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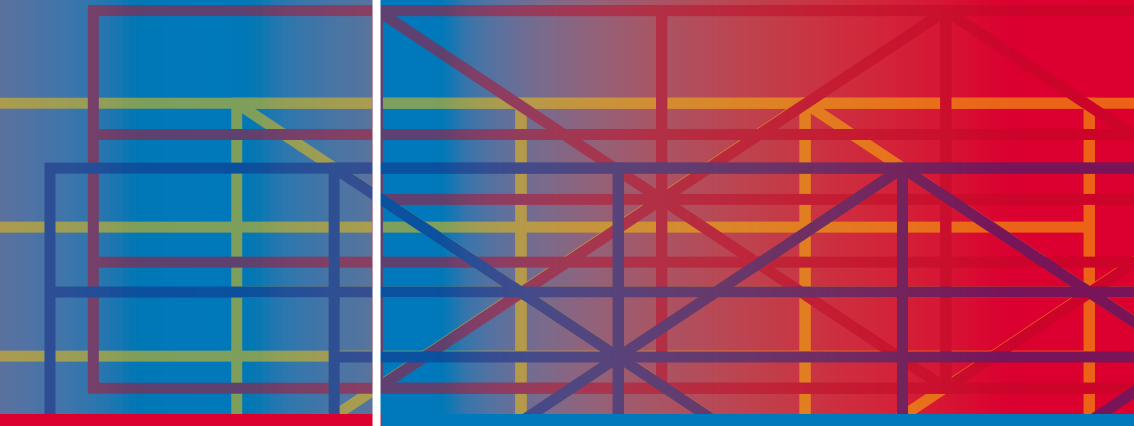
Trends and Good Practices in Research and Teaching

A Spanish-English Collaboration



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Introduction

Our lives are increasingly digital and digitised, which increasingly requires that all of us become are appropriately equipped to face the current and emerging challenges that a digital life poses. Coexisting in highly diverse yet and nonetheless closely related settings, often with increasingly blurrrednearly inexistent boundaries between, such as the physical and the virtual spaces, enhances the complexity of teaching and learning processes. These new ways in which we establish a relationship between information and knowledge require an evolution metamorphosis in theour way in which education systems are developed, in the educational practices, and teacher development, as well as in the way in which we conceive the knowledge and professional competencies, skills and literacies required by of educatorsour teachers. Technology is present in these processes, as an essential element in all of these factorsthis equation (López-Gil y Bernal, 2016; López-Gil y Bernal-Bravo, 2019).

The XXIst century is the century of information, where individual learning is conceived mainly through interactive and collaborative technologies. These technologies are meant to offer a stimulating and socially positive learning experience, but equally to become a construct that allows students to learn by doing, while sharing their learning experiences with others who are often at the other side of that virtual space (Gómez-Parra y Huertas-Abril, 2019).

The rapid integration of ICTs into almost all aspects of modern life since the turn of the millenium is fostering a continuous transformation in our society, becoming one of the most significant agents of social change (Esteve, 2016). In previous epochs, information was the preserve of a small elite (teachers being one example), however, with the advent of the World Wide Web and the physical and virtual networks which it runs on, the XXIst

century can now be seen as a period of abundant information. This information is primarily accessed, now, through physical networks (e.g. servers, wifi routers/towers, satellites, cables…. etc) and digital networks of application services, social platforms, and people. Interaction is mediated through ubiquitous Web-enabled, mobile devices from any physical location. Education has, of course, not been immune to the change represented by digital technology and is undergoing a fundamental re-evaluation of what it means to teach and learn in this information-rich, networked age. In short, understanding the transformative role of ICTs in education must not be ignored (Cabero, Llorente & Morales, 2013). Current societies need education systems able to respond to the social and educational changes resulting from digital networks. Furthermore, modern education systems also need to be fit-for-purpose for future professionals entering a rapidly changing labour market increasingly typified by Industry 4.0, Robotics, Big Data and machine learning / artificial intelligence. These educational systems should therefore rapidly evolve from traditional teacher-centred models, based on the transmission and memorisation of knowledge, to new pedagogies and methodologies that allow students to acquire knowledge, skills and attitudes that are continuously applicable to real-world changing work / life practices (Fernández, Leiva y López Meneses, 2017).

This is especially true for Higher Education, with the reification of new pedagogical approaches, as well as new learning design in which digital technologies, and in particular the Web, have a fundamental role (Mar Marín & Cabero, 2015). The use of these digital technologies also transcends teaching and learning processes, having an influence on the organisational and structural aspects of education provision (Jiménez, Alvarado & Llopis, 2017). This is because learning has become a sociotechnical process (e.g. Cummings, 1978; Bijker, 1997; Geels, 2002) in which the learner and the learning process can not be separated from the technologies used for learning purposes. Learners are at the centre of an autonomously built and maintained network of connections to digital devices, services, information and people – their Personal Learning Network (Fair, 2020) - which forms the framework for all their learning activities. This reconceptualisation of the learner from merely a physical body located at a single

point in space/time, to the learner being the centre of a complex, dynamic, evolving and temporally/spatially unbounded network has prfound effects on how we conceptualise learning.

This reconceptualization of the learner is one important reason why professional development programmes for HE educators that include the construction and dissemination of knowledge around the Networked Society (Castells, 1996), Personal Learning Netowrks and networked learning are needed, in order to equip educators with the knowledge and understanding necessary to face the demands of the current complexities and sociocultural dynamics of this networked age (Piscitelli, 2006). This is why it could be argued that we are facing a change of paradigm in the way professional development processes for Higher Education educators should be understood (Vázquez-Cano, 2015). Consequently, universities are the sociotechnical pillars for the expansion and dissemination of global knowledge, citizenship's empowerment, professional development and educational innovation for the progress of the social and economic fabric of society (López-Meneses, 2017). Universities will therefore need to continue, and even accelerate, the adaption of their teaching and training practices to supply the demands of this changing society. HE institutions (HEIs) are already paying increased attention to the characteristics and needs of current students;and are facilitating the incorporation of flexible and open settings that help transform traditional communication models - characterised by the passivity of the students - into new models in which students can actively participate in the construction of knowledge and where they are aware and own their processes of competencies acquisition (Cabero, Ballesteros y López-Meneses, 2015). However, there remains considerable institutional inertia, as predicted by sociotechnical theory (Geels, 2002), towards the pedagogical and learning design shifts we argue are necessary to respond effectively to the new networked paradigm.

This book will attempt to add light to current debates by indicating that it is not only important to expose students to virtual tools, as well as ensure HEIs remain up-to-date with learning technologies that transform education, but also to pedagogically transition to the active, autonomous development of mature and effective personal learning networks and the development of digitally-enabled, networked learning behaviours. The book consists

of thirteen chapters reporting on research in which collaboration between British and Spanish universities has taken place. The book aims to disseminate and critically reflect upon a series of educational experiences with the common factor being the use of a wide range of learning technologies, with the common aim of enhancing the sustainability of Higher Education provision by implementing new pedagogies or learning design applicable to the network age. This work also aims to encourage Higher Education professionals to generate innovative approaches to their teaching practices.

To conclude, the research described in this book indicates the need for an acceleration by HEIs in their transition to digitally-enabled personal learning pedagogies and has provided a series of examples of how this may be achieved in practice using a range of digital technologies in innovative ways. The book also indicates, in line with Fernández-Márquez et al., (2019), that the professional development of HE educators requires an increasing focus on network-centred, digitally-enabled pedagogies and learning design, where skills, literacies and competencies are as important as content knowledge (for both students and educators). In this way, HEIs can find sociotechnical approaches which are capable of rising to the challenge of aligning the HE learning experience with the expectations and behaviours of the modern HE student, living, working and learning in a Network Society.

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1

MOOCS and Higher Education Globalisation: Social Work and Social Education Students' Perspectives

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Abstract
MOOCs can support educational innovation in a wide range of contexts, from formal to informal and from expected to unexpected. This kind of open online courses are often used within campus modules as core elements of their curriculum. This is the case of this experimental study, where we analyse an experiment of HE educational innovation about the perceptions of students around strengths and weaknesses of MOOCs in socio-educational settings. 54 students were surveyed with multiple choice questions around this topic. The results show that HE students of education degrees tend to see the potential of MOOCs to aid the transformation of the classrooms often currently reserved to social elites. They also see that MOOCs can transcend to new learning arenas more ubiquitous, connected, informal and horizontal, which can facilitate the digital inclusion of disenfranchised groups, as well as potentiate the blooming of interactive communities of collective intelligence. However, these students were also aware of important shortcomings such as the lack of monitoring, and MOOC´s often unattainable demand of high learner autonomy.

Keywords: MOOCs, education innovation, MOOCs within campus, MOOCs for inclusion

1.1. MOOCs and learning models in Higher education and Society

Conner (2013) suggests that learning in the Knowledge Society occurs in a diversity of contexts, ranging from formal to informal and from expected to unexpected (figure 1).

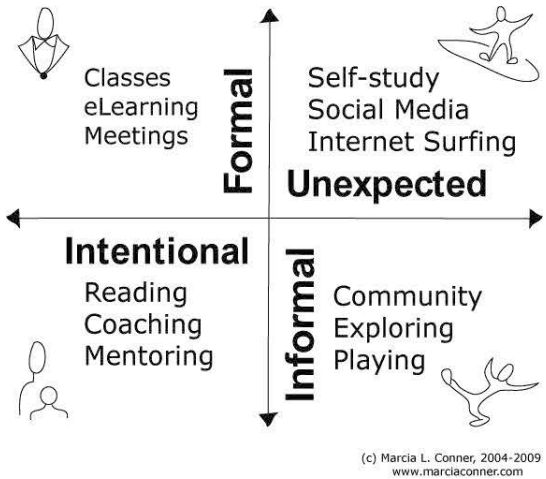


Figure 1. Learning contexts (Conner, 2013).

In this sense, MOOCs are interesting educational approaches to develop in this polychromatic plurality of educational contexts.

MOOC acronym stands for Massive Open Online Courses (Rheingold, 2013). In scientific literature, MOOCs are often portrayed as virtual environments of social connectivity around a particular area of study with an open pedagogical approach (McAuley et al., 2010; Vázquez-Cano, López-Meneses & Barroso, 2015; Aguaded, Vázquez-Cano & López Meneses, 2016). These are in turn offered by many of the top Higher Education Institutions (HEIs) worldwide, and have the potential to alter the global Higher Education ecosystems (López-Meneses, 2017). Castaño & Cabero outline the following characteristics of MOOCs:

- They are educational resources with certain resemblance to a classroom.

- They are events with start and finish dates.
  - They have assessment mechanisms.
  - They are online.
  - They are free for learners to use.
  - They are open, without admission prerequisites.
  - They allow interactive participation at scale of large learning communities.

The MOOC universe is object of pedagogical and educational reflection among many academics in the field (Zapata, 2013; Ramírez-Fernández, Salmerón y López-Meneses, 2015) as well as for HEIs in the globalised world (Haggard, 2013). That entails an innovative model of massive education that exploits the potential of communication and information technologies in a paradigmatic fashion at societal level (Pérez-Parra & Gómez-Galán, 2015). In the same way, massive and open education poses a challenge for HEIs and the HE teaching community, who is pushed to redefine the current methodological paradigm in order to charter new curricular approaches which are more open, interactive, collaborative and ubiquitous, in symbiosis with a more dynamic and holistic assessment, embedded in more flexible and diversified programmes, more adapted to the job market to promote and provide students with the implementation of their own skills and competencies development paths for their academic and professional development (López-Meneses, 2017).

Many attempts have been made at classifying the different types of MOOCs. Perhaps one of the most commented taxonomies is that of Clark's (2013), who identifies seven types:

- TransferMOOCs (consisting of taking existing in-campus courses and transferring them to MOOC platforms).
- MadeMOOCs (purpose-made MOOCs with emphasis on the quality of the multimedia materials and MOOC-specific tasks and interactions for students).
- SynchMOOCs (courses have start and end dates, as well as specific assessment events).
- AsynchMOOCs (self-paced, with no dates or deadlines).
- AdaptiveMOOCs (using adaptive algorhitms to personalise learning, based on learning analytics insights).
- GroupMOOCs (designed for specific groups)

- ConnectivistMOOCS (following Siemens' and Downes' connectivist principles).
- MiniMOOCSs (with small numbers and short duration).

However, the most generalised classification is that of xMOOCs and cMOOCs, where the former is a centralised approach with behaviourist pedagogical underpinnings, and the latter is a distributed approach with social constructivist and connectivist pedagogies (Downes, 2012; Karsenti, 2013; Vázquez-Cano, López-Meneses, & Sarasola, 2013).

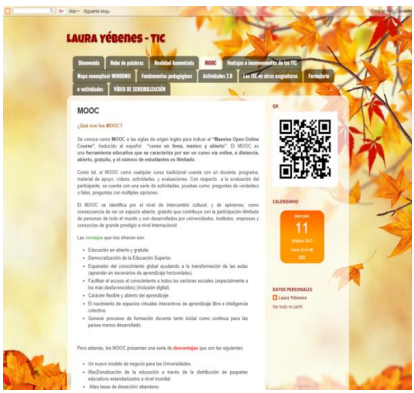
As Aguaded & Medina suggest (2015) the MOOC movement currently emanates from a process of innovation in the context of open education, oriented by the principles of massive and free distribution of contents, and technologically facilitated by online, interactive and collaborative applications. Gértrudix, Rajas, & Álvarez (2017) note that his movement has significant academic and journalistic attention, as evidenced by the bibliometric analyses of academic (López-Meneses, Vázquez-Cano, & Román, 2015; Aguaded, Vázquez-Cano, & López-Meneses, 2016; León-Urrutia, Vázquez-Cano, & López-Meneses, 2017) and non-academic literature (White, León, & White, 2015; Kovanovich *et al.*, 2015). This attention is also reflected in the institutional policies that stimulate MOOC production (Hollands & Tirthali, 2014), and the analysis of their pedagogical quality (Roig-Vila, Mengual-Andrés, & Suárez-Guerrero, 2014; Aguaded & Medina-Salguero, 2015), among other areas. MOOCs can be therefore considered as a new learning path for universal education.

1.2. The setting

In this study, we analyse an experiment of HE educational innovation about the perceptions of 54 students of an Education degree module named "Information and Communication Technologies" in the double degree of Social Work and Social Education, from the cohort of February 2016-17, in the University Pablo Olavide of Seville. One of the core contents of these modules are MOOCs and their social and educational impact (see module in <http://bit.ly/2xwjh4x>).

This experiment encourages first-year Social education students to reflect upon the advantages and disadvantages of MOOC in socio-educational settings. For this, every student would produce a personal *edublog* for the module, keeping record the activities carried out in it. One of the tabs would be a record of the MOOCs where they would contribute with their reflections. In figure 2, two exemplars are displayed.

Edublog 1
URL: http://laurayebenestic.blogspot.com.es/p/mooc.html



Edublog 2
URL: http://educametetic.blogspot.com.es/p/mooc.html

Figure 2. Personal edublog exemplars

1.3. Aims

The structure of this study was devised in attention to its main aims, which are the following:

- Analysing how students perceived the advantages of MOOCs in socio-educational settings where students of this particular module operate.
- Determine the main weaknesses of MOOCs as seen by the students of the module.
- Enhance our understanding of *edublogs* as educational resources, and find how to best use them to support the professional development of the social educator.

1.4. Methodology

This research Project used qualitative and descriptive methodological approach. The sample was formed by 54 students of the double degree of Social Work and Social Education, in the Faculty of Social Science of the University Pablo Olavide, cohort 2016/17.

To analyse the different students' outputs (comments made in the individual edublogs) throughout the module, a reference framework was taken from the guidelines established by Bogdan & Biklen (1992); Miles & Huberman (1994), and Monje (2011).

The first stage of the data analysis process consisted of data reduction by categorising and coding the information obtained. The categorisation involved simplifying and selecting the information in order to make it more manageable. For this, the following steps were followed:

- Units were separated to identify relevant instances about reflections on advantages and drawbacks of MOOCs in socio-educational settings.
- These units were grouped in themes.
- The instances were synthesised and classified into those different themes.

During the coding stage, each textual instance was identified and inserted into its corresponding category through a mixed inductive-deductive procedure, to then perform a statistical analysis of the counts obtained. Finally, the analysis process was completed with a second stage in which the different instances were interpreted and categorised, in order to facilitate the inferences and interpretations of the results, as described below.

1.5. Results

This section starts with the analysis of the study participants' reported perceptions with regard of the strengths of MOOCs in socio-educational settings. More specifically, Table 1 displays the frequencies of participants' responses around this topic. From the table it can be inferred that most students saw gratuity as one of the main advantages of this approach for knowledge expansion,

followed by 46 students who thought that its greatest advantage is the flexibility that MOOCs provide, adapting to the learners' availability and ability to devote time to those courses. It is also worth highlighting the 33 responses stating MOOC's ability to create learning communities and networks, from pools of massive numbers of participants, facilitated by discussion forums (32 responses specific to fora). Moreover, 31 students highlighted the inclusive nature of MOOCs, enabling access to disenfranchised groups.

Table 1. Participants' responses on MOOC strengths

MOOC advantages	FREQUENCIES
Gratuity	47
Higher education content	24
Flexibility	41
Width of choice	18
Education for the disenfranchised	31
Employability	9
Support to traditinal education	10
Discussion forums	32
Multimedia materials	4
Introductory topics and life-long learning	19
Online education	12
Collaborative social networks	33
Certification	14
Unlimited enrolments	9

24 responses agreed that MOOCs offer Higher Education contents, signed off by prestigious universities. 19 of the responses indicated that MOOCs can introduce learners to scientific topics and disciplines, as well as providing live-long learning experiences, with a wide variety of offerings (18 responses).

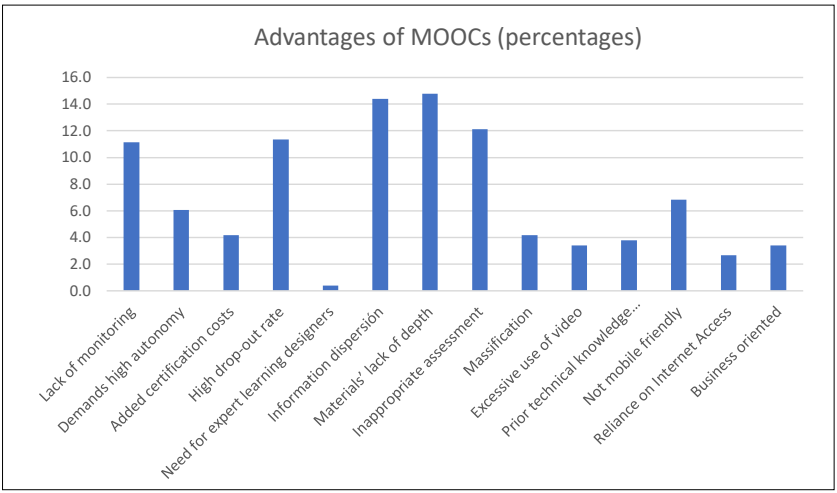


Chart 1. Percentages of responses from participants about advangages of MOOCs

In light of the results obtained referring to the advantages of MOOCs, it can be inferred that these courses have a significant potential to offer affordable and accessible education to everyone regardless of their background, as others have already suggested (Christensen et al., 2013; Daniel, 2012). The results show that this is also true in our social and educational settings, where these courses can support the digital inclusion of disenfranchised groups (Vázquez-Cano, López-Meneses, & Sarasola, 2013). Finally, in consonance with Moser-Mercer (2014), learning in "fragile" contexts is fundamental for an equal societal development, as well as the internalisation of HEIs (Teixeira *et al*. 2016).

With regard of the main challenges and dificulties of the MOOC movement in socio-educational settings, Chart 2 higlights a 15% of participants noting a lack of depth in the contents and materials offered in MOOCs. To this respect, as pointed out by Daniel, Vázquez-Cano, & Gisbert (2015), too many MOOCs are designed as a collection of videos with a discussion forum, which involves a traditional distance learning model that does not promote personalised learning. This in turn leads to a unidirectional teacher-centred content-based communicative design, with serious issues in attending individual differences, in a tendency to standardise learning (Valverde, 2014). In this sense, other authors (Lane & Kinser, 2013; Aguaded, Vázquez-Cano, & Sevillano, 2013)

use the term McDonalisation of education to refer to the distribution of standardised educational packs at global scale. Also, over 10% of the participants expressed that these courses lack appropriate and quality-ensuring assessment systems.

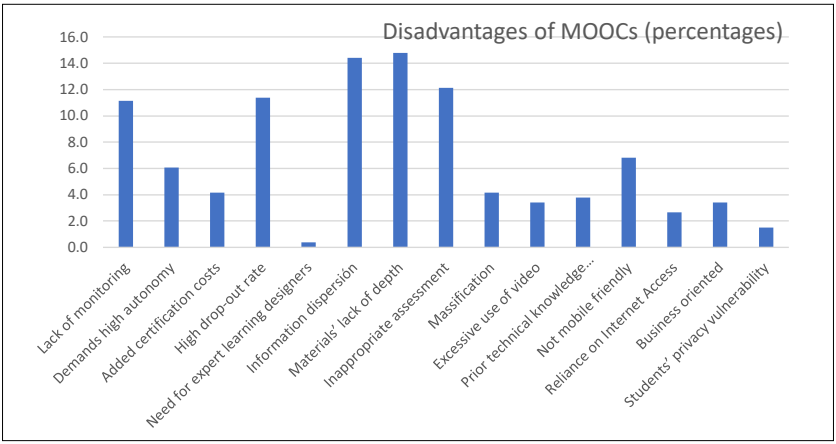


Chart 2. Participants'opinions about MOOC weaknesses, in percentages

There was also a 14.39% who stated that most MOOCs, due to their massiveness, come with an information deluge that could lead to dispersion and disorientation. In this sense, Calderón, Ezeiza, & Jimeno (2013) pointed out that some learners who feel disoriented and overwhelmed have low probabilities of interaction with tutor or expert co-learners, little meaningful socialisation in the MOOC, and little depth in their interactions.

12.12% of the participants also identified the predominance of multiple choice questions in the MOOC assessment methods as one of their main drawbacks. Another widely criticised aspect of MOOCs (11.36%) was the high attrition rates, in line with Fidalgo, Sein-Echaluce, & García Peñalvo (2013). Also, almost 11% expressed that MOOC lacked an appropriate follow up of the learning process.

Other reported weaknesses worth mentioning were MOOC's non-mobile friendliness (18), a high reliance on students' autonomy (16), and additional costs for certificate obtention (11). See table 2 for all the results about MOOCs' weaknesses.

Table 2. Frequencies of participants' responses in relation to MOOCs' weaknesses

MOOC weaknesses	FREQUENCIES
Lack of monitoring	29
Demands high student autonomy	16
Added certification costs	11
High drop-out rate	30
Need for expert learning designers	1
Information dispersión	38
Materials' lack of depth	39
Inappropriate assessment	32
Massification	11
Excessive use of video	9
Prior technical knowledge requirements	10
Not mobile friendly	18
Reliance on Internet Access	7
Business oriented	9
Students' privacy vulnerability	4

Another 10 participants indicated that MOOC often required too much previous technical knowledge to get started with the course. Also, 9 of the participants expressed that there was an abuse of video materials in detriment of other formats, an unbalanced that affected the quality of the courses (Zapata, 2013; Vázquez-Cano, López, & Sarasola, 2013).

Finally, seven participants indicated the indispensability of a working Internet connection as a significant weakness. One of the students also expressed that quality MOOCs could not be delivered without specialist learning designers. In this sense, León-Urrutia, Vázquez-Cano, & López-Meneses (2017), suggested that MOOC designers must provide a more comprehensive and adaptive design to cater for different socio-educational realities, in order to address the diverse training and educational demands.

1.6. Discussion and conclusion

One of the most salient features of the current Information Society is the relevance that Information and Communication Technologies have been gaining recently, becoming elements for exclusion and discrimination in a wide range of social contexts (Cabero-Almenara, & Ruiz-Palmero, 2018). Martín-Padilla (2017) indicates that this is especially true for MOOCs.

