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The Changes in Teaching Methodology due to the ICT Integration

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Abstract

This article describes a multi-case study embedded design (Yin, 2009) in an interpretative paradigm centered on the methodological changes within the classroom to develop students' new literacy skills. The study adopted a mixed-methodology design, surveying 252 teachers and interviewing 13 institution directors, ICT coordinators and a head teacher. This included the analysis of official and executive documents. Four Pious Schools of Catalonia were selected based on the level of ICT implementation and the number of educational lines. These different cases form a whole one. The concurrent triangulation of data allowed interpreting each case separately and then inters prettying the data set as a whole. The results revealed that even though the majority of teachers have high confidence in using ICTs and considered ICT investment necessary for schools, the integration and new literacy practices were scarcely implemented. There is a positive expectation but it is necessary that teachers work collaboratively and increase the implementation in the teaching-learning process.

I. Introduction

The incorporation of ICT in Spain became a priority in the context of education. In 2009, the Education Department of Catalonia provided the media required, aided in the development of OLPC (one laptop per child) in schools and created a network to exchange information. The funding required for this project was cut in 2012 and subsequently ceased in 2013.

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The new ICT has had a swift economic, social, political and cultural impact on society. Education researchers and professionals are especially concerned by the effects on the public and on its educational efficacy.

ICT –especially the Internet– enable new forms of organization and information storage. This results in direct access and manipulation by teachers and students alike. Digitalisation facilitates interactions among the aforementioned. The impact of ICT in schools has long been debated, as has the discussion regarding its role in altering the teaching-learning process (Law, Pelgrum & Plomp, 2008).The study investigated when and how teachers implemented ICT in the classroom, to see how they were interpreting the Spanish Educational Law. "In many countries, ICT is mentioned in curriculum documents (...). Countries have also adopted instruments (...) [as] the ratio of computers and Internet access per students and teachers" (OECD, 2009, p.33).

A critique has surfaced regarding the focus on implementation of technology in the education system. This resulted in a setting of new technological requirements for teachers and new situations related to the centers' management, educational material design, curriculum project development, etc. In addition, the peculiar structure of education systems in Spain favours dynamics where the teacher is a consumer of technological proposals including a benchmark. This is the material and media, as translated from the curricular requirements (de Pablos, 2009).

The incorporation of ICT in the classroom involves changes in the school and in its environment (Majó, 2003). This study suggests the changes were occurring in the organisation of schools at least changing the teaching-learning processes. The purpose was to consider teacher's perceptionsin some Pious Schools of Catalonia (Pious Schools of Catalonia is known as EPC).

Research design

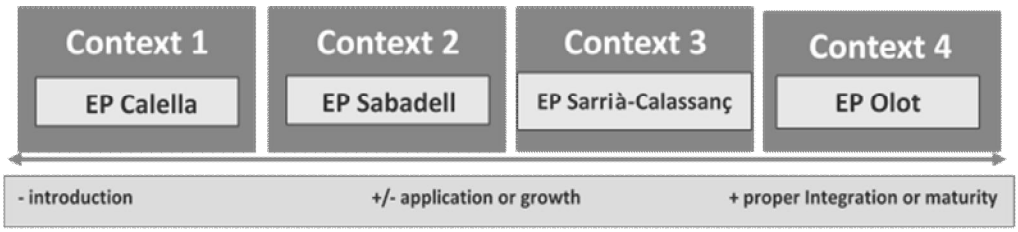
Universe and sample

The schools analysed were a stratified sample of four schools specially chosen. The choice was based on the following criteria:

- The level of ICT implementation in May of 2009 based in the S-curve. The S-curve (OECD, 2010)developed from Spain explains three states; introduction, growth and maturity based in ICT use in schools: One school was a leader in the use of digital tools, two schools had the ICT plan since 2011 and one was in the process of design it.
- The number of educational lines, regardless of education level, taking into account that the different cases form a whole (Figure 1).

The director of each school had given his approval for the study.

Figure 1: Design of subunits. Note: Adapted from Yin, 2009.



Research method

The aim of this research was to understand and interpret the reality of education with ICT integration, the meaning of the actors involved, their perceptions, intentions and actions with a holistic focus of the case analysed. That enables their explanation and understanding –trying to figure out what was generalizable to other situations within the particular community under study. This research adopted the principles of the interpretive paradigm. The research was divided into5 phases (Table 1).

Table 1: Phases of research

1: Defining the object of investigation	The statement of the problem is the focal point of the research. The purpose explains what the research intends to accomplish.
2: Drafting on the theoretical framework	The literature review develops broad ideas of what is already known, assists in order to narrow the problem for investigation and highlights any theories that may exist to support developing hypotheses
3: Type of design, choosing methods and instruments and collecting data	Research proposal's methodology, research questions and choose main methods in a case study. Design the study and the instruments; clarify the role as researcher and the ethical implications. Collect data.
4: Processing and interpreting data	Look for concepts and theories in what has been collected so far. If necessary, collect further data to address revisions. Verify the findings with triangulation.
5: Final conclusions	Write reports, present findings and make conclusions.

