

TRACING THE EMERGING USE OF COMMUNICATION TECHNOLOGIES IN HIGHER EDUCATION

A Literature Review

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Abstract: Communication Technologies being used in Higher Education Institutions worldwide are producing changes in the design of teaching and learning practices, giving rise to learning paradigms such as e-learning, b-learning and m-learning. Research embraces different perspectives on how the use of Internet and Communication Technologies potentiate innovation and disruptiveness of more traditional forms of education, as well as promotion of changes in the way teachers and students work and in the roles they adopt. The present review suggests that web 2.0 technologies has promoted new forms of communication, interaction and sharing between users and content in formal education settings. Furthermore, the realization of how vast and disperse the body of literature is, revealed as significant the main goals of the project “Portuguese Public Higher Education Use of Communication Technologies”, that aims to characterize Portuguese higher education institutions according to their use and best practices, disseminating the information obtained through an online information visualization tool. The ultimate goal of the project is to contribute towards making valuable and up-to-date information available to Higher Education Institutions and users, facilitating and potentiating research in the area.

1 INTRODUCTION

The adoption and promotion of Communication Technologies (CTs) is happening throughout the world of Higher Education Institutions, especially because CTs are now embedded in people’s lives, shifting into more ubiquitous and networked participations. This is estimated to further contribute towards the future of economy, society and personal quality of life, by simultaneously demanding Higher Education (HE) institutions to compete in the globalised economy, cooperating among themselves, and resorting to a variety of technological services that add to their capacity to potentiate best practices and innovation. As to the existing impact of CTs in

HE, programs such as i2010 and entities like UNESCO and OECD report that students are mostly using the web to interact, communicate and produce content, being increasingly influenced by Web intelligent services that empower user to distribute content and customize Internet applications. In this article CTs are defined as the hardware and software that allow and promote communication and information distribution supported by the Internet (Armstrong and Franklin, 2008); (Groddecka et al., 2009).

The vast emerging and disperse body of literature justifies the relevance of the present literature review, aiming to provide a synthesis of the research conducted in the field, and to draw some conclusions as to the impact of these CTs in

HE teaching and learning environments. In this setting, it challenges of the project “Portuguese Public Higher Education Use of Communication Technologies” - TRACER, under development at the University of Aveiro, are enhanced, once it aims to trace and disseminate the information expected to characterize the Portuguese Public Higher Education Institutions (PPHEI) as to their adoption and use of CT, disseminating the information obtained through an online information visualization tool. This will contribute to making information of interest to institutions and users, available and up-to-date, proposing the dissemination of best practices.

2 LITERATURE REVIEW METHODOLOGY

A systematic literature review search was undertaken from June to November 2011, in the attempt to answer two questions: a) which CTs are being used in HE? b) how are CTs being used in HE? The need to answer these questions relates to the development of the aforementioned research project TRACER, looking specifically for publications concerning web 2.0 tools, services and platforms use in HE. The review was made in the following international online bibliographic databases: Scopus, Eric, Springer, B-On and Google Scholar. Search was also performed directly in the UNESCO and OECD websites. The keywords used were: higher education, communication technologies, communication technologies, web 2.0, e-learning, blended learning, mobile learning, immersive worlds, and personal learning environments, all combined with the boolean operator “AND”.

Search resulted in a total of 193 documents, limited to the English and Portuguese languages, namely: 22 books; 22 conference papers; 95 journal articles; 28 reports; 18 work thesis; 2 series documents and 2 webpages.

3 CTS USED IN HE TO SUPPORT TEACHING AND LEARNING PRACTICES

The use of CTs in HE has evolved, alongside the evolution of the web and web technologies, from web 1.0 tools with no interactive components, to web 2.0 tools which embrace interaction and

promote social network media tools and applications (O'Reilly, 2005).