Moreover, universities are socio-technical pillars for the expansion and dissemination of global knowledge, as well as for the empowerment of citizenship, educational innovation, knowledge transfer. Universities are also catalysts for professional development, social cohesion, and an integrating agent for the economic and technological fabric of the knowledge society and human development (López-Meneses, 2017). Under this socio-technical and educational perspective, MOOCs can aid the transformation of the classrooms often currently reserved to social elites. MOOCs can transcend to new learning arenas more ubiquitous, connected, informal and horizontal, which can facilitate the digital inclusion of disenfranchised groups, as well as potentiate the blooming of interactive communities of collective intelligence. However, we must be aware that, after of a first phase of effervescence in HE, a set of shortcomings have become evident, as participants in this study have identified, and other authors have corroborated. These are, among others, the high attrition rate, the scarce interactivity of MOOC participants, the weaknesses in the official recognition through creditation, and the tendency to monetisation over quality (Aguaded, Vázquez-Cano, & Sevillano, 2013; Daniel, Vázquez-Cano, & Gisbert, 2015; León-Urrutia, Vázquez-Cano, & López-Meneses, 2017). An awareness of these shortcomings, as well as these advantages, can support a transformation towards more horizontal, connected, informal, and inclusive educational offerings, creating virtual habitats for sustainable educational development for the *Homo Conexus/digitalis* in the path of globalised knowledge (Vázquez-Cano, López-Meneses, & Barroso, 2015).

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2

Towards a Taxonomy of Video for HCI Education

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Abstract

This paper examines six case studies where video has been used for educational purposes, specifically on topics of Human-Computer Interaction. Through this examination, we identify the recurrent themes and propose the main dimensions upon which a taxonomy of video for HCI education can be drawn: considering who the actors in the producer-consumer dichotomy are, whether students, tutors, or external third parties. Recurrent observations made in a wide variety of contexts across our educational practice are also outlined. We propose further development of this taxonomy.

CCS Concepts: Human-centered computing → Human computer interaction (HCI); Social and professional topics → *Computing education*

2.1. Introduction

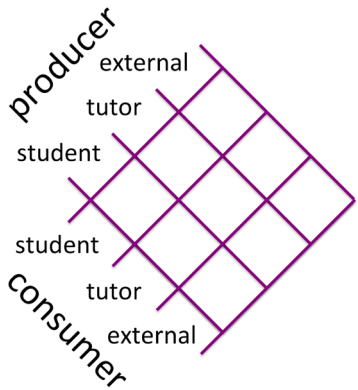

Figure 1. The roles played by producers and consumers of video for HCI Education (whether students, tutors or external stakeholders) are the main dimension to consider for an adequate classification of said videos.

The use of video in education is not new, especially for distance education. Since the early 1970s, the Open University have been broadcasting lecture-like material aired during gaps in programming on BBC's public channels (Dix, 2016). In Human-computer interaction (HCI), video has also been an integral part of both innovative systems, such as Xerox PARCs early experiments in ubiquitous office video sharing (Stults, 1998), and also methodologies in research and practice. Many of the more radical early ideas, such as the Phone Slave (Schmandt & Arons, 1985) and Wellber's DigitalDesk (Wellber, 1993) were demonstrated through "envisionment" videos, and since the 1990s video has become a normal tool of ethnography and design requirements capture.

However, in recent years there have been significant changes. On the one hand, platforms such as YouTube have changed the pattern of video consumption, widening the type and quantity of video beyond the traditional gatekeepers, and in consequence also shifting quality and accuracy judgement from producers to consumers. On the other hand, the production of video has become easier and cheaper. It is now possible to create relatively high-quality video using tools available on nearly any smartphone. This is also enabling new forms of stand-alone systems using web-cams, HTML5 video, and lower-barrier coding tools. These changes have had an impact in education broadly, sometimes making use of the generic video platforms, such as Khan Academy, and sometimes embedded within specialist platforms including plugins for generic VLEs and MOOC platforms such as FutureLearn.

This paper is based on six case studies from our educational practice, and also draws on broader input from the literature and workshops the authors have organised on HCI education [6, 8, 9]. Crucially, these case studies include not only tutor-created resources, but also various examples of student production. Reflecting on these experiences, we seek to embed the lessons learnt, problems identified, and issues raised within a nascent framework, around the producer-consumer roles of various actors (students, tutors and others), and their combinations as shown in Figure 1. Through this framework we seek to initiate steps towards articulating a taxonomy of video for HCI education. Such framework allows an increased understanding of our diverse experiences, facilitate mutual learning between them, and highlight future directions for pedagogic process and educational research. Many of the issues presented are common across similar disciplines, but others, such as the use of video within prototyping, are HCI-specific.

2.2. Case studies

Case study 1: Interactive "e-lectures" for flipped classrooms

Table 1. (Case study 1) Interactive e- lectures for flipped classrooms at UCL

Level	Course	Length weeks	Num. of students
Master-level	Persuasive Games	10	40
3rd year UG	Interaction Design	10	182

This case presents experience of two instances of using interactive e-lectures to deliver material for flipped classrooms, as detailed in Table 1. Both courses were taught at University College London (UCL), UK, and both lasted one semester (10 weeks of lectures). In the both instances the tutor designed the e-lectures to be studied by students prior to face-to-face workshops. The workshops were intended to assist learners with getting to grips with the material from the e-lectures. The effectiveness of the flipped model using e-lectures as videos was then evaluated using end-of-term online surveys. The results suggest that students prefer the flipped model offered by e-lectures compared to traditional lectures. These e-lec-

tures were not simply long videos, but they embodied interactive elements, including table of contents, which enabled students to obtain an overview of the material and also rapidly access specific parts (see Figures 2 and 3).

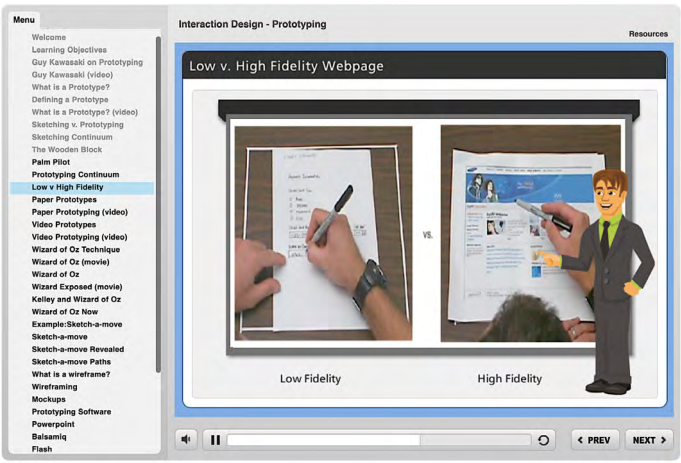

Figure 2. (Case study 1) Web layout for e-lecture delivery contrasting low- vs high-fidelity prototyping in the Interaction Design course, with a detailed table of contents (on the left), main screen with animated instructor, link to additional resources (top right corner), and navigation buttons (at the bottom).

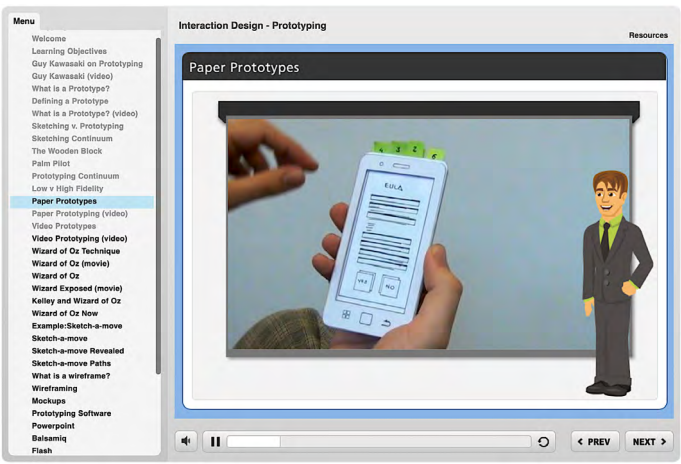

Figure 3. (Case study 1) A second view of the e-lecture shown in Figure 2, this time demonstrating paper prototypes.

Case study 2: e-lectures for the Interaction Design Foundation

In this case, video material originally created for an experimental MOOC on HCI was then reused in Interaction Design Foundation courses (interaction-design.org) and also in flipped class activities (Dix, 2016). This was in many ways 'standard' video material, but had two features of interest. First, it was deliberately low-budget compared with MOOCs that involve semi-professional studio space and editing; the aim was to emulate what an ordinary academic would produce for their own students and for sharing. This led to insights about engagement (students seemed capable of up to 10 mins length before fall-off despite widely suggested figures of less than half that); and crucial fine details of production, e.g. positioning camera so that natural eye movements to screen 'look' towards slides during simple screen-in-screen presentation, as in shown in Figure 4. Second, there was a focus on reuse of the MOOC materials, both for flip class teaching by the presenter, but also wider sharing for in-class or out-of-class use in standard face-to-face teaching. The literature on reuse is often focused on producing stand-alone units of learning (such as learning objects or Sharable Content Objects in the SCORM Reference Model); however, real instruction is highly contextual, so instead this has led to seeking methods and tools to better view small snippets from longer videos in ways that present them as units, but do not hide their extracted nature.

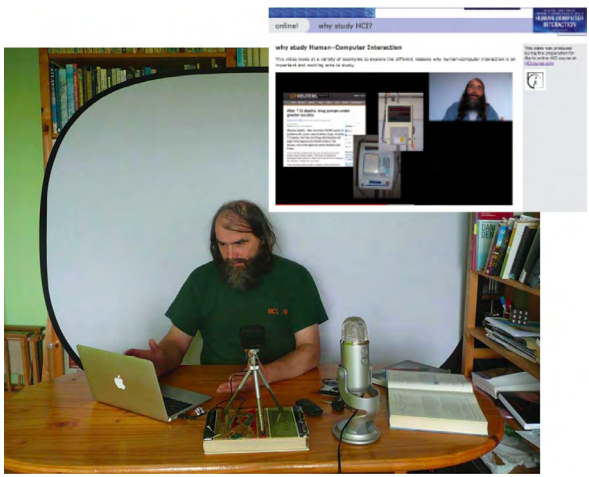

Figure 4. (Case study 2) Setup for e-lecture delivery on prototyping for an Interaction Design Foundation course, with a detailed table of contents (on the left), main screen with animated instructor, link to additional resources (top right corner), and navigation buttons (at the bottom).

Case study 3: Video coursework for Usable Security

Here, students were asked to create videos for computing courses related to *Usable Security* at the University of Glasgow (Table 2). Video presentations required the demonstration of the development of a proactive password interface for minors. The assignment was a video presentation on key challenges of the specific context, the devised interface and evaluation. The marking scheme was not tailored specifically to presentation or video challenges, but did emphasise aspects such as clarity of speech and use of visuals aids. Teams were not provided with any specific guidance on how to produce videos, suggested tools or any strict guidance as to format, but a structure was suggested.

Table 2. Coursework at Glasgow (Case study 3)

Module:	Usable Security
Number of students:	approximately 80
Course duration:	one semester
Group size:	2-3 students
Length of videos:	10 minutes
Video-production guidance provided:	minimal

Table 3. Coursework at Southampton (Case study 4)

Module:	Interaction Design
Level:	2nd year undergraduate
Number of students:	140
Course duration:	one semester
Group size:	4-5 students
Length of videos:	4 minutes
Video-production guidance provided:	lecture + past year's examples

The main observation of this case study was that 'digital native' students may submit unpolished artefacts which suggest a limited skill set in video production. This may have been

alleviated by offering guidance on video presentations issued to the students. However, the level of sophistication of the submitted artefacts may be attributed to the nature of the assignment. Very similar observations were made by one of the authors when using video coursework when teaching the module *Complex IT Systems in Large Organisations* at Uppsala University (Case study 6, see table 5).

Case study 4: Video coursework for Interaction Design projects

This case study was based on the Interaction Design module taught at the University of Southampton, UK, detailed in Table 3. The module was assessed by exam and coursework (50% each). In the coursework, students were required to conduct qualitative research and develop low-fidelity prototypes for Internet of Things devices. A student-authored video showcasing the features of the prototype was the primary assessment tool. Video production was encouraged to use a range of prototyping materials, e.g. paper, physical, computer-generated or combinations of these all. The video, part of the final submission (which included a report) required the presentation of features, functionality, fitness for purpose and justifications for design decisions of the prototype. In total, working in small groups, students authored 27 video submissions, screenshots of some of which are featured in Figure 5. The assessment criteria for the video component

Figure 5. (Case study 4) Stills from student- produced video demonstrating the functionality of a smartphone app which interacts with a smart watch in a lo-fi prototype.

were developed carefully, prioritizing prototype over production quality, so that marks were weighted towards the fitness for purpose of the developed and presented technology prototypes. In this way, students with limited video-making experience were not disadvantaged (Wilde & Snow, 2018).

Analysis of this method revealed that creation of video presentation is successful in giving students freedom to explore low-fidelity prototyping techniques, beyond simply "apps". Further, it acts as a level-playing field for materials' choice when prototyping, with the additional benefit to allow students to employ humour and ingenuity to showcase their prototypes.

Case study 5: Video coursework for Ubiquitous Computing course

This case study is the Ubiquitous computing module at Newcastle University, UK (details in Table 4). As part of the assessment (30% of the module total) students individually created three short video tutorials of their practical sessions, explaining how to program Raspberry Pi in various scenarios.

Table 4. Coursework at Newcastle (Case study 5)

Module:	Ubiquitous Computing
Level:	3rd year undergraduate
Number of students:	34
Course duration:	one semester
Group size:	1 (Individual Individual coursework, though with elements of cohort-wide collaboration)
Length of videos:	2-4 minutes
Video-production guidance provided:	lecture + shoot templates in video-production tool

A mobile video production tool was provided to aid collaborative video production. As part of the process, students used the provided tool to first create a number of short video clips to document their work with Raspberry Pi during practical sessions. Then students uploaded their clips to a dedicated server through the tool, making those clips available for their peers to see. Final-

ly, students individually combined shared clips into their own edits, which they submitted for assessment.

The used tool provided students with a "shoot template", a set of suggested shots that the tutor has chosen to help guide students on what to shoot, and aid framing and structuring their tutorials better.

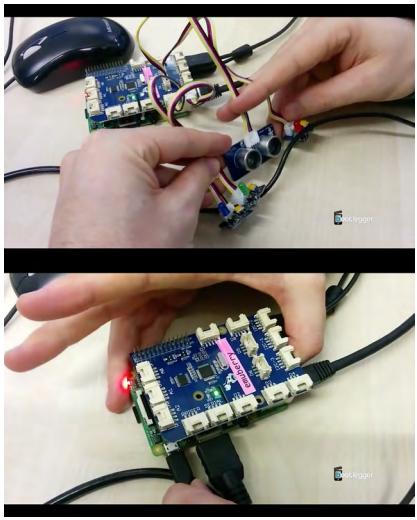

Figure 6. (Case study 5) Stills from a tutorial on Proximity Detection showing how to connect peripherals to a Raspberry Pi.

Assessment criteria for the video tutorials were developed in a similar way to the previous case study. The biggest portion of mark was given for the understanding of required concepts for working with Raspberry Pi and accuracy in explaining the steps required to achieve a certain task in the video tutorials, rather than the production quality of the video.

Feedback suggests high enthusiasm for video making, with many students expressing a preference to video over written reports and oral presentations. Further, post-analysis of the learning process (from meta-data of the video production tool) showed that collaborative video creation helps students to both demonstrate and develop media literacy skills, an unplanned by-product of the assessment.

Case study 6: Video coursework for Complex IT Systems in Large Organisations

This study took place at Uppsala University, Sweden, detailed in Table 5. The learning objectives of the course were to understand various stages in the life-cycle of complex IT systems in large organisations. The assessment comprised a group project and an individual exam. For the project, students conducted interviews with key people in various organisations to understand processes

related to a IT systems life-cycle (development, procurement, etc.) and then prepare a report accompanied by a short video. Interviewees were selected by course tutors and randomly allocated to each group. Students received interview training and discussed what makes a good educational video and what to note when creating their films.

Figure 7. (Case study 6) Stills from a video where students re-enact an interview they conducted of an expert in the field.

Table 5. Coursework at Uppsala (Case study 6)

Module:	Complex IT systems in large organisations
Level:	Master level
Duration:	one semester
Number of students:	approximately 40
Group size:	3-5 students
Video-production guidance:	Lecture + discussions of what makes a good educational video

Submissions were then shared among students and used as a base for learning goals' discussions, which were based on the learning theory of constructive controversy and the use of affinity diagrams. The individual exam at the end of the course included questions about all organisational contexts covered in the course, as presented by their peers' films and reports. The main observation from this case was similar to those of the case study 3. Many of the student groups produced videos of modest quality. This impacted the delivery of necessary information to other students who learnt from those videos. Unfortunately, since each group has been assigned to cover a specific phase of IT system development

in a specific context, the instructors had to include all of the videos and reports into class discussion and exam preparations. The course timetable restrictions allowed no time to re-do the videos. However, as reported by students in the interview the students who used the videos and reports as learning materials did not see any major issues with them and did not question the information delivered to them, despite the quality issues noted by the instructors. In other words, the learners did not think it was necessary to critically evaluate the content of peer-produced materials. This suggests, that today's students still need some scaffolding to mitigate any lack of experience in producing videos. Moreover, this case also revealed that many students lack the critical thinking skills required for peer-assessment.

2.3. Themes for video production in education

Video production in education can be classified in two themes: videos as delivery and as assessment. HCI as a discipline requires students to master design and technical skills, including film making and video production (Hewett et al., 1992). The affordances of video for communication fosters students' creativity while allowing effective demonstration of knowledge and skills. Also, in learning about prototyping, just like in industry, video is impactful for challenging prototypes. Students do not yet have mature skills to make a fully working tool or system within a course time frame, so video allows for effective Wizard of Oz demonstrations. Moreover, with video, it is possible to effectively demonstrate the prototype in context, by visualising a scenario in near-real settings with zoom-in and zoom-out options, rather than in oral in-class demos.

Production of video coursework could be supported by a specific tool or platform (like in case study 5), however, it could also successfully rely on students simply having cameras on their smart phones (like in case study 4). When designing curricula/assessment that involves student-made videos, tutors should not regard today's students "digital natives" (Prensky, 2001) as digitally proficient. As suggested by results of case studies 3 and 6, students do require sufficient motivation (make them buy the idea of how useful it is for them to produce quality videos) and scaffolding in

order to be able to produce good quality video materials and fully benefit from the making process. This could be dealt with by either investing some time in class to thoroughly explain the tasks or by having a technological support, like in case study 5, where a tool could guide the students giving them video production templates and suggesting order of steps and framing for shots.

Table 6. Use of video for delivery or assessment

Video for delivery:	**Video for assessment**:
Tutor-created video for delivery of content to students. This is not simply a recorded lecture but purposefully created content, tailored to "digital consumption" with features such as non-linear navigation, a short format and embedded interaction (e.g. quiz) to encourage viewer engagemen.	**Student**-created video that students create as part of their learning in a course. Video coursework could take various forms: presentation of research results, demonstration of a developed prototype or a working software or hardware, tutorial for acquired skills, etc.

Another technique to help students with video production is to encourage and support their collaboration. This could be done with or without a specific tool (see case studies 4 and 5). Peer learning is a powerful technique which could boost student creativity (by broadening their perspectives - e.g. seeing what others have come up with) and productivity by peer-pressure and competitiveness (thinking "I/we could do better than other students"). Technological support, however, can boost this even further and help students to acquire additional (sometimes unexpected) skills, such as media literacy, as shown in case study 5. Furthermore, collaboration where students share pre-production media material prepare them for the sharing economy. This way students also get to know basics of fair use and copyright principles as well as acquire such skills as co-production and crowd-sourcing. We found numerous educational benefits of video making across our practice. As well as promoting deep learning and being a reliable assessment technique, video production provides students an opportunity to master transferable skills, of which media literacy is a valuable one. In this process, students learn how to create a meaningful media message, whilst also acquiring or mastering video

production skills. When the process of production is collaborative and students share and see each others' pre-production material, they can engage in critical evaluation of video clips in order to make editorial choices in their own work.

2.4. Taxonomy

Drawing observation from these case studies we propose a framework that presents nine scenarios where roles of video producer and consumer are allocated in turns to tutor, student and a third party, who is external to a particular course and student cohort, as illustrated in Figure 1. In what follows we refer to pairs according to how these actors fall in the producer-consumer dichotomy, discussing their common attributes.

A **student-student** video allows sharing, encourages critical thinking, peer learning, peer assessment. At best learn critically from one another, but some consumers may tend to *overtrust* (see sidebar), given that they know the producers. A **student-tutor** video is typically used for demonstrations and assessment. FAQs could potentially be used for scaffolding and guidance. A **student-external** video is used in publications and student portfolios[1] potential to become external resource for another institution, or to allow cross-institutional peer-learning.

A **tutor-student** video can consist of e-lectures (as in case study 1), a lecture capture, or even feedback on student work. Another use could be to answer frequently asked questions (FAQs) for scaffolding and guidance. A **tutor-tutor** video can be used for coaching, professional development, or community-building in computer science education.[2] A **tutor-external** video includes MOOCs, complementary material to textbooks, and sites such as IDF (case study 2).

An **external-student** video suggests the reuse of creative-common materials and other sources. This could be either direct (requires information search and critical evaluation); or mediated by tutor (recommending tools for easy collection, editing and attri-

1. A *student-tutor* video can also be *student-external* if the institution allows the public distribution of assessed material.

2. An example of a teacher explaining how to flip a classroom: <https://youtu.be/ZRvmjjeZ9CA>.

bution). An **external-tutor** video encompasses both professional development and selection of material for teaching. Finally, an **external-external** video for educational purposes include television and broadcasts as well as online videos and vlogs in tended for information or even marketing and trend-setting, but these are not typically within the context of higher education.

2.5. Stepping back thoughts

Video as prototype builds on long-standing research on User Interfaces and HCI as well as practice, including envisionments. Not only affords numerous pedagogic advantages to students as discussed above but it is a powerful tool for all actors involved. In particular, within the proposed taxonomy, when we consider the different actors across the producer/consumer matrix presented in Figure 1, the roles of producer and consumer can be taken by student, tutor or external party, defining the purpose of the video. In the case of students, production promotes learning of video skills and domain knowledge, whilst consumption foster learning of other skills such as critical evaluation. Similarly, for tutors, both production and consumption can support their professional development and community-building, whilst for external actors the motivation is often showcasing advances in developments and services which can increase reputation and commercial rewards.

It is worth exploring further what other dimensions to the proposed taxonomy of video for HCI education can be considered, perhaps in style, tone, level of support, and other aspects which we have identified and outlined in Tables 1, 2, 3, 4 and 5.

We also observed that students may trust poor information on other students' videos. An explanation is that the videos may be perceived as endorsed by the tutor, who through the exercise is giving it some kind of approval. If videos are interviews or selection of other seemingly real or reliable original sources, the student consumer may underestimate the significance and potential bias in the process of selection, editing and collecting the material.

2.6. Conclusions

Contrasting the various case studies structured across the themes has helped to highlight potential points of mutual learning; for example, template-based approaches used to ease students sharing and editing video may also be useful for tutor produced material. It has also highlighted common challenges to practitioners, such as the need to find ways to make editing of rough videos easy. Finally, it has helped suggest potential new directions; for example, whether student questions as well as tutor feedback could be delivered through short video or audio clips. However, we feel we are at the beginning of exploring this broad and rich area, with great significance to the computer science education community at large. We welcome discussion with other HCI educators and Computer Science Educators in general, and we believe that the proposed taxonomy will offer a common vocabulary for such exchanges.

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3

New Emerging Technologies for University Innovation

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Abstract

The present study has been carried out under the umbrella of a wider Spanish research project "Augmented Reality to enhance the development, design, production and evaluation of AR aided HE training programmes" (EdU-5746-P–Proyecto RAfodIUn). This immersive educational experience was conducted through a seminar about emergent technologies, the aims of which were 1) Raise awareness of new AR applications in educational settings, as well as their pedagogical potential applications, 2) generate proactive attitudes of students towards AR, and 3) develop students' competencies around the pedagogical applications of AR. The results show that, among a set of AR applications, Quiver and Zookazam were the most attractive and motivational for educational purposes, while other applications such as Anatomy 4D were not so suited for this purpose, despite being a highly powerful application in the field of healthcare.