Note: *Own elaboration from Ballester, 2004; McMillan & Schumacher, 2005.*

For this kind of research, it was applicable to use the multiple-case study method, which contributes to broadening and deepening the knowledge concerning individuals, groups, organisations and related phenomena (Stake, 2010; Simons, 2011). Case studies blend numerical and qualitative data –mixed methods– and triangulation of data assisted to generate reliable evidence to collect and compare the databases (Yin, 2009).Therefore, the multiple sources of evidence provided convergent and concurrent validity on the study.

The main objective of this study was (1) to analyse and describe the process of integrating ICT in Pious Schools of Catalonia from four selected cases and (2) based on the perceptions of stakeholders in the schools studied; identify the factors that could facilitate the integration of ICT in other schools.

In particular, in this article, the research findings answered the following questions, which had a specific objective derived to the general objectives:

- What is the EPC model of use of ICT? What are the characteristics of the model of use of ICT implemented by the EPC in schools? → OE1.1: To analyse the evolution of different levels of integration of ICT in the schools under investigation.

- What role adopts the actors involved in the integration of ICT in the classroom? What benefits and fears do the teachers perceive from the integration of ICT in the classroom? → OE2.2: Discover the perception of stakeholders on the possibilities and limitations generated by the integration of ICT in the classroom and in the teaching-learning process.

Information gathering tools

The qualitative techniques consisted of analysing documents, performing and analysing interviews to the school directors, ICT coordinators and the heads of the Educational Institutions Secretariat. The interviewees were free to convey their situational perspectives openly and in their own words. Participants were asked to describe and reflect upon what significance ICT has for them. The answers allowed for the creation of different categories depending on the interest of the investigation.

On the other hand, quantitative techniques focus on the application of questionnaires among teachers of all schools that constitute the sample. Data collected from the interviews and surveys were transcribed and analysed using software for analysis (Atlas.ti v.7, SPSS v.20).

Document review (D)

The research carried out was in accordance with the classification listed in Bisquerra (2004) (Table 2) with official internal documents showing the institutional and personal perspective describing the past, the present and the future regarding ICT. Of all the documents, those chosen are relative to the subject of investigation.

Table 2: Documental taxonomy in a Pious School in reference of ICT

Documents	Officials	Privates/Personals
Internal	PEC (including NFOC, PAT...) ICT planning	Programs Classroom programming
External	WEB scholar External letters Divulgations, magazines	Websites, blogs Materials EPC and schools magazines

Note: Own elaboration from Bisquerra, 2004.

The first document analysis was carried out on the EPC documents and ICT planning of the four schools under study –in Catalonia ICT planning is known as a TAC plan–. A second resource of documents used in this research is articles and studies published on the same subject of study in other Spanish regions and schools, as well as European and international schools. The documentation was used in order to provide a basis for the research and specificity of the questions of the interviews.

A third documental source was the internal school magazine *Papers Del Secretariat.* It has articles regarding the historic introduction of technology and computers, ICT training in schools and in the classrooms. School magazines constitute a significant record of the institution itself, with detailed information on everyday life and interests as well as transmitting the received values of each school (Cohen, Marrion & Morrison, 2011).

Interviews (I)

The interview is the most important tool for data collection in qualitative research and it is the best way to access the perceptions, intended meaning, and definitions of situations and individuals' constructions of reality. It is also one of the most effective methods to understand each other and the main way to reach multiple realities (Punch, 2009; Stake, 2010).Semi-structured interviews –used in this research– were characterized by the development of an applied script in a flexible manner (Ballester, 2004). The interviews were centred on key informants within the Pious Schools of Catalonia and within schools subjected to the study. This was of great importance considering the positions they uphold. The key informants are critical to the success of a case study (Yin, 2009).

The design of the interviews conformed to an algorithm based on a category system to ensure the treatment of key issues, with a goal of obtaining the precise information to answer the investigation objectives and the subsequent analysis (Table 3).

Table 3: Guide for interviews.

Sections of interviews*	Perceptions by General Secretary and Heads of EPC about	Schools: perceptions by directors and ICT coordinators about
Schools infrastructure and future forecast.	ICT documents and policies in Pious Schools.	ICT documents and policies in Pious Schools.
Support and reality in EPC and schools (previous analysis of the institutional program that integrate ICT in EPC or each school).	Different proposals and documents.	Different proposals and documents.
	Annual investments authorized for each school.	Reason for investments made in ICT.
		Compliance with their ICT plan.
ICT use and frequency in classes.	Innovative features associated by ICT use, project development, flexible curriculum…	Material, activities used and the criteria for the selection made by teachers.
Notions of good practice, innovation and change with ICT.		Teachers and students role in the activities with ICT in the classroom.
		Good practice…

Note: *There is only a part of the guide, because in this article it is only explained a part of the study.

