INTERNET, TELEVISION AND MOBILE TECHNOLOGIES FOR INNOVATIVE ELEARNING

Interneta, televīzijas un mobile tehnoloģiju izmantošana inovarīvām e-studijām

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Abstract. *We are developing an innovative cross-media learning delivery system (eBig3, ETM) that goes beyond traditional web-based learning approaches. The approach combines wide availability of television and mobile technologies with the capacity and flexibility of Internet based e-learning. This approach allows the learner to use either a single learning delivery system (depending on availability and preferences) or a complementary combination of two or three delivery systems, thus supporting the anywhere, anytime — by any preference—learning paradigm. The development of the eBig3/ETM learning solutions includes integration of technical aspects of cross-media learning content delivery. Moreover, the approach incorporates pedagogical and usability principles based on an understanding of the target users learning needs and their contexts.*
Keywords: *e-learning, t-learning, m-learning, next generation life-long-learning, anywhere, anytime, by any preference learning.*

Introduction

As e-learning technologies continue to grow, they have become more popular and more central to teaching and learning in higher education as well as lifelong learning programs. Yet one of the problems is that technology enhanced learning undertakings often mimic traditional education approaches where technology is regarded as a way of transferring traditional learning forms via technological formats. One reason for this is that the screen is often viewed as a way to transfer the content of a printed book or a recorded lecture. The mobile screen is too small for large pieces of texts and diagrams; the digital TV is not sufficiently interactive, and classical e-learning alone meets the promise of any time any place learning only partially. Very large scale e-learning based life-long-learning is also not appearing mainly because of significant entry thresholds. Typical Life Long Learners are watching TV every day, and they are often not

satisfied with availability content in LLL context. They also usually have mobile phone; typically they use them to deliver SMSs and fail to exploit the full potential of these devices for learning due to the lack of appropriate context.

As a solution we are presenting the position paper identifying the new situation in e-ecosystem, and new trend in eLearning development. It is based on the complimentary deployment of three well known technologies: internet, television and mobiles (eBig3). The integrated approach eases the digital divide because the users feel comfortable with at least two of the three technologies that make-up the eBig3 system. Our approach differs from current "mostly eLearning" that widens a divide based on availability or complexity. Internet connection for rural areas still is largely behind the one available for cities in terms of reliability and speed, besides internet technologies and their updates are often too complex for many users, and they, therefore, exacerbate the digital divide. The technologies that most engage the public are those of our integrated learning system and historically the facts bear us out. The most popular technologies are Television since the 1950s, the Internet since the 1990s, and mobile phones (among the public) since the 1990s. All three technologies were initially designed for better transfer of information and proved so popular that a demand was created that ensured the rapid deployment of the technologies in just a few decades. Simultaneously, the increasing demand for life-long learning (LLL) access created by rising student enrolments and the phenomenon of adults returning to school produced many technology driven LLL solutions that produced a series of innovative learning approaches.

The new technologically driven learning approaches seemed to offer a solution to increased demand at comparatively low initial cost and many countries supported a wide array of e-learning projects. Yet the impact of these e-learning solutions was lower than expected because of a high student drop-out rate. The cause for this phenomenon was quite apparent: there was insufficient learning support and a lack of understanding of pedagogic usability principles as applied to e-learning delivery.

Objectives

- To identify the key obstacles that impede the effective delivery of the eBig3 technologies to support LLL in popular media format
- To eliminate the key obstacles the impede the effective delivery and usability of LLL in an eBig3/ETM format
- To design a new LLL approach (eBig3/ETM) based on integrated applications of available three popular technologies: Internet, TV and mobile telephone.
- To identify the set of new research challenges in the present context and technological developments.
- To design a prototypes of the new eBig3/ETM e-courses.

Methodology

The eBig3/ETM learning approaches do much to ease the challenges of the digital divide. These approaches do more than simply deliver e-learning over the

Internet but rather present it in a format that is attractive and familiar to most users and also extend their applications in an innovative and flexible way.

