Clicker: Assessment Strategy

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Abstract. Virtual education has become utterly important recently, however, one of the biggest challenges is how students should be evaluated. The focus of this proposal relies in avoiding traditional written exams. Instead, students should active participants in the learning process. Virtual education should benefit from the use of new tools, gamification techniques, etc. In this paper, a novel application called *Clicker* is discussed covering its impact on the learning process, and the evaluation of the students.

Keywords: Web-based intelligent learning system, game-based learning, virtual education, learning evaluation, learning assessment.

1 Introduction

These days, we have a huge challenge in front of us, education radically changed towards a virtual system [5,3,6]. We have migrated our academic activity face-to-face and content in many ways; however, what remains a challenge today is the assessment of the learning process and the evaluation of the students in this new virtual modality [1].

There are many methodologies, techniques and tools for teaching, the Socratic method [2] consists "roughly speaking" in enforcing participation of students by making them to answer questions posted by the teacher . A considerable amount of feedback can be obtained from their answers, which is useful for evaluation, assessment, or deciding wether to remain longer on a specific topic or move on to the next. Some authors consider evaluations to be a complex process with many facets [7].

In [7], the author remarks the importance of assessments instead of simple evaluations. He claimed that a student could study just for the purpose of getting good grades in the evaluations.

Karina Figueroa, Luis Valero Elizondo, Antonio Camarena-Ibarrola, José Carlos Cortés Zavala

This is an important issue with a big impact on education. We present in this paper a novel digital tool which encourages the active participation of students in a quick and dynamic way.

This article is organized as follows. First, some dynamic strategies will be introduced at section 2, and in section 3 Clicker is presented as a novel assessment strategy. Discussion, conclusions and future work is described in section5.

2   State of the Art

There are different tools to measure how much students have learned, some are dynamic and popular, for example: kahoot, and quizizz, just to mention a couple.

2.1   Kahoot

Kahoot is a tool where the teacher creates a game consisting of a set of questions [4]. Each question could have up to 4 answers. When the game starts, each question is shown during a short period of time (customized time) in seconds. At playing the game, all the gamers/students read a question and answer in a general page. Each answer has a related colored figure, a circle, a square, a triangle, and an X. Each gamer, during the customized period of time should touch/click the correct answer, when time is up, Kahoot shows a bar-graphics with the number of gamers who clicked on each answer, also showing which was the right one. In addition to these statistics per question, the score obtained by the best 5 gamers is also shown.

At the end of the game, Kahoot shows a ceremony-like for the best three contestants. It is without doubt a dynamic and interesting tool; however, a student may not be motivated enough and just click on any answer randomly.

2.2   Quizizz

Quizizz is an interesting tool [8], it has many quizzes with general topics, and each user can create new ones, it is also a game, and each one has many questions with a set of answers (usually 4, each one is in a different color). During the game, each participant has to click on one the possible answers, It is an interesting application and there are many games that can be played. The game presents statistics on the performance and score of each player.

3   Proposal

Clicker is a novel tool designed in a responsive web page and it is based on the Socratic method [9] to encourage the learning process by asking and answering questions to stimulate critical thinking and to draw out ideas and underlying presuppositions. It is a dynamic application in which questions can be typed in real time and then, sent to the students, in real time also. Alternatively, the questions can be sent from a database previously elaborated.

In this game, the questions can be launched in a specific order, specified by the teacher, who is able to decide which question to send or write a new one during the class session on the flight. Remember that Clicker is a real time play.

This proposal is described in 4 phases:

- **Teacher**. How to generate the questions.
- **Student**. How to log in and be part of the game.
- **Game**. Description of the statistics and feedback delivered by the system.
- **Reinforcement of learning**. How this proposal can contribute in the learning process.

During the next section each section is described in detail.

