

# E-PORTFOLIOS AND ASSESSMENT: A CASE STUDY FOR CIVIL ENGINEERING

A. Soeiro, I. Martins, T. Correia

University of Porto

Porto / Portugal

*avsoeiro@fe.up.pt, imartins@reit.up.pt, tcorreia@reit.up.pt*

## Abstract

The University of Porto implemented a project for the use of e-portfolios in its academic community. The main idea of this project was to use the e-portfolio as an assessment tool of the student learning journey and also to show the importance of this reflective work for their academic and professional life.

One of the examples that decided to use this methodology was the discipline of Construction Management, from the Faculty of Engineering. The students were in their fifth year of the master in Civil Engineering. The testing was done in 2006 and 2007. The conditions that led to this option were the experience obtained in the use of an e-learning platform for five years (WebCT), the fact that the contents of the classes have a close connection with the professional activities and the symbiosis between the educational, professional and curriculum components of the exercise. The assessment was graded based on the result of elaboration of the e-portfolio dedicated to present what the students had learned in the course: There was no imposed structure but a core index was suggested. The development of the e-portfolios was made by the students with the technical support of the Office of Support for New Technologies in Education of University of Porto (GATIUP).

The learning objectives presented at the beginning of the course were also analyzed by each student in the e-portfolio at the end of the learning. The results were important to assess the learning objectives and to adapt some of the teaching arrangements to accommodate the criticisms and behaviors presented by the students. For the teacher the main result of these experiences was that digital portfolios are an excellent way to assess knowledge, competences and skills acquired by the students. A parallel benefit was the improvement on using web pages as communication tools.

**Keywords** - E-learning, e-portfolio, learning objectives, self-assessment.

## 1 THE ORIGIN

This paper describes a project of the University of Porto to implement the use of e-portfolios in the academic community. The project was born out of the necessity to register and show a student learning journey over time that, at this moment, during the learning process is getting lost. During the academic journey students develop several assessments and activities that are delivered to the teachers in paper or digital support without an organized and contextualized registry of the initial and development phases, work progress, tutors comments or evaluation. In this way students get to end of the school year only with a list of final grades of each course, but without a registry that demonstrates the progress and result of their own learning journey, assessments, research projects, knowledge, abilities and skills acquired during the learning experience.

Because learning is changing, the process of constructing an e-portfolio is a way to respond to the new teaching and learning guidelines that take into account a more participative, constructive, reflexive, interactive and creative attitude concerning to learning experiences and enables students to easily update the knowledge and competencies acquired. It is also this reflection about achievements and developments that is intended for students learning outcomes. Therefore, e-portfolio can be viewed as an important tool for validating skills that aim the construction of a digital identity inside an organization/institution.

The project mission is to encourage teachers and students to use e-portfolios as an important tool to promote autonomy, interactivity and the integration of several elements, presenting itself as a stimulus for self-assessment, peer assessment and teacher assessment. This project is also targeting the continuous improvement of the quality of teaching and learning in University of Porto.

## 2 THE IDEAS

The teachers who joined the project - use of e-portfolios in their classes - defined its use as a pedagogical tool which allows the use of a different methodology and an evaluation of the process of teaching and learning. The discussion teacher/student(s) dictated in most cases that the e-portfolio of the student was as a roadmap of the personal growth, development and learning journey that by demonstrating skills provides evidence of self-reflection and promotes self-knowledge.

In an e-portfolio it is intended that the student register all the steps of the work: planning; collecting items; selecting and organizing documentation that demonstrates knowledge, reflection, and other skills including artistic and emotional, besides those that will be evaluated by the teacher. One of the fundamental premises of this project is to encourage students to learn by themselves and cooperatively outside the context of the educational curriculum, preparing them for professional life and for lifelong learning. The purpose of implementing a project of this nature is to know and monitor the development of the students (cognitive, affective and metacognitive) through organized and planned collection of works produced [1]. Thus, the institution in general and teachers in particular, allow students to acquire greater maturity and professionalism, management, leadership and reflection skills for the "real" life.

The students had to understand and assimilate the particularities of this methodology that require new ways of living, thinking and acting, in most cases, contrary to the passive learning attitude that they were used to. One of the fundamental premises of this project is to encourage students to learn by themselves and cooperatively outside the context of the educational curriculum, preparing them for professional life and for lifelong learning. The purpose of implementing a project of this nature is to know and monitor the development of the students (cognitive, affective and metacognitive) through organized and planned collection of works [2].

