

Impact of using tablets together with active didactic methodologies in secondary school

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ABSTRACT

High schools are increasingly implementing the usage of tablets as well as active didactic methodologies such as cooperative learning, project-based learning or gamification. These changes in the teaching and learning process consequently involve teachers' motivation and training in order to face the continuous innovation in the pupils' educational development. In this sense, it is key to make the most when didactic methodologies and information and communication technologies as tablets are put together to consolidate emerging pedagogies in high schools as a commitment to the future. In this paper, the strategy followed by Claret Las Palmas School to combine the usage of tablets together with active methodologies in secondary schools is presented. This approach is beginning in the first cycle of secondary school in this 2018-2019 course. As a first step, the involved teachers have completed a survey after passing a training of both active didactic methodologies and the usage of tablets (Chromebook). The results of this survey show that teachers highlight the use of cooperative learning and project based learning methodologies. Moreover, they are mainly concerned with future training and WiFi connection in the classroom, among other aspects.

Keywords: tablets, active methodologies, didactics, impact, teaching

1. INTRODUCTION

Student's creativity, motivation and active attitude are some of the main shortcomings of the current education system [1]. Accordingly, it is required to find innovative ways in order to involve students in the classrooms.

Didactic methodologies consist on the study of methods of pedagogical research and the study of the methods of teaching-learning processes: these are strategic teaching actions, made flexible by the teacher based on concrete training situations and the particular characteristics of the students. Active methodologies mean those teaching strategies that put students at the centre of their learning process, involving their creativity and their sense of initiative, naturally, without neglecting the curricular contents [2]. Therefore, to perform active didactic methodologies is a challenge for teachers to promote STEAM (Science, Technology, Engineering, Arts and Mathematics) competences in the students.

The use of tablets has made easier for both pupils and teachers to use technology in teaching and learning on a general level. User-friendly technology, one-to-one access, fast broadband access to the Internet and various online sources mean that pupils are handling the technology and have high self-confidence in using tablet technology. The exercises and assignments that pupils are receiving have changed; they are more open and challenge pupils' assessments of relevance to the problems they need to solve. However, technology is only used to a limited extent in a didactic perspective beyond the individually-based, with options to synchronize data across tools and share with several users in order to work on the same document at the same time [3]. It is therefore required to develop active didactic methodologies together with the integration of information and communication technologies in secondary school.

The rest of the paper is organised as follows: section 2 presents the combination of tablets and didactic active methodologies in secondary school following the strategy of the Claret Las Palmas School; section 3 introduces the survey design in order to get teachers opinion and the associated results. Finally, in section 4, the most significant conclusions are outlined.

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2. THE COMBINATION OF TABLETS AND DIDACTIC ACTIVE METHODOLOGIES IN SECONDARY SCHOOL

2.1 Global framework

Education has changed in the last century. New tendencies, known as XXI competencies, have arrived to school to stay. These competencies include deep understanding, flexibility and ability to make creative connections and a range of interpersonal skills such as communication, collaboration, creativity and critical thinking [4]. According to OCDE, education agenda must face a new scenario characterized by: student-centered, well structured, deeply personal, inclusive and social. For these reasons, ICT and Digital Revolution are tools that can be used in school to manage such a great project as education nowadays [5].

Many challenges are about to happen in the schools that take the risk of including ICT in their classes. These include training in digital skills, programming for an appropriate use of technology, training teachers in rights, values and digital skills that allow transmitting to children a comprehensive and critical view of technology, as well as training all children in social skills, security and civic values [6].

These and other reasons are remarkable for our context to measure the impact of using tablets in Secondary School, at the very beginning of the implementation in our school: Claret School, located in Gran Canaria (Canary Islands, Spain).

