Collaborative Learning Through Youtube

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Information and Communication Technologies (ICTs) have been increasingly applied to teaching. Although these tools improve and reinforce the student's learning, the students are not usually involved in the creation of new digital material, but rather they are only users of them. This paper presents a methodology that combines collaborative learning with the use of ICTs, and in particular with YouTube. The main objective of the methodology is to put the students as the real protagonists of the learning process, to reach deep learning and to improve a wide range of transversal competencies such as teamwork, oral expression, creativity, critical spirit and acceptance of external criticism. Finally, an example of practical application on the methodology is presented and the main conclusions of this work are listed.

Keywords: ICTs, collaborative learning, digital teaching material, YouTube

INTRODUCTION

The didactic methodology traditionally used in university teaching has been characterized by the use of lectures, in which professors try to transfer content on a given subject in front of a large group of students who participate in the learning process in a totally passive way (Glasser, 1986). Although this method has been used for centuries and unfortunately is still one of the most widely used today, many authors have shown that the implementation of other learning methodologies are more effective and efficient. For this reason, the European Higher Education Area (EHEA) aims for the student to be the protagonist (Günter, 2008) and responsible (Guardiola-Víllora, 2017) for his own learning, being able to independently prepare part of the contents of the subject (Fernández Sánchez, 2009) (García Fernández, 2011), thus placing the student's learning process as the main axis for the definition of a pedagogical renewal, which implies the imperative need to redefine the role of the teacher.

On the other hand, it is important to highlight the work of W. Glasser (Glasser, 1999), in which he explains that teaching should not push the student towards memorization, since he will probably forget most of the concepts shortly after the test. In order to achieve deeper learning, W. Glasser introduces a relationship between the degree of learning and the technique used, representing this relationship in what is called a "learning pyramid" (see Figure 1). Based on this theory, one of the main objectives when defining

and implementing a new teaching methodology should be to ensure that students are able to perform the actions indicated at the base of the pyramid (explain, summarize, classify, structure, define, generalize, elaborate, test and illustrate), which implies the use of active learning methodologies. On the other hand, the use of passive learning methodologies is often associated with the neglect of the strengthening of certain skills, such as oral expression, creativity, the courage to face new challenges, the search for personal goals, self-improvement, critical spirit and the acceptance of external criticism, or teamwork, among others.

FIGURE 1
LEARNING PYRAMID

Source: A. Segura (2017) based on W. Glasser (1999)

For all these reasons, this article describes a methodology that combines collaborative learning with the use of ICTs, in particular YouTube®. The main objective of this methodology will be to make the student the protagonist in the learning process, to promote deep learning of the subject matter and to improve a wide range of transversal competencies.

The methodology is based on the recording of a video by the students in which they explain in a reasoned way how to solve an exercise, which is later corrected by other students and made available to the whole class in order to increase the amount of teaching material available in relation to the subject. The fact that the students must explain the procedure for solving the problems involves not only that they will participate in the learning process of their classmates, but also that their level of learning and the amount of information they will retain in their memory will be substantially increased (see Figure 1).

RELATED JOBS

Collaborative Learning

Collaborative learning has its basis in the theory of constructivism (Vygotsky, 1974), which refers to the learning environment as "a *place where learners should work together, helping each other, using a variety of tools and informational resources that enable the pursuit of learning objectives and problem-solving activities*" (Wilson, 1995, p. 27). In relation to this theory, there are different studies in the literature that seek to establish the teacher's work as a simple facilitator of a learning environment that allows students

to acquire knowledge and transfer it to their classmates effectively (Johnson, 1993), (Calzadilla, 2002) (Muniz-Calvente, 2018).

Use of ICTs in Teaching

There is no doubt that Information and Communication Technologies (ICTs) have practically invaded all areas of daily life, transforming the way we relate to each other (Facebook, WhatsApp, Instagram...) and the way we access information and knowledge (Moya López, 2013). However, although ICTs have had a very high impact on society, there are still few teachers and educational systems that have considered using them on a regular basis in the classroom. This fact may be mainly due to the gap that currently exists between students, considered "digital natives", and teachers, who in many cases have low digital competencies compared to the former (Moya López, 2013). Therefore, it is very important to start training teachers in the use of ICTs and to implement as soon as possible methodologies that include the use of ICTs in the classroom, thus reducing the existing digital gap between the two. In addition, this type of teaching projects and activities is usually well valued by students, for whom it is an added stimulus (Lopez, 2013).