One of the fundamental premises of this project is to encourage students to learn by themselves and cooperatively outside the context of the educational curriculum, preparing them for professional life and for lifelong learning. The purpose of implementing a project of this nature is to know and monitor the development of the students (cognitive, affective and metacognitive) through organized and planned collection of works produced. Thus, the institution in general and teachers in particular, allow students to acquire greater maturity and professionalism, management, leadership and reflection skills for the "real" life.

## 3 THE CASE STUDY

It started by consulting our teachers to know if someone was using e-portfolios in their courses, since we knew that the majority already had a component of e-learning associated to their face-to-face classes (blended-learning). Some of them were already using portfolios in paper format, others had tried portfolios but without much success [3]. The group was pleased and motivated with the idea of participating in a project in this area, very flexible, since no conditions were imposed. In other words, because an e-portfolio is defined by his purpose and the work group had teachers from different academic backgrounds, no software or rigid structure was imposed, only suggestions were given of possible structures, some examples, bibliography and personalized support so that they could implement the project in their classes.

It was interesting to note that teachers rethought their usual techniques and methodology of teaching, having been faced with different approaches from students that stimulated their own reflection on teaching and making easier the recognition of strengths and weaknesses of the students and consequently of their teaching. This challenge also allowed them to increase their skills in the use of ICT (Information and Communications Technology) not only because all along the construction process of e-portfolio they will have an active and important role in guiding and tutoring the students in this new challenge, but also because they need to have the 'know-how' to understand and evaluate students work [4].

Just a quick search on the Internet is enough to understand that there are many definitions of e-portfolios, however, the majority of them include keywords such as: reflection, collection, competence, curriculum, digital repository, projects, work, planning.

For the purposes of this project we consider the following definitions [5]:

a) "An electronic portfolio provides an environment where students can: collect their work in a digital archive; select specific pieces of work (hyperlink to artifacts) to highlight specific achievements; reflect

on the learning demonstrated in the portfolio, in either text or multimedia form; set goals for future learning (or direction) to improve; and celebrate achievement through sharing this work with an audience, whether real or virtual. When used in formative, classroom-based assessment, teachers (and peers) can review the portfolio document, and provide formative feedback to students on where they could improve.”

b) "An electronic portfolio is a collection of authentic and diverse evidence, drawn from a larger archive representing what a person or organization has learned over time, on which the person or organization has reflected, and designed for presentation to one or more audiences for a particular rhetorical purpose.”

The teachers who are implementing the use of e-portfolios with their students currently do not use specific software. Due to the fact that the majority of students are not technically skilled, the teachers decided to recommend the development of e-portfolios in simple and accessible tools, such as HTML editors (FrontPage, Dreamweaver) or text editors (Microsoft Word, Microsoft Publisher).

No conditions for constructing, structuring and contents were imposed to the teachers. It was only clarified and illustrated with some concrete examples possible formats, common contents and possible tools for development. In meetings of the working group some essential questions were explained: How e-portfolios will be used? Why? For what? When? How can e-portfolios support assessment and grades? What type of structure to adopt (rigid, recommended or flexible)? What are the evaluation criteria?

After this first stage - prepare the teachers for the implementation of the project in their classes - some guidelines to support the construction of digital portfolios were defined and a workspace to share information and experience was created in the platform <http://moodle.up.pt>).

The second stage was to present the project to the students and start implementing. This was a critical phase because part of the students got worried and confused with the idea of building an e-portfolio. The teachers had to clarify the concept of an e-portfolio, explain the importance of this reflective work for their lifelong learning, explain how they will be evaluated and assure them support when they have technical problems.

The method of evaluation (criteria) was probably one of the most difficult subjects to explain to the students. In result of discussion teacher/student(s) in most cases the final grade assigned to the e-portfolio was based on the implementation of the following: presence of all the elements agreed; organization; selection and systematization of content; research and synthesis of text; reflection on learning (content, self-assessment and hetero-assessment). It was evident that this kind of work will require from students a lot of time, hard work and dedication. From teachers it will require a lot of time, capacity of guidance and adapted methods of teaching and learning.

## **4 THE RESULTS**

Construction Management is a course, from the Faculty of Engineering, dedicated to the study and analysis of the following themes: construction management; safety in construction; decision and economy of construction; industrialization of the construction, human resources; information in construction. There is a particular interest of students in this area because about two thirds will have jobs in this area. It is a course where the learning contents have a close connection with the exercise of the profession.

This course uses an e-learning platform since 2004/2005 and the use of ICT has been increasing in terms of quantity of contents and type of activities carried out. These activities consist in using the platform as a repository of documents of support, as a communication forum between teachers and students and as a way of achieving and grading different works during the school year. It was planned in 2006/2007 to use the platform for the presentations of the final projects, with the consequent consideration and discussion, and to submit an e-portfolio.

