KAHBOM, AN EXPLOSION OF KNOWLEDGE AND EDUCATIONAL EVALUATION

TECNOLOGÍA PATENTADA

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RESUMEN

The EDUCAPHYS research group at the University of Alicante has developed an educational tool that simultaneously allows the learning and evaluation of student knowledge at all stages and is suitable for any educational area.

The device allows questions with multiple answers in which students are the players who feel being part of a real gamified game, making it perfect for gamified activities, increasing their motivation and reducing the level of stress produced by traditional exams. Among its features are: its ease of use, its inclusive nature and the fact that it is not dependent on being connected online or making use of databases.

A prototype demonstrator is currently available and has already been validated in a real environment in small group activities. The device is protected by a patent application. Companies interested in its commercial exploitation are sought.



INTRODUCCIÓN

In the 21st century, innovation in education and learning within the theory of self-determination is becoming increasingly important. As a result, there is a growing need for elements that can make a difference in students' learning.

A very important part of learning is assessment, which should be understood as a reflective and enriching phase of learning for students and should be three-dimensional, formative, formative and guiding.

Nowadays, not only written tests are used for assessment, but also online methods such as Kahoot, Quizizz, etc. These tools have advantages and disadvantages, such as the fact that the questionnaire must be prepared in advance on the website or the use of computers or mobile devices in the classroom, with the problems that these can entail. Moreover, it makes difficult to invent a narrative for gamification in education.

Moreover, these tools are not accessible for people with visual impairment, as they cannot see the mobile screen, cards or boards. Therefore, they do not make it possible for all people to use them, giving rise to possible discrimination.

Beyond online tools, there are different inventions within the field of education and educational games, where we find, in general terms, similar problems:

- limitation of questions;
- impossibility of use with people who are visually impaired;
- the need for a database connected to the internet to store the data;
- etc.

For all these reasons, there is a need to develop easy to use and applicable educational tools that do not need to be connected to a network or that do not work with a database that previously loads the predefined questions.

DESCRIPCIÓN TÉCNICA

The EDUCAPHYS research group at the University of Alicante has developed an educational tool with the following characteristics:

- it allows questions of all kinds to be asked, without prior preparation and without the need to be connected to any network, which makes it an ideal device for all educational stages and areas of knowledge;
- it is inclusive, as it respects different disabilities and provides solutions for them, with reliefs, sounds and lights;
- the requested response time is programmable, as it has a microcontroller;
- The code is in block language, making it accessible for modification.

The developed device consists of an educational game for learning and assessment composed of three parts:

1. CLOSED HOUSING MADE OF PLASTIC OR RECYCLED MATERIAL: protects the electronics. It gives it an appearance that can be modified for any gamification narrative. It comprises at least five faces in its construction (*See Figure 1*):

- a **student/player face**: it comprises a plurality of holes and signalling elements in relief or Braille relief, so that each signalling element (Braille) corresponds to a hole. In addition, a plurality of lights is displayed on it, for the correct display of the elapsed time and the failure in the answer.
- a **teacher/moderator face** (opposite the previous one): it has at least one hole and a plurality of signalling elements, which may be in relief or in Braille, the number of which coincides with the number of holes used on the student/player face.
- **two** more **sides on the sides** closing the casing: they comprise a hole for the on/off element and at least one hole for proper sounding.
- a **support face** on the table: the base.

2. ELECTRONICS: it allows the interaction of the device with the student/player and with the teacher/moderator, and it consists of six parts:

- A plurality of **student/player interaction elements** consisting of an answer switch for each of the options posed, where they can select which of the answers are correct or false, according to the question proposed.
- At least one teacher/moderator interaction element, to **select the correct or false question position**, according to the question statement.
- An **on/off switch**.
- At least one LED strip with three lights, for the **correct display of elapsed time and answer failure**.
- At least one **acoustic device**, to operate in the event that the student makes a mistake in selecting the **answer**, whether **correct or false**, according to the approach of the question or if the time foreseen for the answer has reached its maximum.
- A **micro-controller**, whose program housing allows all parts to function.

3. CODE: at the lowest level is the code that allows all the instructions necessary for the correct operation of the invention to be executed.