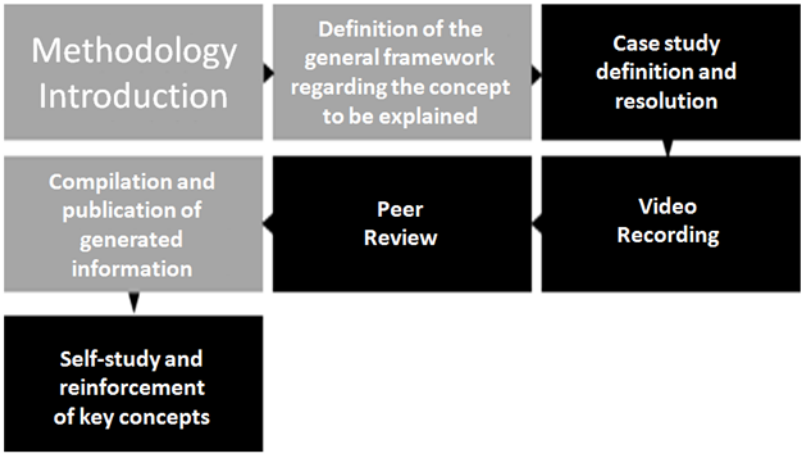
In this paper, the social network YouTube is used as an educational tool (Ramírez-Ochoa, 2016) in a collaborative learning process. It should be noted that YouTube has been selected because it is one of the most widely used video platforms today, in addition of being one of the most frequently used applications on phones (being a native application in many of them). This is an important consideration, since students do not frequently access the official pages of their academic institutions (Virtual Campus, Moodle...), but they are constantly connected to social networks from their cell phones (Guardiola-Víllora, 2017) and visit them regularly, which facilitates students' access to the digital content generated in the teaching project.

METHODOLOGY

The project aims to involve students in the creation of a collection of videos linked to the teaching process. It should be noted that in this project it will be the students who will create the multimedia content (videos, reports, etc.), share it among themselves and create a network for the dissemination of knowledge in the classroom that favors collaborative learning. This contrasts with other teaching innovations that used ICTs and especially videos as tools, since to date most of them were based on content generated exclusively by teachers, relegating students to the background as was the case with face-to-face lectures.

The flowchart in Figure 2 shows the methodology used, in which the teacher takes a back seat in the learning process, since his or her tasks are focused solely on guiding and accompanying the student.

FIGURE 2
PROPOSED METHODOLOGY



In gray color: tasks developed by the teacher; In black color: tasks developed by the students.

STEP 1: Introduction of the Methodology to the Students (Teacher)

The teacher explains to the students the teaching project to be followed in the subject, making special emphasis on the fact that the project's success depends on the students as a whole, in such a way that if everyone participates actively, the class as a whole will be highly benefited. At this point, the flow chart in Figure 2 should be explained to the students, indicating how the pairwise and double-blind correction system will be implemented.

STEP 2: Definition of the General Framework of the Concept to Be Explained or Problem to Be Solved (Teacher)

The teacher introduces the knowledge related to the subject, and indicates to the students the framework of the work they must develop. For example, in scientific-technological subjects, the teacher can introduce the different existing methods for solving a problem (e.g.: parabolic movement, equilibrium of a structure, chemical equilibrium, statistical problem...).

Subsequently, the teacher establishes some basic conditions for the definition by the student of the problem statement or case study to be solved or developed.

STEP 3: Case Study Definition and Resolution (Students)

Based on the information provided by the teacher, students should form groups of 2 or 3 people and define the problem statement to be solved in the video. For example, if the topic to be developed is parabolic movement, the student must invent a statement that can range from the calculation of the trajectory of a ball pass from Messi to Luis Suárez, to the calculation of a projectile launched from a ship. This not only encourages the student's creativity, but can motivate him/her to apply and understand physics by applying it to a case that is of interest to him/her.