Keywords: Technological education, augmented reality, educational apps, Higher Education innovation, emerging technologies

3.1. Augmented Reality: new technologies that generate proactive learning scenarios

The present digital era is moving towards new ways of interacting with reality through "new" interactive and emerging technologies, bringing people closer to a culture of collaborative knowledge (Cope and Kalantzis, 2010), whose trend tend towards privacy, connected content, globality as a process, the use of mobile phones, a digital identity and b-learning, among others.

Nowadays, emerging technologies such as Augmented Reality (AR) are increasing their popularity in training scenarios (Kipper & Rampolla, 2012, Moreno-Martínez and Leiva-Olivencia, 2017). In this sense, the "Augmented Reality" is a technology that allows the combination of digital information and physical information in real time, through different technological supports, such as tablets or smartphones, and that allows creating a new reality (Cabero y Barroso, 2016, Cabero et al. 2016, Fombona y Vázquez-Cano, 2017, Cabero y Barroso, 2018).

Its meaning for educational training is established, on the one hand, by its own specific features, such as: being a mixed reality, the chance to combine, in real time, different layers of information and in different formats (texts, url, videos, …), it is an interactive technology, it is easy to use, and through its use we make richer or change the information of reality by adding additional information (Cabero and García, 2016). And on the other hand, because the devices that are often used for observation, such as smartphones, are technologies easily available to university students (Cabero y Barroso, 2018).

From a technological point of view, combining the proposals of different authors, Cabero and Barroso (2016) point out the different resources and technological devices that are needed for the production and observation of objects in AR, in particular the authors point out the following:

1. An element that captures the image of reality that users are seeing (computer screen, a telephone, or a video game console);
2. A device where to project the mixture of the real images with the synthesized images (the three mentioned above can be used);
3. A processing element or several that work together whose function is to interpret the real world information that the user re-

ceives, generate the virtual information that each specific service needs and mix it in an appropriate way (computers, mobiles or videoconsoles);
4. A specific type of software to produce the program;
5. An augmented reality activator or markers that can be QR codes, physical objects, GPS ...; and
6. A content server where the virtual information that we want to incorporate into reality is located.

Finally, despite the great possibilities offered by this technology, as Fernández-Robles (2018) points out, we have some challenges to incorporate it into the teaching-learning process and, among them, we can find the following: the lack of teacher training, the lack of resources and objects of learning of AR, not enough centres that support professors in the production of learning objects of AR, and a lack of experiences with AR that could be used as support (Billinghurst y Düenser, 2012; Cabero y García, 2016). In addition, the AR needs contextualized studies in educational processes that allow research into its advantages and limitations; a technology whose functionality and practicality has been highlighted by different researchers (Prendes, 2015; Garay et al., 2017).

3.2. Scenario of the study

The immersive innovative experience is developed through a Seminar on Emerging Technologies carried out in the months of January and February in the academic year 2017-18 in the subject: "Information and Communication Technologies in Social Education", linked to the first year of the Degree in Social Education of the Faculty of Social Sciences of the Pablo de Olavide University, of Seville (Spain) with a load of 7.3 ECTS Credits (European Credit Transfer System). With regard studies program, the subject of "Information and Communication Technologies in Social Education" belongs to the area of Didactics and Educative Organization and is organized around several thematic blocks; in our case, corresponds to the fourth content core called: "Social / cross-cutting themes", in particular it belongs to the unit 9: "Augmented Reality in social training scenarios". The conceptual scheme of the subject can be found at the following link: <http://bit.ly/2xwjh4x>.

The immersive didactic experience was made through a Seminar of Emerging Technologies whose objective was the following educational intentions: 1) Knowing the new applications of AR in educational settings and their pedagogical possibilities in educational contexts. 2) Generating in the students, proactive attitudes towards the augmented technologies and 3) Develop in the student's competences of didactic use on AR applications presented in the training seminar.

The Seminar on Emerging Technologies was developed in three sessions of two hours where the students of both degrees (Double Degree in Social Work and Social Education) learned the concept of the AR, the levels of this technology, the possibilities and limitations of the AR in formative scenarios and the practical use of different applications of AR oriented to the socio-educational context, such as: Quiver, Zookazam, Chromville y Anatomy 4D. To do this, different tablets, paper printed markers (provided by the professor) and mobile phones of the students who downloaded the applications for the use of the AR were used. In Figure 1, students are shown using markers from the Zookazam app.

Figure 1. Students of the Pablo de Olavide University 2017-18 (Seville, Spain)

The training event aimed to achieve the following didactic intentions:

- To know on the part of the students, educational apps of AR to use them in formative socio-educational scenarios.
- Encourage students to develop cognitive and metacognitive skills in the collaborative construction of object designs implemented with emerging technologies.
- Develop in the students, competences of didactic use of the AR apps used in the classroom.

In addition, in the edublog of the subject (Figure 2), a tab was designed called: "Augmented and Virtual Reality", which offered educational materials on this subject and presented a collection of other educational apps, tutorials and news of interest (<http://cort.as/x-F4>).

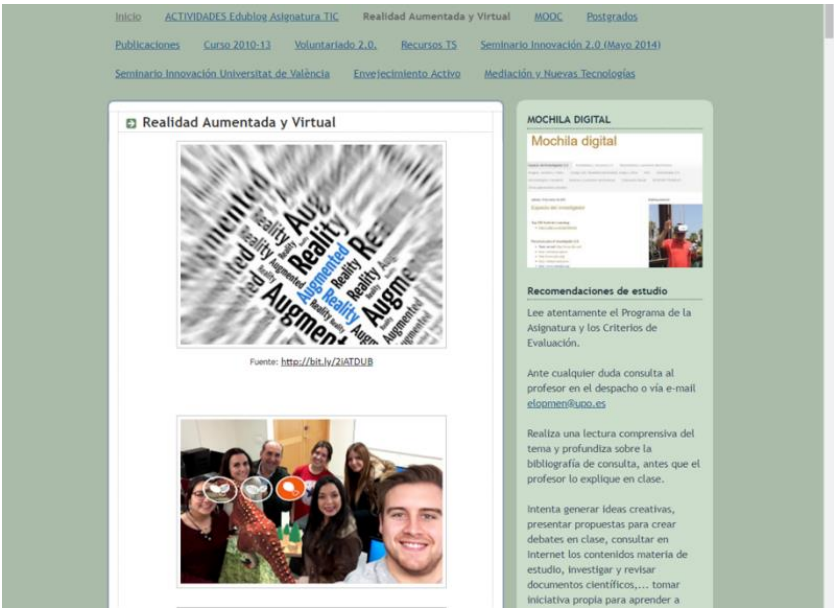

Figure 2. Edublog of the subject: "ICT and Social Education"

At the end of the training seminar each student was asked to complete a questionnaire prepared ad hoc entitled: "Didactic use of the AR", in order to investigate which application used in the AR training seminar was the most motivating, analyze the preferred areas of social intervention for using these immersive technologies

and expose the advantages and limitations of AR in the educational context. Its link is: <https://goo.gl/forms/STik3sI9KdPzZi773>.

Ultimately, each student had to develop a personal edublog for the subject on the evidence of the activities carried out, where one of the tabs should be named Augmented Reality and there they should answer these three questions: 1) What is Augmented Reality (AR)? Advantages and Disadvantages of the AR in the training scenarios. 2) Make a brief comment (max 300 words) about the preferred areas of social intervention (Children, adults, elderly, community care ...) where this emerging technology (AR) can be applied and 3) What application of Augmented Reality seen in the Seminar on Emerging Technologies (Zookazam, Anatomy 4D, Quiver and Chromville) did you like more? In Figure 3, two examples of the edublogs that belong to the students of the Degree in Social Education of the academic year 2017-18 are displayed.

Figure 3. Edublog of a student of the Degree in Social Education. Academic year 2017/18. URL: <https://miblogdeticbeatrizrm.blogspot.com/p/realidad-aumentada.html>.

3.3. Methodological scenario

We approach an exploratory study whose main objective is to know the most motivating and useful educational apps of AR used in the Seminar of immersive technologies for the academic year 2017-18 in the Degree in Social Education.

For this analytical study, the contributions made by the student group were checked by analyzing the words or sets of meanings as units of record. Subsequently, the guidelines established by different authors were taken as a frame of reference (Bogdan & Biklen, 1992; Miles & Huberman, 1994; Monje 2011). Specifically, in a first stage the data was reduced by categorizing and coding the information obtained. The categorization involved simplifying and selecting the information to make it more manageable. For this we follow the following steps:

- Separation of units to identify significant segments of information on the reflections formulated on the concept of Mediation.
- Identification and classification of the units in order to group them conceptually in groups that shared the same topic with meaning.
- Synthesis and grouping of the different information units.

During coding, each textual unit was related to its category through a mixed procedure (inductive-deductive) to proceed subsequently to its frequency count and percentages count.

Ultimately, all categorized information units were analyzed to facilitate the stage of inference and interpretation of results presented below.

The participating sample consisted of: 56 students of the first year of the Degree in Social Education (Subject: "ICT and Social Education") of the academic year 2017-18.

The questionnaire "Didactic use of AR" was implemented (link: <https://goo.gl/forms/STik3sI9KdPzZi773>). The questionnaire design was based on the theoretical considerations made by Barroso and Gallego-Pérez (2017) and was checked by expert judgment in two rounds by means of a Delphi study. The main objective of the questionnaire was to obtain the opinion of the students according to descriptive aspects, such as the preferred areas of intervention, its advantages and limitations and the perceptions

about the different AR apps used in the aforementioned Seminar on Immersive Technologies. In our study we analyze the appreciations and impressions of the 56 students related to the AR apps used in the university classrooms. For this we rely on clicker-based technologies (audience response systems), that is, tools that can be applied in the educational context as feed-back with the student, very useful for monitoring student learning (Caldwell, 2007) and there is evidence that clickers have positive effects on cognitive learning (Hunsu, Adesope & Bayly 2016).

3.4. Results of the immersive innovative experience

First, the response frequency of the 56 students on the most attractive and usable AR apps used in the subject's practices is compiled in Figure 4: "ICT and Social Education" in the Social Education Degree in the academic year 2017-18.

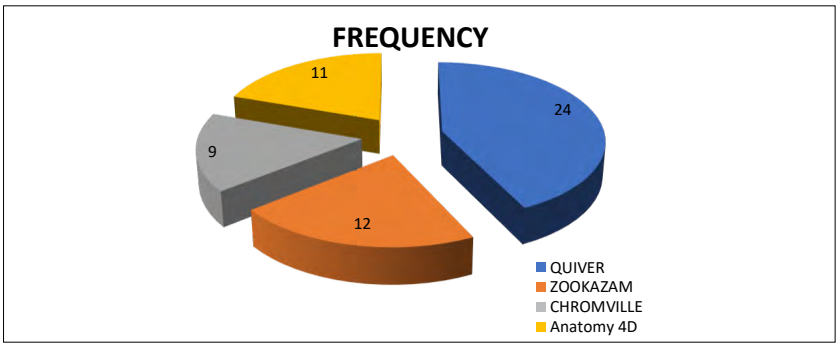

Figure 4. Frequencies of responses from the students of the Degree in Social Education, regarding the most motivating AR apps (2017-18).

Next, Figure 5 shows the perceptions of the 56 students about the AR apps used in the Seminar on Emerging Technologies corresponding to the Degree in Social Education in the academic year 2017-18.

As can be seen in the percentage analysis, the students of the Degree in Social Education (2017-18) reported that the most motivating AR apps used in the Seminar on Emerging Technologies were: Quiver with one (44%), followed by the app Zookazam (23%), Chromville (14%) and the least interesting Anatomy 4D (19%).

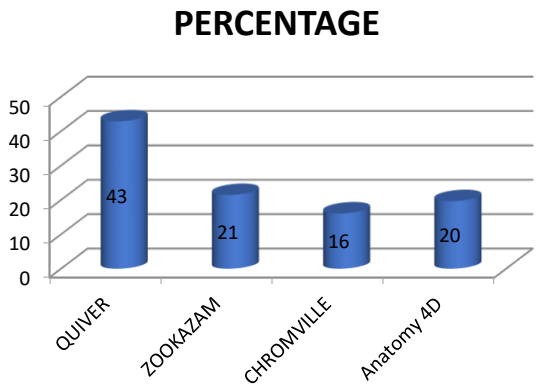

Figure 5. Percentage of the most significant AR apps of the Degree in Social Education for the 2017-18 academic year.

Finally, they showed that Quiver and Zookazam were the most attractive and motivating apps because they were very easy to use, usable, friendly and oriented to educational processes, while the other two were less usable and, in particular, Anatomy 4D was a very specialized and specific app for the field of health. But, all affirmed that these AR apps fostered cognitive abilities, spatial abilities and increased positive attitude and understanding in educational processes. In addition, they also reflected that these apps could offer friendly training scenarios for communication, the promotion of gamification in training scenarios and these could be very suitable and functional didactic resources for their professional future in social contexts.

3.5. Final reflexions

In the first place, it is found in agreement with other studies (Bressler & Bodzin, 2013, Cozar *et al.*, 2015, Cabero, Llorente, & Gutiérrez-Castillo, 2017) that this type of emerging technologies show that students have favorable attitudes towards them and their use favors the motivation towards learning. Besides, it also stimulates a proactive teaching environment (Fombona *et al.*, 2012) and favors a high level of student satisfaction (Han et al., 2015, Kim, Hwang, & Zo, 2016). Likewise, as stated in another research

(Cabero, Vázquez-Cano, & López-Meneses, 2018), the use of AR has been useful in the construction of emerging competences on the use of ICT, the ability to work in teams, the discovery of new immersive didactic resources useful in the scenarios of Social Education and Social Work, unknown by the majority of students, which can help the development of new training processes from a constructivist and researching perspective. In this sense, we want to emphasize that the didactic activities based on the AR can be especially useful in pre-university and higher education studies related to the Humanities and Social Sciences areas, because these activities allow access to contents that are often presented in a more unidirectional way through printed paper that does not increase motivation or require a greater effort of abstraction among students. With this resource, the contents are visualized in a more creative, dynamic and real way, achieving a more attractive, innovative and motivating didactic at any educational level.

The analysis of the didactic experience of the application of the AR with university students allows us to assert as a first conclusion that the use of objects based on augmented technology in Higher Education, arouses real interest among students. This has also been corroborated by different studies that show high levels of satisfaction when students use this technology and the significant increase in levels of motivation when students are immersed in training actions with AR (Chin-Ming & Yen Nung, 2011; Neven, Hala, & Mohamed, 2011; Di Serio *et al*. 2013; Wojciechowski & Cellary, 2013; Cózar *et al*. 2015; Kim, Hwang & Zo, 2016;). In addition, the students have also commented at the Seminar on emerging technologies that its use is interesting and fun, in accordance with other studies (Teo & Noyes, 2011; Fernández-Robles, 2018)

Despite this increase in motivation among students, the application of the AR must also overcome certain limitations such as the possible dehumanization of methodological processes and the need for a relative economic investment that may cause an increase in the digital divide in society and in education.

Despite these limitations, it should be noted in line with Barroso, Cabero & Moreno-Fernández (2016), that their incorporation into teaching is easy, since almost all students have mobile devices and know how to download AR applications. On the other hand, as it is also extracted from the analysis of the results and confirming the study carried out by Barroso & Gallego-Pérez (2017), it is

interesting to see how, in their opinion, a technology like the AR can be used by themselves in their future professional development. In addition, the immersive innovating experience has been useful in the construction of emerging competences on ICT use, ability to work in teams, the discovery of new immersive didactic resources useful in the scenarios of Social Education and Social Work which were unknown by most of the students, which can help the development of new training processes from a constructivist perspective.

Likewise, as it was indicated in 2015 by Cabero, Ballesteros, & López-Meneses, we must state that in view of the current technological, social and communicative framework, Universities should adapt training processes (as the vast majority of them do) attending, among other aspects, to the current characteristics and needs of the students, allowing the easy incorporation of flexible and open scenarios for training and learning that help transform traditional communication models (characterized by the passivity of students) by others in which they can actively participate in the construction of knowledge and where they are aware of their own training process in the acquisition of skills and abilities. We speak, in short, about a new drawing for the university institution, the University 2.0 (Cabero & Marín, 2011).

Ultimately, in accordance with Fernández-Robles (2018), augmented reality can be presented as a technology with real usefulness for university education, since it allows working with active and constructivist methodologies, it offers the possibility to visualize the object from different perspectives, allows the easy acquisition of difficult-to-access knowledge, enables the presentation of simulated scenarios, and enriches the printed material.

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4

The Primary Education Teacher about ICT and Special Educational Needs. A Study in the Spanish Context

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Abstract
One of the main challenges of international organizations, specialized in educational issues, is the measurement and diagnostic of teachers' digital competences, both in primary and secondary education. Within this context, and with the aim of looking at one of these theoretical premises, this study aimed to identify the degree of training and technological knowledge of primary school teachers in Spain with respect to the use of ICT with individuals with disabilities (functional diversity). A descriptive ex post-facto research method was used, where the sample comprised 777 teachers. An ad-hoc questionnaire was used as the data-collection instrument. The results revealed the low skill levels of the teachers with respect to the use of ICT with students with disabilities, where the level of training of the teaching staff was determined by personal (gender, age), professional (teaching experience) or educational (qualifications) variables. Among the conclusions, we highlight that teachers highly believe that ICT are useful resources for the training of people with disabilities. However, their technical management and educational use of the ICT, computers and the Internet had an effect on the knowledge they mentioned having on the use of the ICT with individuals with disabilities. This knowledge was not sufficient, according to the teaching staff. Also, the female teachers were perceived as having more knowledge than the male teachers.

Keywords: information and communication technologies, disability, educational inclusion, accessibility

4.1. Introduction

The work was financed by the Spanish Ministry of Economics and Competitiveness within the State Plan for the Fomenting of Scientific and Technical Research of Excellence 2013-2016 (DIFOTICYD EDU2016 75232-P).

According to the Education at a Glance 2015 report, information and communication technologies (ICT) are an important component of economic growth in all OECD countries. Given the need of today's young people to competently use these technologies as students, as job applicants or workers, as consumers and as responsible citizens, those who do not have access to them or lack experience in their use find more and more difficult to take part fully in economic, social and civic life. However, the basic skills in ICT cannot add value unless they are accompanied by cognitive and other skills, such as those related to communication, creativity, teamwork and perseverance.

The teaching practices that teachers follow can play an important role in the degree of student learning.

One of the main challenges of international organizations, specialized in educational issues, is the measurement and diagnostic of teachers' digital competences, both in primary and secondary education. Along these lines, there have been many investigations and reports, both national and international, that have achieved to define different standards and the development of digital competence indicators. These studies have served as a reference and have encouraged the creation of other studies focused on the systematization of digital competence in an increasingly diverse society. This diversity can generate contexts of inequality if the formation of those that should favour the inclusion is not adequate.

Information and communication technologies (ICT) are an important component of economic growth in all OECD countries. Given the need of today's young people to competently use these technologies as students, as job applicants or workers, as consumers and as responsible citizens, those who do not have access to them or lack experience in their use find more and more difficult to take part fully in economic, social and civic life. However, the basic skills in ITC cannot add value unless they are accompanied by cognitive and other skills, such as those related to communication, creativity, teamwork and perseverance.

Thus, the educational discourse on information and communication technologies (ICT) is deeply rooted on the premise that these are tools that favor the development, inclusion and participation of collectives that have been traditionally excluded.

The ICT facilitate the easy and comfortable access to all types of information; favor the student's autonomy, through their adaptation to the student's needs and demands; contribute to synchronous and asynchronous communication of these students and their peers and teachers; help with adaptation to the environment thanks to the activities that can be conducted; save time for the acquisition of abilities and skills; favor the diagnostics of the student; back a multisensorial model of communication and training; promotes individualized training that favors the student's progress at his or her own pace, which is highly important for these subjects; favors the development of autonomy and independence; prevents margination; the digital divide, which leads to one being unable of using the instruments of development from the society of knowledge; eases the socio-occupational integration of the students who have specific difficulties; provides moments of leisure; saves time for the acquisition of abilities and skills; the exercises that the students must do can be executed and repeated with minimum efforts so that the students acquire the competences, attitudes and capabilities; favors bridging the gap between these individuals and people in the scientific and cultural worlds; or they can be excellent stimulators (Toledo, 2013).

Authors such as Luque & Rodríguez (2009) mention that among the future actions needed for an adequate implementation of the ICT, we find the integration of the technology in the classroom for students with disabilities and the development of research on the methodology and the didactics for the application of the ICT with these students. In the studies that relate the ICT with its possibilities for students with special education needs due to disability, the potential of the ICT for contributing to a better quality of life of students with functional diversity, is made evident (Altinay & Altinay, 2015; Turner-Cmuchal & Aitken, 2016; Vladimirovna & Sergeevna, 2015; Alper & Goggin, 2017; Hollier, 2017).

In this context, the teachers have to be trained with a set of knowledge and skills that allow them, on the one hand, to understand and master different technological resources, and on the

other, to achieve their integration in their didactic practice in the classroom. This implies the necessity of possessing a series of competences that will allow for the implementation of the ICT in the process of teaching-learning (Almerich, Suarez, Orellana, & Díaz 2010).

Within the context in Spain in the last few years, research works have been developed that are related to the initial training of the teachers, and their technological competence and disability (Morales & Llorente Cejudo, 1916; Cabero, Fernández Batanero, & Barroso, 2016). That said, with respect to the active teachers, it should be first pointed out that there is a strong marginality of the works that address the problem of training on the ICT and the competences that these teachers need in their daily practice to be able to use them with disabled individuals. On the other hand, the research conducted evidence the lack of training and knowledge these teachers have with respect to the different types of technologies that could be used. (Roig, Ferrández, Rodríguez-Cano, & Crespo, 2012; Suriá, Martínez & Ordoñez, 2014; Tello & Cascales, 2015). This aspect negatively impacts the use of the ICT, thereby preventing the accessibility of information and the promoting of the individual's capacities, which in the case of individuals with disabilities, could help alleviate their difficulties and in some cases, reduce their limitations to a minimum (Homero, Tejedor, & Calvo, 2017).

4.2. Methodology

To reach these goals, an exploratory study was conducted in the second trimester of 2017. The study of the design was post-facto descriptive, with an accidental non-probabilistic sample. The objectives of the study were: to learn, through the use of a questionnaire, the degree of technological training and knowledge that Primary School teachers have with respect to the use of the ICT for individuals with different types of disabilities. Analyze if this degree of technological training and knowledge is determined by variables such as gender, age, years of teaching experience, education degree, and specialty studied in their initial teacher's training.

The study sample was comprised by 777 teachers from primary schools from the 17 Autonomous Communities in Spain,

with most of these centers being public (f=588, 75.68%), followed by subsidized schools (f=141, 18.15%) and 48 private schools (6.18%). Of these 777 teachers, 216 (27.80%) were men and 561 (72.20%) women. 25.48% (f=198) were less than 30 years old, 27.84% (f=294) were aged between 31 and 40, 30.89% (f=240) were aged between 41 and 55, and 5.79% (f=45) were older than 55 years of age. A little over 35% (35.14%, f=275) had between 1 and 5 years of teaching experience, followed by 18.15% (f=141) who had between 16 and 25% years of experience.

Most of these teachers (43.24%, f=336) were career civil servants, followed by 19.31% (f=150) who were interim staff, with the least number of teachers being substitute teacher (2.70%, f=33).

4.3. Data collection instrument

For data collection, an "ad hoc" questionnaire was utilized, comprised by 53 items with a Likert-type scale with six answer options, which collected information on the following dimensions: general perception of the use of the ICT with people with functional diversity (10 items), ICT for people with visual disability (9 items), ICT for people with hearing disability (9 items), ICT for people with motor disability (7 items), ICT for people with cognitive disability (8 items), and accessibility (7 items).

Table 1 shows the values of Cronbach's alpha obtained, for the instrument overall as well as its different dimensions

Table 1. Cronbach's alpha values

Dimension	Cronbach's Alpha
Total scale	0.993
General aspects scale	0.967
Visual deficiency scale	0.986
Hearing deficiency scale	0.983
Movement deficiency scale	0.982
Cognitive deficiency scale	0.979
Accesibility scale	0.967

The values could be considered "very high", and thus indicate high levels of reliability of the scale and the dimensions that comprise it (O'Dwyer & Bernauer, 2014).