In all of the interviews, the research had the aim of revealing if their perceptions were similar, different or complementary. There were direct notes and complete transcriptions of these interviews.

"Moreover, non-verbal communication regularly provides more information than the verbal communication" (Cohen and al., 2011, p. 426). For the recording of the interviews, ICT tools were used, and transcripts were made with the word processor linked to the Express Scribe software.

Teachers' survey (TS)

The structure of the questionnaires provides a numeric description of trends, attitudes and opinions based on a sample taken from the interviewees. From the results of the sample, the researcher generalises or makes claims associated with the subjects (Creswell, 2009).

In this research, it was a longitudinal descriptive questionnaire, as it has a considerable potential yielding rich data that can trace changes over time with great accuracy (Cohen et al., 2011).

Once the interviewees and basis of the questionnaire were determined, the pilot test was conducted. It was tested in one of the aforementioned schools for its validation. Some of the questions were improved thanks to that test. Then the final questionnaires were conducted in the other schools resulting in use of their data. All the information collected was processed and analysed together giving rise to the writing of the final report. The final sample included 252 teachers, of which 74.2% were female. Additionally, 37.5% of teachers were between 41and 50 years and the majority had been at the school for more than 20 years (38.2%). The professional sector was similar, a 52.2% of primary vs a 48.8% of secondary. The questionnaire comprised 126 items organised in eight sections. The layout of questions and sections of the survey had been designed, following studies of the same type in Spain (Table 4).

Table4: Sections and information questions

Sections*	General information derived from the closed questions
General	Age, gender, experience in years as a teacher and in the same school.
ICT knowledge (teachers perception)	Perception based on the competence scale from UNESCO (2008) and their knowledge about different software commonly used by teachers.
ICT use for professional support (school)	Hours a day/week focusing on supporting the learning process. Satisfaction about ICT in their school: infrastructure, computers and other ICT devices.
ICT use for class	Hours a day/week for class use and into their daily activities, use of EVA**. Use with students and in collaborative activities with other teachers.
Innovation	Perception of the importance of community groups in innovation (by use of ICT).

Notes: *There is only a part because in this article it is only explained a part of the study. **EVA in Pious Spanish Schools was based in Google for Education combined with an administration system "**e**duc@**m**os" and other educational programs.

The non-response was controlled doing the survey with ICT tools in each school after a brief personal presentation by the researcher. Control of the psychometric quality of the research instruments reveals a high level of internal validity (α>0.7).

There are three types of reliability: stability, equivalence and internal consistency. Stability measured by Spearman and equivalence controlled by implementing the survey in each school similarly and internal consistency by Spearman and Cronbach alpha (Cohen et al., 2011).

Some test items in the instrument were divided into two halves (yes/no answers), if the test was to demonstrate split-half reliability, the marks obtained on each half should be correlated with the other. The "r" indicates the correlation between the halves of the instrument and requires a correlation coefficient. The reliability calculated for the split-half is particularly high and all values are r>0,7 (Table 5).

Table5: Reliability coefficients

Questions	Spearman-Brown	Reliability : 2r/1+r	α de Cronbach
ICT knowledge	0,885	0,938	0,928
ICT for professional support: ICT applicability	0,928	0,962	0,929
ICT use for class: Applications use for class (EVA/IWB)	0,619	0,764	0,781
ICT use for class: Utility ICT	0,987	0,993	0,988
Perception about innovation	0,904	0,949	0,934

For the analysis of instruments and triangulation, it was necessary to code and categorise data and to reduce the material to manageable proportions whilst maintaining fidelity for essential content (Creswell, 2009). This study used factor analysis, tabulation, correlation, graphical representation and dendrograms.

Theoretical Framework

Introduction of the computers in the schools

The socio cultural context of schools underwent a profound transformation, which undoubtedly affected the curriculum and school education system. "Technological resources are seen as teaching means for achieving educational objectives integrating them into the curriculum" (Mena, Mena & Marcos, 1996, p. 9).

At this point it was important to design learning techniques, and more specifically learning conditions in which ICT resources were used as a common tool, not only transferable in a linear form, but also allowing the transfer of technological processes. This way, they could be adapted to other contexts, used to solve problems or rethink the problems that appear within the new context. Even though students require an active and emotive participation in classroom, what they get is a passive reality provided by teachers. This situation can arise due to the teacher being tired of educational policies, massive investments in equipment and training and a continuously changing context with direct dependence on the legal, social and educational context where they live and work (Alonso, Guitert and Romeu, 2014; Akbiyik, 2010).

