IMPACT ANALYSIS OF THE EDUCATIONAL MATERIAL IN HIGHER EDUCATION

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Abstract

In the last decade, the universities have evolved for suiting the demands raised by the new generation of students and the current changing society. Learning Management Systems (LMS) have been implemented in higher education but much of the effort has been focused on training the teaching staff on the use of such applications. Unfortunately, there is not a substantial improvement in the academic results since these tools basically, deliver the necessary documentation for lectures in digital form rather than printed. However, teachers are not aware of the predilection of the students for printed documentation, who finally proceed to print such digital content.

Many studies try to assess the satisfaction of the students, which is certainly positive with regard to the online platform, but do not delve into the issue in detail. Some universities consider sufficient the implementation of a LMS that allow teachers to interact with the students in an online basis. However, the use that teachers make of those platforms is overlooked.

An extensive survey was conducted among some students and teachers of the Engineering Faculty of Bilbao. This study reveals the tendency to share mainly lectures in text and presentation formats. At the same time, the skills of the teachers to develop more engaging educational material such as, 3D models, interactive documents, etc., are analysed. Finally, the opinion of both population samples is gathered in qualitative terms.

Keywords: educational technology, higher education, m-learning, 3D, learning management system.

1 INTRODUCTION

Universities are involved in a constant evolution to promote competent professionals according to the requirements of the present demanding society. At the same time, administrators are concerned with the success rates of their institutions. Implementing Learning Management Systems (LMS) to provide a Blended Learning experience is, currently, a common practice. It is supposed that face-to-face lectures will be enriched with the educational content delivered through these platforms.

However, teachers are reluctant to use them, due to the increased workload that it entails [1] [2]. As a result, the LMS has often substituted the reprographic service, delivering the same material through a digital format, which should not necessarily improve the learning-teaching process [3] [4]. Although students are inclined to multimedia-rich content such as video and audio but, specially, interactive content and applets [5] [6], the development of such material is not feasible for every teacher. Therefore, regarding the type of contents provided, the discretion of the teacher prevails [7].

Unfortunately, several studies that attempt to assess the satisfaction of the students do not focus on the quality and variety of the educational material. Students are only questioned about the style and attitude of the teachers, leaving aside issues regarding the skills of the teachers to create engaging contents [8] [9]. Moreover, web browsing and productivity software (text processors and slide presentations) are considered remarkable skill in some previous studies [10]. In order to excite the cognitive system of the students, the provided material should be impressive, since their initial impression will guide the use that they will give to the tool [11] [12].

The present research presents the analysis of parallel surveys conducted on students and teachers. The aim of the study is to assess qualitatively the type of educational material delivered and the opinion of the students regarding the improvement on the teaching-learning process.
2 METHODOLOGY

Several university grades and master courses are subjected to the present study. Being the authors attached to the Construction Engineering area, their teaching comprises specialized knowledge that are taught on the final courses of 5 grades and in 2 master courses, as shown in Table 1, spread among two different campuses of the University of the Basque Country. In a first stage, the opinion of 291 students was collected. Although the students are enrolled to more than one analyzed subjects, they were asked to answer only in the survey corresponding to the upper course. In a second stage a control group of a master course was selected and some interactive materials were provided. A final survey was provided gathering their opinion on the newly development contents.

**Table 1. Distribution of students and teachers.**

<table>
<thead>
<tr>
<th></th>
<th>1st Grade</th>
<th>2nd Grade</th>
<th>3rd Grade</th>
<th>4th Grade</th>
<th>1st Master</th>
<th>2nd Master</th>
</tr>
</thead>
<tbody>
<tr>
<td>Students</td>
<td>---</td>
<td>---</td>
<td>33 %</td>
<td>16 %</td>
<td>51 %</td>
<td>0 %</td>
</tr>
<tr>
<td>Teachers</td>
<td>3 %</td>
<td>28 %</td>
<td>60 %</td>
<td>33 %</td>
<td>37 %</td>
<td>23 %</td>
</tr>
</tbody>
</table>

Additionally, in order to establish a contrast with the opinions of the students, unlike other studies, the skills and the proceedings of the teachers were qualitatively analysed. In favour of a representative amount of responses, in addition to the members of the Construction Engineering area, all the members of the Mechanical Engineering department, which encompass among others the aforementioned knowledge area, were invited to participate in the survey. From the 110 fillable PDF forms sent, 60 answers were gathered, corresponding to a 55 % of the total. In contrast to students, the Table 1 summarises the percentage of participant teachers who teach in each academic course. Obviously, the rows do not sum up 100 %, since the teachers are in charge of more than a subject at a time in different courses. The great variety in ages, motivations and skills of the teachers, involves a significant population that comprises different behavioural patterns: innovators, early adopters, mainstream and laggards [13].