The questionnaire was administered online, and can be viewed at <https://docs.google.com/forms/d/e/1FAIpQLSfux-6m1cU6Nf-69eiiMS28LjcSom38yqe2OmS-Jy4mXAgJVnA/viewform>.

4.4. Results

The data shows that the mean score reached for the instrument overall was 3.26, with a standard deviation of 1.28. This score could indicate that the teachers in the sample considered themselves to be experienced in the use of the ICT with students with functional diversity. This training was better in the "general" perspective (3.70) and in the use with subjects with cognitive (3.45), motor (3.29), and hearing (3.02); on the other hand, the lowest scores were obtained by the knowledge the teachers indicated as having with respect to accessibility (2.85) and the use of technologies with people with "visual" deficits (3.02).

The teachers were asked to score themselves from 0 to 10 on the knowledge they thought to have with respect to the technical and educational management of the audiovisual, computer and internet media; the results are shown in table 2.

Table 2. Assessment of the teachers with respect to their knowledge on the technical and educational management of the different ICT

	Mean	**Std.** Dev.
How do you rate your training on the technical management of audiovisual and computer technologies?	6.58	1.92
How do you rate your training for the educational use of audiovisual and computer technologies?	6.44	1.87
How do you rate your training on the technical use of the Internet?	7.05	1.90
How do you rate your training for the educational use of the Internet?	6.84	2.00

The results indicated that the teachers seemed to have certain knowledge on the use of the ICT, although their use of the Inter-

net was greater than the audiovisual or computer resources and higher in the technical use as compared to the educational use.

One of the objectives of the present research study was to understand if there was a relationship between the level of training/knowledge of the teachers on the use of the ICT with students with diverse disabilities, and the teacher's own perspective on their training on the technical management and for the educational use of the audiovisual, computer and internet technologies. Pearson's correlation coefficient was used, with the scores shown in table 3.

Table 3. Correlations between the technical and educational domains of the audiovisual, computer and internet media and their mastery for the educational use of the ICT with students with functional disabilities (* p≤ .05 - ** p≤ .01). T.M. AV-Co (Technical mastery audiovisual-computer); E.M. AV-Co (Educational mastery audiovisual-computer); T.M. Int (Technical mastery Internet); E.M. Int (Educational mastery Internet)

		T.M. AV-Co	E.M. AV-Co	T.M. Int	E.M. Int
General	Pearson's Correlation	.106**	.149**	.192**	.209**
	Sig.(bilateral)	0.003	0.000	0.000	0.000
Visual	Pearson's Correlation	0.036	.080*	.099**	.111**
	Sig.(bilateral)	0.314	0.026	0.006	0.002
Hearing	Pearson's Correlation	.090*	.130**	.140**	.156**
	Sig.(bilateral)	0.012	0.000	0.000	0.000
Motor	Pearson's Correlation	.072*	.088*	.111**	.101**
	Sig.(bilateral)	0.044	0.015	0.002	0.005
Cognitive	Pearson's Correlation	.084*	.097**	.140**	.152**
	Sig.(bilateral)	0.019	0.007	0.000	0.000
Accessibility	Pearson's Correlation	0.053	.088*	.134**	.123**
	Sig.(bilateral)	0.144	0.014	0.000	0.001
Total	Pearson's Correlation	.079*	.115**	.148**	.156**
	Sig.(bilateral)	0.027	0.001	0.000	0,000

The results were split three ways: in first place, there were primarily significant relationships between the technical and educational mastery of the audiovisual, computer and internet media, and the mastery the teachers point to having on the use of the ICT with students with functional diversity, in general as well as for different types; in second place, the correlations are positive, so that when a variable increases, the other does as well in the same direction; and in third place, and in agreement with Mateo (2004), these correlations are very low.

As for the existence of significant relationships between the knowledge mentioned by the different teachers on the different dimensions that were asked about in the questionnaire (general, visual, hearing…etc.) a new Pearson's correlation coefficient was used, with the values shown in table 4.

Table 4. Correlations between the different dimensions in the questionnaire. (**p≤ .01).

Dimensions compared	Correlation
General-Visual	.738**
General-Hearing	.775**
General-Motor	.744**
General-Cognitive	.770**
General-Accessibility	.676**
Visual-Hearing	.814**
Visual-Motor	.804**
Visual-Cognitive	.742**
Visual-Accessibility	.773**
Hearing-Motor	.865**
Hearing-Cognitive	.832**
Hearing -Accessibility	.753**
Motor-Cognitive	.837**
Motor-Accessibility	.774**
Cognitive-Accessibility	.728**

In this case, the results showed that all the correlations were positive and significant to ** p≤ .001, and very high. In other terms, the teachers who indicated being trained in one of the dimensions were also trained in the others.

With the objective of delving into the possible relationships between training in the dimensions examined in the questionnaire, the following hypotheses were formulated:

- Null hypothesis (H0): There are no significant differences with an alpha risk of rejecting the hypothesis of 0.05, or less between the different dimensions compared.
- Alternative hypothesis (H1): There are significant differences with an alpha risk rejecting the hypothesis of 0.05 or less between the dimensions compared.

For this, the Student's t-test was used. The resulting values, for 776 degrees of freedom, are presented in table 5.

Table 5. Student's t-test values between the different dimensions examined in the questionnaire. (**p≤ .01)

Dimensions compared	t
General-Visual	19.529**
General-Hearing	14.617**
General-Motor	10.846**
General-Cognitive	6.855**
General-Accessibility	21.973**
Visual-Hearing	-5.766**
Visual-Motor	-8.164**
Visual-Cognitive	-11.349**
Visual-Accessibility	5.028**
Hearing-Motor	-3.170**
Hearing-Cognitive	-7.952**
Hearing - Accessibility	9.683**
Motor-Cognitive	-5.093**
Motor-Accessibility	12.375**
Cognitive- Accessibility	15.380**

The resulting values led to the rejection of all the H0, so that it could be concluded that there were statistically-significantly differences as well as an alpha risk of rejecting the H0 of p≤ .001, with respect to the knowledge shown by the teachers on the different types of knowledge on the use of the ICT with individuals with different types of functional diversity.

Another of the hypothesis referred to the existence of differences in the knowledge as a function of the gender of the 216 male teachers and the 561 female ones, with the means shown in table 6.

Table 6. Values reached as a function of the teacher's gender

	Gender	Mean
General	Male	3.6000
	Female	3.7326
Visual	Male	2.8356
	Female	3.0914
Hearing	Male	2.8920
	Female	3.3244
Motor	Male	3.2560
	Female	3.3086
Cognitive	Male	3.1337
	Female	3.5782
Accessibility	Male	2.8869
	Female	2.8304
Total	Male	3.0967
	Female	3.3196

As shown in the mean values, they tended to be higher for the women than for the men, except for the dimension "accessibility".

In order to analyze if the differences found were significant from a statistical point of view, a Student's t-test was used for independent samples, although before this, a Levene's test was used to analyze the equality of the variances (homoscedasticity), and as a function of the significance value obtained, to determine the

t-value that should be used. Table 8 shows the values obtained and the degree of significance in order to accept or reject the H0, which referred to the non-existence of significant differences.

Table 7. Differences as a function of gender of the teachers. (** p≤ .01)

		Levene's test				
	F	Sig.	t	Df	Sig.	
General	Equal variances are assumed	1.582	.209	-1.447	775	.148
	Equal variances are not assumed			-1.500	420.348	.134
Visual	**Equal variances are assumed**	20.998	.000	-2.253	775	.025
	Equal variances are not assumed			-2.459	472.723	.014**
Hearing	**Equal variances are assumed**	8.248	.004	-3.667	775	.000
	Equal variances are not assumed			-3.898	444.653	.000**
Motor	Equal variances are assumed	3.106	.078	-.426	775	.670
	Equal variances are not assumed			-.441	420.314	.659
Cognitive	Equal variances are assumed	.618	.432	-3.641	775	.000
	Equal variances are not assumed			-3.702	403.679	.000**
Accessibility	**Equal variances are assumed**	6.028	.014	.488	775	.626
	Equal variances are not assumed			.519	445.475	.604
Total	**Equal variances are assumed**	7.550	.006	-2.181	775	.029**
	Equal variances are not assumed			-2.326	447.749	.020

The results did not lead to the rejection of the H0 that referred to the non-existence of statistically-significant differences to p≤ .05 or less in the following dimensions: general knowledge, application of the ICT for people with motor deficit and accessibility. On the other hand, there were significant differences in the following dimensions: visual, hearing and cognitive. It should be mentioned that the H0 was also rejected in the scores found for the instrument overall. In every case, the female teachers had greater knowledge than the men on the useof the ICT with people with functional diversity.

To analyze if there were statistically-significant differences as a function of the teacher's ages, an ANOVA was used (table 8).

Table 8. ANOVA as a function of the teacher's ages (** p≤ .01)

		Sum of squares	Df	Quadratic mean	F	Sig.
General	Among groups	66.650	3	22.217	18.059	.000**
	Within groups	950.966	773	1.230		
	Total	1017.616	776			
Visual	Among groups	84.361	3	28.120	14.656	.000**
	Within groups	1483.091	773	1.919		
	Total	1567.452	776			
Hearing	Among groups	146.115	3	48.705	24.070	.000**
	Within groups	1564.151	773	2.023		
	Total	1710.266	776			
Motor	Among groups	144.282	3	48.094	21.786	.000**
	Within groups	1706.419	773	2.208		
	Total	1850.702	776			
Cognitive	Among groups	148.903	3	49.634	22.790	.000**
	Within groups	1683.529	773	2.178		
	Total	1832.432	776			
Accessibility	Among groups	47.184	3	15.728	7.732	.000**
	Within groups	1572.476	773	2.034		
	Total	1619.661	776			
Total	Among groups	94.008	3	31.336	20.591	.000**
	Within groups	1176.355	773	1.522		
	Total	1270.362	776			

The results allowed for the rejection of all the H0 formulated that referred to the non-existence of significant differences as a function of the teacher's age, to significance level of p≤ .01, with respect to the knowledge the teachers mentioned having on the application of the ICT for individuals with functional diversity. These differences were found in their general knowledge, as well as the one possessed by the different types of diversity.

In order to understand if there were differences between the different age groups, a "Post-Hoc" ANOVA analysis was applied

for multiple comparisons (Miller, 1997) (Table 9). It should be noted, that to not over-explain on the results, and as they were very similar, only the data collected when the test was applied to the entire instrument are shown.

Table 9. Post-test of multiple comparisons for the differences obtained as a function of age

Age	Age	Differences in means	Standard error	Sig
Younger than 30	Between 31 and 40	.44349	.11341	.000**
	Between 41 and 55	.72222	.11843	.000**
	Older than 55	1.34934	.20372	.000**
Between 31 and 40	Younger than 30	-.44349	.11341	.000**
	Between 41 and 55	.27873	.10732	.010**
	Older than 55	.90585	.19747	.000**
Between 41 and 55	Younger than 30	-.72222	.11843	.000**
	Between 31 and 40	-.27873	.10732	.010**
	Older than 55	.62712	.20040	.002**
Older than 55	Younger than 30	-1.34934	.20372	.000**
	Between 31 and 40	-.90585	.19747	.000**
	Between 41 and 55	-.62712	.20040	.002**

As it can be observed, differences were fundamentally shown between the younger professors with respect to the older ones. Thus, it could be said that the 10-year cutoff used was enough for establishing differences in the knowledge the teachers indicated as having on the application of the ICT with individuals with functional diversity.

4.5. Conclusions

The conclusions derived from the data presented, in relation to the objectives proposed, reveal interesting aspects such as:

- The teachers highly believe that ICT are useful resources for the training of people with disabilities. However, their technical management and educational use of the ICT, computers and the Internet had an effect on the knowledge they mentioned having on the use of the ICT with individuals with disabilities. This knowledge was not sufficient, according to the teaching staff.
- The low level of training indicated was on the general overview as well as the specific application to individuals with disabilities: Visual, Hearing, Motor and Cognitive, as well as to accessible design and accessibility. These low scores are the result of the little training received.
- The female teachers were perceived as having more knowledge than the male teachers.
- The age of the teachers and the years of experience had an effect on the level of knowledge on the use of the ICT with people with disabilities. In this sense, in both cases the younger teachers mentioned having more knowledge. This could be due to these younger students having finished their studies very recently, which coincided with the recent addition of training on the use of the ICT with people with disabilities in the curriculum. This interest could have been fed by the recent appearance of manuals on the ICT and disabilities in different universities in Spain, in Masters' degree in special education, etc.

As for the limitations of this research work, three can be highlighted only information on the teaching staff was collected, and it would be important to collect information on the educational center's directors as well.

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5

Making an Argument in the Arts: Using Genre Analysis to Inform Embedded Academic Writing Support in a UK Arts University

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Abstract

Students entering art and design courses in UK higher education come from a range of educational and cultural backgrounds. These students frequently report finding academic writing challenging. Expectations as to the nature of description, analysis and criticality can also differ across subject areas. As a result, students need support in developing their ability to communicate appropriately within their disciplines – their academic literacies. This study applies genre analysis to identify ways in which students express critical thinking in undergraduate *Visual Effects Design and Production* essays. The findings highlight common ways of linking ideas through exemplification, drawing conclusions from grounds, and challenging the validity of assumptions. Ways of expressing the strength of claims and indicating the writer's attitude are also frequently used in the sample. The findings are then integrated into a practical model for impromptu teaching of writing by subject lecturers. The article confirms understandings of the way students express criticality in essays, and aligns insights from genre analysis and academic literacies in a novel way. The outcome is a proposal for a practical, low-preparation approach to teaching academic writing within the disciplines.**Keywords**: blended learning, active methodologies, students' participation, learning community, teaching-learning processes.

Keywords: genre analysis, criticality, academic writing, academic literacies, embedded

5.1. Introduction

This chapter describes the attempt to improve academic writing support on the Visual Effects for Film and Television (VFX) undergraduate degree course at a UK arts university. The study is based on systematic analysis of student written assignment texts and teacher feedback produced within the particular discipline.

Though students at the university are required to produce written work for assessment, students enrolled in arts subjects commonly struggle with expressing themselves in writing. As such, a clear need exists for support which equips students with the knowledge and skills they need to produce written assignments. The research project attempts to apply an 'embedded' approach to supporting academic writing in the novel context of an arts university.

The first section explores how understandings of academic writing and communication have developed in UK higher education. This development moves from initial conceptions of discrete skills, to more nuanced concepts of academic literacies within discourse communities. Within these discourse communities, distinct genres of writing are identified which reveal particular communicative purposes and language structures.

Diverse students, diverse support needs

Student populations at UK universities are diverse in terms in of their prior educational experiences and nationalities. At the same time, most courses rely on written assignments as an important aspect of student assessment. As a result, dealing with this diverse student body "poses a great challenge to universities to ensure progression of students from different educational backgrounds and abilities" (Wingate, 2006, p. 457). In this context, innovative approaches to supporting students in developing their writing ability are required. This is especially the case among students in arts and design courses who often resist writing as "they find it constraining and difficult" (Borg, 2012, p. 5).

Moving from teaching generic study skills to developing academic literacies

The UK university system typically requires students to specialize in a particular subject area at an early stage in their studies. Subject lecturers often have limited time, resources or expertise to focus specifically on supporting student writing in addition to developing core knowledge and skills of their discipline. Conventional institutional responses to this were to establish generic, extra-curricular support services, separate from subject departments which aimed to help students develop their 'study skills'. However, simplistic approaches to teaching discrete skills of 'academic writing' or 'academic reading' to students across a range of disciplines were quickly found to be inadequate, as these skills are both linked with one another and embedded within their contexts of use (Maldoni, 2017). As a result, more nuanced understandings of 'academic literacies' developed which embody "the ability to communicate competently in an academic discourse community" (Wingate, 2015, p. 6).

Applying academic literacies insights via genre approaches

The academic literacies approach is sensitive to the ways particular discourse communities develop norms of communication as social practices, with common understandings of how knowledge can be constructed and shared (Lillis, 2006:33). The practices of particular discourse communities are revealed, for example, in the distinct expectations for forms of analysis required in subjects as seemingly similar as History and English Literature (Chanock, 2000). However, researchers have claimed that the academic literacies perspective has limited utility in teaching students the practice of writing, so have attempted to use it alongside the more text-focused aspects of genre awareness (Wingate & Tribble, 2011). Genre is "both a social and a cognitive concept" (Hyland, 2008) which represents the way texts can be categorized or grouped according to how their writers use, and how their readers understand language. Genre analysis of texts focuses on the aims of the writer (their communicative purpose), how texts are structured and how language is used to achieve that purpose. In order to usefully apply this genre approach, therefore, it is necessary to look at the particular forms of writing used in a particular setting.

Analysis, argument and criticality in academic essays

For students in UK universities, including those on arts courses, the dominant form of written assessment is the "argumentative essay" (Hewings, 2010). In such essays, student writers are expected to "argue for a particular position in relation to a given question or proposition" (Moore & Morton, 2005, p. 74). In order to construct a successful argument, writers must demonstrate "a critical stance through the text" (Bruce, 2016, p. 14). For these reasons, this research project focuses on ways students demonstrate critical thinking in their essay writing.

It is difficult, however, to capture the meaning of the term 'critical thinking' in a single definition. In common with studies in genre analysis and academic literacies, research published in the broader higher education literature has shown that ways of thinking and creating knowledge differ across disciplines. Almost twenty years ago Chanock (2000) demonstrated that the idea of 'analysis' can be interpreted differently by both students and teachers in different subject areas. In Chanock's study, tutor feedback on work deemed insufficiently critical frequently noted that there was "too much description and not enough analysis" (p.95). However, students frequently found it difficult to understand and act upon this kind of feedback, because teacher understandings and expectations regarding the nature of 'analysis' in their respective disciplines were not clearly defined or explained. Chanock's study calls for teachers to directly demonstrate a range of models of successful analysis in the various contexts relevant to their subject areas.

Similarly, Moore (2013, p. 506) surveyed HE tutors in Humanities and found seven "definitional strands" of critical thinking. Moore argues that because understandings of criticality are "multiple" and "contested", teachers must discuss and encourage engagement with particular uses of critical thinking "within quite specific study contexts" (2013, p. 520). This suggests that commonly used generic models of argumentation such as Toulmin's (2003) three-part identification of *grounds*, *claims* and *warrants* may not be sufficient in helping students across disciplines to understand the different requirements of writing tasks (Nesi and Gardner, 2012). Indeed, Nesi & Gardner's findings on argumentation align with Chanock's view on analysis (stated previously) in that the way argument is used differs across subject areas.

'Signalling' analysis and argument in writing

It is clear, then, that criticality is expressed in multiple ways in university writing. One way to deal with this diversity is to focus on how key aspects of analysis and argument are linked together and "signalled" in writing (Bruce, 2016, p. 15). Bruce attempts to bring together diverse ways of looking at criticality through a "holistic, multiple-variable examination of expression of critical thinking" (2016 p. 16), using his *social genre/cognitive genre* model (Bruce, 2008). The social element of the model focuses on how the overall purpose of a text is realized within a discourse community. The cognitive element explores how a writer's rhetorical aims are realized through particular stretches of texts and the way they are organized or linked together. Taken together, these elements of the model can help reveal how a writer's "critical stance" can be demonstrated (Bruce 2016 p.15).

Using insights from genre analysis to inform teaching of writing

Teaching students how to identify and ultimately express this critical stance is, then, the next challenge in supporting student essay writing within particular disciplines. Borrowing insights from Systemic Functional Linguistics, genre approaches often use Feez's (1998, in Hyland, 2008, p.558) 'teaching-learning cycle' as a basis for planning writing sessions for students. This approach scaffolds students' attempts to produce written texts through a "a series of linked stages which support learners towards understanding texts" (Hyland, 2008). The stages gradually extend the demands required of students in their writing, progressing through the following steps (Feez, 1998; in Hyland, 2008, pp. 558-559):

1. Setting context - identify the purposes and setting of the written genre
2. Modelling - analysing examples within the chosen genre for text stages and particular elements used
3. Joint construction - students are supported in producing selected sections of texts or functional language
4. Independent construction - students write particular text types, teacher monitors

5. Comparing - students look at examples of the same or different genres, thinking about how particular texts work to achieve their social aims within a discourse community

By employing this model of genre analysis, this research aims to contribute to understandings of how students express criticality in a sample of 10 academic essays. It then considers how writing support embedded in disciplinary teaching can use these insights from genre analysis to enhance students' ability to write critically in an arts university context. This responds to an identified need for "systematic research […] to obtain a more nuanced account of texts produced by learners and expert writers across a wider range of disciplines" (Wingate & Tribble, 2012, p. 491). This need is particularly acute in the art and design contexts where research into student writing is relatively limited, and is often focused on doctoral writing or research articles (Paltridge *et al.*, 2012; Ravelli *et al.*, 2013).

As such, the research questions (RQ) for this study are:

- RQ1: How do students express a critical stance in academic essays in VFX?
- RQ2: How can embedded writing classes support student use of a critical stance in these essays?

This introduction section has highlighted the need for an innovative embedded approach to supporting student writing in art and design higher education. It has also shown how concepts of academic genre and academic literacies can provide a useful basis for understanding and teaching written academic communication, and linked this to the aims and research questions. The second section sets out the research design and identifies how Bruce's model of social/cognitive genre is used to identify how students express a "critical stance" in various ways in the sample of written essays. The third section outlines the findings of the research, followed in section four by a discussion of how these findings broadly align with previous studies of critical stance in academic essays from other disciplines, and a discussion of how these findings might be practically applied in an educational setting via the use of academic "literacy windows" in lectures or seminars.

5.2. Method

The VFX undergraduate degree course was chosen as a focus because lecturers had observed that students often had problems producing high quality written work, especially in essays. Though student attitudes were not directly surveyed, lecturers reported that many students on the course found writing difficult or unpleasant. This broadly supports Borg's claims that HE students in arts contexts find writing particularly challenging (Borg, 2012).

The study used a purposive sample of 10 second year undergraduate VFX student essays. All essays had been graded by course lecturers as 'first' (n=1) or 'upper second' class (n=9), so received the highest or second highest overall grade classification for the task. These essays were selected intentionally as samples of 'good' student work, as the research aimed to identify useful, authentic exemplars of students taking a critical stance which could inform future writing development activities in the classroom. Essays had an average length of 3000 words, so the sample was approximately 30 000 words in length overall.

Permission to use the essays was obtained from all of those involved following research ethics guidelines of the university. These essays selected were produced by students in second year courses, so that any insights produced from the research could benefit participants in the study as they moved through the university, and help new students entering in subsequent years.

The social/cognitive genre model

As noted in the introduction section, the analytical approach follows Bruce (2016) in using the social genre/cognitive genre model to identify how student writers express a critical stance in argumentative essays.

Social genre is the broader level of analysis, concerned with the "overall social purpose" of a text. In contrast, cognitive genre looks at the way a writer deals with the "cognitive orientation and internal organization" of a text and its particular sections. Following indications from Bruce's recent work, this study focuses on the social genre element of "stance" (Paltridge, 2014), and the cognitive genre element of "interpropositional relations" (Crom-

bie, 1985) as ways to identify the critical stance of a student writer. Social and cognitive genres are explained in turn below.