Changing educational scenarios

In Spain the Ministry of Education regulates the basic elements of the system. The autonomies' Education Authorities develop the regulations in their own territory. In addition, schools have pedagogical, organisational and managerial autonomy for their resources, which is accompanied by the participation of the educational community.

There are reasons for integrating ICT into curriculums.

"ICT use in schools can help students develop the necessary skills to succeed in a globalised knowledge economy, as well as help reduce socioeconomic and gender division in access to jobs" (OECD, 2010, p.118). However, according to Correa and de Pablos (2009), the rapid development and influence of ICT has generated within the educational community three different perspectives:
First, exclusively concerned in technical aspects

The second one sees ICT as means of distributing the conventional content.

The third perspective adopts a more radical position and considers the advances in ICT, with its powerful potential for democracy and differentiation, as a catalyst for a fundamental reconsideration of all education. These three perspectives and the increasingly customary and essential use of ICT, assisted in understanding its potential. The capacities of ICT became a way of distributing information throughout the organisation and simplifying repetitive administrative tasks. Curriculum innovation and academic management progressed together in order to support one other. There are also technological tools adapted for schools such as virtual learning environments (VLE) or educational platforms.

So, "what is really important is the use of a variety of communication technologies to provide the needed flexibility to meet individual and social needs, achieve effective learning environments and the interaction of students and teachers" (Salinas, 2011, p. 6).

Divergent laws

Many organisations (OCDE, European Commission…) call for schools to adopt other teaching methods and abandon traditional methods. However, the conclusion of the studied reports –more than 10 studies have been analysed at international, European, Spanish and Catalan level– states that educational institutions have integrated ICT without incurring changes in the processes of teaching and learning by teachers.

The e Europe 2002 objectives of the Lisbon Summit underlined the importance of ICT in education. The most recent educational policies in Spain were in the *Plan Avanza* I and II and particularly in the School 2.0 Programme (MITyC, 2005; MITyC, 2010). In March 2012 the government announced its demise. The education laws, LOE (2006) and LEC (2009) cited the integration of ICT in their texts and the role of systematic and structured pedagogical innovation with a discrete role, more evident with ICTuse(Alonso, Casablancas, Domingo, Guitert, Moltó, Sánchez & Sancho, 2010).

LOMCE refers to ICT as one of three areas "in view of the transformation of the educational system" (LOMCE, 2013, p. 97864) together with multilingualism and the modernisation of vocational training. Its contrasts refer only in a transversal level.

It reveals the idea of breaking all previous regulations deemed as negative. Moreover, this sustainable model does not include any issues for schools to deal with alone.

ICT in the classroom

One Laptop per Child (OLPC) emerged in 2005 as a direct follow-on to work by Papert –the team of Papert creates a specific programming language of educational software, LOGO, during the late 1970–. At the 2005 World Economic Forum, Nicholas Negroponte described a new approach to altering education. First, children must have access to the necessary tools and information in order to educate themselves. Secondly, the fundamental approach to education must shift from passive knowledge acquisition to active construction of knowledge. OLPC planned to build an organisation with the capability to deliver these computers and support these shifts globally (Bender, Kane, Cornish and Donahue, 2012).

The *Plan Avanza* strategy was launched in 2006 with the proposal for *Plan Avanza 2*, the next phase of the strategy. The underlying idea was to help fund and train citizens to enter the SI through actions to promote ICT in administration, labour, services, schools and universities (IEU, 2009). The Plan sought to support efforts to incorporate ICT into classrooms/universities and helped integrate ICT into teachers' pedagogical methodology. The objective was to continue improving connectivity –speed, resilience or broadband connections–in schools, as well as provide students with individual laptops as an OLPC (OCDE, 2010).

In Catalonia, the project called EduCAT1x1 – similar to OLPD– reached half of the secondary schools and the Minister of Education, Irene Rigau, replaced it with the edu CAT 2.0 Programme, and finally stopped both at a funding level in June 2012. This meant that schools had to make important decisions about the use of ICT in the beginning of the 2012/13 academic year (Consorcid' Educació de Barcelona, CEB, 2013). Recent studies in Catalonia conclude that there are real encounters between the educational policies around the use of ICT in education and teaching practices (Sancho and Alonso, 2012). The analysis of projects in Catalonia and the views of teachers only allow for certain considerations: The pedagogical aspect is diluted in the technological aspect confirming the metaphor of the invisible computers (Gros, 2000) despite being more than 25 years later. The role of government must go beyond collecting pedagogical aspects. OLPD projects appear as two opposite poles: an opportunity vs. a threat.

The needs and concerns of teachers have to be taken into account.

In all cases, the OLPD concepts go far beyond the relationship between the child and the device. "The relationship that each student has with his/her own learning or how the child takes advantage from this device to mediate the learning (...) considering options that allow the shared and collaborative use of technologies (...) must be considered" (Alonso et al. 2014, p. 60) and the promotion of technological facilities.