The perceived usefulness and perceived easy-of-use are, according to the Technology Acceptance Model (TAM) [14], the main factors to study. The questionnaires were populated with close-ended questions, either with one answer items or with check-all-that-apply items. The attitude of the students towards the use of the e-learning platform was assessed by the first question type, while the second type allowed particular opinions that may require more possible answers.

3 RESULTS

As mentioned above, teachers were questioned about their skills and procedures, while the answer of the students showed their interest and opinion regarding the LMS itself and the educational content delivered through it. The present section will be focused, firstly, in the material provided by the teachers and secondly, in the results of the perception of the students regarding their usefulness and easy-of-use.

3.1 Teacher survey

As illustrated in Fig. 1 (inner circle), the majority of the teachers declare having skills to create every kind of educational material. It can be observed that there is not any answer on news and links creation skills but, as the authors considered them basic in computer use, the survey did not include any option to declare that knowledge.
The LMS is used mainly as exchange folder to deliver lectures in text (pdf, doc(x), odt, etc) and presentations (ppt(x), opd, etc.) formats. Video and images are also shared, but as other authors have stated [15], they can not be considered interactive materials, which would lead to better satisfaction and outcomes. Real interactive material creation and provision is only marginal.

The 53% of the teachers admits that the only upload text and presentations to the LMS, but only a 43% are aware with copyright issues. A reduced number of them (13 %) reports that use the available forums within the LMS and design tests. However, few negative aspects are remarked in the answers, such as, being a complicated tool (5 %),

3.2 Students survey

3.2.1 First stage

The answers collected from the students are in accordance with the above statements. They report a major provision of lectures in the form of text and presentation files, while videos and links are following. Questioned about their inputs in the LMS, the bidirectionality in the teaching-learning process is only admitted by the 66 % of the students. The uploaded content by the students is limited to assignments mainly in text form (89 %) and secondly as presentations (38 %).

The 40 % of the students consider the LMS useful for their learning process, but the 58 % believe that it is necessary to enhance it. However, few are who consider that the contents are very static (4 %) or that the teachers use it as a cloud storage (18 %).

One of the issues of which teachers are not aware is that the 62 % of the students report that prefer printed documents over digital ones. Although they are provided through the LMS, they proceed to print them, with the consequent loss of interactivity.

3.2.2 Second stage

With this background, some interactive 3D models embedded in common Portable Document File (pdf) format documents were provided to the students. These models can be activated within a common viewer and enlarged, rotated, spun, panned, etc. as required.
Moreover, some other interactive tools were developed and provided to the control group. On the one hand, based on the Geogebra software, the students were able to modify the basic parameters of the design stage of an industrial building, namely, the span, length, height, type of deck, etc. and visualize the results in a graphical image. These are not numerical exercises but an interactive scenario to experiment how their decisions influence in the formal design of the building.

On the other hand, HTML5+Javascript interactive tests were developed and delivered. These, combine fill in the gaps style and multiple choice form exercises. Some buttons are added to show a helpful hint or the correct answers. Additionally to the inherent interactivity of such elements, text fields, checkboxes and buttons, the fill in the gaps questions have implemented an event that will show a red background when the result is wrong and a green background when correct.

The 77 % of the students reported its usefulness to accomplish the requested assignments, the 63 % that they were helpful for studying and the 56 % considered that they were adequate for acquiring basic concepts. However, no negative feedback was received. Only the 19 % of the students requested some improvements on the provided material. Regarding their predilection, the 47 % of the students preferred the interactive tests, the 33 % the geogebra applet and the 21 % the interactive 3D pdfs. Nevertheless, the majority of the students wish to extend this kind of educational material to more subjects.

4 CONCLUSIONS

The present study analyses the educational material provided by the teachers and its impact in the teaching-learning process. The irruption of Learning Management Systems (LMS) has not modified the traditional methods based on traditional lectures. Although the Bologna Process has encouraged to complement these lectures with seminar and practices, the Blended Learning sought with the implementation of LMSs is not fully achieved.

Different interactive educational materials were developed and provided to a control group. The feedback collected from the students, shows that they are receptive and find them very useful, particularly for the resolution of the case studies established as assignments. However, they report a predominant interest for interactive tests, as a consequence of the prevailing pragmatism in the classroom, since they focus mainly in passing the exams.
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REFERENCES


