RESEARCHING ELECTRONIC PORTOLIOS: EDUCATIONAL AND PROFESSIONAL DEVELOPMENT THROUGH TECHNOLOGY

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The use of ePortfolios in distributed learning in higher education and corporate training worldwide has increased over the last years. An ePortfolio is a highly personalized, customizable, web-based information management system, which allows students to demonstrate individual and collaborative growth, achievement, and learning over time. ePortfolios are beginning to be used as tools for personal development planning, lifelong learning, and learning in the workplace. The paper describes major types of ePortfolios in accordance with the IMS ePortfolio Specifications and an ePortfolio model that could be useful to plan the introduction and the implementation of an ePortfolio in electronic engineering education.

Keywords: ePortfolio, distributed learning, competency based learning, learning design

1. MAPPING THE LEARNING SPACE

"Learning" is now a complex weave of new knowledge and thoughtful reasons for change. These changes are occurring across the institution: in faculty teaching methods, in course curriculum design, in the environment and design of the classroom (whether surrounded by four walls, enhanced by technology, or on the internet), in the library, in academic programs, in student advising and in student-centered support services. Across higher education, a jigsaw puzzle picture of this space is beginning to emerge - driven by technology, learning theorists, cognitive scientists, the economy, a changing student population and dedicated faculty rethinking and re-engineering everything they've ever believed to be true about teaching and learning (Figure 1). *Technology Uses in Teaching and Learning.* 24/7, anytime, anywhere, online, blended, distant, extended education. Technology has changed the way a generation thinks about learning. It has created classrooms without walls and brought libraries into our living rooms. Although technology enables transformation, it does not dictate improvement or guarantee significant change. It is not the tool itself that creates meaningful learning, but the desired outcome to which the tool is applied. *Teaching Practices for Higher Education.* A multitude of factors have come together in rapid progression to change the way higher education approaches the classroom, teaching and learning. The best teaching practices: relate real world problems and incorporate student's a priori experiences; enable student's choice and independence and encompass diverse ways of knowing and learning; support collaboration; encourage interaction and enforce time on learning activities/tasks. *Deeper learning* occurs when students can learn much more, learn it

earlier and more easily, and fundamentally, learn it with a pleasure and commitment that only a privileged few now feel toward school learning. Deeper learning: is social, contextual and active; requires ownership; encourages engagements. Deep learning involves reflection, is developmental, is integrative, is self-directive, and is lifelong.
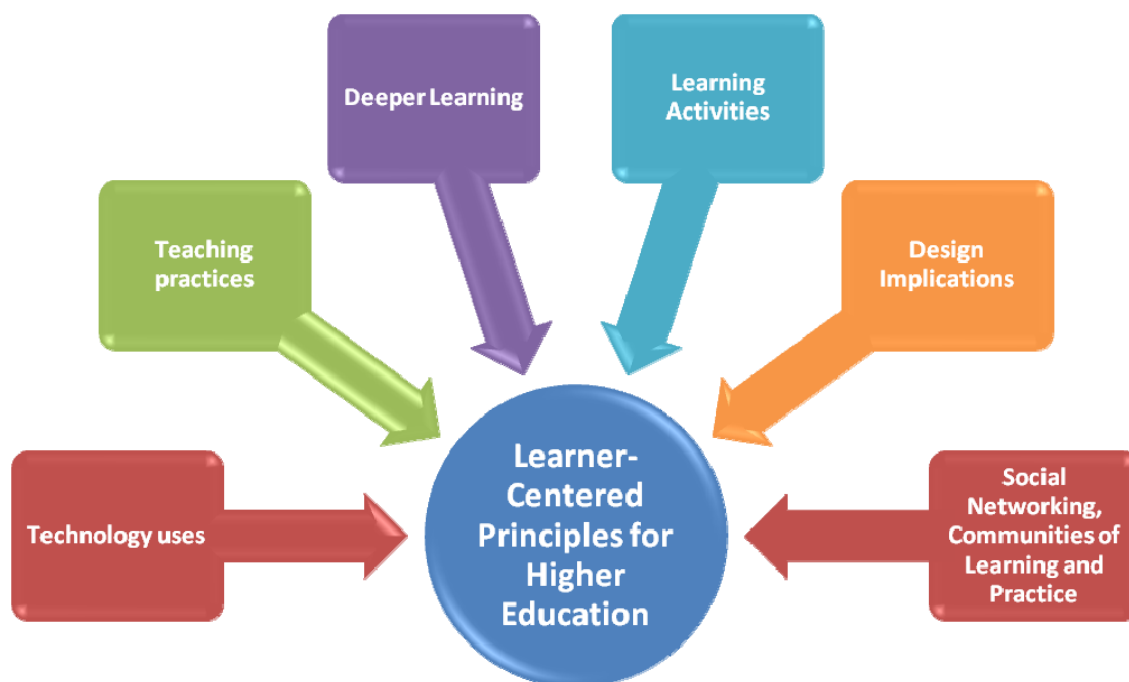
Figure 1. Mapping the Learning Space