3.1 Teacher

As a teacher, a user have some task, in this case, in a teacher can:

- Create a new game. Each game has a unique consecutive number (id).
- Create a pool of questions.
- Set the tone of the game.
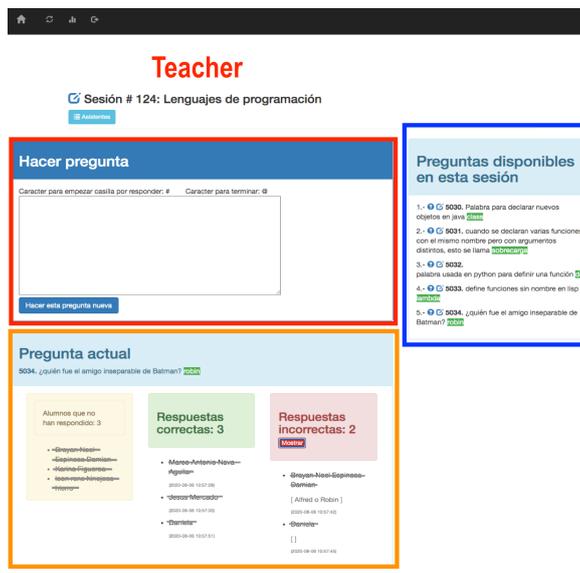
Fig. 1. Teacher interface. The name of the teacher is displayed instead of *Teacher* in the real page.

In Figure 1 the interface of *teacher* is shown. This user has a page with three main regions.

- − Area to write a question (red box).
- − Questions that have been or can be asked in that game (blue box).
- − Statistics on students (orange box):
    - a Who remains to answer.
    - b Who answered well.
    - c Who answered wrong.

Each question is written in natural language. In order to specify the part of the sentence that will be filled by students, the empty part has to be enclosed between symbols @ and #. For example, a complete question can be: `2+2 = @4#.`

The question will be displayed in this way : `2+2 = _____`

Once the question is launched, the section in orange box will be filled, and the new question will appear in the blue box.

3.2 Student

The interface for a *student* is shown in Figure 2. Basically, this page has two regions:

- − Answer the current question (red box).
- − History of answers for the entire game session (orange box).
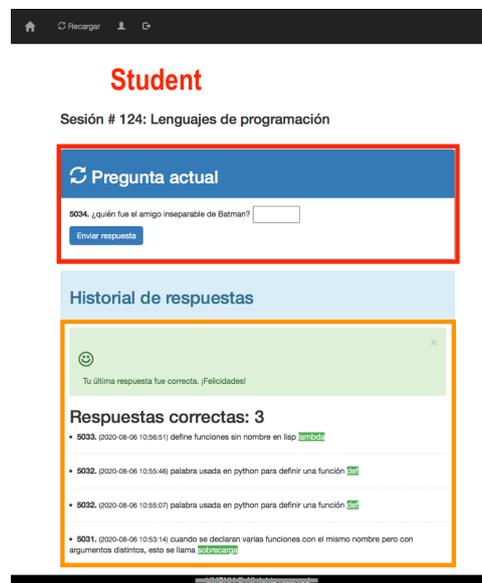
Fig. 2. Student interface. The name of the student is displayed instead of *Student* in the real page.

The students must write the answers in the boxes indicated for this. Notice that within the region marked with a red box you can see the quetion and the space for the answer, which is a texbox element. When a student writes his answer, it is automatically evaluated and it is shown at *correct answers* (orange box).

In Figure 2, within the orange box all the answers sent by a student are shown regardless of wether they were right or wrong. Wrong answers are shown in red and right answers are shown in green.

3.3 Statistics

At the third stage of the game a statistics summary page is shown in a page as that of Figure 3. This page is shown to all the students, the purposes the page serve are:

- − Feedback to all the students (orange box).
- − Motivation through competition among the students (purple box). It shows the best 3 students, like a ranking.
- − Showing the current question (red box).
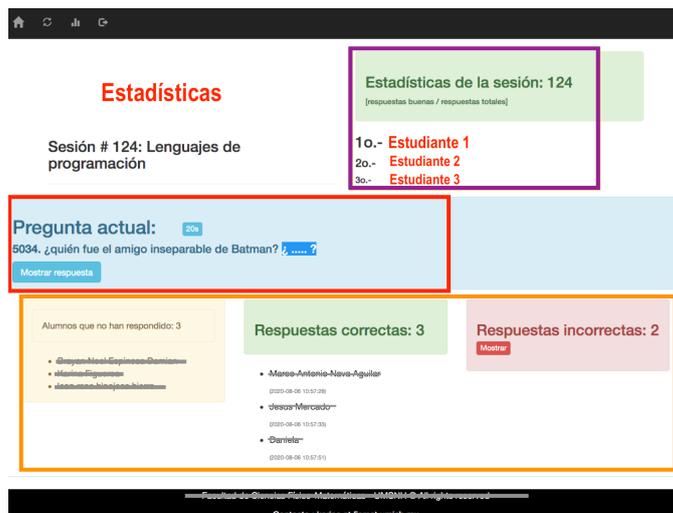
Fig. 3. Statistics interface. All the students can see the information about the game that is shown on this page.