Once the case study has been defined, the student must solve it and internalize the solving method to the point of being able to explain it in detail to a third party.

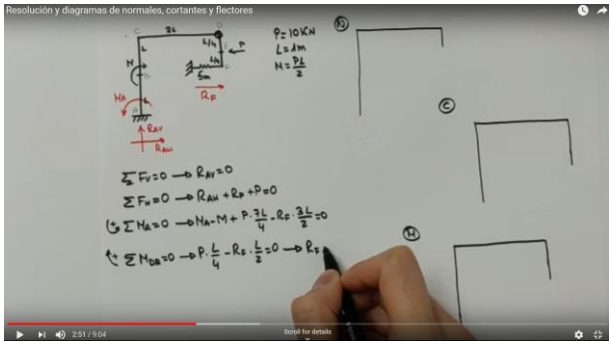
STEP 4: Recording of Videos by Students (Pupils)

In this step the student must make a video in which he/she explains in his/her own words the resolution of the case study defined in the previous step. Given the fact that the physical appearance of the students is not relevant and most of them prefer to hide their identity, we have chosen to use the technique of "hand drawing" or "whiteboard video animation". In these techniques, only the author's hand appears, who draws or introduces cut-out images to explain a concept, process or exercise (see Figure 3.a).

For the recording of this video, it would be best to use video cameras (Ríos, 2000), interactive whiteboards (Ruiz Tarragó, 2000), or Tablet PCs (García Fernández, 2011). However, given the high cost of making this equipment available to a large number of students, the use of the students' own cell phones as recording tools was considered to be the most appropriate alternative. In addition, the fact that most Smartphones already have the YouTube application and access to the network facilitates the uploading of videos to the Internet. In order to facilitate recording, structures have been designed and fabricated to hold the mobile in a suitable position (see Figure 3.b).

Once the video is recorded, students must upload it to YouTube and send a link to it to the teacher through the Virtual Campus.

FIGURE 3
A) CAPTURE OF A VIDEO USING THE "HAND DRAWING" OR "WHITEBOARD VIDEO ANIMATION" TECHNIQUE; B) STRUCTURE PROVIDED TO STUDENTS TO MAKE THE RECORDING

a) 

b) 

It should also be noted that the creation of the video results in an improvement of the student's computer skills, oral expression, the ability to transfer knowledge and above all ensures a greater understanding and deep learning of the subject based on W. Glasser's Pyramid (see Figure 1).

STEP 5: Peer Review (Students)

Once all the videos have been received by the students, the Virtual Campus Workshop tool (UniOvi) allows the teacher to cross-check the exercises in order to carry out a peer review among the students.

In this project phase, it has been observed that students are highly demanding with their classmates, as they understand that it is necessary to carry out a good correction to avoid creating content that is not useful for the class as a whole (Muniz Calvente, 2018). In addition, in some cases the identification of errors in the reviewing phase is not only beneficial for the student who receives the correction of his/her exercise, but it is also positive for the student who is correcting, since by observing what errors his/her classmates have made, he/she will probably not make them in the future.

Finally, it should be noted that in some cases the students use reasoning and explanations that are different from those generally proposed by the teacher in the classroom, but equally valid, which contributes positively to the understanding of fundamental concepts of the subject by their classmates. This fact is also encouraged by the more informal and horizontal (non-hierarchical) explanations that students tend to use in front of their classmates.

STEP 6: Compilation of Generated Information and Publication (Teacher)

Once the correction phase is finished, the subject teacher is in charge of compiling all the exercises and their corrections in order to create a collection of videos related to the subject under study that will be available to the students for their consulting.

STEP 7: Self-Study and Reinforcement of Concepts (Students)

Finally, students can review the collection of videos compiled by the teacher, and review all those aspects that they consider appropriate to strengthen their knowledge of the subject related to the course. In addition, the use of videos allows each student to set the pace of learning autonomously, pausing and repeating the different parts of the video in question according to his or her needs (García Fernández, 2011).