Learning Activities. Active learning happens whenever the student is engaged, involved and makes an investment of time and energy in their learning. There may be as many ways of involving students in discovery as there are disciplines, but every discipline can borrow from and build on practices that allow the student to examine and explore their understandings. Learning activities include: case studies, group projects, discovery based assignments, performance, problem solving, apprenticeship, formative assessment & self-assessment, experiential & field learning, creation and critique. *Design Implications.* Traditional, didactic, delivery-focused models of teaching in higher education still prevail, whether in the lecture theatre or in the online environment. Knowledge of methods to relate specified events of instruction to learning processes and learning outcomes is never the basis for evaluation of faculty performance. This is new territory for most faculty interested in best practices for teaching and learning. Learning Design [1, 2] moves beyond such transmission models of education, to the design of more active, collaborative, authentic and engaging learning experiences for learners over the last years. The first general idea behind Learning Design is that people learn better when actively involved in doing something (i.e. are engaged in a learning activity). The second idea is that learning activities may be sequenced or otherwise structured carefully and deliberately in a learning workflow to promote more effective learning. The third idea is that it would be useful to be able to record 'learning designs' for sharing and re-use in the future.

Social Networking, Learning Communities, and Communities of Practice. Online learning is changing dramatically as emerging learning content formats, technologies, and services continue to gain adoption. Increasingly today, online learning is all about people connecting through 'social networking,' 'learning communities,' and 'communities of practice.' These three terms are often used interchangeably, but they have different meanings. Social networking has been one of the major advantages of e-learning when compared with traditional classroom based learning. The term social networking refers to a technology and requires an "architecture of participation," that is, an infrastructure that supports and gives life to online communications and collaboration. Social networking applies to five types of technologies: Communication (IM, e-mail, SMS, etc.); Experience Sharing (blogs, photo albums, shared link libraries such as del.icio.us, etc.); Discovery of Old and New Contacts (Classmates.com, online personals such as Match.com, social networking sites such as Facebook, etc.); Relationship Management (Orkut, Friendster, etc.); Collaborative or Competitive Gaming (online versions of traditional games such as Chess & Checkers, team-based or free-for-all First Person Shooters, etc.). Learning communities, on the other hand, don't refer to technologies but rather to groups of people who aim to mutually assist each other in learning a subject. Communities of practice differ from social networking and learning communities. Unlike learning communities, which focus on learning a specific subject, communities of practice are often united by a profession. So, the purpose is not to learn, say, electronics, but rather to share ideas with other electronic engineers. Communities of practice often include mentor/apprentice relationships, allowing less experienced members to learn from the more experienced.

2. WHAT ARE THE MAIN TYPES AND FEATURES OF EPORTFOLIO THAT CAN ENHANCE LEARNING AND PROMOTE SELF REGULATION?

In the context of the above mentioned learner-centered principles for higher education, this section is focusing on the ways in which ePortfolios are currently used in the modern education and the potential of ePortfolios to support learning. Implications for processes and pedagogies will be identified, and the benefits of ePortfolios and issues of implementation will be considered.

The ePortfolio supports the advancement of lifelong learning important to many government initiatives; makes exchanging portfolios from school and university to work transitions easier; allows educators and institutions to better manage competencies; enhances the learning experience and improves employee development.

In the software industry, the IMS consortium (and related, regional organizations) plays a major role in this by creating the ePortfolio XML specification [3]. In their Best Practice guide, IMS recognizes these types of portfolios: Learning ePortfolios, Assessment ePortfolios, Presentation ePortfolios, Personal Development ePortfolios, Multiple Owner ePortfolios and Working ePortfolios(Figure 2).

2.1. Learning ePortfolios

Learning ePortfolios are used to document, guide, and advance learning over time. They often have a prominent reflective component and may be used to promote metacognition, to plan learning, or for the integration of diverse learning experiences. Learning ePortfolios are most often developed in formal curricular contexts. For example, engineering students might be asked to develop a learning ePortfolio that tracks and allows them to reflect upon how their technology skills improve over the course of a year.

2.2. Assessment ePortfolios

Assessment ePortfolios are used to demonstrate achievement to some authority by relating evidence within the ePortfolio to performance standards defined by that authority. Rubrics are commonly used to score assessment portfolios. For example, electronics students at a university might be required to submit an assessment ePortfolio that presents evidence that they have a set of competencies defined for electronic engineers in their country as a graduation requirement. Departments may use assessment ePortfolios for accreditation purposes.