3.4 How it Works

Clicker is an interactive game, the complete process is shown in Figure 4, first a teacher begins a game and a new *id* is provided, then he writes some questions.

Karina Figueroa, Luis Valero Elizondo, Antonio Camarena-Ibarrola, José Carlos Cortés Zavala

The teacher gives the *id* to the students so that they may login to the game, and see the statistics page. When the teacher asks a question (step 1), students type the answer (step 2), when answers are sent, the statistics page is updated shown the numbers of right and wrong answers (step 3).
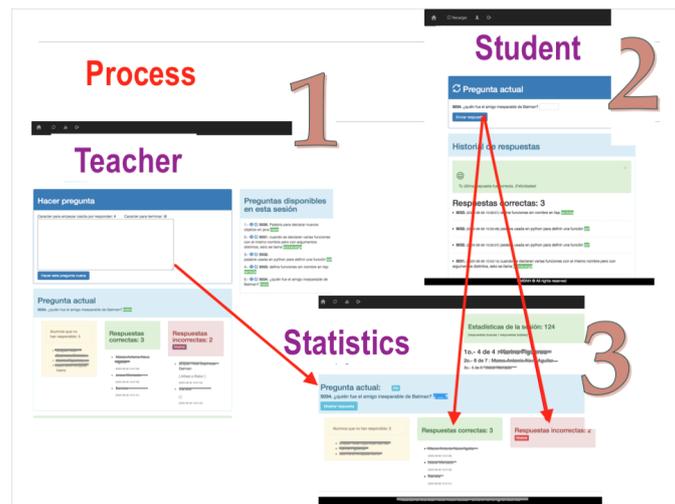
Fig. 4. Complete process. Step 1, Teacher asks a question. Step 2, Students type the answer. Step 3, Statistics for that question/answers are updated.

4   Results

Several teachers have used this tool in their lessons since at least 2 years ago. Students are more interested in the class, since they know that at any time they can be asked to actively participate in the discussion of the subject in turn. They explain and help each other by seeing the problems that their classmates have at answering the questions regarding their lessons. The teacher has a better idea of the degree of achievement of the class in general. He is able to determine when to move to the next topic, and when to reinforce the previous topic. There is also an evaluation tool that accurately reflects the daily work of each student, as well as a diagnostic tool to determine what each student needs to reinforce.

4.1   Interview

In order to collect feedback about Clicker for this paper, a group of students has been interviewed. They were 8 university students, between 19 and 20 years old, *detailed are blinded*. The questions were:

– How many times have you played Clicker?
– Do you think it helped you to retain the issue that was the object of the class?
– Was it stressful or fun to play Clicker?
– Was the interface difficult?
– How much impact does it have to show the names of those who have answered the question correctly?
– How many questions could you get bored with?

Most of the students interviewed have played Clicker around at least 10 lessons. They agree that it is an interesting frame, stressful at times but fun to play. Their favorite part is the ranking. They consider that 12 to 15 questions are enough. Also, they say that the interface is intuitive and easy to use. However, the most interesting part is that they remember easily the questions-answers played.

5 Conclusions and Future Work

Clicker is a novel responsive web application for assessments, which provides both an evaluation and a diagnostic tool. It is a different strategy to motivate our students to participate in class. Each student can view his answers any time, then, this tool can be used to study for a real exam.

As a future work, we are interested in several minor updates, for example, setting a timer for each question; and downloading statistics as a csv file, etc.

Mayor changes are considered, for version 2.0: Design an add-on for "Clicker" that allows mathematical writing as easy as it is to write on the blackboard in order to make mathematical questions clearer and easier; Also, add a module for handling theorems and proofs.

Clicker is available using this url[3].

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