<div align="right">Table 1</div>

Advantages of e-learning, m-learning, and t-learning technologies in LLL context

	e-learning	M-learning	T-learning
Advantages in a LLL context	Great amount of open source content widely available There are well known approaches to support the completion of e-course. Universities award certificates and diplomas to mark to completion of e-courses completion Learning can be based on strong interaction and collaboration component. Can provide the greatest degree of interactivity of the three. Offers access to collaboration and learning.	Most people use the telephone daily; they have good skills in its basic applications. Individuals may any time any place find support and consult with tutors and peers over the telephone Learning is transferred in small chunks that are easily comprehensive to users. Its value is increased because it is read and understood. Learning can be personal that no one can disturb the learning process. Offers great communication capabilities inherently built into the system. Offers any time any place access communication	Many people use the TV daily to relax. With transition to digital TV the number of TV channels has increased while costs have decreased. Often video presentations are very effective means for transfer of complex knowledge. The TV reaches most people in communities world-wide and household penetration of TV is very high. Many TV viewers acknowledge TV content as being important and the one can be trusted. TV can be seen as a tool for social inclusion and life long learning. TV can be good for creation of motivation and influencing peoples' attitudes. TV is very strong in delivering audio/visual presentations and telling stories. TV has a high picture quality. TV has high viewer involvement and high emotional impact. TV has a wide reach from regional to national to global. TV can be made interactive, but it requires the extra effort and iTV ecosystem that's in place. Complementary interaction can be also provided in other media types such as internet or mobile.

Our approach to e-learning is an inclusive next generation e-ecosystem for LLL that integrates eBig3/ETM technology design concepts making use of existing technologies such as mobiles, TV and the Internet already familiar to users and provides them with a wide-range of learning options in a guided, step-by-step approach to effectively exploiting available t-learning opportunities to suit their needs and interests, anytime, anyplace with any option. Our system proposes extending the meaning of the familiar and the new technologies as an enlargement

of the natural and logical knowledge users already possess. We feel the approach will do much to ease the digital divide. Table 1 presents the advantages of e-learning, m-learning, and t-learning technologies in a LLL context.

In Table 2 we present the weaknesses of e-learning, m-learning, and t-learning technologies in a LLL context.

Table 2

Weaknesses of e-learning, m-learning, and t-learning technologies in LLL context

	e-learning	M-learning	T-learning
Weaknesses in LLL context	The Internet does not always allow for rich multimedia e-content delivery. Text based e-content is often not effective for knowledge transfer. The learning process is highly individual. Often study support is insufficient to encourage users to finish a course. Takes great effort to organize learner groups. High drop-out rate with insufficient knowledge on how to decrease it.	Only small amounts of content can be transferred and stored. The screen often has limited size and resolution. Battery life is limited. Diversity of devices with varying processor power and operating systems calls for multiple designs. Limited interaction in terms of text input.	Delivery of content must be done in real-time; timing is inflexible Viewer can chose content from limited options; the content is not on-demand. Non-existing or limited interaction possibilities Mainly one way communication and operating push or one content to all model Broadcasting linear programming model with no or little user content choice No possibility to collect user activity data unless TV is made interactive with an ecosystem in place.

The Tables 1 and 2 demonstrate that LLL applicability of single technologies; they demonstrate that each technology has its own strengths, but none of them alone meets the needs of LLL of tomorrow that must include:
- Signing-up without hassle;
- Rich multimedia content;
- Flexible study support;
- Ubiquitous learning contexts;
- Some face-to-face seminars;
- Course completion awarded with a certificate.

The tables are also a source of inspiration for identifying smart combinations of the available technologies; unexpected applications lead to innovations and promote the increases of efficiency in LLL usage and an easing of the digital divide.

Table 3
Applicability of Internet eLearning, TV learning, and mobile learning for an integrated LLL approach

	Internet eLearning	TV learning	Mobile learning
Ease of joining the course	With university registrar or through an open courseware without registration.	No need to sign-up, just watch us on TV learning channels	With university registrar or through open courseware without registration
Content delivery	Over PC learning portal	Over TV channel	With a mobile device
Learning conditions	Individualized learning with PC	In relaxing settings among other TV viewers	Small screen with limited navigation
Study support availability	Possible over internet, but limited to when the computer is in use; e-mail, skype, chat	Very limited on broadcast TV; available only in the case of interactive Television systems.	Over the phone, but limited by a voice and small screen
Face-to-face seminars	2 to 3 course seminars when following a blended learning approach	No place for seminars for TV watchers	Limited amount of content does not require face-to-face seminars with mobile device
Course completion certificate	For registered users participating in face-to-face seminars	Not possible for TV viewers.	Limited amount of content insufficient certificate

The methodology of eBig3 approach is based on accessing the strengths and weaknesses of e-, t-, and m-technologies. In the following table we reviewed our experience in the application of e-, t-, and m-technologies as applied to LLL. The technologies were evaluated in relation on their applicability to (DESC at RTU is currently developing the EU regional project eBig3 that integrates television, internet and mobiles into a comprehensive learning system. Its ergonomic effectiveness will only be demonstrated with repeated iterations in the course of the project development. "Synergetic approach with eLearning, TV and mobile technologies to promote new business developments –"eBig3" (Līguma (Contract) Nr. LLIII-183):

- Ease of joining the course;
- Content delivery;
- Study support technology;
- Effective organisation of face-to-face seminars;
- Course completion awarded by a certificate.