CTs may be seen as becoming “an icon of early 21st century higher education provision” (Selwyn, 2007, p. 83), with increased investments on computer infrastructures in developed and developing countries, attempting to “‘blend’ ICTs into all aspects of face-to-face teaching and learning, as well as into students’ independent study” (Selwyn, 2007, p. 83). In new learning environments, new roles are adopted. Teachers position themselves as facilitators and mentors, continuously negotiating authority (Wesch, 2009), in a shared process of scaffolding of learning, where students gain more autonomy. With greater autonomy students are empowered to create spaces where learning can take place and skills are built, managing information in different ways, analysing, discussing, and sharing (Wesch, 2009), using and transforming content. This is having its confirmation in the exponential development and use of web 2.0 and social networking software for communication, interaction, collaboration, establishing connections, and sharing information, opinions and thoughts (Downes, 2005).

Conversely et al., (2008) contested the idea of disruption happening as a result of the impact of technologies in HE. Their research showed that between 2005 and 2006 the main use of one Virtual Learning Environment (VLE) in Dublin City University, did not go beyond replication of existing practices, creating no disruptive change in assessment methods and activities, where web tools which demand collaboration or reflection are less used than face-to-face teaching (Blin and Munro, 2008).

Other learning theories, such as connectivism (Siemens, 2005), have revised the meaning of learning, adjusted to reflect the changing and connected learning environments.

3.1 Teaching and Learning Supported by CTs

All the systems related with teaching and learning as being supported by CTs in both the delivery of face-to-face and distance modes – resorting to classical or online approaches, may be defined as Distance Learning (DL) (Bielschowsky, 2009). In this context, teachers and students tend to nowadays communicate resorting to several online tools and media. When referring to distance learning we have to understand Distance Education (DE) from which it derives. DE is defined as being institutionally

based, where teacher and student can be separate geographically or in time, and CTs contribute to diminish those distances (Schlosser and Simonson, 2009). The effort to develop DE supported by CTs is extended to developed and developing countries, as the UNESCO incentives African countries to invest in the applications of CTs in HE, despite the need of faculty training and the need to cooperate internationally. The literature shows that within learning supported by CTs, the concept of DL comprises three learning paradigms, intersecting: e-learning, blended learning, mobile learning. For the purpose of this article, the definitions of the learning paradigms will only contemplate the formal learning context.

3.1.1 e-Learning

e-Learning can be understood as a significant part of the learning content made available via the Internet, “the use of new multimedia technologies and Internet, to improve the quality of learning by facilitating access to resources and services, as well as remote exchanges and collaboration” (European Commission, 2001), and the support of online teaching and learning processes. E-learning in European HE is considered to be strategic for the education and training systems to become more competitive and dynamic within a knowledge-based economy.

It is expected that every HE institution in the OECD area uses a learning management platform, justifying the results of the OECD report on Millennium Learners, which identifies the use of VLEs by students (82.3% several times a week) as one of the largest technologies used for academic purposes (Pedró, 2009).

3.1.2 Blended Learning

Blended learning is considered to be a mix of face-to-face and online learning, although “it is not clear how much or how little, online learning is inherent to blended learning” (Garrison and Kanuka, 2004, p. 97) and its instructional design must be flexible. It requires a restructuring of the class, of the contact hours between teachers and students, and of the approach to teaching and learning (Garrison and Kanuka, 2004). By practicing blended learning the conveniences of online courses are gained without the loss of face-to-face contact (Ellis et al., 2009). Thus, a learning environment is created which is richer than either a traditional face-to-face environment or a fully online environment.

3.1.3 Mobile Learning

Mobile learning as a theory encompasses learning in a society characterized by mobility of people and knowledge supported by mobile devices (Sharples et al., 2007) and by application software and networking technology. The accessibility of mobile technology to the average person is making learning accessible anytime and anywhere.