Social genre: Analysis of 'evaluative features'

A writer's stance is realized through various "metadiscourse devices" which can guide the reader in their understanding of a text. Most relevant to this study are the "evaluative features" of a text which involve the reader in the argument being made (Hyland, 2017, p. 20). In this study, student essays were manually analysed for the following evaluative features:

- **Hedges** (might, perhaps, possible, about)
- **Attitude markers** (unfortunately, I agree that, surprisingly) and **boosters** (in fact, it is clear, certainly)
- **Engagement markers** (consider, note that, you can see that)
- **Self-mentions** (I / we / my / our)

Cognitive genre: Analysis of 'interpropositional relations'

In terms of cognitive genre, the most relevant aspect of Bruce's model is its use of Crombie's (1985) concept of "interpropositional relations" which show relationships between statements within a writer's argument. According to Bruce (2016), writers express meaning by constructing "binary relations between two propositions", connecting ideas in both language and meaning (2016, p. 17-18). Linguistic links can be shown with overt linking terms such as 'because' or 'as a result', or statements can simply be placed in sequence to create various kinds of meaning as shown in Table 1 below:

Table 1. The meaning and use of interpropositional relations (adapted from Crombie, 1985)

Interpropositional relation	Explanation / example
Amplification	the second clause in a sentence repeats the propositional content of the first, but adds detail or specifics to that content. *X works as an active element that Y understands to be ...*

Concession / contraexpectation	the truth of an inference is directly or indirectly denied, signalled by subordinators, prepositions or conjunctions. *Although X, Y …; X appears to suggest, but …is highly problematic; This seems … , yet … /*
Condition / consequence	one clause states a condition or hypothetical cause for the event or observation in the other clause. *If X works poorly, Y will occur.*
Grounds / conclusion	deduction from an observation: *X can be observed in the film, therefore it can be concluded that Y is …*
Means / result	one clause states how a result stated in the other can be achieved. *The director provokes reaction X by doing Y.*
Reason / result	a reason element explains why a particular effect (the result) came about. *As a result of X, Y happened; X is true because/as …*
Statement exemplification	one clause makes a general statement and the other gives a proposition as an example of the first statement. *The use of visual effects is very subtle. For example, the use of X and Y evoke …*
Simple comparison	Stating that one thing is similar to another
Simple contrast	Stating that one thing is different from another

Following Bruce (2016), each student essay was manually analysed by one of the researchers in a series of stages:

1. Identify the overarching argument made and text structure.
2. Highlight extracts from the text which express the student's critical stance in relation to the essay question.
3. Code the extracts in terms of (a) metadiscourse markers and (b) coherence relations which help to express the student's critical stance.
4. Summarise and compare elements of critical stance across the sample.

Due to constraints of time and resources, one researcher acted as the sole manual rater to read and code the texts, but used a 'critical friend' also familiar with genre analysis to confirm interpretations of key stretches of text or categorizations.

A table of coded extracts was produced for each essay, and an overall summary sheet produced for discussion with the subject lecturer. The researcher and subject lecturer then examined the results together in order to consider how the findings might lead to research-informed teaching interventions on future courses.

5.3. Results 1: Identifying critical stance in essays

Following Bruce (2016), this study focused on identifying writers' statements of their critical stance in essays. It did this by using the social/cognitive genre model to analyse student essays as described above. The analysis identified 173 critical statements overall across the ten essays, giving an average of 17 critical statements per essay. These statements could be found at any stage of the essay, rather than being focused at any particular points (such as the conclusion, though unsurprisingly every essay contained at least one statement of critical stance in the conclusion section).

In attempting to fully answer RQ1, the analysis followed Bruce (2016) by focusing closely on identifying the most common metadiscourse markers and coherence relations used to express a critical stance in these critical statements. The overall answer to RQ1 was that the writers expressed their critical stance in argument essays primarily by:

- Using metadiscourse markers of (1) attitude markers and (2) hedges
- Using interpropositional relations of (1) Statement exemplification, (2) Amplification, (3) Grounds / conclusion and (4) Concession / contraexpectation.

Though some statements of critical stance only contained a single element (an interpropositional relation or metadiscourse marker), many statements contained both or even multiple instances, as in extract one below:

> …certain markers of film genre are common. **However,** audience expectation regarding these markers <u>can in some cases</u> lead to inclusion of stereotypical characters. [Essay 1]

The extract shows a concession / contraexpectation **interpropositional relation** (in **bold**), and a hedging <u>metadiscourse</u> <u>marker</u> (<u>underlined</u>) occurring within a statement of critical stance.

The following section will consider in more detail the identification of metadiscourse markers and interpropositional relations.

5.4. Results 2: Use of metadiscourse markers

Using Hyland's concept of 'stance' from Bruce's social genre model, the critical statements were analysed for use of expressions which function by "assisting the writer (or speaker) to express a viewpoint and engage with readers as members of a particular community" (2005, p. 37). A total of 173 such metadiscourse markers were identified in critical statements from the essays, an average of 17.3 per essay. It should be noted that the researcher at times found the distinction between boosters which show the "writer's certainty" and attitude markers showing "the writer's attitude" difficult to make. For example, it was difficult to clear distinguish between certainty and attitude in statements such as 'I believe' or 'it is important'. As a result, the researcher decided to categorize the 'booster' and 'attitude marker' elements together in the coding process. This choice can be justified in that the focus of the study is to identify language used to express a critical stance as a teaching tool, rather than as a focus on comparing instances of particular micro elements of language use.

This dual category of attitude marker/booster was therefore the most frequently used, comprising over 60% of all metadiscourse markers identified (78 in total, 7.8 per essay). Hedging language was the next most frequently used technique, by which the writer could demonstrate or "withhold … full commitment to statements" (Hyland, 2004, p. 111). As shown in Table 2, hedges were used 34 times in total across the essays with an average of 3.8 instances per essay. Hedging language took a variety forms but the majority of hedges (19 of the 34) made use of modal verb constructions (*can*, *might*, *could*).

Table 2. Use of discourse markers in statements of critical stance in student essays

Discourse markers	Total number used	Percentage	Average per essay
Attitude marker/booster	78	61.4%	7.8
Hedge	34	27%	3.8
Self mention	10	8%	2
Engagement marker	5	4%	2.5
	127		12.7

5.5. Results 3: Interpropositional relations

A range of interpropositional relations were employed by students in their essays, with a total of 221 used across the sample, giving an average of 22.1 per essay. The most frequent inter propositional relations used were statement exemplification (totalling 46 across the sample, almost 21% of all such propositions used). Next was amplification (44, 20%), followed by grounds / conclusion and concession / contra-expectation (both having 37 propositions each, 16.7% of the total). The full details as to use and frequency of interpropositional relations in the essays can be seen in Table 3 below.

Table 3. Use of interpropositional relations in statements of critical stance in student work

Interpropositional relation	Total number used	Percentage	Average per essay
Statement exemplification	46	21%	4.6
Amplification	44	20%	4.9
Grounds/conclusion	37	17%	3.7
Concession/contraexpectation	37	17%	3.7
Means/result	34	15%	3.8
Reason/result	9	4%	1.5
Condition/consequence	8	3.5%	1.3
Simple contrast	3	1.5%	1.5
Simple comparison	3	1.5%	1
	221		22.1

The essay required that students analyse a number of films as a key part of the task, so it is perhaps not surprising that statement exemplification was used most frequently (on average 4.6 times per essay). Many statements were made which presented a student's critical stance on a particular matter, and this was then illustrated with the use of an example. Students were able to articulate a range of linguistic means to provide examples (*for example, such as, this is shown in […], this is an example of …).*

The second most common interpropositional relation was amplification (averaging 4.9 per essay). Amplification involves simply adding specific detail to a previous statement, often using *'which/ that'* as a way to link the ideas as the following examples show:

> [Film X] employs a number of different styles of VFX, **which** contribute to the narrative in terms of … [Essay 7]

> …we see use of cinematography to create distinguishing shots **that** focus the audience on a specific object … [Essay 9]

The next two most common relations involved constructions of grounds /conclusion and concession / contraexpectation (both on average 3.7 times per essay). Grounds / conclusion relations often explicitly show a deduction being made from an observation, and help students to clearly highlight their thinking on a particular subject:

> Spectacle can enhance the visual storytelling in a film… **Therefore,** [film genre X] uses VFX to support and expand upon … [Essay 6]

> …The emblematic VFX within [film Y] catalyses both the narrative and themes directly, and **therefore** answers the question of … [Essay 5]

Concession / contra-expectation statements were the joint third most commonly used interpropositional relations. These constructions allow students to demonstrate their knowledge of, for example, a common assumption or widely held idea, but then go on to challenge its accuracy or appropriateness in a particular context:

> Without visual effects this would not have been possible, **however** it can be argued that to tell the story… [Essay 1]

> Many films were seen as science fiction purely for utilising effects. **However,** we have learnt that… [Essay 3]

> **Although** [film genre X] may be cordoned off into its own category independent of [genre X], they still share the same foundations of… Essay 5]

The next most common interpropositional relation used was means / result (34, 15.4% of total). Again, the frequency of use of this construction is perhaps unsurprising given the nature of the task (to explain how and why VFX can be used in film).

5.6. Discussion

The broader literature on critical thinking suggests that different disciplinary communities may differ in their expectations about how criticality is expressed (Chanock, 2000; Moore, 2013). The findings of this study confirm this in that the way criticality is signalled in VFX (itself an adapted form of film studies) differs in some respects to expression of criticality in Bruce's (2016) study of sociology and English literature argument essays (see Table 4). However, the difference lies mainly in the order of the three most frequently used signals of critical stance (interpropositional relations), rather than in types of relations used:

Table 4. Frequency of type of interpropositional relation used in VFX compared to Bruce's (2016) study of sociology and English literature

	VFX	Sociology	English literature
1	Statement e.g	Reason result	Grounds conclusion
2	Amplification	Concession contraexpectation	Concession contraexpectation
3	Grounds conclusion	Grounds conclusion	Reason result
4	Concession contraexpectation	Amplification	Amplification

As shown in Table 4, Bruce (2016) identified amplification, grounds / conclusion, and concession / contraexpectation as 3 of the four most commonly used interpropositional relations in essays from sociology and English literature, and these have been similarly identified in undergraduate writing on VFX in this study (though in different orders of frequency).

Though the frequent use of metadiscourse signals of hedging and attitude markers was also very broadly in line with those in Bruce's study, the findings in this area are less comparable given the decision to combine the categories of attitude marker and booster in this research project. In any case the particular patterns for frequency of use were not similar across subjects as show in Table 5 below.

Table 5. Comparison of use of metadiscourse markers across subjects as a percentage of markers used in the essays

	VFX	Sociology	English literature
Attitude marker	61.4%	74%	42%
Hedge	46.5%	15%	46.5%

This study acknowledges that argument is a key aspect of effective essay writing (Hewings, 2010; Moore and Morton, 2005:74), and focuses on how successful student writing actually makes an argument. As a result, the findings of this study can contribute to teacher and student understandings of how knowledge can be constructed and shared in a particular discipline (Lillis, 2006). The following sections explore RQ2 on how these findings might inform teaching practice.

Teaching critical stance in embedded writing support classes

The findings of RQ1 answer, to a limited extent, Wingate and Tribble's call for "systematic research […] to obtain a more nuanced account of texts produced by learners and expert writers" in particular disciplines (2012, p. 491). The research literature is clear that to be most effective, support for students in developing their academic writing is most effective when embedded within the students' academic discipline (Maldoni & Lear, 2016). It is important, then, to consider how these empirical findings can be used to provide writing support which is embedded within VFX courses.

The results of the study were discussed and analysed in collaboration with the VFX course lecturer. Both the researcher and lecturer agreed on the possible usefulness of a combined focus on argument and its written expression in teaching sessions. In fact, the unit which includes the essay task already has three essay-focused academic writing sessions embedded within it. In these sessions, subject lecturer, subject librarian and academic writing tutors collaborate to support students towards completing the essay task.

However, concerns were raised about the lack of space for additional, extensive teaching interventions using these insights within an already crowded syllabus. As a solution, we propose to intertwine subject lectures/seminar discussions with occasional

"literacy windows" (Wingate, 2016, p. 360) in which "time is set aside to focus on academic literacy conventions and requirements …[including] how knowledge is presented and debated in the literature, how claims are made".

Responding to concerns about lack of time for dedicated sessions, these 'windows' could be opened at convenient times during lectures or seminars, at points when suitable examples arise from discussion of authentic disciplinary subject matter. For example, in discussing a current debate in the field of VFX, the teacher could introduce and model an example statement of critical stance which might be found in a student essay using the concession / contra expectation structure. A one or two sentence language structure could be modelled on a whiteboard / projector, whilst the lecturer makes the purpose and context of such academic communication clear to students. A quick follow up activity could ask students to generate, in small groups, a relevant example which illustrates the point made in the concession / contraexpectation statement. The small groups could then jointly produce a reformulated written sentence to express their idea in academic style, perhaps adding hedging or attitude markers under guidance from the lecturer. Students could then briefly share and compare their sentences.

These activities make use of the empirical findings on how critical stance is expressed in VFX (through interpropositional relations and metadiscourse markers). Furthermore, the approach can be aligned with a suitable pedagogic approach in the form (outlined in the introduction) of Feez's teaching-learning cycle (1998), which is designed to operationalise insights in genre-based approaches to the teaching of writing. The proposed activities link the teaching content (generated by this piece of genre research) to Feez's genre-informed teaching approach, as highlighted in Table 6 below:

Table 6. Stages of Feez's (1998) teaching-learning cycle mapped against a proposed 'academic literacy window' (Wingate, 2016) in a VFX lecture/seminar

Stage of Feez's teaching-learning cycle	In-lecture 'academic literacy window' activity using outputs of genre analysis
1. Set context	Teacher highlights how the VFX literature contains debate, arguments and alternative viewpoints on theory and practice

2. Model chosen text	Teacher writes and displays a concession / contraexpectation-type sentence construction (and any use of meta discourse markers of hedging or authorial attitude) which expresses, in essay style, a point from the current lecture
3. Joint construction of text	Students are encouraged to (a) generate examples from their experience of film which illustrates the given point. Students then jointly try to form a concession / contraexpectation sentence which illustrates their thinking.
4. Independent construction of texts	(Omitted because of time constraints)
5. Compare texts	Students share and comment on texts produced by each group. Students could consider whether meta discourse markers such as hedging are required to add nuance to arguments made.

This approach has the advantage that it requires little or no preparation by the teacher (as it responds to typical issues covered in lectures), and could be incorporated as an engaging and student-centred activity within a more formal lecture or seminar discussion. It also requires students to engage with the potentially distinctive critical thinking practices of a particular discipline (Moore, 2013), and the communication norms of its associated discourse community.

Limitations

It is important to note that the size of the sample of essays analysed was relatively limited, partly because of constraints of time, resources, and the number of student essays available. However, the main focus of the study was to explore how successful student work expresses argument or critical stance, rather than to make definitive statements about disciplinary content. In addition, though a 'critical friend' was used as a means of checking understanding and application of coding of texts, analysis was conducted by a single rater so no formal measures of inter-rater reliability could be conducted. The merging of categories of attitude markers and boosters also meant that analysis of discourse markers was less precise in its focus.

5.7. Conclusions

This paper has identified a need to support the diverse cohort of students currently entering higher education in developing their written argumentation skills, especially in the arts. Research shows the need for support which attends to both meaning making and the language used to express such meaning in a particular discipline. Such support needs to be grounded in the discipline area, rather than focusing on generic study skills. Thus, this study aimed to identify how students in VFX express argument via their critical stance in essays.

Using Bruce's social/cognitive model of genre analysis, the study found that successful student writing uses a range of interpropositional relations to indicate the relationships between ideas that form their critical stance in an essay. The most frequent relations used are statement exemplification, amplification, grounds/conclusion and concession/contra expectation.

In addition, students add nuance to statements of critical stance arguments by adding metadiscourse signals, primarily attitude markers and hedging to express their argument. Student writing in VFX used interpropositional relations and discourse markers in a broadly similar way to that of previous studies of sociology and English literature essays. Although all these disciplines shared a high level of use of the three most common relations, the specific frequencies of their use varied across the three subject areas.

The article confirms and extends knowledge about the ways in which students express criticality appropriately in assessed writing within their particular subject areas in the novel context of an arts university. It responds innovatively to Wingate and Tribble's call for such studies (2012), by combining genre-informed approaches to identifying and teaching the language of argument with established ideas on embedding teaching within subject disciplines. In drawing on these genre-informed analytical and pedagogical techniques, the study proposes a theoretically aligned means by which this embedding can occur. Thus, subject lecturers can support students in developing written argumentation skills, with minimal preparation required, in a classroom environment via Wingate's "literacy windows". Future research will attempt to evaluate the effectiveness of this teaching approach.

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6

Learning Communities and the Development of Teaching Skills in traiNing Environments as Blended Learning. An Innovative Methodological Experience at the University of Granada (Spain)

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Abstract
Current training in University requires the introduction and development of lifelong learning due to the evolution society has experienced and hence higher education. The training needs can be faced up with the introduction of different innovative strategies, such as the development of blended learning through the use of ICT in a specific learning community. Even more, considering the globalization and its effects it seems indispensable to use the communicating possibilities provided by ICT, the potentialities they can bring us in different training settings. Obviously this will require the use of active methodologies to be able to share knowledge so that learning communities reach a relevant role transforming the teaching scenario in a more updated and dynamic context. Student's participation is necessary both face-to-face and in virtual settings. No doubt, the introduction of all these issues requires deep methodological changes in the University context, being able to assume a continuous process of re-

flection and innovation. The aim of this paper is to analyse the most relevant contributions made by several teaching innovation projects that have been implemented at the University of Granada (Faculty of Educational Sciences) during various academic years, and whose implementation teachers and students have positively valued. The innovative action allows us to analyse the impact of how learning communities in blended learning and with different active methodologies contribute to enhance the students' learning process. Self-didactic and collaborative ICT tools in learning communities in university courses seem to guarantee the development of a suitable lifelong learning process.

Keywords: blended learning, active methodologies, students' participation, learning community, teaching-learning processes

6.1. Introduction

In accordance with current socio-educational requirements and job placement-related training needs, in the "lifelong learning" environment the University should increasingly promote the improvement of educational quality for teachers to develop in, who are better trained, in order to acquire and master a series of professional skills as basic tools for their self-learning, which derives from social interaction in face-to-face and virtual environments (social networks) (Soler Santaliestra, Soler Costa and Araya, 2016). In turn, this training experience will lead to their own continuous and self-taught professional development, which will improve their teaching activity and performance in education centres by transmitting knowledge and learning to new generations through a "waterfall model". This implies laying the bases for a fundamental methodological change characterised by using active methodologies from initial levels of education. Thus teacher training in the Faculties of Education is essential as teachers are the main agents of much socio-educative importance to change and develop the transformational process in school teaching innovation, and even the University training model, according to the European convergence framework (the Bologne Declaration).

Hence in an increasingly more interconnected world, which has been called "the global village" given the possibilities of communicating thanks to major advances in ICT, which totally minimise geographic distances, it is crucial to properly use the

main potentialities offered by these new training scenarios, such as collaborative learning (Hinojo, Aznar, & Cáceres, 2009; López, Jaén, & Cabero, 2013; Cabero & Marín, 2014; Grande, Cañón, & Cantón, 2016). This can be understood as "the reciprocity between a set of individuals who know how to differentiate and compare their points of view to generate a knowledge building process. In this process, all individuals learn more than they would if they learned by themselves as a result of the interaction among team members" (Guitert & Giménez, 2000). In this way, and together with such learning, *solving projects* is necessary which, according to Román 2004, involves performing *group tasks* (fulfilling qualitatively richer aims with several group members); *group dynamics* (increasing closeness, better interactions and personal relationships, and a higher degree of job satisfaction and valuing others) and its implication in *personal aspects* (developing social and communicative skills, respect for differences, growing feedback, etc.).

All this is framed within *active methodologies* and the aim is to build knowledge in a shared manner so that learning communities play a relevant role throughout this transforming process, as verified by the research results published in different works and by former innovative teaching projects undertaken at the University of Granada since academic year 2005/06, and also at other Spanish Universities. Here active and dynamic student participation is basic to favour their training in a continuous interaction process.

Hence learning through a community, a group, becomes the central and cross-curricular axis in students' training in both face-to-face and virtually settings (blended learning) (Chaves, Trujillo, Cáceres, Hinojo, & Alonso, 2015; Fernández, Arias, Fidalgo, & Robledo, 2017). Defined as free pedagogical spaces for cooperation that promote "an interactive process of collective building that is permanently submitted to public scrutiny, and debate to socially and educationally improve the community" (Leiva, Pedrero, & Pérez, 2014:1), they become one of the main priority training strategies to meet one of the principal demands in implementing the European Higher Education Area and to improve the quality of University teaching.

6.2. Justification

The way to face methodological changes will depend, to a great extent, on each University's idiosyncratic features (supporting teaching innovation, work dynamics, financing, teachers' motivation, incentives, etc.). First of all, it requires a continuous process to reflect on both the practice and innovative initiative of the teachers who work in dynamic and interdisciplinary groups according to operational and sequenced goals in time (Aznar, Raso, Hinojo, & Romero, 2017; López Llorent & Medina, 2017).

One example of all this is the teaching innovation experience, which is backed by a successive professional career that derives from former teaching innovation projects which have covered a 10-year period of innovative initiatives, and with commitment to improve the quality of University teaching and research, action which detects strengths and weaknesses, and which restructures new intervention proposals about more particular aspects. All this focuses on the innovative action of University teaching methodologies.

This proposal intends to synthesise the most relevant contributions made by several teaching innovation projects that have been implemented at the University of Granada (Faculty of Educational Sciences) during various academic years, and whose implementation teachers and students have positively valued, these being the people it addresses and the direct beneficiaries of a series of actions. There is the importance of making good use of students' active implication through the possibilities that the method by projects offers to favour greater implication and motivation, and to undertake "self-didactic" and interactive strategies by successively alternating with collaborative learning in networks. Here information is exchanged, opinions are compared and collaborative learning is undertaken as groups. All these strategies and tools are necessary to develop specific skills, which are required to train future teachers. Moreover within the European Higher Education Area, acquiring strategic skills to master Information and Communication Technologies (ICTs) is a fundamental challenge throughout this training process and, within this, so is knowledge and the practical use of the advantages provided by Web 2.0 tools. In this way, combining and reflecting on practically putting into practice projects were done with technological support to facili-

tate the development of skills that any teacher requires to work according to the quality and professionalism parameters currently expected of them.

By considering verifiable aspects in today's university situation through implementing former teaching innovation projects, and other studies and reports, we confirm a series of teaching methodological drawbacks that are indicated in the Universidad 2000 Report (excessive use of master classes, poor pedagogic innovation by teachers). During the previous academic year (2016-2017), we considered integrating all this background into a project in an attempt to reflect the methodological advanced made in university training holistically to help to improve Higher Education teaching (Cáceres, Raso, Bautista, & Hinojo, 2013; Cáceres, Aznar, Hinojo, & Alonso, 2014; Raso, Aznar, & Cáceres, 2014; Cabero, Marín, & Sampedro, 2017). Among the obtained results, which are susceptible to improvement, we found:

- A high percentage of students who lack teaching transversal skills (reflective capacity, the capacity to analyse, plan and organise work; personal initiative and metacognitive self-regulation, etc.)
- Differences for students in skills in and knowledge of handling ICT (digital skills) which is a handicap to establish true networking learning communities (collaborative learning). Some students lack motivation and availability, which limits their extensible participation
- Students lack motivation and implication to study, particularly in core subjects like Didactics and School Organisation, which are fundamental for training future teachers.
- Lack of training for the teachers who have actively participated in the project, who recognise their limitations in planning the method by projects, designing assessment instruments to do follow-up, and how to organise suitable feedback to students' requirements, interests and cognitive needs.

We centre on the main weaknesses detected in the latest innovative action, and we focus on the following lines of action taken in this project or innovative experience, financed by the Teaching Innovation Unit of the Vice-Rector of Quality at the University of Granada:

- Supporting key skills or metacognitive skills. Lack of knowledge in some cases, and lack of, in most cases, mastering and/or skills to use the techniques and resources needed in university teaching, such as "learning to learn", are key aspects for students' professional development as future teachers.
- The emerging design of classrooms and spaces to form learning communities (in semi-face-to-face or blended learning settings). The intention of this line of action is to follow a series of procedure principles (a growing community, emerging objectives, exceeding limits, respecting others, etc.) according to Olivencia, Pedrero, & Pérez, 2014, and backing, in turn, its training process to mitigate teachers' gaps in learning when designing such face-to-face and virtual learning places to guide and motivate participation and social knowledge building by students.
- Methodological-type implications to develop an all-round integrated approach in which all competences are coordinated and participate with one another where students are the main figures in their own learning. Hence action and experience become two characteristic notes that delimit, to a great extent, the development of competences through having to introduce active methods that centre on students' autonomic and decisive participation: e.g., like that we propose by the "method by projects" by semi-face-to-face interaction in learning communities (blended learning).
- More specific intervention that centres on developing "learning communities" as an axis to encompass the interaction, collaboration, sharing experiences, ideas, skills and knowledge from group diversity (Fig. 1), particularly in relation to improving metacognitive (reflective capacity, the capacity to analyse, plan and organise work; personal initiative and metacognitive self-regulation, etc.) and teaching transversal skills; digital competences (suitably using and handling ICT); and teacher training for planning these innovative actions (method by projects with use of ICT, self-assessment and follow-up of the teaching-learning process through feedback from the aforementioned "learning communities" outline). To this end, here the intention is to follow a series of procedure principles (a growing community, emerging objectives, exceeding limits, respecting others, etc.) that are fundamental for this training model to be successful.

