assessment: the first advantage of such a model is the increase in professional competences of adults who are already employed or are in the process of seeking for a new job. Although evaluation can be stressful, the proper use of it can be a rich learning experience. The model is presented in the framework of knowledge society and innovative learning tools brought by this type of society.

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