By integrating three types of ICTs : e-, t-, and m-technologies, we designed the eBig3 learning approach that delivers the advantages of all three. Its advantages are demonstrated by Table 4:

Table 4

Applicability of eBig3/ETM learning approach to LLL

	eBig3
How to join the course	Sending SMS to an assigned mobile phone number presented eBig3 / ETM television component
Content delivery	Mainly over the Internet or printed workbook
Study support applications	Mainly over the mobile telephone
Face-to-face seminars	Easy to organise for registered course participants
Course completion certificate	Easy to issue to registered course participants

The tables show that each of the three technologies complements each other and have a stable place as a part of an integrated e-ecosystem.

Often E-, T-, M- components have been studied in isolation or as independent systems or joined together "mechanically", such as testing the transmission potential of t-content over mobile devices. Our approach, however, goes beyond these isolated experiments and proposes to integrate the eBig3/ETM popular technologies into a single synergetic system so that users may operate these applications interchangeably according to need and convenience (Figure 1).
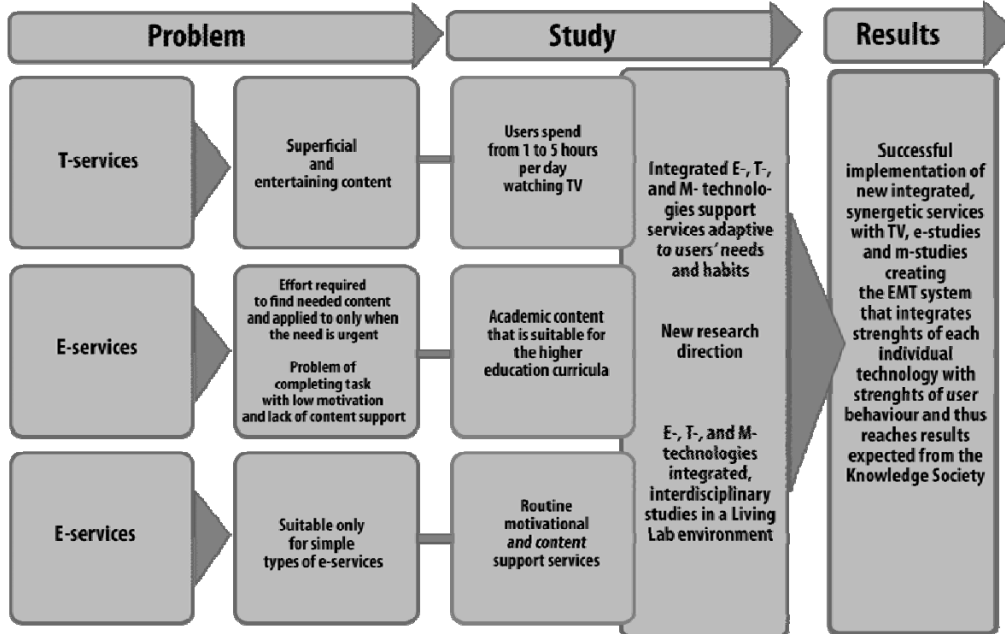
Figure 1. **eBig3/ETM approach development**

Our approach aims to design a functioning eBig3 ETM prototype that integrates e-, t- and m- contents and collects them in a newly designed e-portfolio environment. In the initial stages of the approach existing e-content could be used, but as the project advances new multiplatform contents will be designed to meet the specific requirements of the eBig3 ETM approach.

The project draws upon interdisciplinary knowledge on how best to integrate ETM/eBig3 system as a provider of various e-learning services meeting the needs and learning habits of large target groups.

We are working on the testing of the proactive e-portfolio technology usability and designing solutions in cross-platform learning delivery context.

Developments

Further development includes the integration of the technical aspects for cross-media learning content delivery and the production of learning content.

The video component of courses is broadcasted on TV channels. A video informs viewers that they may register for a course at a designated mobile phone number by sending an SMS.

The eBig3/ETM management portal user interface is designed as a traditional e-learning environment. The eBig3 ETM management /administrative portal interface is designed to encourage and support learners sending SMS to course participants.

Results

The system combines a wide coverage of TV technology with the accessibility of mobile technology and the capacity and flexibility of Internet e-learning. This combination allow a learner to use a single delivery channel at a particular time (depending on availability and preferences) or a complementary combination of two or three delivery systems, thus supporting learning anywhere anytime by the preferred technology.

Conclusions

1. There are new opportunities to design new more efficient approaches to e-learning for the next generation Life Long Learners.
2. The new eBig3/ETM approach eases the digital divide by extending the use of familiar technologies and producing innovations by identifying unexpected combinations.
3. The produced eBig3/ETM pilot courses open new areas of research that combine existing technologies and apply them in innovative combinations.

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