EXAMPLE OF APPLICATION, RESULTS AND DISCUSSION

The methodology introduced in this article has been applied in the subject Theory of Structures and Industrial Buildings, taught in the third year of the Mechanical Engineering Degree at the Engineering Polytechnic School of Gijón. More than 70 students participated in the project, divided into 32 working

groups. In this case, the methodology has been implemented 4 times during the course of the term, which has allowed the creation of 4 collections of multimedia content containing a total of more than 100 videos of solved exercises related to different topics of the subject.

It has been found that students have responded very favorably to the methodology implementation, have increased the use of tutorials during the term and have recognized that the project has helped them to follow the subject on a continuous basis. In addition, occasionally the statements presented by the students exceeded the demands set by the teachers, which contributed positively to increase the level of the class.

Finally, the methodology has allowed the teacher to evaluate certain transversal competencies, such as teamwork skills, oral expression, creativity, critical spirit and acceptance of external criticism.

CONCLUSIONS

The main conclusions of this study are:

- A methodology that achieves positive interdependence has been presented in which students approach the acquisition of knowledge related to a subject as a common goal, sharing resources and information efficiently.
- Through the application of the proposed methodology, an enhancement of collaborative learning and a promotion of interaction among students was identified, while strengthening the student's awareness of individual responsibility in the contribution during the learning process as a whole.
- The recording of the videos by the students has allowed the professor to evaluate different competencies during the course of the term.
- A positive use of the student's work outside the classroom has been achieved, while at the same time it has favored the monitoring of the subject during the period of teaching.

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REFERENCES

Calzadilla, M.E. (2002). Aprendizaje colaborativo y tecnologías de la información y la comunicación. *Revista Iberoamericana De Educación*, *29*(1), 1–10.

Fernández Sánchez, P., Salaverria Camacho, A., González Dacosta, J., & Mandado Pérez, E. (2009). El aprendizaje activo mediante la autoevaluación utilizando un laboratorio virtual. *IEEE-RITA*, *4*(1), Feb.

García Fernández, P. (2011). Aprendizaje Autónomo Utilizando Videos Docentes. *IEEE-RITA*, *6*(2).

Glasser, W. (1986), *Control Theory in the classroom*. New York: Harper & Row.

Glasser, W. (1999). *Teoría de la Elección*. Barcelona: Ediciones Paidós Ibérica Vigotsky, 1974.

Guardiola-Víllora, A., & Pérez-García, A. (2017). El estudiante universitario responsable de su propio aprendizaje. *V Jornadas de Innovación Docente en Arquitectura, JIDA*. https://doi.org/10.5821/jida.2017.5245

Huber, G.L. (2008). Aprendizaje activo y metodologías educativas. *Revista de Educación, Número Extraordinario*, pp. 59–81.

Johnson, D.W., Johnson, R., & Holubec, E. (1993). *Circles of learning* (4th ed.). Edina, MN: Interac- tion Book Company.

López, D., Maneu,V., Formigós, J.A., & García-Cabanes, C. (2013). *Las redes sociales como medio de interacción estudiante-profesor: uso de Twitter para la resolución de problemas*. XI Jornadas de Redes de Investigación en Docencia Universitaria Retos de futuro en la enseñanza superior.

Moya López, M. (2013). *De las TICs a las TACs: La importancia de crear contenidos educativos digitales*. Revista DIM / Año - Nº 27 - diciembre - ISSN: 1699-3748

Muniz-Calvente, M., Fernández Fernández, P., Álvarez Vázquez, A., & Lamela Rey, M.J. (2018). *Aprendizaje colaborativo en Teoría de Estructuras*. CUIEET 2018.
Ramírez-Ochoa, M.I. (2016). *Posibilidades del uso educativo de Youtube*. Ra Ximhai.
Ríos, J.M., & Cebrian de la Serna, M. (2000). *Nuevas tecnologías de la información y de la comunicación aplicadas a la educación*. Aljibe. Málaga.
Ruiz Tarragó, F. (2000). *Internet in the classroom and at home: The bridging role of publishers*. Proceedings of The Internet Global Summit INET2000, Yokohama, Japón. 2000. ISBN: 1-891562-09-6.
Vigotsky, L.S. (1979). *El desarrollo de los procesos psicológicos superiores*. Madrid, Editorial Grijalbo.
Wilson. (1995). *Cómo valorar la calidad de la enseñanza*. Madrid, Paidos.