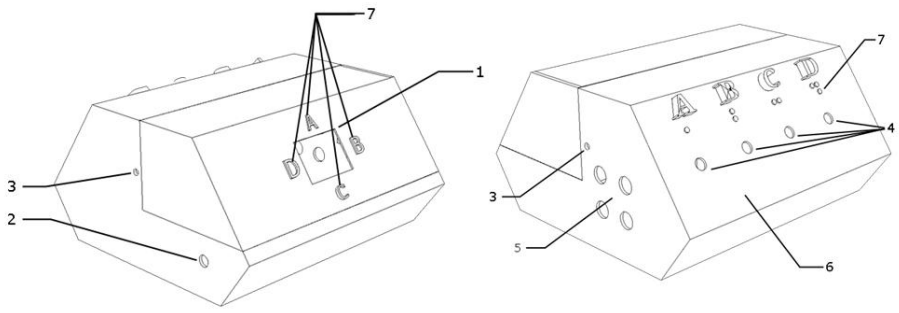


*Figure 1. Various orthogonal views of the device (**Left**: Teacher/moderator side; **Right**: Student/player side), where: 1. Hole for housing the teacher/moderator interaction element; 2. Four holes to house the pupil/player interaction elements; 5. Four holes for the correct sounding of the acoustic element; 6. Lights, housed inside; 7. Four signalling elements that can be in relief or in Braille.*

This invention also tries to solve a problem that occurs in education for carrying out gamified activities, educational breakout or escape room, with any narrative and not having to prepare the specific consumable material for each narrative to be used. This is achieved thanks to the response activation device, in this case a joystick. In this way, the correct answer could be selected, giving

versatility to the device and, in addition, the students/players do not know where the correct answer is located (it could be a pattern) and, therefore, generate uncertainty and focus the student/player on the question and not on the functioning of the invention.

VENTAJAS Y ASPECTOS INNOVADORES

ADVANTAGES

The proposed device has the following advantages:

- It is a tool adaptable to all educational content, assessment and marking.
- It is always available to ask questions; it is not necessary to have a previous questionnaire in order to be able to ask questions.
- It reduces stress when carrying out assessment tests.
- It increases the student's motivation.
- It minimises the digital divide, which can be a problem for the educational centre, both in terms of electronic resources and specific teacher training.
- It allows the implementation of any gamification, educational breakout or escape room, in any narrative used.
- It can be used by all people, even if they are visually impaired, thanks to its structure and acoustic device and adapted with the Braille code.
- It does not need to be connected to a network, nor does it require the use of electronic devices.
- It does not need to make use of any database either to store the records or to store predefined questions. The questions are proposed by the teacher/moderator, according to his/her interests, making it a tool open to any subject.
- Instant evaluation.

INNOVATIVE ASPECTS

The main innovative aspect of the developed educational game device for learning and assessment lies in the fact that it is user-friendly and applicable, inclusive, allows questions of all kinds with no limitations and does not need to be connected to a network or making use of a database for its operation.

ESTADO ACTUAL

A prototype demonstrator of the invention is available and has been tested in a real environment in activities with small groups of primary school pupils aged 6 to 12. Initial feedback has been positive, as the pupils have been highly motivated to work as a team to find the correct answer and they have gained significant learning from the learning experience.

The future of this device involves the development of an improved prototype, based on the implementation in classrooms together with scientific studies, which will allow us to make stronger assertions about the benefits of the device. In addition, the necessary tests will be carried out to ensure that the device is fully inclusive and sensitising.

APLICACIONES DE LA OFERTA

The present invention is framed within the field of education, especially in devices for gamification and evaluation, and educational games.

The device allows for multiple-choice questions where the student is the player who feels being part of a real gamified game, making it perfect for gamified activities, increasing their motivation and decreasing the level of stress produced by traditional exams.

With this device, formative assessments could be carried out, by helping knowledge retention, while assessing the knowledge and providing a grade, as it is required by educational laws.

The learning of time management is facilitated thanks to this device, both for answering questions and for other activities, as it provides visual and audible feedback that allows the user to know the elapsed and remaining time of the activity in progress. If we are talking about a physical activity, where it is not possible to wear watches during the activity, this makes the tool very useful for effort management.

Gamified learning or educational breakouts would be favoured thanks to this device, thus providing a multipurpose tool for the different narratives to be promoted, providing students with an unforgettable learning experience accompanied by meaningful learning of the subject matter.

COLABORACIÓN BUSCADA

Companies interested in acquiring this technology for commercial exploitation are needed:

- Patent licensing agreements.
- R&D projects for the development of other types of games or educational tools or other business needs.
- Consultancy services.
- Etc.

Type of companies needed:

- Companies in the educational sector (private academies, training centres, etc.).
- Companies supplying educational resources (publishers and educational material companies).
- Companies in the board games sector.
- Manufacturers of educational games.
- Associations of people with disabilities.
- Escape rooms companies.

DERECHOS DE PROPIEDAD INTELECTUAL

This technology is protected under **patent application**:

- Patent title: “Dispositivo de juego educativo para aprendizaje y evaluación”.
- Application number: P202230622.
- Application date: July 7, 2022.

SECTORES DE APLICACIÓN (1)

Education

IMÁGENES TÉCNICAS (1)

GENERALITAT VALENCIANA
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