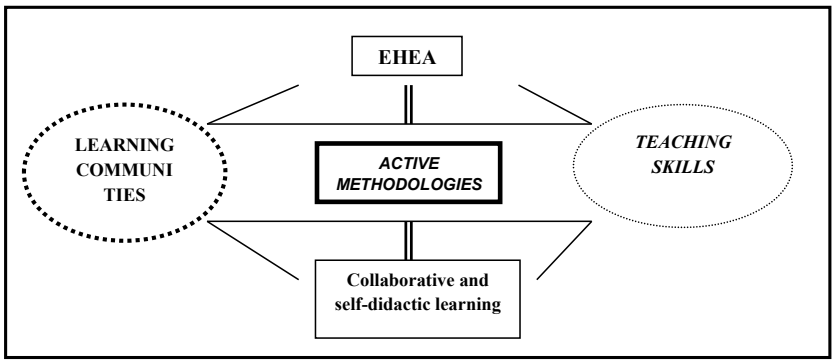

Fig. 1. Learning communities in students' development of skills

The intention of this whole process of restructuring innovative action in the university teaching methodology is to "analyse the impact of learning communities on semi-face-to-face settings by putting into practice different active methodologies (method by projects, using ICT, collaborative self-didactic learning, etc.)". This was the general objective of our innovative action.

6.3. Objectives

- Carrying out a DASW (detecting and analysing strong and weak points) analysis to design and develop learning communities in blended learning university settings.
- Training teachers to design face-to-face and virtual settings that guide towards, and motivate participation and social knowledge building, among university students.
- Promoting students' development, commitment and implication in using technological tools and in developing active learning methodologies.
- Promoting "self-didacticism" among students in interactive and interdisciplinary learning processes with which to acquire a high potential to develop continuous training permanent learning strategies (lifelong learning).
- Favouring teaching skills being acquired by the method by projects, and active and collaborative work dynamics, by focusing on knowledge management using technological tools.

- Improving students' learning outcomes, and their levels of teaching quality and success, in the teaching-learning process.
- Helping students acquire/master metacognitive skills by making them more aware of their own cognitive resources, and by promoting their self-regulation ("learning to learn").
- Developing significant and autonomous learning in a group oriented to research and critical thinking.
- Acquiring seeking, evaluation, quality and selection skills for information on the Internet. Evaluating the levels of the main agents' (teachers and students) satisfaction with the way the innovative action proposed through its impact to improve the teaching-learning process at the university.

6.4. The action plan and its beneficiaries

It involves the students who participated in this teaching innovation experience, who focused on the different courses of the Degrees of Primary and Childhood Education taught at the Faculty of Educational Sciences at the University of Granada. This experiment involved some 345 students from the four courses per degree.

A series of phases in the procedure were carried out, which specified the actions to be taken: *Phase 1. Structural aspects*: setting up a moodle education platform (basic lines of activities or proposals to be performed as part of the method by projects); *Phase 2. Undertaking the project*: an initial seminar (face-to-face), and then seminars on a monthly basis (virtual/face-to-face), to determine the common and generic aspects of all the contents to be developed, and to design practices that integrate acquired knowledge, skills and attitudes; i.e., the teaching skills needed to adapt to today's educational expectancies and challenges; online/face-to-face tutoring; and training in and counselling about suitable platform operation (LeaderGroup.com). *Phase 3. Assessing the project:* assessing the impact of the taken innovative action via the involved agents (questionnaires, reflections through seminars, etc.). Finally, writing an end report that includes future research lines, including the project possibly continuing or its extension by introducing the required improvements; diffusing the obtained results (multimedia production) in different media and electronic

resources (journals, books, talks, posters, communications, etc.); attending Conferences, Teaching Innovation Events, etc.

6.5. Discussing the results

In order to learn about the degree of the planned objectives being fulfilled after applying this innovative teaching methodology, we centred on analysing students' perceptions, who are the direct beneficiaries of this whole training experience, by designing two surveys (initial and final) on a Likert-type scale using the "lime survey" server, with responses that go from 1 to 4, whose values represent progressive responses (not at all, somewhat, quite a lot and a lot), save the last item, whose evaluation goes from "completely disagree" to "completely agree". Both surveys centred on four dimensions:

Identifying data

Students' profile offers a good gender balance with 45% males and 58% females, which is quite normal in Education Degrees. Specifically, more than half the participants studied the second course of the Primary Education Degree (62%), and 38% studied the first course of the Childhood Education Degree. Their ages went from 19 to 20 years, so their initial expectancies when they arrived at university were compared with the experience of those who had known some teaching methodologies in different subjects.

Perceptions of using and expectations of ICT

It can be stated that after taking this innovative action, students considered that they possessed suitable knowledge and could appropriately use ICT to conduct their learning, as opposed to either expressing uncertainties (stating that they were barely up-to-date with the latest novelties in technological tools and resources), or considering them difficult to understand or use, which they showed in the survey (more than 60%) on initial expectancies. Some of the most outstanding results are summarised in Figure 2:

ITEMS	Valid percentage
"Suitably using Internet search engines (Google, Yahoo, Proquest, etc.) is a very useful tool to access relevant information" (item 5)	82.33%
"I found it easy to handle the education platform" (item 4)	70.68%
"I find it more motivating to work on subject contents using ICT-based teaching methodologies than conventional classes" (item 6)	65.04%
"I think I master today's technological tools quite well" (Item 13)	72.93%

Fig. 2. Summarised results on the "use and knowledge of ICT"

Perceptions of collaborative learning in communities and social networks

As with the previous dimension, quite positive results were obtained about respondents' perceptive experience in collaborative learning and its use in learning communities. The same line coincided with the initial vision, that of students maintaining the importance of group work (more than 80%) as a facilitating element to acquire and complement new information, learning, etc. However, one of the items with a lower score refers to preferences of working individually as opposed to working as a group, where almost 40% opted for the first option; this indicates poor training in group dynamics, lack of knowledge of how to collaboratively work, negative group work experiences, etc. It will be necessary to learn about them in order to work to improve this situation.

In line with this, Figure 3 provides some of the most significant items and results:

ITEMS	Valid percentage
"Working with other colleagues helps me learn and better understand contents" (item 16)	85.34%
"Entering in dialogue and interacting with other people helps me learn by comparing different points of view" (item 18)	83.38%
"I prefer to work alone than doing group tasks" (item 19)	67.29%
"Forming part of professional learning communities in the future with other teachers and professionals, etc. is fundamental." (item 23)	85.72%

Fig. 3. Summarised results about "learning communities and group work"

Valuing degree of satisfaction

Students quite positively valued the use and operation of social networks, developing interactive learning, the need to train by using this type of university models with ICT, improving the quality of face-to-face classes and motivation, making contents to be worked more accessible and practical, etc. Nonetheless, some handicaps have to be considered; e.g., more than 40% of the study group stated that teachers do not frequently use "active methodologies with the use of ICT"; about 30% indicated certain difficulties in grasping that "interacting with others in social networks facilitates collaborative learning", which might coincide with the previously mentioned preference to working "individually" as opposed to working as a group. So it would be necessary to examine in-depth students' *work cultures*. Students were also divided in their views about developing the "digital skill" as 50% considered it had increased, while the other half believed the opposite was true.

ITEMS	Valid percentage
"Social networks favour cooperative-dynamic learning"	66.17%
"Teachers use active methodologies with ICT"	57.09%
"Using ICT favours autonomic and self-didactic learning"	73.68%
"Using social networks facilitates interactions with other colleagues and developing collaborative learning"	68.08%
"I feel that using social networks greatly motivates learning and complements face-to-face classes"	67.29%
"My digital competence has increased by undertaking this subject"	50%

Fig. 4. Summarised results about "assessing the use of new methodologies with ICT"

In general lines, students' degree of satisfaction with the initiative of the project dealing with university training was high, as reflected in Figure 5:

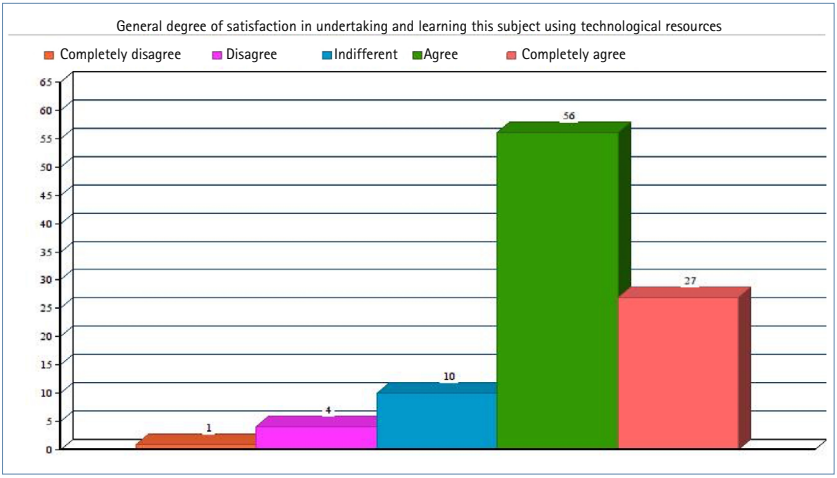

Fig. 5. Students' degree of satisfaction with having undertaken and learned the subject using the ICT

6.5. Conclusions

According to the obtained data, the questionnaires, observations and reflections carried out and made throughout the process confirmed that students' responses were most favourable about this methodology, and about the learning possibilities it offers. As strong points, the importance attached by students to using new teaching methodologies and using ICT stood out for their training as future teachers through developing a series of specific skills. Here the interaction taken in learning communities through semi-face-to-face settings also positively stood out as a key motivating element to improve the teaching-learning process by, for example, using search engines and databases on the Internet (Web of Knowledge, Proquest, etc.). This interaction is integrated into work done by the "method by projects", where self-didacticism and collaboration are constantly combined, and even an evaluation of the great enrichment gained from having a virtual community of education professionals. However as some limitations were detected by both students and teachers, it would be important to consider them to improve implementing future teaching innovation actions as the results verified the need to examine digital skill training for students and teachers more in-depth because tech-

nological advances and their implications for education change and contents need to be updated. Hence a self-didactic training process followed by teachers would be necessary to plan and orientate technological resources, to detect any possible student difficulties and, in particular, to revitalize group interactions in learning communities by encouraging participation and moderating solving projects. This would be fundamental to motivate students to work in groups, to learn collaboratively and to acquire satisfactory learning experiences. Nonetheless, the personalized attention needed today in this teaching methodology presents severe structural limitations given the high teacher/student ratio. So it would be necessary to set up the personalized didactic planning of practical seminars, to count on smaller class groups and, above all, and to reinforce intergroup and intragroup tutoring as indirect support to solve any main doubts, interests and requirements that may emerge in each work phase through classmates themselves. Besides, the time needed to reach an agreement about setting up some common guidelines to share tasks and to reach a consensus about them is lacking. Many students' habits and "academic cultures" are also lacking who, having played a passive role in the teaching-learning process, and having employed traditional methodologies and reinforced individual learning more, now face the restructuring of different roles to what they are accustomed, and they have no knowledge of the strategies and skills required to work in a group from not only an academic approach, but also from a personal one (developing social skills, knowing how to communicate, knowing how to suitably express themselves, being tolerant, developing active listening, etc.) (Trujillo, Aznar, & Cáceres, 2015).

Therefore, acquiring this whole series of self-didactic and collaborative tools through learning communities in early university courses will guarantee being able to better face the academic world (later courses, preparing Final Degree Projects, etc.), for their professional development. Thus it is fundamental to continue working in this line, and also with all those aspects that ensure verifiable improvements in student learning to acquire evidence that guarantees improving university education quality in agreement with today's challenges.

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7

Analysis of the University Student's Satisfaction with the Introduction of New Methods of Teamwork

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Abstract
Teamwork is currently one of the most highly demanded competences among university students by companies. In this paper we make a contribution to research into the area through an experience of educational innovation. We assess the level of satisfaction of a student group with the deployment of teamwork through a collaborative software open. To this end, an exploratory-descriptive study has been carried out and a questionnaire has been used with questions on technological skills and satisfaction in ICT knowledge. Among the results, the highest score questions are: the student's ability to coordinate a group activity carried out on the internet, knowledge about information programs in which to share information on the network with peers and the use of cloud storage systems. The advantages detected when using a web application for group work for the first time are related to the motivation and the greater involvement of the students, as well as a better distribution of tasks among the different members of the group and a more effective follow-up of the development of the works by the teacher and coordinator responsible for the group.

Keywords: university student's teamwork, technological skills, learning methods, social education

7.1. Introduction

Teamwork is currently one of the most highly demanded competences among university students by companies. There are many researches that we find on this subject, but as stated by Driskell, Salas & Driskell (2018), despite being in the golden age of publications on this subject, much of the results are preliminary and point to the need for further research.

Therefore, in this paper we make a contribution to research into the area through an experience of educational innovation in which we value the satisfaction of a group of students with the introduction of teamwork through a collaborative software open.

Background

Europe's higher education system must face in the coming years major challenges linked, among others, through innovation, persistent social divisions and the necessary counter capabilities. As noted in the communication from the European Commission on a renewed EU agenda for higher education,

"All advanced learning students, regardless of subject matter, need to acquire advanced cross-disciplinary skills and key competencies that enable them to succeed: high-level digital skills, writing and calculation, autonomy, critical thinking and the ability to problem solving are increasingly crucial attributes" (European Commission, 2017, p.5).

Among these cross-disciplinary skills, for university students the acquisition of skills related to teamwork is fundamental. These are competences that will serve not only to satisfactorily overcome their university studies but also, in a medium and long term, will be of great use in their future professional performance, as the experience carried out by Lakkala *et al.* (2017) in which they formed work teams with students of Teaching and Social Work. According to these authors, this type of work combines commitment and efficiency together with tensions and dilemmas.

Also, as it was concluded in the research of Ramírez, Rodríguez & Blotto (2016, 77), "The small group could be a first instance to validate or not a scientific proposal. The act of verbalizing arguments to a partner and receiving explanations from others provides students with the opportunity to rehearse modes of expres-

sion in scientific terms, free of charge. pressures — real or imaginary — by the presence of the teacher".

The teamwork is, therefore, one of the most effective tools in the classrooms in general and concretely, in the university ones, since it improves the academic performance of the students (Delgado Rivera *et al*., 2017; Férez & Cutillas, 2015).

In addition, currently companies identify teamwork as one of the key capabilities for staff recruitment because, as Miller (2003) indicates, organizations base their decisions, develops strategies and measure performance workers through teamwork (Delgado Rivera *et al*., 2017; Férez & Cutillas, 2015; Park, Kim, Park, & Park, 2015).

On the other hand, and specifying in the study presented here, in the degree in which research has been developed (Degree in Social Education), the transversal competence that refers to teamwork has been written as follows:

> Value the importance of teamwork and acquire skills to work interdisciplinary within and outside organizations, from planning, design, intervention and evaluation of different programs or any other intervention that may require it.

Interest in this methodology is also present in various degrees from all areas of knowledge in Spanish Universities. The recognition of this relevance in the training of university students has inspired several innovative experiences in the university environment such as Carballo (2013), Coronado (2013); Guitert, Romeu, & Pérez-Mateo (2007); Leris, Fidalgo, & Sein-Echaluce (2014); Lozano, Romano, & Segovia (2014); Messetti, Dusi, & Rodorigo (2016) and Valiente (2013), among others.

On the other hand, the methodology of group work has some specific characteristics, of which we highlight, following Coronado (2013, p. 174), the following: motivates the students on the subject to be treated, makes the students responsible for their work, encourages the group discourse in the classroom, integrates the group comments, the students learn from their personal and group experience, encourages reflection, exchange and participation. And in the study by Putra and Fibra (2016) it was shown that group work is the main element in the generation of innovation.

These characteristics of group work make it a complex methodology that involves personal factors and interrelation with others

that, at times, generates problems among the components of the group that can prevent the realization of a good job (Belando & Carrasco, 2014).

Canto et al. (2009) analyzed the most common conflicts faced by students when they work as a team. These are: imbalance in what each member of the group does, difficulty in reaching an agreement, imbalance in the levels of motivation and ambition of the members, and distrust when it comes to sharing information. However, these authors argue that the presence of conflicts should not lead teachers to give up working with this methodology, rather it should be seen as an advantage since it allows not only the learning of technical knowledge but also cross-disciplinary skills that are very useful in the professional world.

Another of these cross-disciplinary skills is, as was acknowledged in the communication of the European Commission mentioned at the beginning, digital competences. It is a fact that new technologies have transformed both learning processes and the same knowledge and skills, both in the workplace and in the development of leisure activities. In the university area of ICT management is imprescindible for all its members, both students and faculties must have adequate technology management. In the specific case of students, research shows that learning experiences through ICT are valued positively by them (Maquilón, Mirete, García, & Hernández, 2013; Rubio & Escofet, 2014).

In addition, the study carried out by Gutiérrez-Porlán, Román-García, & Sánchez-Vera (2018) it detects that university students show greater use of Internet tools for collaborative work. However, in the same study it has been detected that students do not conceive ICT as a learning space. According to this idea, another study indicates that the knowledge that students have of the tools they have at their disposal is still scarce, although students are constantly connected to the network, there are tools that are completely unknown to them and it is detected that the tools that are devote more time to those already know how to use (White & Le-Cornu, 2011).

This should lead us to reflect on whether methodologies carried out in university classrooms are consistent, or not, with the specific needs of the students. For example, the study carried out by Vilches Vilela & Reche Urbano (2019) shows that the use of WhatsApp as a group work tool limits the relationships between group participants and communication processes. Therefore, as

teachers we must improve the vision that students have towards ICT and the network, bringing their perception closer to that of an effective and adequate collaborative learning space.

"Collaborative technological tools can generate new learning scenarios derived from the impact that the evolution of communications has had on the way people work and on the structure of organizations" (Muñoz-Repiso, Martín, & Payo, 2012, p. 162).

7.2. Methodology

Considering the scenario described above mind, it has drawn up an exploratory-descriptive study, where you want to study student satisfaction with the methodology of teamwork, through a technological tool in a subject's degree of Social Education.

In the study we have combined two complementary research methodologies, since two major objectives are proposed with each of the parties. On the one hand, exploratory designs are used in order to prepare the ground for future research and are, generally, the antecedent to any other study. This design is used when the research plan is to examine a field little studied and, therefore, there are many questions unanswered (Hernández, Fernández, & Baptista, 2014). On the other hand, the descriptive designs, the same authors define them as the investigation that tries to describe situations, contexts or events.

For all the above, this type of study has been selected to obtain an approximation to the satisfaction and technological learning that students have when an innovative element is introduced in the university classroom. In addition, this study may allow the implementation of a larger experiment in the future in which we can have control groups to improve the results and study in depth the effect that the introduction of technologies for group work in the classroom, may have in the development of students. For this, the following objectives are proposed:

- Know the satisfaction with the subject of the students.
- Know the satisfaction with the selected tool for time management.
- Evaluate the degree of knowledge of students after the use of this tool.
- Measure the evolution of learning perceived by students.

The experience was carried out in the subject "Planning and management of socio-educational programs", where the teaching methodology was adapted to introduce the use of the Trello tool as a means to elaborate group work.

The selection of the tool to use is a fundamental aspect in the study, since it must meet a series of criteria, as evidenced in a previous study (Belando-Montoro & Carrasco-Temiño, 2014), in which the characteristics of ten applications that facilitate group work were analyzed. It was demonstrated that the use of the selected tool (Trello) was quite simple, free and, although part of its software is in English, it allows to rename both the boards and the lists and tasks, which allows students to adapt it to their needs. To this is added the fact that the way of visualizing the pending tasks is very intuitive and the monitoring by the teacher can be done quite easily. When starting the course/project/work, Trello it acts as if it was a mind map because it allows to put all the ideas on the cards for individual tasks, then sort or prioritize them according to importance or due dates and add attachments (Woods, 2017).

No control has been in the study, only the experimental group. This supposes a limitation for the interpretation of the data, since it can not be indicated that the results are due to the implementation of said tool. However, for the implementation of further studies to develop this methodology, it is you study may provide a basis that offers data and interesting tracks on various issues.

A survey was conducted at the beginning of the course and another at the end, which was completed in the computer room of the Faculty of Education through Google, so that all students had the opportunity to participate in the study.

This study has a great relevance, since it allows us to detect the satisfaction of the students with teaching innovations in the classroom and, therefore, to develop more and more and better methodologies to use in the classroom.

Sample

The sample consists of students enrolled in the 4th semester of Grade in Social Education at the Complutense University of Madrid of tomorrow's group. In the pre-test, 42 subjects participated and in the post-test the sample was reduced to 29 students. This mortality of the sample is the cause of the evolution of the

students in the subject, since the post-test was applied at the end of the semester and in these last days the students begin to be absent from the classes for the preparation of exams and/or end-of-course assignments.

Instrument

The instrument used for this study is a self-made questionnaire, both in the pre-test and in the post-test. A series of demographic questions were asked about the availability of ICT for students and other questions structured in three blocks:

- Technological competences of students
- Previous ideas about program development
- Satisfaction in the knowledge of ICT

The measured items are presented on a scale of 1 to 4, where 1 means "nothing true" and 4 "very true". For the posttest, questions about the availability of ICT for students technological skills of students and more general questions related to the skills associated with the subject remained were removed. In addition, in the section of previous ideas about the preparation of programs, items related to the subject to be taught were kept and questions about satisfaction with the class taught were added. Finally, in the section on satisfaction with ICT knowledge, a large part of the questions is eliminated, adding three on satisfaction with the teamwork tool and time management used.

Process

The data obtained were grouped, tabulated and analyzed with the statistical package SPSS, where all the results presented below were elaborated. On the one hand, a descriptive statistic was carried out and, on the other hand, pre-experimental statistics with a pretest-posttest design with a group. The statistical tests used were the T-Student for related samples and the Wilcoxon test based on the homogeneity of variances between the different variables.

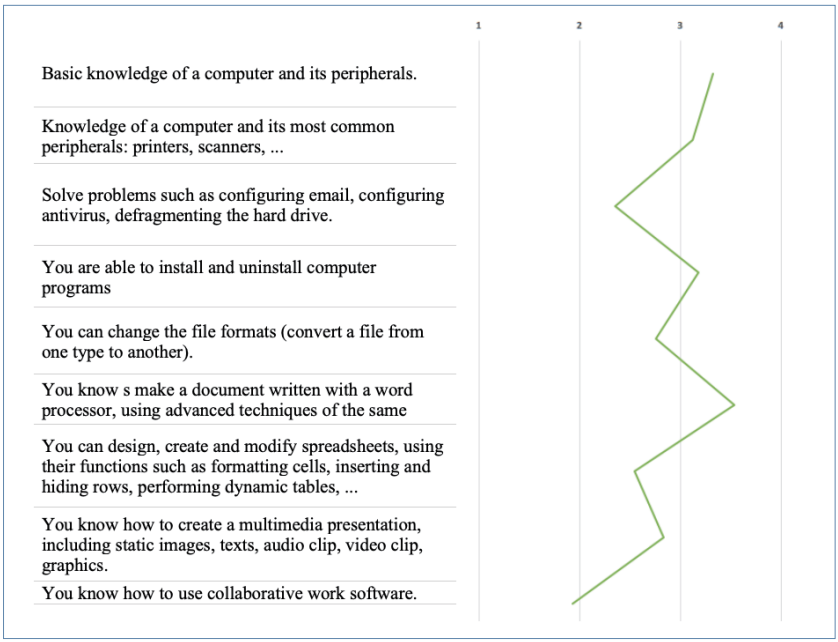
7.3. Results

Regarding the results of the study, the first thing that was analyzed was the familiarity that students have with new technologies, so that we could guarantee the continuity of experience in their home, since they had enough knowledge to perform this experience. 95% of the students of the subject indicate that they have a computer at home and 90% indicate having internet at home. However, regarding the use of computer class in the faculty, almost 74% of them say they do not use it. These data are consistent it each other and we can see that students have technological support at home that permit them properly and follow the class from their homes and have no need to use the computer classroom of the faculty.