Figure 2. ePortfolio Types

2.3. Presentation ePortfolios

Presentation portfolios are used to evidence learning or achievement to an audience in a persuasive way. Presentation portfolios often contain instructions about how their contents should be rendered. Presentation portfolios are often used to demonstrate learning outcomes or professional qualifications. For example, a software engineer might create a presentation ePortfolio that incorporates and shows the relationships between professional certifications she/he has received, code she/he

has written, and her/his employment history in order to convince a potential employer to hire her/his. Faculty members might use presentation ePortfolios to collect materials for tenure track review purposes.

2.4. Personal Development ePortfolios

Personal development planning is defined as a structured and supported process undertaken by an individual to reflect upon their own learning, performance and / or achievement and to plan for their personal, educational and career development. Thus, an ePortfolio for personal development planning contains records of learning, performance, and achievement which can be reflected on, and outcomes of that reflection, including plans for future development. This could include a learning ePortfolio, but goes beyond that, as it is often related to professional development and employment, so also possibly used as a presentation ePortfolio.

2.5. Multiple Owner ePortfolios

Multiple Owner ePortfolios are used to allow more than one individual to participate in the development of content and presentation. A multiple owner ePortfolio might combine elements of the above portfolio types, but most likely takes the form of a Presentation ePortfolio when used for such purposes as a website or group blog and a Learning ePortfolio when used by a group of learners to present evidence of their academic growth through the group collaboration. Multiple Owner ePortfolios are often used to represent the work and growth of an organization or organizational unit and, when so employed, may by referred to as program or institutional portfolios.

2.6. Working ePortfolios

Working ePortfolios combine elements of all of the proceeding types. They often include multiple views, each of which may be analogous to an assessment, presentation, learning, or development ePortfolio. In the terms of the definition, a working portfolio is the larger archive from which the contents of one or more ePortfolios may be selected. The whole of a working ePortfolio is generally accessible only to its subject, while views are made accessible to other individuals and groups.

3. THE IMPACT OF EPORTFOLIO ON LEARNING AND PERSONAL DEVELOPMENT

When taking our research, we encountered a great number of different ways of looking at ePortfolio-learning, its goals and benefits. A number of these are illustrated in the diagram below (Figure 3).

A way to present yourself, telling your own story. One of the leading thinkers on ePortfolios, Dr. Helen Barrett, sees a strong relation between Digital Storytelling and ePortfolios [4, 5]. The premise is that when a learner tells the story of a learning experience, or of his or her life, 'deep' learning takes place, and video, blogs, wikis and websites are considered to be powerful ways to facilitate this.

A tool for assessment of student competences. ePortfolios are also seen as a way to assess the attainment of standards. After the student submits evidence in a certain

form, the assessor can determine and store a certain competence-level. Sometimes this can be judged based on the materials alone, sometimes the assessor also has observed the behavior of the student first-hand.

Figure 3. ePortfolio Features

A tool and file-format to help transitions to other institutes. An ePortfolio can also be seen as primarily a structured (XML) file that contains all information that is needed for the easy transition of a student or worker from one organization to another. In other words, an "ultra-CV".

A way to facilitate coaching by providing insight into the learner. When an ePortfolio contains a set of personal information such as interests, work experience, affiliations, qualifications, etcetera, along with the student's the Personal Development Plan, current competency status, and all the learning products that have been created up to a certain point, there is no doubt that this is a valuable resource for a coach. In such an ePortfolio, the coach can access this information in real-time, and quickly form a picture of areas in which the student could use guidance.

Helping personal development. An ePortfolio can also be seen as a tool that facilitates personal development. Almost every book on 'success' emphasizes the need to be clear about your values, goals, talents and weaknesses. And not just know them, but write them down and regularly reflect on them: are you achieving your goals or are you missing the mark? And if the latter, what's missing? An ePortfolio can not only provide a place to store these goals and reflections on them, it can also make them available to your coach and to others in the community of the student. The premise (and paradox) is that personal growth is easier done together with others.

A tool for networking and collaborative learning. Using an ePortfolio, a student can easily put her/his learning results on-line for others to review and give feedback on. This facilitates collaborative learning and the formation of social networks of people with similar skills, experiences and interests.

