Advanced mobile communication and media devices and applications in the base of higher education

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Abstract - The incorporation of mobile devices and social media content into everyday life has radically changed the acquisition of information, reading, and learning mechanisms. As a consequence, a part of the users today form a demand for rapid acquisition of knowledge. It is now well known that users find information no longer only in printed, but in online sources and libraries, and search mostly on the world wide web. Today social networking sites have become a part of students’ every day. Online social networking is now so deeply embedded in the lifestyles of students that it rivals television for their attention, according to a new study from Grunwald Associates LLC conducted in cooperation with the National School Boards Association. These sites and services are both independent of time and space and give students access to information as well as provide opportunity to become members of virtual groups. At the same time, the information boom has radically altered the teachers’ roles. Teachers can no longer be a source of information, but are now meant to provide methodological assistance to students. There has never been such close links between the online collaborative working and learning environment. Both Hungarian and international practice shows many attempts and sets examples of direct or indirect use of the latest ICT-s (Information and Communication Technologies) in the teaching-learning processes. Due to the flexible nature of time and space management in the digital age, the “raison d’etre” of electronic and mobile learning is changing the environments. The modern learning environment supported by ICT, latest mobile devices and online services is both effective and efficient.

II. DIGITAL COMMUNICATION DEVICES

In the presence of the information society, the nature of knowledge is becoming practical, multimedia dependent and transdisciplinary. The methods of gaining knowledge are also going through a change: lifelong learning is becoming dominant, the difference between grown-ups and children – created during the new age – becomes irrelevant again, and the formal scholar system is getting changed to open virtual cultural platforms. Pervasive and ubiquitous computing (PUC) is the growing trend towards embedding microprocessors in everyday objects so that they can exchange information. The words “pervasive” and “ubiquitous” mean “existing everywhere.” PUC devices are fully connected and constantly online. PUC relies on the convergence of wireless technologies, advanced electronics and Internet. Today’s mobile communication devices have changed people’s lifestyles and created new subcultures. Wherever users are located, the data can be found. In fact, things that

1. INTRODUCTION

Ubiquitous computing – the incorporation of mobile devices and social media content into everyday life has altered the way one acquire the information, read and learn. As a consequence, a part of the users today form a demand for rapid acquisition of knowledge. Users find information no longer only in printed, but in online sources and libraries, and search on the World Wide Web. Social networking sites (Facebook, Twitter, YouTube, Pinterest and Google+) have become part of students’ every day. These sites and services are both independent of time and space and give students access to information as well as opportunity to become members of virtual groups. At the same time, the information boom has radically altered the teachers’ roles. Teachers can no longer be a source of information, but are now meant to provide methodological assistance to students. There has never been such close links between the online cooperative working and learning environment [1].

Both Hungarian and international practice shows many attempts and sets examples of direct or indirect use of the latest ICT-s (Information and Communication Technologies) in the teaching-learning processes. Due to the flexible nature of time and space management in the digital age, the “raison d’etre” of electronic and mobile learning is changing the environments. The modern learning environment supported by ICT, latest mobile devices and online services is both effective and efficient [2] [3].
people have not ever imagined before can be realized by pervasive and ubiquitous computing [5].

CSUL (Computer Supported Ubiquitous Learning) or context-aware ubiquitous learning (u-Learning) is defined as a technology-enhanced learning environment supported by ubiquitous computing technologies such as mobile devices, RFID tags, and wireless sensor networks [6]. It is characterized by its augmented learning environment which presents information on personal mobile devices through the Internet based on the detection of physical objects in surrounding environment using sensing technologies [7]. Henceforth the method of learning also changing. Information technology and the digital appliances have been embedded in everyday life in such a way that they remain unnoticed. They are used as a part of an automated process.

**Web 2.0 and Social Networking in Higher Education**

It is common knowledge that the Web 2.0 allows users to interact and collaborate with each other in a social media dialogue as creators and authors of user-generated content, in contrast to websites where users are limited to be mere receivers of the messages intended for them. As such it also narrows the gap between academic and common knowledge.