It was also necessary to discover the technological competences of the student that they had at the beginning of the semester to adapt the training in the selected ICT tool, as well as in other adjacent resources that might be needed for an adequate use of the subject.

To do this several questions about skills and competencies related to the management of computers that are detailed in the Graphic 1. In this, as it can be seen by the responses provided by students, they have a high knowledge of management information systems in general. This level can be classified as a user level, since the resolution of problems in the computer does not obtain a score as high as the rest, which indicates a lack of more advanced knowledge. It should also be noted that also get a low score paragraph consulting them on the use of leaves c to calculation, confirming knowledge to indicate user level.

Finally, the item is staked referred to knowledge of collaborative work programs, where the average score does not reach the value of 2. This indicates that students have a generic knowledge about the use of new technologies, but do not know specialized programs that can support them in their work professional as collaborative work tools could be.



Graphic 1. Technological skills of students.

Pretest-Postest comparisons in student technological competencies

For the pretest-postest analysis of the results obtained, it is necessary to verify the normality of variances in the sample previously, using the Kolmogorov-Smirnov and Shapiro-Wilk tests. This test has indicated a significance of less than 0.05 in all items included in the questionnaire, so the sample does not follow a normal distribution.

Based on this result, it is determined to perform the contrast of the differences between the pretest and the posttest through the non-parametric Wilcoxon test in all the comparative variables. In this test it has indicated a significance less than 0.05 in all the items included in the questionnaire, so the sample does not follow a normal distribution.

With respect to the ranges of the variables, it must be indicated that in the variables analyzed in pretest and posttest, better values are detected in the posttest. Although the absence of a control

group, we can not state that this improvement is due to the application of the methodology, but a set of factors influencing the student. Next, the variables analyzed and the results in each of them are detailed.

In the item, "You are able to coordinate a group activity carried out on the internet" we found 19 positive and 2 negative ranges and according to the Z statistic and its associated p, we can affirm that there are statistically significant differences in the pre-test and post-test measurements and the number of positive ranges indicate that the scores are higher in the post-test. Specifically, the average of this item in the pre-test is 2.49 and in the post-test a value of 3.28 is obtained. Therefore, in the post-test students perceive greater ability to coordinate team activities with their peers that can be done through the internet.

Ranges

		N	Average Range	Sum of ranges
You are able to coordinate a group activity carried out on the Internet, for example in an electronic forum. PRETEST- You are able to coordinate a group activity carried out on the Internet, for example in an electronic forum. POSTEST	Negative ranges	19[a]	11,42	217,00
	Posive ranges	2[b]	7,00	14,00
	Ties	7[c]		
	Total	28		

a. *PRETEST < POSTEST*

b. *PRETEST > POSTEST*

c. *PRETEST = POSTEST*

Test statistics[a]

	You are able to coordinate a group activity carried out on the Internet, for example in an electronic forum. PRETEST- You are able to coordinate a group activity carried out on the Internet, for example in an electronic forum. POSTEST
Z	-3,645[b]
asymptotic significance (bilateral)	.000

a. *rank test of Wilcoxon*
b. *It is based on positive ranges*

Figure 1. Wilcoxon 1 test

It was also investigated in the knowledge that the students had before and after the subject, on computer programs in which they could share information on the network with the rest of their classmates. In this case, 15 positive and 3 negative ranks were obtained, as shown in Figure 2, and we can confirm through the Z statistic, that students obtain higher scores in the question after the subject. In the initial questionnaire, an average of 3.12 was obtained and after the subject rose to 3.55, therefore, at the end of the subject they affirmed have knowledge about computer programs with which they can share information on a network with their peers.

		N	Average Range	Sum of ranges
You know computer programs to share information on the network with your colleagues PRETEST - You know computer programs to share information on the network with your colleagues POSTTEST	Negative ranges	15a	9,80	147,00
	Posive ranges	3b	8,00	24,00
	Ties	10c		
	Total	28		

a. *PRETEST < POSTEST*

b. *PRETEST > POSTEST*

c. *PRETEST = POSTEST*

*Test statistics*a

	You know computer programs to share information on the network with your colleagues PRETEST - You know computer programs to share information on the network with your colleagues POSTTEST
Z	-2,878b
asymptotic significance (bilateral)	.004

a. *rank test of Wilcoxon*
b. *It is based on positive ranges*

Figure 2. Wilcoxon 2 test

It was also examined if the students make use of the existing cloud storage systems, since for the development of the subject they required to have an account in these types of system together with their peers. In this case, 20 negative and 2 positive ranges were obtained, which, together with the significance of the lower *alpha* sta-

tistic, indicates that there were better results in the post-test questionnaire. The mean in this case also shows an important increase, since it goes from 2.05 in the pre-test to 3.21 in the post-test.

		N	Average Range	Sum of ranges
Easily use cloud storage systems PRETEST - Easily use cloud storage systems POSTTEST	Negative ranges	20a	12.05	241,00
	Posive ranges	2b	6,00	12,00
	Ties	5c		
	Total	27		

a. *PRETEST < POSTEST*

b. *PRETEST > POSTEST*

c. *PRETEST = POSTEST*

*Test statistics*a

	Easily use cloud storage systems PRETEST - Easily use cloud storage systems POSTTEST
Z	-3,787b
asymptotic significance (bilateral)	.000

a. *rank test of Wilcoxon*
b. *It is based on positive ranges*

Figure 3. Wilcoxon 3 test

To conclude the analysis of the results, in the section on technological skills of students, they were asked about the knowledge about conducting consultations in national and international databases. The statistic of both items is significant, indicating the positive and negative ranges of these, which improved the results after the subject, since their means are higher in the post-test, as can be seen in the following table.

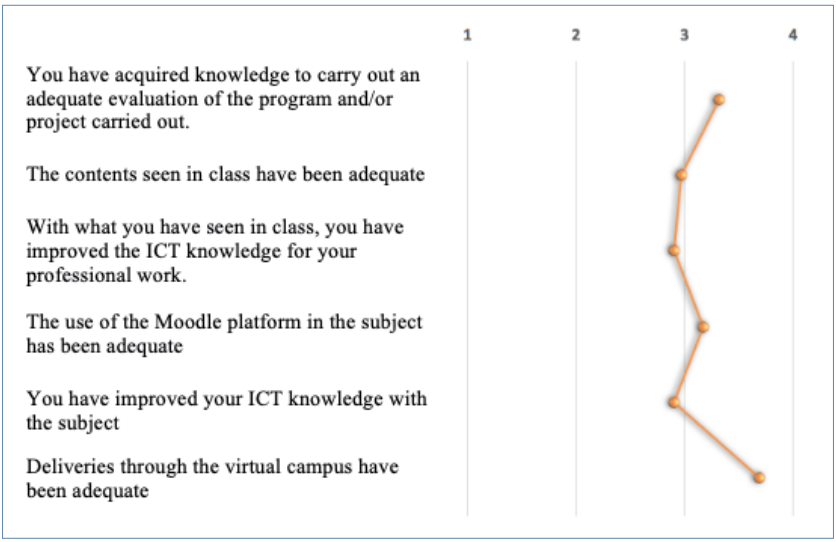
Table 1. Media knowledge databases

	Pretest	Postest
You know how to consult in national databases	1.78	2.66
You know how to make queries in international databases	1.68	2.34

Satisfaction with the subject

In general, one of the objectives of the study and the project was to know the satisfaction of students with the subject, so that it can be determined whether the improvement in satisfaction is solely due to the tool used or, on the contrary, if it is due to the subject as a whole.

In this case, a good degree of student satisfaction is detected, highlighting the response received to the item: "The deliveries through the virtual market have been adequate", which is very close to 4, which is the maximum possible score (see Figure 2). The rest of the items are located in values very close to 3 of the scale, which is a positive assessment, highlighting slightly among them the item related to the knowledge acquired in the class to make an adequate evaluation of the program and / or project carried out. In addition, deviations from the data show a grouping of results, which describes homogeneity of responses among students. You can see the means in Graphic 2.



Graphic 2. Average rating of the sample on different statements regarding satisfaction with the subject

Satisfaction with the selected tool

To analyze the satisfaction that students have with the implementation of a tool like Trello in the subject, they were included in the post-test three questions as you relate with it. Next, the descriptive results that show the satisfaction of the students are detailed with the selected tool.

The first was the adequacy of the explanation of the tool to be used, since this tells us if the kind of initiation to the program that was carried out in the first days of class on the tool has been adequate (see table 2). The average is at 3.48, which is a high value considering that the measurement of the variable was of intervals with values between 1 and 4. In addition, the median reaffirms that the explanation was perceived by students as very adequate

On the other hand, they were asked if the use of Trello had allowed them to better organize the subject. On this occasion, the average stands at 2.62, which indicates that there is good satisfaction in this regard.

Table 2. Trello. Explanation and relationship with the organization of the subject

		The management of Trello has allowed you to better organize the subject	The explanation of Trello has been adequate
N	Valid	29	29
	Lost	13	13
Half		**2.62**	**3.48**
Median		3.00	4.00
Standard deviation		,942	738

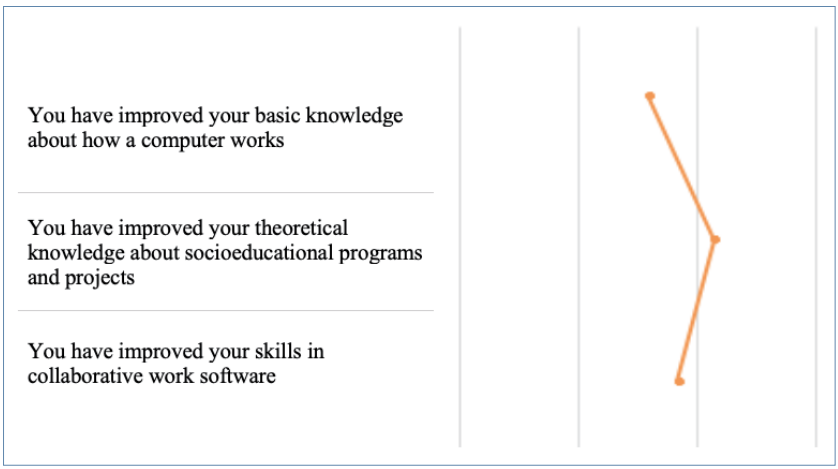
Next, it was examined whether they considered the introduction of Trello in the subject adequate (see table 3). On this occasion, the question gave the option of yes or no, so we are going to analyze it through the percentage of both items. Students indicated that they considered adequate the introduction of Trello in the subject account for almost 83% of the sample, so we can say that the class generally agrees with the application of a task manager in subject of the way it was done.

Table 3. Pertinence of Trello in the subject

You consider adequate the introduction of Trello in the subject					
		Frequency	Percentage	Valid percentage	Accumulated percentage
Valid	YES	24	82,76	82,76	82,76
	DO NOT	5	17,24	17,24	100.0
	Total	29	100.0	100.0	

Perceived evolution

Finally, he tried to know the evolution that the students themselves perceived of their knowledge and skills after the subject. These issues allow us to be aware of the improvement students perceive about their basic computer knowledge and theoretical knowledge about socio-educational programs and projects. In addition, we wanted to know the improvement in collaborative work software skills concretely. For this, these questions were interspersed throughout the questionnaire. The results are shown in the following graphic:



Graphic 3. Average rating of the sample on different claims related to the evolution perceived by students in knowledge and skills

The highest average score is awarded to theoretical knowledge about socio-educational programs and projects, which is to be expected, since it is one of the main objectives of this specific subject. The knowledge and skills related to the collaborative learning experience through Trello obtain lower scores, but achieve the approved, since they exceed 2.5. The improvement of basic computer skills was not an objective with this experience, however, they were also questioned about it and students perceive how their knowledge has improved, since they have been forced to intensify the use of these devices for the completion of the tasks of the subject, therefore, in this item they obtain a score of 2.59. As it regards the perception of the class about their skills in software for collaborative work, here a value of 2.83 is obtained, which indicates that students perceive that they were improving their skills.

Therefore, we can conclude this section of analysis of results indicating that the students of the subject have at the beginning of it a knowledge at user level of technology in general and highlights the low score of the item referred to the knowledge of collaborative work programs. With respect to the technological competence perceived by the student before and after, we find that all the variables obtain significant differences between both measurements. Specifically, they obtain the highest score in the post-test, the question referred to the student's ability to coordinate a group activity carried out on the internet, knowledge about information programs in which to share information on the network with peers and the use of computer systems, cloud storage. Regarding the satisfaction of these students, with respect to the subject in general, the scores of all the items are close to 3, with a Likert scale of 1 to 4, positively highlighting the satisfaction with the deliveries made by the virtual campus. Now we specify the satisfaction of the selected tool and this is also positive, although not as intense as with the subject in general. Finally, the evolution of the students themselves perceive n after the experience is very positive, because the values of these items are located and n good place.

7.4. Conclusions

One of the objectives of using applications such as Trello for group work was to avoid one of the problems that arise when using this methodology, and that not all the components of the group work equally. In this way, the teacher can check the work done by each student, the internal organization of the work, and the dates of delivery of each of the tasks within the group. In addition, with this way of working, it is possible to naturalize the follow-up of group work and maintain high the level of demand of all group members during all the months the subject lasts. Moreover, and coinciding with what was demonstrated in a previous study (Carrasco-Temiño, Belando-Montoro, & García-Garzón, 2017), it can be said that this tool improves the competence of time management in students.

The positive results found on the use of Trello in the teaching of higher education coincide with the experiences of Delgado, Mesquida, & Mas (2014) focused on the follow-up of the apprehension of work teams and that of Maněna, Maněnová, Myška, & Rybenská (2015) which defends that Trello is the best tool to help students to plan their tasks well and guide them in their obligations. Also, in the studio of the Prtljaga, Nedimović, & Đorđev (2016) hold the valuable role of the use of Trello in the organization and planning of work in higher education institutions. In our case, most of the class considers the introduction of such a tool adequate, which confirms the results obtained by the mentioned authors.

In particular, our students, after passing through the subject, are more able to coordinate group activities carried out through the Internet, they know more computer programs to share information on the network with their colleagues and they use cloud storage systems more easily. Although it is true that, as we have indicated previously, we can not confirm a direct relationship between the data and the tool due to the lack of a control group. Although after the good results obtained, the realization of the same experience with the measurement of a control group is not ruled out.

In addition, data on student satisfaction indicate that the introduction of these innovations in the classroom is a strategy well accepted by students. Therefore, although Trello has been

selected to be used in the work of the subject " Planning and management of socio-educational programs", as has been reported in previous pages, it is an application that can be useful for group work of any kind. subject as well as in any work environment, so the results of this research can serve as a basis for other research that aims to deepen the use of ICT tools for group work in the university field.

The advantages detected when using a web application for group work for the first time are related to the motivation and the greater involvement of the students, as well as a better distribution of tasks among the different members of the group and a more effective follow-up of the development of the works by the teacher and coordinator responsible for the group.

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8

Enhancing the Student Experience: Integrating MOOCs into Campus-Based Modules

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Abstract

Massive Open Online Courses (MOOCs) are continuing to expand in Higher Education Institutions (HEIs). In some cases, these courses are becoming integrated into institutions, to such an extent that they are being incorporated in the on-campus curriculum. There are a range of benefits which learners can enjoy when undertaking a university module in which participating in a MOOC is part of the syllabus, such as participating in wider learning communities, and accessing state-of-the-art learning materials. However, at the moment it is not easy to evaluate the outcome of integrating MOOCs into traditional university modules, as there is not yet a great deal of research reporting on the area. To address this research gap, this paper reports on a socio-technical intervention in which 46 undergraduates on the Online Social Networks module at the University of Southampton also had the Learning in the Network Age and Power of Social Media FutureLearn MOOCs, and an offline support programme, integrated into the syllabus for revision purposes. Learners were surveyed before the module started to establish their prior experience of and attitudes to MOOCs. In order to reach an assessment of the effectiveness of the intervention, the module final grades and result profile, the learners assessed reflections and the anonymized end-of-module feedback forms were analyzed. The module grade average increased by three percent, moving up a band, and the number of top grades awarded doubled. However, learner reflections and feedback were rather

more mixed, with equal numbers of learners finding MOOCs of great value for deepening understanding as those who gained little benefit from the experience. Such diversity of outcomes led the researchers to a discussion of the barriers affecting a socio-technical approach to HE teaching and learning.

Keywords: MOOCs, networked learning, blended learning

8.1. Introduction

The web has already had a transformative effect on most aspects of modern life, work and education, and Higher Education Institutions (HEIs) have not been exempt from this process. According to Sir Tim Berners-Lee (2000), the web was originally created as a system for CERN researchers to share their findings and thereby learn from one another - a global learning tool. Equally, the Innovating Pedagogy Report (Sharples *et al*, 2014) recently identified "massive open social learning" as the innovation most likely to have a significant impact upon education. It is unsurprising therefore that a plethora of formal and informal, profit and not-for-profit online services targeted at teaching and/or learning have continued to spring up in the years since the creation of the web. Massive Open Online Courses (MOOCs) form one type of online teaching and learning approach and have now begun to move from an emerging technology to a maturing feature of the educational sector. A 2013 review of MOOCs by the UK's (then) Department for Business, Innovation and Skills (BIS) suggested that,

> There is consensus that MOOCs, correctly deployed, do offer education institutions a useful lever for restructuring and transition. On balance, the literature expresses the view that MOOCs will probably not threaten traditional forms of University teaching in the short term, but a significant sub-group of credible writers forsees wide and sudden changes and disruptions to HEIs from MOOCs. (p. 6)

In the four years since the review, forward thinking HEIs have begun to move beyond a focus on online file storage towards harnessing the potential of digital technologies to support social, collaborative learning on a global basis. A growing number are putting MOOCs at the heart of their online education strategy as the

building blocks of flexible, networked curricula and collaborative partnerships (e.g. the Universities of New South Wales and Deakin in Australia, and most recently Leeds and Coventry Universities in the UK). Every programme in UNSW is developing an integrated curriculum framework that combines free MOOCs, traditional modules and professional development elements according to its specific requirements. However, this forward thinking is not yet typical across the HE sector generally.

MOOCs were primarily conceived as externally facing educational initiatives in HEIs (Davis et.al. 2014) (although they have subsequently also been used internally as testing grounds for educational innovation (Leon, et.al. 2015)). The most common model for the development of MOOCs is a partnership between HEIs and bespoke platforms, such as FutureLearn, Coursera, or EdX, who host the educational content produced by the HEI's academics, and provide them with a specific interface. There is another model by which a university produces a course and the materials and activities of which are distributed across different applications, usually through social media. These two formats have been categorized as xMOOCs and cMOOCs respectively (Rodriguez, 2012). Both formats have the university as the content provider, and as a key stakeholder, and have the potential to "drive innovation and experimentation, leading to improved learning and lower costs and a managed restructuring" (BIS, 2013, p. 6) for the HE sector.

Mainly due to the fact that these courses are massive and open, many opportunities have been identified as a result of the integration of these courses within on-campus modules. However, as the BIS Review (2013, p.6) suggests, "There is as yet no agreed satisfactory system of measurement for assessing the quality of MOOCs from the learners' point of view". This paper aims to build on a small but growing body of research evaluating the effectiveness of integrating MOOCs into traditional university modules. The objective is to investigate whether blending MOOCs into a traditional module as a revision tool positively impacts learning. It will begin with a brief history of MOOC developments and a socio-technical approach to HE teaching and learning, before reviewing the results of earlier work in this area. It will then report on a MOOC intervention in which 46 undergraduates on the 'Online Social Networks' module had the Learning in the Network Age and Power of Social Media FutureLearn MOOCs integrated

within the syllabus and module activities. Finally, it will evaluate the lessons learned and discuss some of the barriers to wider adoption.

A brief history

Although the first courses categorized as MOOCs did not include campus-based students, they did integrate enrolled paying students with open online learners (Downes, 2008). Downes reported on the experience of a course entitled Connectivism and Connective Learning, in which one version of the course featured a paid enrolment, capped at 25 online students, and another version was free and had an enrolment of nearly 3000 learners. As a manifestation of Connectivism (Siemens 2005a), learners in both versions interacted with each other through a set of distributed open online tools, mainly chats, blogs, and even in virtual worlds such as Second Life.

A different approach to the open online course flourished a few years later. In 2011, leading universities such as MIT and Stanford started to liaise with MOOC platform providers such as EDx and Coursera to offer platform-centered courses to tens and even hundreds of thousands of students (Davis et.al. 2014). These courses were categorised as xMOOCs, as opposed to the above described connectivist MOOCs (cMOOCs) (Rodríguez, 2012), and many universities adopted them as part of their strategy. Both cMOOCs and xMOOCs are open, online and externally facing. This feature motivated many universities to adopt them for achieving outreach and visibility, (León et.al. 2015), but there were other drivers. For example, MOOCs provide opportunities to interact with high numbers of learners other than those on-campus (*ibid*), as well as opportunities to for educators to wrap their materials in flipped and blended learning experiences on-campus (Koller, 2012).

At first glance, it may seem that early connectivist MOOCs were conceived as interactive experiences between university learners and a wider, diverse learning community, whereas later platform-centered MOOCs ran the risk of being perceived as a means of expansion and colonialism (Daniel, 2012). However, this distinction does not align with the numerous mission statements of xMOOC stakeholders and there is also variation between the connectivity offered by courses and platforms within

the xMOOC model itself. It may also be the case that sometimes MOOC participants themselves voluntarily choose to connect with coursemates through alternative platforms. For example, a learner on the Learning in the Network Age MOOC (FutureLearn / University of Southampton) chose to start a Facebook page for the MOOC with the express intention of providing a means for interested learners and the educators to stay in contact once the MOOC was ended. Many MOOCs also feature a course Twitter hashtag to provide non-platform-based communication avenues, or include links out to quizzes, surveys or others hosted on third party platforms. There is also an increasing blurring of in-platform communication and activity and out-platform interactions, which may be voluntary or formal.

In summary, MOOCs in 2017 can mainly be considered as platform-centred services developed in partnership between a MOOC provider and a university, each located at different points along the spectrum of strict xMOOC to strict cMOOC according to appropriacy, capability and intent. They are primarily externally facing resources, but are starting to become used for internal purposes. As such, they provide fertile ground for providing a gateway through which universities can transition towards a socio-technical approach the HE teaching and learning.

A socio-technical approach to HE teaching and learning

Developing from the fields of Science and Technology Studies (e.g. Bijker *et al*, 1987; Hughes, 1987) and Actor Network Theory (e.g. Callon, 1986; Latour 1987, 1990; Law, 1992), a socio-technical system may be best defined as one which "focuses on the interdependencies between and among people, technology and the environment" (Cummings, 1978). Socio-technical theory tells us that the development of society and the development of technology is interdependent, with each impacting the other in complex and inseparable ways at Niche, Regime and Landscape levels (Geels, 2002). At the level of the individual, personal development can not be separated from the technologies which are available to that individual and the societies in which the individual exists. When applied to education, this approach recognizes that learning becomes something an individual accomplishes inseparably from their technology and their social context.

Evolving from the learning theory of Social Constructivism as expressed in Communities of Practice (Vygotsky, 1978; Lave, 1991; Lave & Wenger, 1991), Connectivism (Siemens, 2005a, 2005b; Downes, 2006) underpins the socio-technical approach to HE teaching and learning. Connectivism suggests that "knowledge is distributed across a network of connections, and therefore that learning consists of the ability to construct and traverse those networks" (Downes, 2007) and that "knowledge and skills emerge from making connections between different domains of activity such as experience, learning and knowledge, as well as between individuals in a social network. It foregrounds learners' exposure to social and cultural experiences, rather than their exposure to didactic transmission or self-directed enquiry" (BIS, 2013, p. 13). Connectivism recognizes the role of forming networks of connections as the process of learning and places equal emphasis on those connections being face-to-face or through technologies. As such, it is the learning theory perhaps best placed to reflect a modern society often described as consisting of networked individuals (Wellman & Rainie, 2012) learning, living and working in a network society (Castells 1996).