Context of study: the Pious Schools of Catalonia

The Pious Schools –founded by the religious order– were local, free and with a preference for literacy teaching. The most known principles *piety* and *letters,* inspired by Saint Joseph of Calasanz, are associated with the pious schools. The first school in Catalonia was founded in Moià in 1683.In 1796 a uniform method of instruction for all schools –forerunner of the current methodological approach– was established. Catalan was adopted as a teaching language at the end of the Francoism (Florensa, 2013). In 1973 the religious community and the educational community were distinguished. The full powers over education went to the Government of Catalonia in 1980. In 1983 Pious Schools of Catalonia received the "Creu de Sant Jordi" from the Government of Catalonia (Florensa, 2002).

Iniquity of Catalan Pious Schools

Currently, the religious orderis present in four continents –Europe, Asia, Africa and the Americas– in 32 countries and with 1421 religious people. Catalonia has 20 educational institutions. Each school preserves its uniqueness but all have a unity of pedagogical style and the *Secretariat of the Educational Institutions* of the Pious Schools of Catalonia coordinates all the schools (SIEEPC) created definitely in 1991.

In 2003 they adopted a pedagogical style called "Estil Metodològic" (EM). Its base is on constructive and collaborative theories that focus on three areas of activity: the student, the teacher and the organisation. It distinguishes three main kinds of activities called training sequence and opens explanation, in which the teacher asks students and transmits knowledge; a supportive task, in which the teacher encourages the individuality of the students, including in small/large group assessment tasks.

Teachers and/or students evaluate the results of the tasks. This approach defines a set of skills and attitudes that measure through indicators defining the organisation of the classroom as open, innovative and transformative, which provokes the use of digital tools.

Stages of use of ICT

The technology used in its educational aspect has a first antecedent in the 60s (RTVE, 1967). Computer science introduced in the 80s that "Pious School schools were not different and (...) they joined the flow with enthusiasm and dedication to knowledge and the possible applications in the classroom" (Florensa, 2010, p. 609).

Internet started to be a communication tool in schools during 1995/96 and the first web from EPC appeared in May 1997. Faced with a changing context EPC considered already during 1998/99 the use of Internet as a teaching resource in the classroom. In 1999/2000 developments occurred while they talked about academic innovation in the classroom aided by computers (D: all *Papers del Secretariat* athttp://w4.escolapia.cat/papers/recindex.htm).

The final set of documents presented entitled *Implementation of ICT in the classroom* (SIEEPC, 2009) suggested the foundations that were to follow within all schools and defined a model based on 7 points that grouped into four pillars:

- The model from the Education Department.
- The pedagogical model within the Pious Schools.
- The gradual introduction of 1x1 and an IWB (interactive whiteboard) in every classroom in the different stages.
- Teacher training. This training is currently based in the use of technology.

ICT Planning of the Education Department of the Government of Catalonia developed in order to be a guide for all Catalan school. Subsequent documents relate to its implementation in the classroom, uses of IWB (interactive whiteboards) in teaching, free software... a guide for all teachers in Pious Schools.

They also take into account other realities such as the treatment of diversity, the reception classrooms, the European projects (...), the PAI (Project Activation Intelligence) and the collaborative work, all applied and adapted to ICT environment. Teaching with ICT in schools relied upon two more groups: families and students. Regarding the students, a piece of documentation appears, *Child protection in Pious Schools of Catalonia* (Beringues, Burgaya, Cadevall, González-Morán, Raventós & Zarza,2012) aimed at protecting the children, since overuse and abuse of social media can compromise their psychological and emotional integrity.

Olot Pious School started in 2009 the Edu CAT 1x1 and some other schools followed the gradual introduction based on the recommendation model by EPC. In 2010, all schools started to use Google for Education, the universal free software, as a Virtual Learning Environment (VLE). In addition, all Spanish Pious School adopted the software "**e**duc@**m**os" for integrated management.

Changes with the introduction of ICT

In general, the schools use of ICT is a general resource. According to documents, interviews and a survey of teachers, ICT is being utilized in the classroom. The study revealed an increase in levels of use in the teaching-learning process –used between 60-80%–in recent years but to go a step further to completely change methodologies is essential. It is necessary to get support from the whole school community.

Changes in methodology

All teachers, directors and ICT coordinators reported that ICT tools are becoming a commodity that coexists with other traditional tools (books, blackboards…). Only 4.4% of the survey reported that ICT is never used in school, neither for supportive tasks, nor for academic support purposes. Despite this increase, 31.3% never use ICT. At the level of beliefs or perceptions of ICT, the majority said that ICT has been accepted and used as a resource to support activities at their schools (95.6%). The teachers designing and enacting classes in their everyday context integrated the use of ICT, in particular IWB (interactive White Board). 70.6% of teachers reported to use it in class with students daily, and 43.3% reported use in an ICT classroom with a different number of computers - these activities had an introduction/explanation supported by teachers and assessment based in EM.