The term Web 2.0 refers to cumulative changes in the ways software developers and end-users use the Web. Lev Manovich in his essay The practice of everyday (media) life suggests that the developments of the previous decade – the Web platform, the dramatically decreased costs of the consumer electronics devices for media capture and playback, increased global travel led to the explosion of user-generated content available in digital form: Web sites, blogs, forum discussions, short messages, digital photo, video, music, maps, etc. Responding to this explosion, Web 2.0 companies created powerful platforms designed to host this content. MySpace, Facebook, Orkut, Livejournal, Blogger, Flickr, YouTube, (the Korean) Cyworld. Thus, not just particular features of particular subcultures but the details of everyday life of hundreds of millions of people who make and upload their media or write blog became public. What was not previously chartable and invisible become permanent, mappable, and viewable. Social media platforms give users unlimited space for storage and plenty of tools to organize, promote, and broadcast their thoughts, opinions, behaviour, and media to others. You can already directly stream video using your laptop or mobile phone, and it is only a matter of time before constant broadcasting of one’s life becomes as common as email. [8].

Present day’s networking environment, even within the frame of educational process, the user shifts from being content consumer to content creator and editor. Its technical environment and infrastructure is provided by today’s Web 2.0 technologies and social media. The most popular networking and social media site, Facebook, is providing the full-scale content sharing services like picture and album sharing. Pinterest has also become the most powerful in the field of picture sharing and uploading with its popular post-processing and after-effecting features. Finally, Snapchat offers the ability to eventually delete chat history. The endless line of social sites that were designed to share knowledge can be continued by mentioning Wikipedia, Khan Academy, blogs that focus on certain topics as well as the educational “tubes” of YouTube. They all have certainly started to corrode the former ways of obtaining information and the traditional paradigm of learning. The cloud-based online storage applications and document editors like Google Drive, Keep, Dropbox or Office 360 make possible to use the same learning environment regardless place and time. Above all thus, it is necessary to understand the functions of social media and the boundaries of its use before its introduction and incorporating into field of education. The task of today’s teachers is to discipline such students, who wish to stay in the so called life-long learning system. Today there are numerous manifestations of this learning style, its most dynamically improving breed is severely connected to the Web 2.0 digital technology and other social sites. The Facebook is famous for its communicational channels it also be used for getting information and knowledge. The way of getting to knowledge and to information has gone through dramatic changes over the past few decades. The educational institutes make strives to pace up to the speed and wide registers of this new way of getting information. The efficient strategies have to be based on the digital networks and on the participants of the life-long learning programmes with their embedded technologies.

The digital literacy is a key factor, an indispensable conditional of the technology based learning. The establishment of knowledge networks, demand accentuated attention from those who want to study, from the adults (the university attendees) and also from the state, social or educational centres or schools which define the mainframe of the formal or non-formal educational system [9].

For example within the correspondent educational system at the Kodolányi János University of Applied Sciences, it can be experienced that students communicate more self-confidently via Facebook, using mobile communicational technology rather than they do in the actual classrooms. Thus within the university programmes emphasizes and focus is on the teamwork and the development of communicational skills.

