

### **Synergy of Engaging Technology Enhanced Learning Approaches and New Generation Smart E-Portfolio Systems**

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*Open Education in 2030 in Europe might look as the synergy of engaging technology enhanced learning approaches and new generation smart ePortfolio system with collaborative group-working and comprehensive assessment environment which, equipped with artificial intelligence tools, would improve learning outcomes and suggest learners appropriate ways to achieve new competence levels based on analysis of acquired prior ones.*

**Keywords:** ePortfolio systems, competencies, technology enhanced learning, artificial intelligence.

#### **Introduction. Statement of Demand**

New technologies change our habits, work procedures, leisure hours, communication opportunities, and our life. These changes bring new breath also in educational environment; educational paradigms switch over from teacher-centric to student-centric, from mainly individual to mainly collaborative interaction; learners are oriented on development of their critical thinking skills, enhancement of creativity, wider use of technology in knowledge acquisition process [Churches, 2010].

What actions should be done to make learning more effective? This question addresses many researchers and education subject matter experts. By virtue of new technology era and changing of educational paradigm, democracy features increasingly interpose learning process. With a positive effect which is gained by distance learning, i.e. technology enhanced learning, when a learner has several lists of learning courses to choose from and a possibility to audit and make learning more flexible, we have got also a side-effect.

This is a question due to too high drop-out rate among students. Forrester report states that only twenty-five per cent learners finish their e-learning courses [Quinn, C., 2005]. A situation in blended learning and hybrid learning seems a little bit better; although, it is also unpromising. This is why the course developers are seeking for appropriate advanced teaching methods to enhance learning [Koochang, A., & Durante, A., 2003]. Teaching staff ought to analyse learners' behaviour forms within e-learning environment and find suitable ways to engage and motivate them.

Some possible solutions were proposed in earlier findings. Thus, to make learning process more effective, it could be necessary to involve students into knowledge acquisition process by means of active engaging and motivating approach, find parallels in learning process with real-life situations, simulate tasks related to daily real-life activities, analyse the problem and find appropriate solution, act, think critically and reflect (find appropriate solutions)



[Bransford, J., D., Brown, A., L. & Cocking, R., R., 2000]; [Driscoll, M., P., 2002]; [Driscoll, M., P. & Carliner, S., 2005]. Real-life situations further improvement of critical thinking skills [Smart, K. & Cappel, J., 2006]. Collaborative learning methods are considered as powerful learners' engaging and learning process quality improvement instruments. Learners are encouraged for active participation in group-working, sharing and distributing own ideas, and creating new ideas and knowledge [Mitnik, R., Recabarren, M., Nussbaum, N. & Soto, A., 2009].

ePortfolio systems might be considered as the new effective competence enhancement instruments. They also have changed their nature: from simple showcase forms in the past to motivating workspace environments nowadays. These two different natures or faces of the ePortfolios indicate two different senses: ePortfolio as a product in the first case, and ePortfolio as a process in the second case [Barett, 2009]. Showcase form of ePortfolios still has prevalence. Nevertheless, more and more educational institutions look for more powerful end effective ePortfolio systems to improve learning outcomes. Reflection, critical thinking, ability to work in collaborative and tied to time settings are considered as important factors to be able to enhance own competencies. Excellent results might be achieved by „involving students in doing things and thinking about what they are doing” [Bonwell and Eisen, 1991]. Stimulation of critical thinking and reflection could be considered as a fine solution to meet the competence enhancement demands.

ePortfolios, initially devised as the show-window instruments, nowadays are changing to the important competence development systems. New ePortfolio systems ought to ensure appropriate engaging and motivating environment where learners could develop their competencies in the most efficient way. It might be done by active involvement of learners in collaborative group-working activities, tailoring tasks with real-life situations, encouraging students think critically and reflect on group members' suggestions and improve learning outcomes. Multi-level assessment tools within the system might allow track learners competence enhancement process and compare it against their study activities. First successful attempts to make ePortfolio systems more efficient were done in 2011-2013 at Riga Technical University; there were observed that ePortfolio system users' achieved competence levels had strong correlation with activities within the system, and it was concluded that 44,29 per cent of learners success was directly attributable to the usage of experimental information system [Gorbunovs et al, 2012 and 2013]. Prospective additional artificial intelligence instruments might solve lifelong learning needs and demands by offering learners appropriate learning courses and objects which correspond to their gaps and learning needs analysis.