2.2 Active learning and technological choices in Claret School

Many global institutions have encouraged schools to change their didactic methodologies and the way they understand the teaching and learning process. For these reasons, Claret School seeks to face these changes supported by researchers and Educational Science. Claret School has focused in the following methodologies as a way to respond to society demands:

- *Customised Personalised Learning*: One of the challenges of Education is to adapt itself to every student. Personalised teaching and learning process to learning styles and needs of pupils are not easy in a traditional classroom. ICT and Virtual environments have promoted the personal environment of learning [7]. The possibility to suit every need that students have or to open new ways of learning are possible with ICT [8]. In Claret school this is one of the main objectives to reach, which involves most of the rest methodological choices that the school has made.
- *Cooperative Learning*: Many researchers studied the influences of working in teams in the school. The main idea is the use of small teams in which members support each other in order to maximize their learning abilities. Different techniques and strategies are used in class in order to increased cooperation instead of individualism or competition interactions in classes [9, 10]. Using social learning with students is a way to introduce cooperation interaction in the class. ICT makes possible to connect with others without time and space barriers.
- *Project-Based Learning (PBL)*: Project-Based Learning is a known methodology that consist in five phases of investigation: set a problem, hypothesize explanations or responses, experiment, observation and conclusion [11]. Teachers in this methodology change their role: they assume that the important part is to plan a well-structured project, with detail directions, questions and sources to encourage their students in the investigation [12]. PBL suits perfectly with ICT integration because students can search their information and create together every research they must complete.
- *Thinking culture*: As many studies have discovered [4, 13], thinking and visual thinking in the classroom are enhancers in the learning process. To think, and moreover, to think effectively and deeply is connected to real understanding and learning. To use cognitive strategies in the classroom and making them visible by thinking skills or thinking that take part in the class scenario can help students to organise their learning. Not only thinking, but using images, colours, structures and mental maps empower pupils in learning to learn.
- *Real assessment process*: In this process, researchers identify evaluation for learning o formative assessment. Some studies argue that evaluation for learning is interactionist. This means that it corresponds to a concrete classroom reality, "focuses attention in what is being learned and in the quality of the interactions and relationships in the classroom" [14]. This evaluation for learning involves:

- The participation of students in their learning process.
- Effective feedback.
- Adaptation of teaching because of the results.
- Recognition of the importance of the influence that this evaluation process has on the motivation and self-esteem of the students and, as a consequence, in their learning.

This kind of evaluation has reveals that is the most effective in relation to students' learning [14, 15, 16].

- *Technological choice*: Digital Revolution has arised in the current context in education. INTEF (Instituto Nacional de Tecnologías Educativas y Formación del Profesorado) encourages the methodological change in the classrooms, based on the promotion of school collaboration, the improvement of learning spaces, the development of skills for the s. XXI and digital educational competence [18]. ICT and Pedagogical change based on active learning demands to get deeper into comprehension of the teachers' digital competence structure in order to reorient the sense of their training in the same direction of their professional development and pupil's needs [19, 20].

However, previous ideas would be real without two big elements: technological supplies and the implications of teachers in the school. Only the joint of both elements together with the action of educational policy makers, educators and families can guarantee the teenagers' digital education in the school [6].

The tool that school has chosen for the ICT project in Secondary School is Chromebook in two different devices, up to the families to choose which one they want. Having access to the internet does not mean having skills and training, so school must ensure that access to the Internet is informed and safe. ICT in a one-to-one access class can be a great accelerator of the methodologies and teachers' digital competencies named before. In this sense, the first step given in this course has consisted on a specific training for teachers on how to use the Chromebook with students, as it is presented in Fig. 1. All these methodologies combined with the introduction of Chromebooks in Secondary School can be a step forward the innovation in the school.



Figure 1. Training for teachers on how to use the Chromebook in the classroom.

3. SURVEY DESIGN AND RESULTS

3.1 Survey design and results summary

Once presented the considered didactic active methodologies together with the technological choice, the survey design and the associated results of this integration are presented in this section. This approach makes up an initial step for the proposed research.

The survey is mainly focused on getting information from teachers trained in didactic active methodologies and the use of the Chromebook as technological choice in order to highlight the methodologies in which the integration may be more useful. Besides, the main issues to accomplish the methodologies applicability, together with an analysis of the advantages and disadvantages of the proposed integration are also analysed.

As a result, a survey of 10 questions was proposed to 14 teachers of the first course of secondary school, since the integration has begun this year. The survey was divided into three main sections:

- The first section, shown in Table 1, is composed by 5 questions assessed considering scores from 1 (totally disagree) to 5 (totally agree). Questions are related to how the Chromebook can aid to implement didactic methodologies in the classroom. The use of the Chromebook will mainly help to develop personalised training and real assessment process methodologies in the classroom. It is remarkable that the average score of all the questions exceeds 4 over 5.

