Abstract

In recent years, new tools have emerged in the context of information and communication technologies that promote active participation, teacher-student interaction and continuous follow-up of students. One of the most popular methodologies is the "Classroom Response Systems", whose most widespread version is the so-called "clickers". In these systems, students use devices that allow the selection of an answer to a question made by the teacher. These tools allow the teacher to stimulate participation and motivation of students, break the classroom routine, improve attention and contribute to resolution of doubts, serving as a complement to traditional teaching systems. They also allow improving the monitoring of student evolution, since they offer real-time statistics of the results. One of the main disadvantages of these devices is their high cost, which complicates their acquisition, especially when they should be simultaneously applied to many students.

In the last years, different alternatives to these commercial systems have appeared in the web that offer the advantage to be free, offering similar or even better services than Clickers. These are applications that can be installed on mobile phones, tablets or computers with iOS, Android or Windows operating systems. These initiatives are part of the growing tendency of using electronic devices in learning. One of these tools is the free application Socrative, which is easily accessible to teachers and students via the web or through downloading and installation on the electronic device. The present work aims to put in place, apply and evaluate the use of this tool during the teaching of undergraduate students at the Technical University of Madrid, within the degrees of Forest Engineering and Natural Environment Engineering. It is intended, ultimately, to evaluate the potential of this tool to stimulate the active participation and the sustained training of students.

In our experience, Socrative application allowed the teacher to follow up the evolution of the knowledge acquired by students, resulting in a very useful tool to implement corrective measures. After Socrative implementation, the degree of overall satisfaction of students was monitored by means of a survey configured on a Likert scale of 5 levels. Most students (57.1%) considered the experience as positive (level 4 of satisfaction), and a 28.6% as very positive (level 5). More than 85% of students indicated that Socrative improved their learning process (level 4 or 5) and a similar percentage of students answered that Socrative stimulated their active participation. The overall experience of the implementation of this technology during the learning process from both, the teacher and the student point of view can be regarded as very positive.

Keywords: Information and communication technology, ICT, Socrative, clickers, active learning.

1 INTRODUCTION

In the last decades new tools have emerged in the context of information and communication technologies with the aim to improve the practical application of docent methodologies. Among the goals of these tools are: i) stimulation of active participation of students, ii) improvement of teacher-student interaction, and iii) continuous follow-up of students. One of the most widespread methodologies is the "Classroom Response Systems" or "Audience Response Systems", the most widely used version of which is called "Clickers" [1], [2]. In these systems the students use devices that allow selecting a response to a question made by the teacher. The system incorporates software that collects information from the questionnaires and summarizes results. These tools allow the teacher to carry out tests of individual response or competition by team, in order to stimulate student participation and motivation, break the class routine, improve attention and contribute to solve doubts, serving as a complement to more traditional teaching tools such as presentation by slides using a projector or the whiteboard [3]. They also enable teachers to better track the evolution of students throughout the grade, as they provide real-time statistics of the results of the answers or quizzes [4],
One of the main disadvantages of using these devices is their high cost, which complicates their acquisition, especially when they want to be used simultaneously with a large number of students.

In the last years, different alternatives to these commercial systems have appeared on the web that offer the advantage over Clickers to be free, while offering similar or even better benefits. These are applications that can be installed on mobile phones, tablets or computers with iOS, Android or Windows Phone operating systems. These initiatives are part of the growing trend of using electronic devices in learning, encouraged by their cheapness [6]. One of the well-received tools has been the free Socrative application, which is easily accessible to the teacher and students both via the web and through download and installation on the electronic device [7]. Previous experiences with this application have very positively valued its use as a tool to improve the learning process in the classroom [8]. The present work aims to put in place, apply and evaluate the use of this tool with undergraduate students of the degrees in Natural Environment Engineering and in Forestry Engineering, at the Technical University of Madrid (Spain). The overall objective is therefore to stimulate the classroom by encouraging the active participation of the students and the sustained learning.

Our work has the following specific objectives: i) create a repository of online activities to boost the classroom within the subjects of Plant Ecophysiology and Wood Pathology and Conservation; ii) perform four experiences to stimulate the classroom using the Socrative application in the same subjects; and iii) evaluate the degree of satisfaction of students with the experience.

2 METHODOLOGY

The use of Socrative as teaching tool was implemented following four phases. The first one was to create a repository of questionnaires in Socrative. Teachers registered at www.socrative.com and worked via the web or through the Socrative Teacher application for iOS or Android on their tablet or mobile phone. Socrative assigned a "room number" automatically. Short answer, true/false or multiple choice questionnaires were prepared.