## **The Vision and Proposed Ways of Implementation**

Competences might be represented as the sets of clusters containing a number of sub-competences (Gorbunovs, 2011):

$$a = \{a_1, a_2, a_3, \dots, a_n\} \quad (1)$$

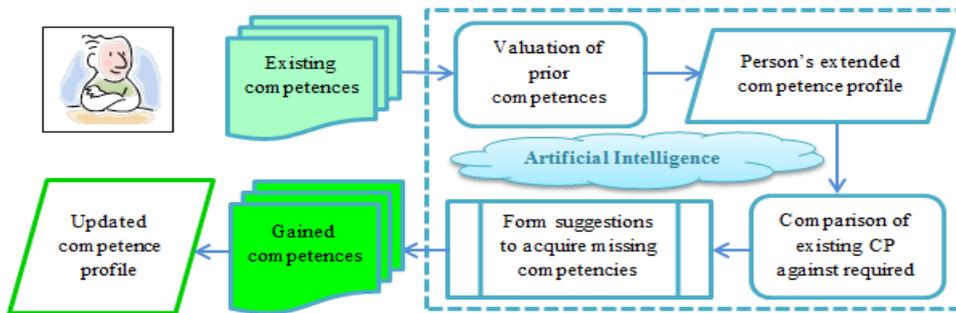
where  $a$  – considered competence;  
 $a_1, a_2, a_3, \dots, a_n$  – sub-competences.

This set of competences might be reformulated also in a matrix view. Similarly, each course theme and its learning object might be conceived as the set or matrix of corresponding weighted values. An acquisition of one theme or learning object leads to formation of the new matrix of competencies. For instance [Gorbunovs and Kapenieks, 2013], in a case if seven course related competences are defined for particular course, “m” theme’s learning objects weighted values and obtained new set of competences might be seen as:

$$\begin{array}{c|c|c|c}
 \begin{array}{c} a_1 \\ a_2 \\ a_3 \\ a_4 \\ a_5 \\ a_6 \\ a_7 \end{array} & \times & \begin{array}{c} m_{11} \ m_{12} \ m_{13} \ m_{14} \ m_{15} \ m_{16} \ m_{17} \\ m_{21} \ m_{22} \ m_{23} \ m_{24} \ m_{25} \ m_{26} \ m_{27} \\ m_{31} \ m_{32} \ m_{33} \ m_{34} \ m_{35} \ m_{36} \ m_{37} \\ m_{41} \ m_{42} \ m_{43} \ m_{44} \ m_{45} \ m_{46} \ m_{47} \\ m_{51} \ m_{52} \ m_{53} \ m_{54} \ m_{55} \ m_{56} \ m_{57} \\ m_{61} \ m_{62} \ m_{63} \ m_{64} \ m_{65} \ m_{66} \ m_{67} \\ m_{71} \ m_{72} \ m_{73} \ m_{74} \ m_{75} \ m_{76} \ m_{77} \end{array} & = & \begin{array}{c} b_1 \\ b_2 \\ b_3 \\ b_4 \\ b_5 \\ b_6 \\ b_7 \end{array}
 \end{array} \quad (2)$$

where  $a_1, a_2, a_3, a_4, a_5, a_6, a_7$  – person’s initial competences;  
 $m_{11}, \dots, m_{77}$  – course “m” theme’s (learning objects’) weighted values;  
 $b_1, b_2, b_3, b_4, b_5, b_6, b_7$  – person’s competences after the “m” theme’s acquisition.

It might be assumed that particular theme or learning object initially ought to be weighted by assigning of appropriate rate to the theme or learning object. Based on learning outcomes after each course module in a form of tests, assessments and exam results, it could be useful to match them against initial (or previous) given rate and correct if needed. Such rate assignment possibilities ought to be studied further to make ePortfolio system smarter and enhance competence development (Fig.2). Inegrated into the system artificial intelligence tools would allow analysing the usability of utilized learning objects in the course, and offering learning objects according to existing and required competencies within common system (Fig.1).

