Measuring Impact of e-Learning on Quality and Learning Outcomes – A Proposal for a PhD Project

Rita Falcão, Alfredo Soeiro, Universidade do Porto, Portugal

Introduction

In the Information Society, the term eLearning is widely used, when referring to the application of ICT to Education. This term, when analysed in a simplistic way, means "electronic learning" or learning using electronic media. However, the definition proposed by the eLearning Initiative of the European Commission, includes deeper and more complex concepts:

"The use of new **multimedia** technologies and the **Internet** to improve the quality of learning by facilitating access to resources and services as well as remote exchanges and collaboration."

In this definition, eLearning should include the use of multimedia technologies, and specifically, the Internet with the purpose of increasing the quality of Learning. It should also facilitate collaboration and access to resources and services.

In Higher and Continuing Education, the use of eLearning methodologies is becoming a common resource. The area of Engineering, in particular, is traditionally associated with innovation of Teaching and Learning, both at graduate and post-graduate level. In Continuing Education, Engineering is also very active, using not only presential courses but also Distance Learning.

At this point, we have probably passed a first stage of eLearning implementation - experimentation. After a first stage where pilot projects were implemented and strategies were defines, we come to a phase where eLearning implementation is more mature. It should now be possible to find consistent examples of the use of eLearning in Engineering Education, with several years of application. It should be possible, at this time, to evaluate the impact of eLearning methodologies on the Learning Outcomes.

Background

What does "evaluation" mean?

Evaluation is the meaning or interpretation of the data from the assessment in an institutional setting: the evaluators may be students, faculty, administrators or accrediting agencies. The results of an *assessment* process should provide information which can be used to determine whether or not intended outcomes are being achieved and how the eLearning material can be improved.

In the assessment process it is important to distinguish between *formative* and *summative* type. Formative assessment is the collection of data and the

feedback of the results on an ongoing basis: this type of assessment is designed to provide information for the purpose of improving the eLeaerning material being assessed. Summative assessment is designed to produce information that can be used to make decisions about the effectiveness of the eLearning process.

Preparation of an Evaluation Scheme

The following six stages present an outline for the development of an evaluation **plan**.

Identify goals and learning objectives

The first step is to write a statement describing the broad outcome desired. Program evaluation is intended to provide information on how well a eLearning material performs relative to its specific objectives and, ultimately, its broad goals. A goal should be far reaching and describe the best situation that could possibly be hoped for.

The learning objective is a statement derived from the goal that defined the circumstances by which it will be known if the desired change in learning skills has occurred. These learning objectives should be precise in stating the expected change, how the change should be proved, the expected level of change, and over what time period the change is expected.

Develop performance criteria for each learning objective.

The performance criterion is a specific statement identifying the outcomes required to meet the objective and must be proved through evidence. It is important to identify criteria against which results will be measured. The **indicators** of performance are not easily apparent, so indicators are used to provide evidence of whether or not the desired performance exists.

Determine the practice to be used to achieve goals

It is important to define the practice to be followed in the classroom or by the individual learner prepared to obtain the specific performance for each learning objective.

Select and apply assessment methods for each learning objective.

The specified assessment methods to collect proof about the quantification of the learning indicators are used and the results are analysed and compared against the performance criteria defined beforehand. The methods should be consistent with the criteria adopted. These can be enquiries, rating sheets, interviews, focus group protocols, etc., as appropriate.

Define correct channels to get information useful for assessment

The implementation of the feedback channels, which provide information at appropriate timings to facilitate continuous improvement of practices, provide information for decision making, and offer bases for evaluation of the eLearning material.

One of the results of the evaluation is that faculty may determine that it is necessary to provide intervention and/or provide complementary training. When results indicate that students are performing consistent with established criteria, faculty may extend the current practice to other students and to other courses.

Clarify the criteria of acceptable performance

Since evaluation is the process of giving meaning and value to assessment results, it usually occurs during the continuous improvement process (formative evaluation) and at the end of a project (summative evaluation). A decision will need to be made concerning how many of the performance criteria must be met to say that the learning objective has been achieved

The proposal

Research questions

The work here proposed intends to address the problem of measuring the impact of eLearning on Education, through the analysis of Learning Outcomes. It will focus on answering the following questions:

- Is eLearning having a positive impact on the quality of Education?
- Are Learning Outcome affected by the implementation of eLearning?
- How can we measure the impact of eLearning on Education?
- Is it possible to identify good practices of eLearning implementation that lead to a positive alteration of Learning Outcomes?

Scope

The scope of the study includes case-studies in Higher Education, pre and graduate courses. Also, cases of the use of eLearning in Continuing Education will be addressed. Authors will look for collaboration with other Institutions, to include a wider variety of strategies and methodologies of eLearning implementation. It is not an objective of this work to evaluate on-line distance learning courses. It intends to address eLearning in a broader view, as it is implemented on the generality of Higher Education Institutions.

Proposed Methodology

To address the problems mentioned above, the authors intend to collect case-studies of courses that have been using eLearning technologies, in different contexts and Institutions. Data collected should include information about the implementation and Learning Outcomes of the course, before and after

eLearning. Using a considerable amount of data, this study aims to identify a potential trend of alteration of results of Learning Outcomes. If possible, this study will try to find a relation between the increment of Learning Outcomes and the implementation of eLearning.

The complexity of this study is determined by many factors. Education is a complex process that depends on a variety of variables, related to the subject, methodologies and the different stakeholders involved. To isolate one of the variables and to study its impact on the whole process, can be difficult. To minimize this problem, each course should be compared to previous editions of itself. Selecting courses that maintained most of the conditions, can contribute to better results. However, European Education is in a moment of change due to the Bologna Process and most programmes are being reformulated, producing changes on all levels, including courses.

The strategies of eLearning implementation can also be diverse. This study will address mainly courses that use eLearning as complement to the pedagogic process and not full online courses. This variability includes different degrees of eLearning implementation, different tools, different pedagogic approaches. The combination of this and other variables increases even more the possible scenarios that can be studied. To study each potential scenario separately and evaluate its impact on Outcomes would be difficult, if possible. This study will try to look at eLearning on a broader perspective, as one single variable "the course uses eLearning methodologies" and how this variable affects the Outcomes. The strategies of implementation will be addressed on the second stage of the work.

One other goal of this work is identifying practices that lead to an alteration of Learning Outcomes. After collecting and analysing data, a selection of case-studies will be described and investigated more deeply to identify the factors and practices that led to the change of Learning Outcomes. At this point, case-studies will be analysed and compared, looking for a relation between strategies and results, positive or negative.

References

1. László Komaromi, José Collado Medina, Jef Van den Branden, Alfredo Soeiro, Brian Perry, *Quality guide of open and distance learning – Procedures and practices*, SOCRATES ODL PROJECT (56591-CP-2-1999-1-HU-ODL-ODL), http://www.szamalk.hu/projects/P010/English.htm
2. Mortimer, L. (2001) *The Devil is in the Details: Converting Classroom Courses to E-Learning*, Learning Circuits, www.learningcircuits.com
3. Carvalho, C. V. (2003) *Defining an evaluation methodology for blended learning in Higher Education*, Evaluating e-learning – Galecia Project