4. EPORTFOLIO AS "A PROCESS AND A PLACE AND A PRODUCT"

The ePortfolio is a process, representing critical thinking, reflection and goal setting for ongoing professional development. The electronic media offer opportunities to create a different type of ePortfolio. The ePortfolio is an electronic means of providing "a process and a place and a product". The ePortfolio can be used for collation and flexible presentation of documents and other (non-print-based) evidence. Introducing an ePortfolio follows Clarke's,1995 and Barrett's, 2006 guidelines to focus attention on students' initial understanding of the process and its purpose; encouraging student ownership and individual expression; providing some structured aspects to balance the open-ended nature of ePortfolios; and evaluating portfolio process and students' responses.
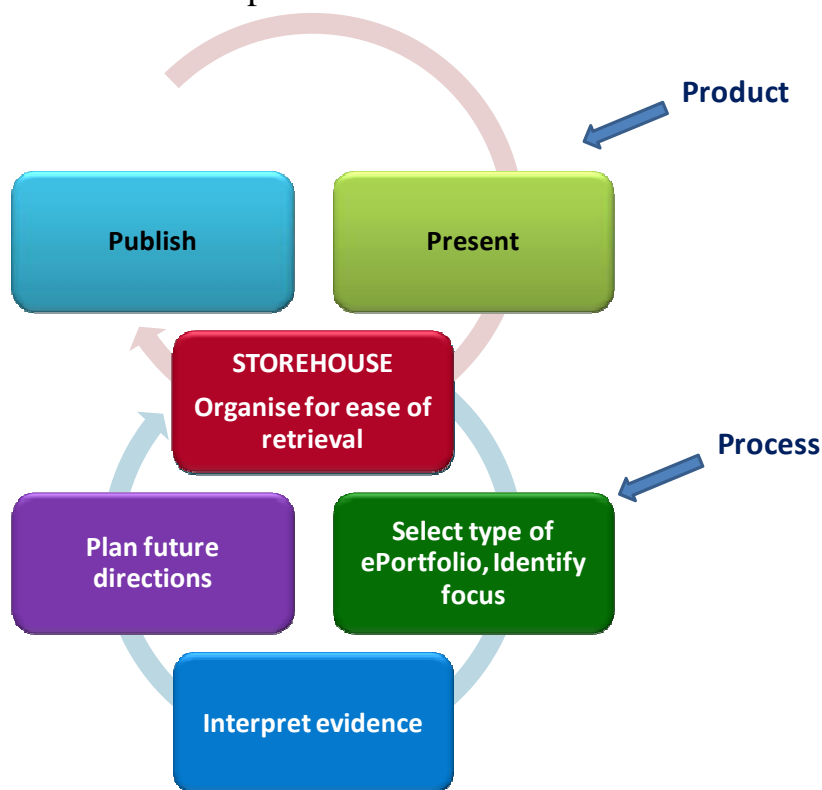
Figure 4. ePortfolio as "a Process and a Place and a Product"

The strength of an ePortfolio (as assessment for professional practice) lies in its collaborative teamwork for students and teacher. It provides a common framework within which learning and achievement are discussed. It is a student-centred and empowering process. It is also a place (database) where evidence is organised and stored until required. The ePortfolio is also a product that is created by combining elements of stored materials for specific applications.

The ePortfolio is more than an electronic storehouse for a resume and copies of hard evidence, such as developed projects, scanned letters, photographs and even

video clips. It includes a self-directed learning activity for students by which they can identify gaps in their current knowledge, skills and competencies against job requirements (using advertisements and job descriptions). Students write their learning outcomes, with objectives and strategies for achieving them.

An ePortfolio offers the possibility to: (1) create a systematic store (database) of all relevant artefacts (evidence) for easy access, selection and presentation in portfolios with a specific purpose (e.g., student assessment, job application or promotion); (2) develop highly creative, visual and authentic artefacts through the technology (e.g., PowerPoint presentations, video clips of performance and products); (3) store large amounts of relevant information that are easy to update, reflect upon and improve; (4) access easily to transfer parts of the portfolio in a fast and efficient manner. Figure 4 shows the structure of the ePortfolio processes. At the process level the portfolio author knows the focus of the portfolio, identifies the criteria, interprets the artefacts (evidence) in the resource file (database), makes notes for future action, and completes the desired task (publish portfolio, development or maintenance). The product loop represents the production of the ePortfolio using multimedia options for presentation.

5. CONCLUSION

This paper, as a report of work-in-progress presents a review of existing major types of ePortfolio and their structure. The research is focused on the advantages of introducing an ePortfolio system to enhance learning and personal development. The main purpose is to assist students to advance their learning and improve their teaching through:

(1) collecting and using evidence to critically reflect on their learning and teaching,

(2) collaborating with peers and their mentor to critically evaluate their progress,

(3) critically analysing their practice in relation to theory and research,

(4) self directed learning by systematically setting and reviewing personal professional goals.

The paper concluded with an analysis of ePortfolio as a process and a product.

6. REFERENCES

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