János Ollé in his discourse on the educational environments, sets apart the institutional and the atypical – online forms, the LMS, Web 2.0 and the social media environment. Starting the line with LMS, e-learning with its advantages, often have disadvantages as well, and the most common issues are it is impersonal and it does not motivate. Ollé erects a new phenomenon. With the interconnection of the society and Web 2.0 a new type of education emerges the ‘connectivism’ which offers new ways of learning never seen before. In the system of Web 2.0 there are plenty of uncertain hyperlinks, it is not always explicit and unequivocal who possesses the content, and the unlimited online storage at the same time is advantageous and disadvantageous since along the
archivation the desire for selection is disappearing. According to Ollé the social sites are gamut independent, and can be interpreted as character murderer networks [10]. Everyone’s school without actual school building, is the counter reaction against the loneliness of the internet. We are faced with real fears. Especially it is the case when it comes to the higher education, that without contact activities, can the process of studying be efficient, since the tutors are losing their control over the process. According to the National School Boards Association 2010 report the 60 pro cent of the student who use social sites, use the services of Facebook and Google+ for debating topics that are related to education, while 50 pro cent of those students explicitly comment to debates related to their assignments that are needed to be handed in [11]. They create online study groups, in which they share their notes that were created in the schools. A new research would be welcome which then would reveal the social learning attitudes and preferences of the Hungarian adult students.

The teacher-student communication through Facebook emerges a set of new type of questions in the higher education as well. The e-mail was the first to pierce the shield of the traditional educational models, which meant need of continuous communication between students and teachers. The previous long-time-taking traditional correspondence between students and teachers has evolved to only a few hours of waiting time to receive the answer from your digital “pen pal”. With the appearance of Facebook, most of the teachers became users of social sites and thus they are available for their student at any time. This relational and communicational opportunity is being used by many professors to complement their actual courses and to give wider picture of the lecture. The following screenshot shows a typical example of it, which depicts a closed group of a chemistry course while approximately 300 students signed up and taking part in that academic semester. The predecessor of the course along the contact lectures, he also used up the communicational tools and functions of Facebook to prepare the students for the upcoming exams.

![Figure 1. Academic course on Facebook: own photo](image)

Tweeted learning material

Twitter in Hungary has basically become one with the celebrity who constantly in the 24 hours are tweeting their thoughts in 140 characters for their society consisting of more than 10 million followers. In March 2014 Turkey having been a democratic country, and being a NATO member has still forbidden Twitter, which obviously proves the mere power and influence the social site possesses. In the surrounding of Twitter simultaneously there is politics, information and entertainment and also the ability to educate. More often than not, we can hear about the overwhelming quantity of information and a lot of people try to make their lifes easier, so that they can allow in the only useful information. They treat the surrounding sea of information like a library from which they read only that volumes which they are curious about. Twitter with its 140 character limits, automatically excludes the extensive chat option. Summarising the materials of lectures, means nothing more rather than concentrating only on the most important aspects. Take for instance those attendees who share information related to their university courses by the means of Twitter feeds, who then learn the excellence of creating reviews and excerpts. Today, the lecturers are the ones who are tweeting the biggest volume, but these tweets are being re-tweeted by more and more university students in some English universities there are internet courses, being in testing phase, which are exclusively available through Twitter [12].

With the incorporation of Twitter into teaching and learning, we have to find answers for the continuous 24 h duties of the lecturers, for the rapid spread of the misleading information and also for the successful exclusion of spamming, or the 140 characters regression of writing abilities [13].

Lectures on YouTube

The world’s third most popular webpage is visited by more than 1 billion users monthly to watch more than 6 trillion of hours of videos, and in the USA it has more users than any of the cable television channels. Thus it is no far to see that the world’s largest video haring site has its place in the higher education. YouTube has created its EDU(cation) project, which already has more than 700,000 videos with educational purposes. The videos are organised into about 800 different channels. The sorting and editing is trusted to the users, of which the members are constantly monitoring for further educational materials in the hope of finding some that can be added to any of the collections. The available videos in the EDU project are on a very wide scale from literature to atomic physics, from popular culture to antique knowledge. The ultimate goal of the initiative is to create the world’s largest and free multimedia library.