During the interviews, the ICT coordinators and school directors reported different activities adopted by teachers that involved ICT. This list of activities comprises presentations, distribution of learning content or Internet searching and classroom practices involving computers.

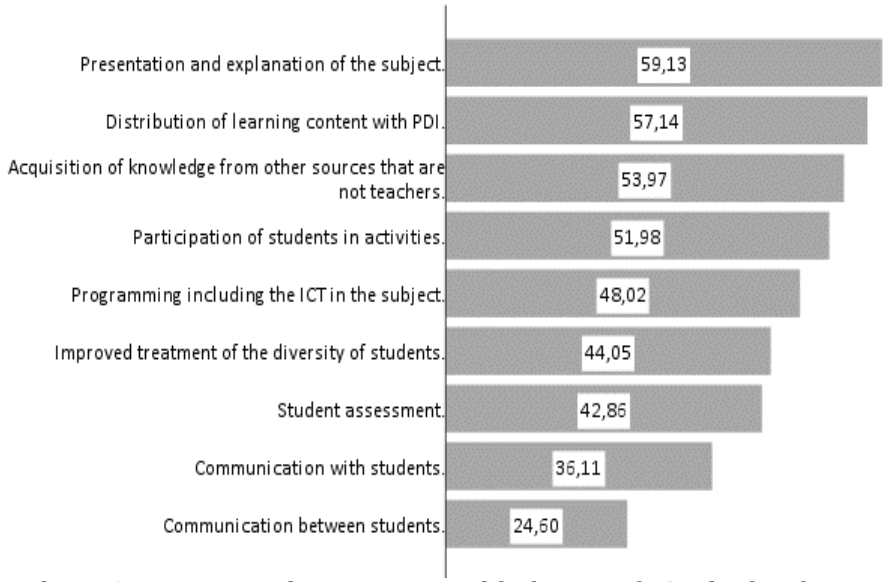


Figure 2: Percentage improvement with the use of ICT in the classroom

All these activities matched with the responses in the teachers' surveys that shown presentation (59, 13%), distribution of learning content with IWB (57, 14%) or acquisition of knowledge whit ICT (53, 97%) (Figure 2). During the open questions teachers explained their everyday context integrating the use of ICT: "I make the whole class group activities and carry out different projects" (TS 235) – teacher survey nnn indicates a code from total surveys (n=252)–, "I work on shared documents, using multimedia resources, research information immediately" (TS 120), "I create online activities with the IWB" (TS 237).

81.6% of teachers indicated that ICT in class had changed their methodology. Some teachers' –coincidence in I, D, TS– were familiar with software before the implementation of ICT plans in schools. They use this software for both internal and teaching tasks because it is already familiar. This enabled them to prepare more contextualised classes.

Despite taking into consideration the differences in teaching-learning process methodology (I, D, TS), the teachers used ICT mostly with the aim of "motivating students" (15 respondents), because it includes dynamism and encourages communication. It is a "more active methodology" (11 respondents) that enables "to increase students participation" (11 respondents). 67.1% of teachers use an EVA. In Pious Schools the majority use Google for Education (Figure 11). Referring to the classroom activities with Google for Education the teachers performed "satisfied" and "very satisfied" on items, except *tools for students to organise their work* / website creation.

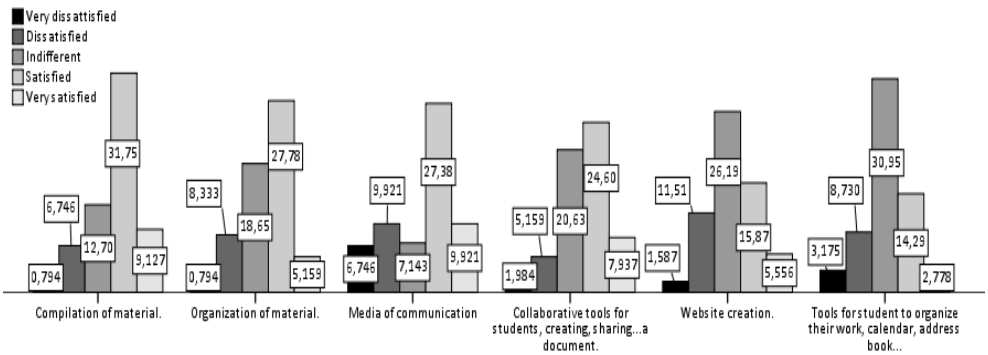


Figure 3: Percentage of satisfaction with Google apps for Education.