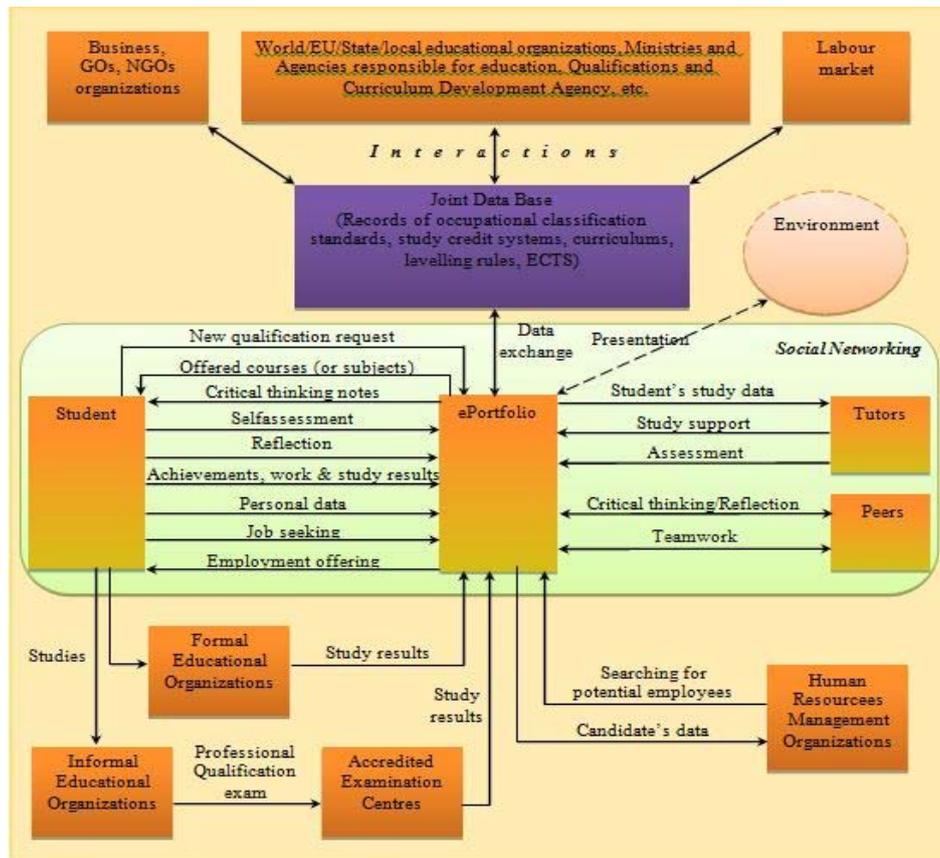


**Fig. 1.** Proposed smart ePortfolio system with artificial intelligence tools [Gorbunovs et al, 2012]

To implement these ideas we ought to think about a necessity to set one frame of mind and standards of competencies which might be based on list of professional standards or job/position requirements. Besides, there would be the necessity to define appropriate series of competencies and sub-competencies, as well their dependencies. Whole related data will be processed, classified, arranged, and calculated within smart ePortfolio system, and linked to prospective joint data base (with records of professional standards, credits, curriculums, levelling rules and so on) as shown at Fig.3. The system would ensure lifelong learning needs by helping people to gain new competencies or improve levels of existing ones, get new job or find appropriate employee.

Next challenge is to recognize informal education and training, and equate it with corresponding formal education courses. This initiative is still in early beginning, and a few accredited eximantion centres have a lot of work to tide over the levelling business of acquired informal learning. Connection of these efforts in common smart information system might help a lot.





**Fig. 3.** ePortfolio system artificial intelligence draft model [Gorbunovs, 2011]

## Conclusions

Open Education in 2030 in Europe might look as the synergy of engaging technology enhanced learning approaches (i.e., e-, t-, m-learning) and new generation smart ePortfolio system with collaborative group-working and comprehensive assessment environment which, equipped with artificial intelligence tools, would improve learning outcomes and suggest learners appropriate ways to achieve new competence levels based on analysis of acquired prior ones.

There are at least four main initiatives to be taken till 2030 to satisfy lifelong learning needs:

- 1) Real recognizing of informal education and training accomplishments, and equating / levelling them with corresponding formal education courses – efforts done in this area are still not sufficient. Recognition of prior learning is essential.
- 2) Setting one frame of mind and standards of competencies which might be based on list of professional standards. Creation of joint worldwide data base of competencies, „weighted” learning objects and courses.
- 3) Creation of the new generation smart ePortfolio system equipped with artificial intelligence tools which would analyse existing competence levels and suggest corresponding learning paths, learning objects and courses.
- 4) Integration of motivating e-, t-, and m-learning approaches into proposed comprehensive system.

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