The benefit of the YouTube courses is that with their help the education becomes independent from place and time, nobody is late for the courses it is achievable to teach simultaneously 10 or 10,000 participants, in a way that due to the interactivity everyone can take part, and with commenting anybody can immediately be part of the experience. The debates that are taking place under the videos in form of comments, can often be as intensive as in a traditional course.
The possibilities of modern communication in education

In present days the majority of Web 2.0 services are much popular, along the online and offline functions and it is explicitly supporting the synchronous and asynchronous forms of digital education as well. Besides all this, an increasing number of online electronic environments are supporting along the private communicational forms (e.g. sending messages, chat channels) the group information exchanging forms, as well as news feeds, forums, glossaries, lectures and workshops. The picture below presents Moodle system’s possible circle of communicational and extracurricular activities.

![Moodle System](figure-2-moodle-system.jpg)

Within the frames of the previously mentioned educational environments, there are easily accessible and usable, integrated examples of webinar systems, and the following screenshot shows one of those examples, which make possible the group and synchronous communication in an online form. The communication is supported by a moderator while creating an interface for students in a way that only those participants can edit content of the webinar who possess the right to actually edit them in a certain time interval. The webinar enables even a classroomful number of students to activate and use webcams with microphones and with the help of those devices, they share communicational channels. The further advantage of the system is, that the jointly edited contents can be saved to hard disk and the complete online communication can be recorded by a video recorder. The Institute of Applied Pedagogy and Psychology of the Budapest University of Technology and Economics has already two years of experience with the usage of the webinar system, which is a very popular communicational platform among the students.

![Webinar Conference Programmes](figure-3-webinar-conference-programmes.jpg)

Virtual environment, virtual communication.

One of the most common Web 2.0 and 3D emitting gaming engines of the virtual worlds, fields, classrooms, or courses is Second Life. The creators in general wanted to create and provide a 3D world but today it is far more than just a virtual space. Many 3D world campuses were build since then in which virtual classrooms, courses, tutors, students and curriculum can be found. The courses run in the virtual environment and its use is on growth in Hungary as well. There can be found many examples for courses or conferences, where the real people’s avatars get the main roles thus bypassing the frontiers and obstacles of the geographical distances. The following screenshot shows the inside look of a digital campus, where the forms of online communication and chat are also present.

![Virtual Classroom Environment](figure-4-virtual-classroom-environment.jpg)

The speciality and holistic approach is extraordinarily motivating and feels empowering, so it cannot be forgotten that this also requires a lot of attention from both lecturer and attendees, which can be very demanding even in short periods. The registration into the system is very straightforward and free for all, but the inside contents need to be tailor made by the users. [14].

A survey on use of Facebook in education among university students
A survey was conducted in 2012 to determine the use of Facebook in education among students of Budapest University of Technology and Economics, Department of Technical Education in Budapest, Hungary [15]. The data collected from 143 students are summarized as below. The ground surveyed consisted of students aged between 19 and 23. Majority of students, 85 per cent, spend daily more than 2 hours in front of a screen (monitor, laptop, tablet, smartphone). 97 per cent of all surveyed has already registered on Facebook.

Some 40 per cent of surveyed and registered students spend same amount of time on Facebook as online. It means that they basically use ICT for Facebook activity.

Some of the students replied, that they have created study groups on Facebook, where they share curriculum, information on lectures and consultations. In bigger groups, questions are answered faster but the chance of wrong answers is bigger, but the majority of surveyed find Facebook study groups useful.

It is interesting to find that only 1/3 of surveyed students find computer mediated learning more useful than traditional forms. The same time, majority finds this form of learning no so efficient as their focus often shifts from learning to other, mostly leisure activities found on Facebook [15].

III. CONCLUSION

The teachers, who are participating in the present days’ higher education, constantly need to learn new digital technologies, to the changed roles of the students, and to the new learning habits, and at the same also they have to understand the way the whole system works. Today there is a need from the direction of the participants in the higher education system to be able to obtain the knowledge in a quicker way, of which the appropriate feed sources could be the social networking sites and Web 2.0 applications. The educational interpretation of the network based digital citizenship can be better fitted into the digital world, which offers endless opportunities by providing new methods and procedures of the modern world. At the same time we also have to take into account their advantages and potential threats in our education.

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