Giorgieva (2011) states that mobile learning is a new trend in the development of e-learning, in which mobile devices help students get access to course materials anytime anywhere. This is important for HE because today’s faculty members and students are arriving at universities with easy-to-use devices such as laptops or mobile computers, fully equipped with web development environments, music and video displays, productivity tools and prepared for broadband web connections (Katz, 2008). Motiwalla (2007), emphasizes that features such as alerts and permanent access to interact and communicate may help users be more productive, showing however that differences reside in the tools used while the pedagogies remain similar.

3.2 CTs used in HE to Support Teaching and Learning

To look at CTs in HE means to look at web 2.0 tools. Longitudinal studies show the considerably patchy and diverse use of web 2.0 social media technologies in formal learning and change of practices (Armstrong and Franklin, 2008); (Conole and Alevizou, 2010) at the teaching and learning levels. To sustain the review analysis we have adopted the major categories of web 2.0 activity and tools proposed in the BECTA Report (Crook et al., 2008), also adopted in other reports (Conole and Alevizou, 2010). Accordingly, 13 activities were categorized, as transcribed (Crook et al., 2008, p. 9-15.): “Trading; Media Sharing; Media manipulation; Data/web mash-ups; Conversational arenas; Online games and virtual worlds; Social networking; Blogging; Social bookmarking; Recommender systems; Collaborative editing; Wikis; Syndication”.

3.2.1 Web 2.0 Activities and Tools used in HE

In result of the review, there was no evidence concerning trading in educational contexts.

Mash-up websites composed by data from different sources into a new Web service (Batty et al., 2010), are seen as a set of tools and

environments of emerging interest in HE (Wesch, 2009). Netvibes, a web 2.0 mash-up is increasingly being used to create ideal learning environments that maximize the exchange of ideas and interaction, individually or in a community (Li and Li, 2011). Personal Learning Environments (PLEs) may be understood as an aggregation kind of tool. In fact, University of Aveiro offers its community, since 2009, aggregation possibilities in SAPO Campus, a technological platform supported by widgets, which integrates web 2.0 tools for video and photo sharing, a cross-institutional wiki and a blog platform promoting a PLE construction culture (Santos et al., 2011).

Social networking sites such as Facebook, Ning or Elgg, are frequently used to create communities of practice in HE (Conole, 2010), to include group settings in formal learning, and for library and administrative applications. Facebook is popular and commonly used by students. College of Business at Carbondale, reported to have 400 members on its Facebook group, receiving school news, communicating with the school community, to publish reports of Facebook use and to market school events (Roblyer et al., 2010). The Brooklyn College Library has provided a MySpace portal to its services containing links to documents, databases and catalogues (Roblyer et al., 2010).

Wikis are user constructed, allowing: i) collaborative writing in a peer group wiki, where students share and discuss ideas, improve their communication skills and comment on their writing (Armstrong and Franklin, 2008), ii) teaching support in their design for learning, a single space where they can share the materials for a lecture (Armstrong and Franklin, 2008).

Blogging, wikis, RSS are commonly offered by HE institutions, being integrated in social networking sites such as Ning and Elgg, frequently used as VLEs (Brown, 2010); (Conole and Alevizou, 2010), concerning mostly the management and sustaining of various kinds of online interactions through several web applications (Brown, 2010). Resulting from the analysis of 4 case studies in 4 different universities, Franklin & van Harmelen (2007) made it evident that there are multiple choices for implementing VLE systems and web 2.0 tools within those systems - besides podcasting and personal blogs; wiki and a social networking sites are offered, to promote campus life communication information, work groups, sharing research findings and participating in communities of practice. Nevertheless, as reported in the study done by Harinarayana and Raju (2010) study, which involved

57 university library web, the use of podcast was used only by 3 of them. Universities have also embraced web 2.0 tools for enhancing their library services. In the Tripathi study (2010), results showed that from 277 university libraries, 211 had adopted at least one web 2.0 tool, whereas 23.8% did not use any web 2.0 tools. The three most used tools were instant messaging (43.7%), blogs (33.2%), and RSS (31.4%) to convey relevant news and events.