Table 1. First section of the survey (5 questions assessed from 1 to 5)

Question	Average Score
1.- Do you think that the integration of the Chromebook will aid you in developing personalised training of the students?	4.50
2.- Do you think that the integration of the Chromebook will aid you in developing cooperative learning?	4.29
3.- Do you think that the integration of the Chromebook will aid you in developing project-based learning?	4.29
4.- Do you think that the integration of the Chromebook will aid you in developing thinking culture in the classroom?	4.07
5.- Do you think that the integration of the Chromebook will aid you in developing real assessment process?	4.36

- The second section, is composed by two lists of priorities from 1 to 4 (question 6, presented in Table 3) and 1 to 5 (question 7, presented in Table 3) in order to determine the applicability and the main associated issues, respectively. Analysing Table 1 and question 6, cooperative learning and project-based learning are the methodologies which seem to be more appropriate to be considered in the use of the Chromebook. Moreover, WiFi connection is the main concern for teachers according to question 7.

Table 2. Answers to Question 6 - Priority (from 1 to 4) of the applicability of the active methodologies using Chromebook

Active methodology	Average Score	Order
Cooperative Learning	1.93	1
Project-Based Learning	2.15	2
Real Assessment Process	2.85	3
Thinking Culture	3.00	4

Table 3. Answers to Question 7 - Priority (from 1 to 5) of the main issues of the proposed integration

Issue	Average Score	Order
WiFi connection	2.07	1
Inappropriate use by the students	3.00	2
Educational use of the tool	3.08	3
Device security (thefts, vandalism...)	3.38	4
Contents preparation (didactic units and classroom programming)	3.38	4

- Finally, the third section is composed by 2 open questions in order to determine the advantages and disadvantages of the proposed integration (both questions are covered in the following subsections) and a final question to give the opportunity to include any additional comment. Answers are especially based on the necessity to continue the training in the use of the Chromebook and its associated applications, especially focused on Google Classroom as an educational tool to share information and organize tasks with students.

3.2 Main advantages of the technology integration in the classroom

The following sentences are extracted from the question 8 of the survey, in which teachers highlighted the main advantages of the technology integration in the classroom:

- Minimization of paper and better adaptation to future jobs.
- Adaptation to didactic methodologies, thanks to the use of multiple educational applications.
- Adaptation to the new technological trend.
- Facilitate the implementation of a methodology based on guided discovery learning, so that students are the protagonists of their teaching and learning process with the teacher as a guide.
- Greater interest and autonomy of children.
- The clear motivation of the students and therefore his interest in learning.
- Improvement of learning through "visual thinking" using powerful tools for content creation.
- Tools not strange for the student, magnificent opportunity to teach to discriminate in a critical way the information, high number of possibilities with the apps.

3.3 Main disadvantages of the technology integration in the classroom

The following sentences are extracted from the question 9 of the survey, in which teachers listed the main disadvantages of the technology integration in the classroom:

- Possible loss of attention by students.
- Preparation of materials and dependence on the IT infrastructure.
- The high number of students to control, assist and guide.
- It can cause students to lose interest in books, not giving them the value they have.
- It can harm the writing of the students.
- Danger of incurring excessive individualism: the student in front of the machine.
- Teachers knowledge dependence.

4. CONCLUSIONS

In this paper, the initial steps of the integration of tablets together with didactic methodologies have been analysed through a survey to secondary school teachers. After reviewing the results, some conclusions are highlighted:

- Teachers are worried about their training in this area. Taking care about training is a key aspect because the isolated ICT integrations does not ensure the pedagogical success with active methodologies in the classroom. Despite that, using technologies and trying to put into action active methodologies named before at the same time could be overwhelming.
- There is an important concern about WI-FI connection in the school. Teachers may feel unprotected without Internet connection in the classes. It is important to transmit them that the loss of the Internet connection happens occasionally and alternatives must be in any case considered in order not to lose the classroom rhythm.

During this course it is important to follow the development of this project of 1:1 integration to check if the teacher's vision change during the school year. In this sense, future research to be conducted will explore the main benefits and disbenefits of this experience, considering not only teachers but also students, families and other stakeholders.

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