In a second phase, a workshop on how to use Socrative was given to students, together with an explanation of the objectives of the experience and the dynamics that should be followed to carry out the questionnaires or competitions.

A third step consisted of putting into practice the activities during the class. The participation in the experience was set on a voluntary basis for the students, offering the incentive that the participation could only add positively in the evaluation, never in a negative way. The questionnaires (Fig. 1) were designed for the purpose of boosting the classroom, improve the learning process, and evaluate the level of assimilation of concepts by the students. For the Internet access of the devices, the wireless network of the university was used.

Four experiences were designed to be done in two phases. The teacher launched a first questionnaire and the students wrote or chose their answers in the application. The feedback was immediate: when a student answered a question the application showed the student if the answer was correct or not, and what the correct answer was in case of failure. This first questionnaire (Q1) was anonymous and served to evaluate previous knowledge or the assimilation of subjects already taught. The teacher then had the opportunity to reinforce those aspects that were considered necessary. In the short answers mode, the class could see the correct answer provided by the teacher, who opened a discussion period to clarify concepts. In a subsequent class, the teacher launched a new questionnaire (Q2) allowing students to write their name, in order to be considered for individual evaluation. This second questionnaire served to evaluate the integration of the concepts taught in the topic. At the end of the questionnaires Q1 and Q2 the teacher generated a report with the results of the class, which allowed checking the evolution of the students over time.
The last step was the evaluation of the degree of student’s satisfaction with the experience. A survey was designed for that purpose and answers were configured on a five-point Likert scale. The survey included 9 items assessing the degree of satisfaction, degree of learning and ease of handling of the application, as well as an item of global assessment of the experience. The results of the survey were analyzed in order to provide conclusions.

3 RESULTS

The implementation of the methodology was successful, and we did not find major technical problems during Socrative use in class. The use of smartphone, tablet or laptop terminals is within the usual practice of the students, and their availability was not identified as problematic in our experience. An example of the results of one teaching experience with the use of Socrative is shown in Fig. 2. In this experience, a first (Q1) test formed by 13 multiple choice questions was launched to students (N=18). All students in class decided to participate. In this first questionnaire, the average percentage of correct answers was of 57.3%. This test provided the teacher with valuable information about which concepts were not well understood. For instance, questions 3, 6, 7 and 11 provided poor results, with less than 40% of correct answers (Fig. 2a). Subsequently, after a review of these less-understood concepts, a second (Q2) test about the same topic was launched including 14 multiple choice questions of higher difficulty. The results provided a clear improvement, with an average of 77.8% of correct answers (Fig. 2b). We found similar results in other experiences (results not shown).

Most relevant results from the survey designed to evaluate the degree of student’s satisfaction with the use of Socrative are summarized in Fig. 3. More than 85% of students agreed or strongly agreed
that the use of Socrative helped to improve their attention in class and that the use of the application served to break the routine during the theory class. Similarly, most students considered that the experience encouraged their active participation in class and contributed to improve the learning process. The 71.5% of students considered the interface intuitive and easy to use, and more than 85% of students were satisfied (57.1%) or very satisfied (28.6%) with the overall experience. However, only 42.9% of students were satisfied with the time spent in the activities with Socrative.

4 CONCLUSIONS

The overall teaching experience with Socrative can be regarded as very positive. Most students considered this tool as useful for improving the learning process during the class, breaking the class routine and boosting their active participation. These aspects can improve students' motivation towards the subject and increase attention in class. They offer students the advantage of expressing their doubts or opinions anonymously, since students often refrain from asking questions in class because of shyness. They also contribute to the development of critical and analytical thinking during the class and to improve self-perception of knowledge assimilation. Group activities can be also implemented with this tool, which promote cooperative learning and active participation by the students during class development, positive aspects to achieve greater motivation, increased retention of information and better attitudes.

From the teacher point of view, the experience can be also regarded as very positive. The real-time monitoring of the knowledge acquired by the students is a benefit for the teacher, since it allows detecting and correcting deficiencies in the assimilation of concepts in a timely manner, which can contribute to improve the academic results. In addition it can be used to monitor the level of knowledge of students with respect to a particular subject, and to stimulate student learning. It can also be a useful tool for improving continuous assessment systems.

The experience with Socrative here presented should be considered as a preliminary one that requires further development, including an increase in the number of questionnaires in different topics. Students suggested that time dedicated to this experience should be increased in future courses, in agreement with our opinion. It is therefore early to evaluate the impact of this experience on other
docent aspects, such as student qualifications and class attendance. These analyses will be evaluated under a more advanced stage of implementation of this teaching tool.

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REFERENCES