Media sharing tools, allow sharing content in open access and open participation contexts. Video media sharing tools, such as YouTube, are being used by HE institutions in order to have official presence in video sharing services, making lectures available to larger audiences, publishing educational content (Armstrong and Franklin, 2008), and also being used for delivering DE courses. A large number of HE institutions have adhered to iTunes U, allowing their lectures to be openly viewed and downloaded online (Katz, 2008).

As to immersive worlds, the 2007 Horizon Report classified virtual worlds as an emerging trend likely to have an impact in HE. Increasingly being used in HE, virtual worlds are enabling authentic and scenario-based learning contexts and, according to Conole and Alevizou (2010), over 250 HE institutions worldwide are teaching using Second Life, because of the interaction opportunities, and also because it supports activities like seminar and lectures, social interaction within realistic contexts, conceptual experimentation and role play, which may facilitate different interpretations of events (Freitas, 2008). The high usage of 3D immersive virtual worlds by teachers in HE is reflected on the numbers Dalgarno (2011) presents, indicating that from a total of 125 HE teachers from Australia and New Zealand, 62 use 3D immersive virtual worlds in their teaching, using Second Life (78.0%) and Active Worlds (5.0%), the most commonly used platforms, followed by OpenSim (4.0%) and There.com (1.0%).

4 DISCUSSION AND SUMMARY OF RESEARCH AIMS

Tracing the use of CT in HE is a time-consuming task, due to the vast and fragmented information published. The systematized analysis proposed was challenging and a small sample of a complex work possible to be built. It is possible to conclude that the ubiquity of CTs are both in people's lives and in educational contexts. Web 2.0 tools and

environments are popular regarding the interactions and communications they potentiate, with strong impact in the support of teaching and learning practices in HE, and changes in the roles adopted by teachers and students, into more student-centred, reflected on activities involving collaboration, interaction, connection between users and content, sharing, consuming and producing. The idea of a disruptive change in teaching and learning practices is considered by some authors, while others state that technologies are used in HE, but teaching forms have not changed. The difference of scale of the documents reviewed, the contexts to which they refer and time-frame of their development offer us a clear view of the wide view upon approaches made. To systematize the richness of the information collected as a whole, a longer and exhaustive review is needed.

One of the main objectives of the TRACER project is to characterize, as stated earlier, the adoption and use of CT in the PPHEI, in order to understand which tools are used, if they are mostly used as support for already existing technological processes and structures of teaching and learning, or whether their potential is being used for innovation. To achieve this objective, an exploratory study will be held based on the results of an online questionnaire, addressing key elements of the HE institutions, so that an overall institutional view of CTs used and their support mechanisms (social, academic, logistic) is unveiled. An information visualization tool will serve the purpose of giving visibility to the collected data, making sense of a vast quantity of information. The aim is to contribute towards making information of interest to institutions and users, available and up-to-date, facilitating and potentiating research in the area.

5 FINAL CONSIDERATIONS

As this literature review has revealed CTs have a confirmed use in HE. The use of social Web tools and environments is a trend in teaching and learning practices in HE, placing challenges to teachers, students, and institutions, at the level of the interaction, production and delivery of educational content. The ubiquity of web2.0 tools revealed a strong relation to the idea of disruptive changes of more traditional forms of education in HE. Despite this, it is possible to conclude that HE is using social web tools as a support for already existing educational processes and adding them to technological structures of teaching and learning

previously used. The change in the roles played by teachers and students may also be disruptive of more traditional ways of learning; although its use is not always potentiated for innovation. The expectation is for teaching and learning practices to change along with an effective integration and innovative use of CTs in education. Keeping up-to-date with the information related to the adoption of CTs by HE and to its' impact on the teaching and learning practices, has become more and more difficult due to the vast and fragmented publications, leading to the need of serious and expedite systematising. That is the ultimate goal of the online information visualization tool proposed by the ongoing project.

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