The strategy used was to request the preparation of an e-portfolio dedicated to the course. This request suggested a reflection on the course and the skills acquired, so it was the last work project asked from the students. The conclusion of work was completely in agreement with some clarifications related to the creation of e-portfolios which were provided offline by the Office of Support for New Technologies in Education in University of Porto (GATIUP). One weakness of this strategy was the lack of experience of students on the creation of web pages. A strong point was the fact that the revision of documents and submission of works was done before the period of examinations that gave

to the student time to think and carefully prepare/develop the e-portfolio without the high tension due to exams.

As to the implementation it was indicated to the students that it was a pilot experiment where one could use HTML pages, MSWord, blogs or even one of several open-source solutions. To help the students (give them some background for the construction of an e-portfolio) it was made a proposal on what an e-portfolio should have like:

- Index, Program;
- Goals (general and specific);
- Bibliography;
- Types and criteria for evaluation;
- Learning platform;
- Relevant texts;
- Videos and other multimedia resources;
- Requested home-works;
- Reflections about what was learned.

Most students registered in the course participated in the project using the resources provided by the Office of Support for New Technologies in Education in University of Porto (GATIUP) either in the use of the e-learning platform, or in the support given to students directly, or in the support given to the teacher in the preparation of the guidelines of the work project. The results of use outperformed the initial expectations because of the amount and quality of information collected by the students. There were 52 e-portfolios in the two editions of the course. Twenty eight had a critical reflection on what they had learned: knowledge evaluation, competences, analysis of course curriculum and personal objectives. Five had a reflection about acquired competences and future professional capacities. Eight had a brief analysis of the discipline. Eleven had just a repository of the course content.

The use of e-portfolios as a tool to assess the students was complemented by other benefits for the learning process. The e-portfolios reflected a thorough work of the student learning experience that illustrates the progress, attempts, skills, knowledge and achievements. It was possible to evaluate different capabilities because this kind of work required from students different skills: planning, constructive analysis, reflective thinking, redesign, (self) assessment, criticism and acceptance. It was important to analyze what was the perspective of the students in terms of their learning outcomes.

This method of work students helped the development of skills for reflected and contextualized learning and created the opportunity to demonstrate the results of their learning journey and not just the result of the exams and home-works. By using this type of resource it is obvious the importance of a more reflexive learning, in which students get used to review, consciously and systematically their work, analyze what has been done, its progress and what still needs to be done. The comments and suggestions about the learning outcomes were decisive in the future improvement of the course.

## 5 REFERENCES

### References

- [1] Anderson, L., Krathwohl, D., Airasian, P. et al, *A Taxonomy for Learning, Teaching, and Assessing - A Revision of Bloom's Taxonomy of Educational Objectives*, (Eds.) Addison Wesley Longman, Inc. 2001.
- [2] Bloom, B., "Taxonomy of Educational Objectives: The Classification of Educational Goals", pp. 201-207, (Ed.) Susan Fauer Company, Inc. 1956.
- [3] Correia, T., Martins, I., Soeiro, A., *Digital Portfolios in University of Porto: defining goals*, IASK 2008, Teaching and Learning 2008, Aveiro, 2008.

[4] Keypal Partners and CITL, "Tutor Guide to accompanying young adults in developing their ePortfolio", pp. 28-30, (Eds.) Bonnie Dudley Edwards and Angela Baker, October 2006.

[5] National Learning Infrastructure Initiative NLII, 2003.

## 6 AUTHORS

**A. Soeiro:** Degree in Civil Engineering from the University of Porto in 1976, and a Ph.D. in 1989 from the University of Florida. Pro-rector of the University of Porto for Continuing Education (1998-2003), vice presidency of EUCEN (1992/8), president of IACEE (2001/4), president of SEFI (2003-2005), academic dean of civil engineering of University of Porto (2003-2007). E-mail: avsoeiro@fe.up.pt

**I. Martins:** Degree in Modern Languages and Literatures in Faculty of Humanities of University of Porto (1997). Works in the Unit of New Technologies in Education in University of Porto (2001-present). E-mail: imartins@reit.up.pt

**T. Correia:** Degree in Journalism - Multimedia Communication from the Faculty of Humanities of University of Porto (2005). Works in the Unit of New Technologies in Education in University of Porto (2005 onwards) where she develops multimedia contents and gives pedagogical and technical support to teachers with courses in the e-learning platforms of the university. E-mail: tcorreia@reit.up.pt