It was decidedly more difficult to develop *websites than to write blogs* with students. Only a minority of teachers showed their satisfaction with the *use of a tool for students and the use of other applications* –sites, drive, groups, calendar...–because it allowed the monitoring of each student´s work –"allows more personalised monitoring of each student's work"(TS 39), "I may follow up the activities by students" (TS42). Despite having enough ICT resources, the data (I, D, ST) suggests that use of ICT in schools tends to be traditional, focusing on teachers handing out content to students. Instead, the tendency seems to be using paper and digital materials in parallel.

Benefits and fears

To analyse the benefits and fears derived, the different participants (I, TS), were asked about various statements such as "if the infrastructure is adequate" or "which factors they associate with human, technological or contextual school condition to integrate ICT in their daily activities".

The great majority felt that in general, there was a willingness to use technology and they were "satisfied" and "very satisfied" with the infrastructure (Table 6). In addition, the interviewers talked about an inefficient Internet connection/program, urging the change to optical fiber connection. Nevertheless, the change depends on the suppliers "the battle was lost with suppliers of optic fiber" (D: Meeting ICT coordinators, April 23th 2011).

	Internet access	Network speed	Network stability	Network security	Computers in teachers' room	Classroom with IWB
Very unsatisfied	1,2%	4,0%	2,4%	0,0%	6,1%	1,7%
Unsatisfied	22,0%	37,2%	31,3%	6,8%	36,4%	13,5%
Indifferent	9,2%	11,6%	17,3%	15,6%	13,0%	17,9%
Satisfied	52,8%	41,2%	42,2%	53,2%	39,7%	51,1%
Very satisfied	14,8%	6,0%	6,8%	24,4%	4,9%	15,7%

Table 6: Percentage of satisfaction with infrastructures

An advantage was the level of ICT teachers' competencies focusing on the learning-teaching process. All members of the school community qualify as having "good" or "enough" skills associated with digital media… This allowed them to use ICT, promoting not only academic but also personal, social and professional development (Table 7). However, there is a gap between teachers' competencies and their intentions to use them in the current classroom practices. There was a lack of necessary mechanisms to enhance the use of 2.0 web applications (there were a 33.2% of "no" and "basic" in the last item).

Table 7: ICT competencies from teachers' survey

	I am capable to integrate ICT in my class.	I have skills and knowledge to increase the use of ICT.	I use the ICT in several ways.	I know a variety of ICT applications; I use and adapt them to the class-group.
No	1,2%	1,2%	4,4%	10,0%
Basic	19,2%	19,2%	22,5%	23,2%
Enough	34,0%	38,0%	37,3%	38,0%
Good	38,4%	34,4%	30,5%	26,0%
Excellent	7,2%	7,2%	5,2%	2,8%

Another positive aspect is the technical and pedagogical support made by the ICT coordinator in each school, which worked closely with teachers. For example "he removes all fear of teachers" (I1), "he is recognised as an expert by peers (…). He has leadership, enthusiasm, communication skills, and the ability to find successful activities for his peers" (I2) (In: interview number).

In contrast, documents, interviewees and teachers indicate that they need time to prepare, develop and implement activities using ICT. For example "this (regarding implementation of ICT) requires dedication that demands time and this, now, is scarce" (I1), "ICT takes too much of teachers time" (I3), "we need more time" (TS 211). Other disadvantages were the current organisational structure of schools and the educational laws. The curriculum reform in LOMCE is unlikely to be successful because it´s made without the understanding of teachers' personal perspectives, fears and practices.

Step by step to improve the collaborative learning

In analysing the documents of interviewers and surveys, the focus was on the collaborative strategies oriented towards student collaborative practices and towards their own professional development. The documents and the interviewers explained that this type of practices was usually included in EM and "ICT provides advantages of collaborative practices with students" (I1). On the other hand, it requires planning of activities and time to prepare the sessions (with ICT tools), which teachers perceived as a fear.

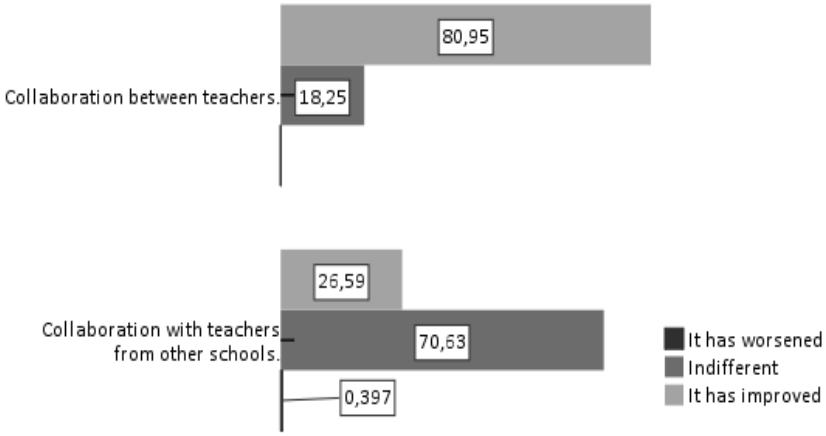


Figure 4: Percentage of collaboration with the use of ICT

A minority explained, "ICT enables collaborative working" (TS 89), "I entered collaborative work through web quests" (TS 159). Thus, the traditional mechanism to work collaboratively in the classroom is not transforming into the collaborative practices by ICT. The translations of these types of practices in the teacher education community were not taking place (Figure 4). Only26.6% of teachers in schools had indicated an improvement in the act of collaborating with teachers from other schools with the use of ICT.

ICT had improved the collaboration with peers of the same centre by 81%. Therefore, this26.6% can increase at higher levels taking advantage of virtual spaces to share experiences and work collaboratively.

Conclusions

The objective of this study was to describe how ICT in the classroom is integrated into the teaching and learning process of Pious Schools of Catalonia, detecting the changes in methodologies.

In particular identifying the activities that are more closely involved regarding the alterations of the teaching-learning process assisted by ICT.

The questions were:

- What is the EPC model of use of ICT? What are the characteristics of the model of use of ICT implemented by the EPC in schools?
- What role adopts the actors involved in the integration of ICT in the classroom? What benefits and fears do the teachers perceive from the integration of ICT in the classroom?

Regarding the first group of questions, all the schools analysed follow the model of EPC. The last policies of EPC included not only technology innovation but also the change in organisation and in the methodology of schools. The EM was a precedent, as communication and interaction play a central role in these schools, facilitating the implementation of ICT. Teachers and students alter the role played in classrooms because they develop generic competences (language, mathematics…) within various contexts. This provided different attitudes and perceptions. With regard to the changes in the teaching-learning process and the use of ICT in the classroom, it is relevant that teachers are using ICT as a tool in their activities:

- To organise and sequence the material rendering it more attractive.
- To present in a more dynamic way along with increased active participation of students.
- To make the students solve activities with the aid of ICT applications.
- To increase collaboration among teachers of the same school.
- To increase the speed of communication within the school.
- To create innovative practices.

Interestingly, it was the traditional approaches to learning, which emerged most frequently. The research also highlights that learning becomes a multidirectional exchange of ideas which not only involves teachers. The students also learn to learn and, in the same environment, can piece together using OLPD, a space managed personally and shared with everyone. The use of more active methods such as problem-based learning, project work or the existence of innovative teachers who advise other teachers bringing about a positive attitude and commitment toward innovation and change within the classroom.

To the second group of questions the vast majority of the teachers stated that they use every day ICT to motivate their students, promote collaboration and encourage students to play more of an active role. The actual ICT practices are still not in line with the ambition of the government. Teachers have been involved in the integration of ICT, though only at a basic or intermediate level. In Spain, the continuous changes in educational laws and ICT policies promote a reactive position. Sancho and Alonso (2012) refer to this as "convergences and divergences" between teachers and policy developers.

There still seems to be a shortage of innovative practices in general. Collaboration appears to be scarce between schools despite the best intentions and integration of ICT, coexistence of textbooks and digital type fonts within classrooms. On the other hand, findings show a lack of time for planning despite the fact very little technical or pedagogical support is necessary for integrating the ICT into the teaching-learning process. The knowledge of creating, planning and pedagogical training accompanied with ICT facilitates and enhances many subjects such as language, mathematics and economy. If it is necessary to increase confidence in the use of ICT, investment is a conceivable means of improving training in those teachers who perceive technology as invaluable in their teaching tasks.

Professional training for teachers is the most important component to ensure efficiency and competent adoption of ICT use in education. Identifying the training requirements may be held at the end of each academic year once the teachers have planned improvement actions for the following year. Once training is complete, the following year is the evaluation. It is then measured by the degree of application in the classroom.

A portion of resources must be allocated to the support and sharing of innovation in schools, utilising information and training to ensure all teachers have sufficient knowledge of Web 2.0 applications and are able to cope with the constant changes in legislation. The model of networking and interconnectedness occurs only in specific working groups. A possible line of research in the future could be focused on the study of networking by teachers from different schools. This research could study how it fosters collaborative culture and how to manage teachers when they work together using virtual platforms.

Another line of research in the future may investigate the methodological changes that occur with the use of ICT in the classroom –to finish evaluating the digital skills of the students. Last, but not least, the teachers' survey could be extended to the whole Pious Schools of Catalonia to confirm that the model established by EPC occurs within all.

Experience of over 400 years in education and a commitment to ICT for over 40 years –the first TV educational program was on 13/12/1964 (Puig, 1998, p. 478)– should continue to allow and promote creative initiatives on behalf of teachers. A commitment to the solidarity of families and students facing the XXI century.

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