The socio-technical umbrella broadly encompasses many well-established and researched efforts to maximise the potential of technology for teaching and learning, including movements around Technology-enhanced Learning (TEL) (e.g. Goodyear & Retalis, 2010), blended learning (e.g. Garrison & Vaughan, 2008), online educational tools (e.g. MOOCs, Khan Academy, etc.), networked learning (e.g. Richardson & Mancabelli, 2011) and Connectivism (Siemens, 2005a, 2005b). Beyond their commitment to the centrality of technology, these movements are also linked by a view that learning is not about passively consuming content provided by tutors.

Rather, learning is social, networked and technological where individuals collaboratively discover, share, discuss, reflect and learn in harmony with their technologies. Socio-technical approaches move beyond the received wisdom of "the sage on the stage" - instead it is about actively participating in learning at times, places and contexts of the learner's choosing. As Mazur (2012) notes, "Active learners take new information and apply it, rather than merely taking note of it. Firsthand use of new material develops personal ownership". Indeed, the author of the first

MOOC (#CCK08) in 2008 emphasized the importance of these elements of MOOCs, explaining that "To date, higher education has largely failed to learn the lessons of participatory culture, distributed and fragmented value systems and networked learning." (Siemens, 2014).

MOOCs in the classroom

There have been a large number of initiatives to experiment with the incorporation of MOOCs in on-campus modules (Sandeen, 2013). These experiences have been shared in a large corpus of literature, some of which, identified by Israel et. al. (2015) are worth highlighting. For example, Caulfield et. al. (2013) report on the experience of using a Stanford MOOC as learning material in a module at a Puerto Rican university. Both the learners and the teacher benefited from the high-quality materials (videos, articles, and quizzes), although the learners did not engage in the MOOC forums. Bruff et. al. (2013) also used a Stanford MOOC in their university -Vanderbilt-, integrating it simultaneously to their module with similar results. The learners in the module were encouraged to participate in all aspects of the of the MOOC, and they did so in all of them except the forums. Another experience shared was that of Holotescu et. al. (2014), who integrated a few MOOCs from different universities in a local Learning Management System in their own institution, the Polytechnic University of Timisoara. The experience was deemed as generally positive, mainly because of the opportunity of leveraging a wide choice of materials from a wide range of MOOCs. Andone (2015) repeated the experience with a similar approach in the same institution. In both cases, several learners reported to have benefited from the participation in the interaction spaces offered by the different MOOCs in which they participated, although the most used interaction tool was the one put in place by the university, not the one put in place by the MOOCs themselves. Therefore, there was interaction through the use of MOOCs, but there was not much interaction between the university learners and the wider MOOC participants.

The last case to be reported here is that of Griffiths (2013), who used a series of MOOCs in on-campus modules as an experiment over two years. Unlike the previous cases, most of these MOOCs

were created by the same university - University System of Maryland - and they were used as part of the syllabus. The results were generally positive, but students expressed dissatisfaction with the quantity of face-to-face interaction in the module, as they perceived that much of the face-to-face settings were replaced by online settings. This may indicate that prior expectations (and/or educational conditioning), such as expecting a suitable amount of face-to-face exposure to an 'expert', may lead to tension in these types of socio-technical approaches which are inevitably going to be different from traditional expectations.

8.2. Methodology

This project was conceived as a combination of research and practice, in a process that shares a great deal of elements with the so-called 'action research' methodological process. The term 'action research' was coined in the forties (Lewin, 1946), who described is as a process that takes place in most areas of social practice. Carr & Kemmis (1986) developed this concept for the area of education, providing the following definition:

> "Action research is simply a form of self-reflective enquiry undertaken by participants in social situations in order to improve the rationality and justice of their own practices, their understanding of these practices, and the situations in which the practices are carried out (p. 162)

The 'action research' process is a continuous cycle that involves identifying a need, planning accordingly, deploy the plan, and evaluate it. This paper describes the first iteration of this cycle. The plans for the second iteration will be described in the 'future work' section. The first stages of this action research process, namely need identification, planning, and deployment, are described in the intervention section.

The intervention

The objective of our research was to investigate the impact of encouraging undergraduates to actively participate in two of the

University's FutureLearn MOOCs on their exam performance in the Online Social Networks module, during semester two of the 2016-17 academic year. Previous observation of this module during semester two had indicated that the long Easter break just four weeks before the exam period might be adversely impacting learners' knowledge retention, revision strategies and exam performance. The repurposing of the Learning in the Network Age and Power of Social Media MOOCs to act as an intervention aimed at reversing some of these adverse effects was developed as the first in a number of possible experimental approaches.

During the four week period between the end of the Easter break and the start of the exam period, learners were encouraged to study the MOOCs, each of which ran for two weeks, as a revision tool. The bulk of the content covered by both MOOCs had been previously covered during standard module lectures in earlier parts of the semester. To assist with individual motivation, learners were made aware that some of the exam questions would be based directly on some of the relevant MOOC activities and steps. As part of their module assessment, students also wrote a 500 word summary reflecting on the extent of the learning value they obtained from MOOC participation.

Research by Davies et al. (2012), for example, has indicated that within the UK A-level cohort, learners from certain higher socio-economic backgrounds and educational contexts were better equipped to make use of their networks of people and technologies for educational purposes, but were quite limited users of social media networks for sharing, creating and communicating. The opposite was true for those from lower socio-economic backgrounds and educational contexts, who were skilled social media users, but lacked literacies and skills in using their networks for learning. There were different expectations (of both learning and technology), different norms of behaviour, and different personal motivations which impacted the level of an individual's digital literacy and network skills.

It was therefore highly likely that not all learners on the module would have the same levels of motivation, nor of digital literacies, network skills or online confidence. As the BIS review stated of the situation in 2013, "Most studies show that the MOOC experience demands skill and aptitude in online social networking, and that these baseline capabilities are not widely enough shared

for MOOCs to present a realistic format for many learners" (p.5) and that "The networking, reputational and learning skills that MOOC environments require for successful learning are an important issue." (p.8).

Consequently, an offline support programme was also developed. The timetabled face-to-face lecture sessions were repurposed to provide a more structured setting for participating in the MOOCs (as opposed to being used for independent self-study), where peers were on hand, and a teacher present to demonstrate. It was felt that this would help to encourage offline networking and situated social interactions to complement those occurring online. In addition, the inclusion of the teacher (as facilitator - there to assist with any technical issues and to guide any in depth discussions arising from the MOOC content), was also intended to be reassuring to learners with more traditional expectations.

Evaluation

In order to investigate the impact of the intervention described above, the learners were surveyed at the start of the module to establish the extent of their prior experience with MOOCs and with online learning more generally. Analyses of both the assessed reflections and the end-of-module feedback forms were conducted. Finally module grades and results profiles were compared with those of previous years.

The sample

The pre-course survey was completed by thirty-six students (18 female, 17 male, 1 trans) during the first face-to-face lecture of the Online Social Networks module in semester two 2016-17. Perhaps unsurprisingly for a module with this title and content, two thirds of respondents self-identified as somewhere on the Digital Resident side of White and Le Cornu's (2011) spectrum (67%), with only nineteen percent placing themselves on the Visitor side (the remaining fourteen percent did not complete the question).

Despite this potential sample bias towards Digital Residents and the fact that just over half the learners had participated in some form of online learning previously (53%), at the start of the course almost two thirds of the learners had, at best, only a vague

idea about what a MOOC actually was (64%); over two thirds had never studied in a blended way (i.e. a course with a mix of face-to-face and online elements) (69%); and over eight out of ten had never participated in a MOOC before (81%).

Results

Those who had completed a MOOC previously reported that they had found them useful. However, in the majority of questions, the attitude of those who had not participated in MOOCs before, unsurprisingly, indicated a lack of knowledge of the benefits/drawbacks of MOOCs ('neutral' or 'don't know' was the highest scoring category in all attitudinal questions). However, it was also clear that there was an overall positive attitude towards the potential for MOOCs to be of use. There were signs of positivity towards MOOCs being a convenient way to learn (44%), being useful for revision (36%) and being best when supported by face-to-face sessions (36%). Only one learner considered them a waste of time and inconvenient/difficult to use (3%).

Although the majority of respondents were neutral or did not know (62%), of particular interest is that when asked whether they learn more from MOOCs than from lectures, equal numbers of learners strongly or partially agreed (19%) as strongly or partially disagreed (19%). This suggests that for some the use of MOOCs as a replacement for traditional lectures may well be a divisive issue and of mixed benefit. Nevertheless, overall the survey showed that despite a largely Digital Resident cohort, starting knowledge of MOOCs was low and that attitudes towards them were consequently neutral or unknown. However, those with a view on MOOCs were generally well predisposed towards them as a potentially useful learning method.

The question of whether the integration of the MOOCs as a revision tool translated into better academic performance can be first seen through a comparison of module results from the same semester in previous years (Figure 1 below).

The figure shows that the percentage of learners achieving the highest grade band doubled in 2017. In addition, there was an increase in learners gaining a 2,i (60-69%) and a significant decrease in the number gaining a 2.ii (50-59%), leading to an average grade improvement of three percent. This equated to the movement of the module average grade upwards a grade band.

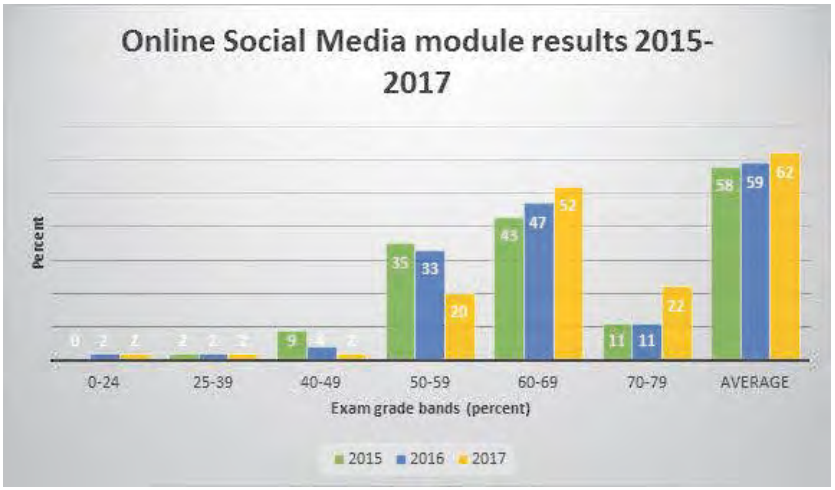

Figure 1. module results pre and post intervention

Clearly caution must be exercised here as a whole host of other mitigating factors may also have had an effect, including the different people involved (the learners), improved teacher/module experience, different exam questions, different marking teams, different performance in other parts of the module assessment, different personal, social and contextual influences on the exam day… and so on. This may be mitigated to a degree by the the fact that the previous two years profiles (2015 & 16) were remarkably similar. Nevertheless, no definitive causal significance can be attached to the changes having resulted from the MOOC intervention. However, it does seem that the increase in the award of 70-79% grades is significant and that the direction of travel is positive, providing some possible weight to the beneficial impact of the intervention.

However, it is important to explore this possibility further by cross-referencing this with what the learners actually reported of their experiences. The first set of data to turn to is the reflective writing assessment which learners on the module were required to submit as part of their assessment activities. It is important to note that as a formal assessment activity, there may have been a perception on the learner's behalf that they should write what they think the tutors would like to hear. Whether this occurred or not was

beyond the scope of this data to capture, however, it is necessary to keep in mind that there may be some task bias in effect.

The first aspect learners were invited to reflect on was the *specific value* which they felt they had received from participating in the MOOC as a revision tool. Interestingly, only 72% of the learners actually commented directly on this, although of those who did several commented in multiple ways. This could be interpreted positively - nearly three quarters of the learners considered the MOOC valuable - or it could be seen more negatively - just over a quarter gained no value from the experience. In fact, what this suggests is a mixed picture, although with a weighting towards it being a positive experience.

The comments were then grouped by theme in four broad areas arising from the analysis as follows:

- General features of being an online course
- Knowledge and understanding of content
- Multimedia aspects of the MOOC
- Interaction and participation
- The results can be seen in the chart below (Figure 2).

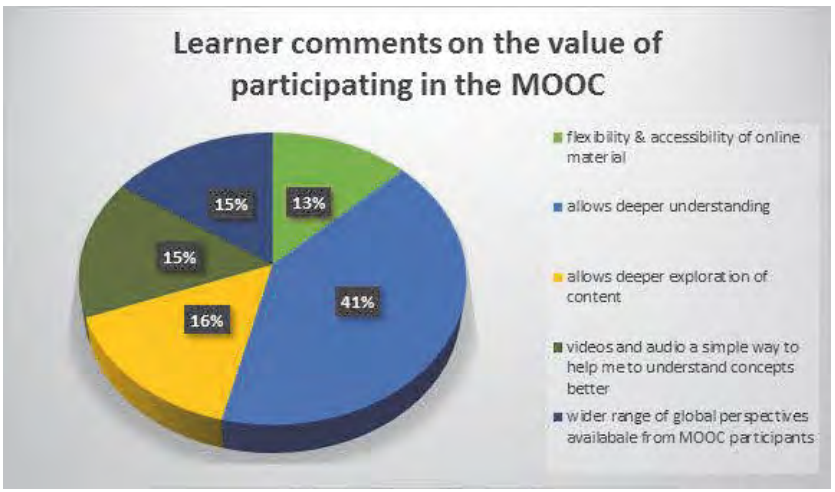

Figure 2. Reflections on the specific value of MOOC participation for learners

The results indicate that 72% of comments focussed on how the MOOC (and its audio and video) helped learners to gain a

deeper understanding of the topic and explore more deeply into course content and concepts. Example comments in this area provides insight when the learners wrote:

> I was able to deepen my understanding in a more connected way.

> The idea that learning is occurring all around me had not occurred to me before, which is why developing my PLN [Personal Learning Network] had such a profound effect on me.

> The MOOC was undoubtedly significant in extending my learning network to the digital environment in addition to the lecture theatre.

> Using a networked learning approach makes everyone a teacher in their own unique fields, with the exchange of these experiences helping the learning of all involved.

This may suggest that, for some at least, the network learning approach added value to their depth of understanding. It may also be one possible reason for the doubling in top grades awarded for the module this year.

Learners also commented on the value of having access to a range of perspectives from a global cohort, with a number of them choosing to reflect specifically on the value they received from both *reading* the MOOC discussions (48%) and *contributing* to them (30%). On reading the discussions, example learner comments included:

> The discussions surprised me with how much they furthered my knowledge. They gave insights and different perspectives that I would not have considered before.

> The main benefit has been in signposting areas that I need to understand more, and having a huge community on hand to help.

Concerning contributing to discussions, comments included:

> By engaging with one of the learners who shared his knowledge, he gave me pointers to interesting and relevant contemporary essays – this is something that cannot be incorporated into a printed textbook.

I'm not confident asking questions in class but I got a lot of value from contributing to MOOC discussions.

Interacting with others to explore the content leads towards a higher quality learning experience.

These comments may suggest, that for some at least, the social learning approach, mediated through technology, also added value to the learning experience. This may be another reason why the module results showed an improvement this year.

However, it is important to note that there were many learners who did not contribute to discussions, citing a preference for lurking, a lack of confidence and a lack of time as the reasons. It was also felt that discussions on the MOOC moved on too rapidly, so late-comers were less likely to receive replies to the comments they did contribute. Some learners also felt that the discussions were often *fragmented and not always followed through, hence of limited use* (learner comment). More generally, others reported finding themselves easily distracted, outside their comfort zone, or that it was hard to learn from a screen alone. Indeed, nine percent of learners explicitly stated that they felt a mix of online and offline was best.

As a further reference point, this time one without the potential task bias of the assessed reflections above, the anonymous end-of-module feedback forms provide additional data. Nineteen learners (41%) completed the feedback forms, with twenty-five percent reporting the MOOCs as the best feature of the module. One example learner commented, *"The MOOC's were extremely helpful in developing knowledge from lectures and good to use when revising"*. Taken as percentage of the total cohort, a little over eleven percent clearly found the MOOCs of considerable value to their learning.

However, an almost equal percentage of feedback respondents (23%) felt that how to use the MOOCs effectively had not been made clear enough and that they had not taken the maximum value from them. An example comment along these lines was, *"The use of the MOOC was not made that clear and the lectures seemed to cover most of what was online"*. It may be the case that these learners failed to take advantage of the weekly face-to-face support sessions which were an important part of the intervention design, nevertheless, for this eleven percent of the total cohort the integration of the MOOCs did not add value. Future interventions could be

improved by developing more effective support programmes that reach out to all.

There may be interesting parallels between the equal percentages of the cohort who found the intervention beneficial (and not), with the equal percentages of learners who *before the start of the module* either strongly or partially agreed (and disagreed) with the idea that MOOCs were more effective than traditional lectures for learning purposes (anonymisation makes a correlation impossible to confirm). This raises the intriguing possibility that prior positive/negative attitudes towards MOOCs may directly correlate to the value a learner can extract from a socio-technical approach to HE teaching and learning. Future studies exploring this would be useful.

In summary, the data concerning the effectiveness of the socio-technical intervention (the integration of the MOOCs into the module and the accompanying support programme) indicates a somewhat mixed picture. At the start of the module the majority of learners considered themselves to be somewhere on the Digital Resident side of the Resident-Visitor spectrum, the starting knowledge and experience of MOOCs was low and attitudes towards them were consequently neutral or unknown. Module results data, importantly, nevertheless indicated that there was a noticeable improvement in the 2017 module results profile compared with the two previous years, with a significant doubling in the number of top grades awarded. Although there may be a range of factors which could have impacted this, the fact that the previous two years profiles were remarkably similar provides some weight to the positive impact of the intervention. In addition, the data also suggests that in a majority of cases the integration of the MOOC helped learners to deepen their understanding, which may be reflected in the improved module results profile. In addition, both the network learning and social learning opportunities afforded by the MOOC were valued by learners. However, this was far from universal, with some learners not supported enough through the process, not valuing the MOOC discussions or the online nature of the MOOC, and a number deeming a mix of online and offline to be best. It may also be the case that prior attitudes towards MOOCs (or even online learning and the web more generally) impact on the value a learner can gain from these types of socio-technical interventions.

8.3. Discussion

It is perhaps not surprising that for individual learners the integration of the MOOCs into the module timetable produced mixed results. For some learners the intervention and the network and social learning approaches were highly beneficial, adding to depth of understanding and the range of perspectives and people they were exposed to. For others, it was unclear how the MOOCs should be used or what learning value they would bring. They were something outside their comfort zone and different from the norm. Even within a predominantly Digital Resident cohort, attitudes towards MOOCs, digital literacy levels, and network skills can not be considered equal. We each have our digital differences.

This finding illuminates two very important barriers to the more widespread adoption of socio-technical teaching approaches in HEIs. The first is that learner's attitudes to MOOCs, online learning and the web in general are likely to be shaped by previous experience and knowledge. Innovative interventions such as this one will tend to cause some students to have to leave their comfort zone, with potentially mixed results. For those conditioned to learning in the traditional modes and equipped with prior expectations of what it means 'to be taught and to learn', (expectations which may only be heightened by the contractual, transactional nature of the current HE model), having to move into less familiar contexts in which their traditional expectations are less clearly matched to the reality of their learning process, can have negative results. The negative impact on the learners however may be more perceived than real, as the improved module results profile may suggest.

The second barrier is that learner's digital literacies levels and network skills are also likely to be very different and perhaps for some more aligned to traditional educational contexts. Through their prior schooling, with its necessary focus on content-led, exam-driven teaching approaches, learners come to university equipped with the literacies to thrive in those settings. While digital literacies are developed by individuals through their own online activities and increasingly encouraged in formal schooling, it still remains largely the case that "the literacies and skills required to benefit from MOOCs are very specific… [and] ...it is also likely that primary and secondary education curricula are not address-

ing these learning skills adequately" (BIS, 2013). Therefore, when asked to participate in innovative HE modules some learners may find themselves with a reduced suite of literacies and skills to deploy, or reduced levels of self-confidence in their literacies and skills, which may have a negative impact for that learner.

This therefore leads to a catch-22 situation for HEIs, who understandably need firm evidence of the benefits of adopting a socio-technical approach to HE teaching and learning as a route to improved achievement and satisfaction. The catch: for as long as innovative modules featuring MOOCs remain the exception rather than the norm in an undergraduate's learning experience and for as long as little explicit effort is made to address the differences in learner's digital literacies and network skills, the results of research is always likely to indicate, put simply, that there are some who love it, most who are neutral, and some who hate it. Or, more reasonably, some who significantly benefit from it, many who benefit a little from it and some who do not benefit from it at all.

8.4. Conclusion and future work

In conclusion, there is some promising evidence from this study that the integration of MOOCs into university modules, in this case as a revision tool, does positively impact the module results profile (e.g. double the number of firsts in 2017 compared with previous years) as it can deepen learning and increase the range of perspectives and people learners are exposed to. The social and network learning approach is also of benefit to some learners, while structural and contextual factors create digital differences (in attitudes to MOOCs, digital literacies levels and network skills), which may be a barrier to the benefits being felt by all learners. More learner familiarity with socio-technical learning and more focus on the development of digital literacies and network skills would be of benefit to all. However, the integration of MOOCs into university modules is not a one-size-fits-all solution to improving achievement and student satisfaction, rather the right MOOC must be deployed in the right way for the right module and cohort. It is to be hoped that this paper will contribute to the discussions concerning the effectiveness of the adoption of MOOCs for internal purposes, and more generally, the adop-

tion of a socio-technical approach to HE teaching and learning. In time, these contributions might empower those HEIs already committed to producing MOOCs to maximize their use throughout the curriculum as a gateway to providing an innovative, connected and effective learning environment for the networked students of today.

As future work, a second iteration of the aforementioned 'action research' process will take place, in which a similar intervention will be run in a different module called 'Living and Working in the Web', the tuition of which has a much higher proportion of online contact hours. The intervention is similar because the same MOOC will be integrated in the module, and students will be surveyed with similar mechanisms in order to obtain responses that will be compared to those in the previous iteration. However, few variations on the intervention will be implemented in response to the evaluation of the module discussed in this paper. For example, a great deal of the social interaction between the students will take place in the comments sections of the blogs they produce as part of their assessment, and they will be suggested to participate in the 'Learning in the Network Age' MOOC only. The purpose of this variation is achieving a more controlled environment where student interactions can be better guided and assessed. Also, the role of the MOOC both as a revision tool and as a task point of departure will be more prominent than its role as a discussion tool. This way, feedback will be addressed in response to those students who reported not being interested in participating in the open MOOC discussion forum.

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9

Educational robotics and computational thinking. A didactic experience of innovation at the university level

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Abstract
Educational robotics has thrived in recent years and is now gaining increasing presence in educational centres around the world. Although it has been especially significant in stages of secondary education, numerous introductory experiences have begun to be developed in stages of early childhood and primary education. The experience presented in this chapter aims to initiate a research line of educational innovation that will be focused on the didactic integration of the following types of robots: mBot, Mouse Robot and Makey-Makey board.

Keywords: educational robotics, computational thinking, university teaching, didactic experience, innovation

9.1. Previous considerations about the development of the experience

The studies by Benitti (2012) and Alimisis (2014) demonstrate how educational robotics has thrived in recent years and is now gaining increasing presence in educational centres around the world.

Although it has been especially significant in stages of secondary education, numerous introductory experiences have begun to be developed in stages of early childhood and primary education.

In Spain, however, although educational robotics has also started to be incorporated in the classrooms, this is still being regarded as an extracurricular activity, mostly due to the boom that this technology has acquired in current society enhanced, among other factors, by the new economic and technological demands derived from an increasingly skilled labor (Smith, 2016).

The experience presented in this chapter aims to initiate a research line of educational innovation that will be focused on the didactic integration of the different types of robots that are currently in the Spanish market.

The first robot was mBot, from the Chinese manufacturer Makeblock (Figure 1), especially designed for stages of primary and secondary education and baccalaureate.

Figure 1. mBot by Makeblock (http://bit.ly/mbot-makeblock)

The second one was Mouse Robot, from the American manufacturer Learning Resources (Figure 2), very similar to the famous Beebot, but more appropriate for early childhood education and the first years of primary education.

Figure 2. Mouse Robot by Learning Resources (http://bit.ly/mouse-robot)

Lastly, we also worked with the Makey-Makey board, from Joylabz (Figure 3), a young spin-off created by two students of the MIT Media Lab of Massachusetts, U.S.A.

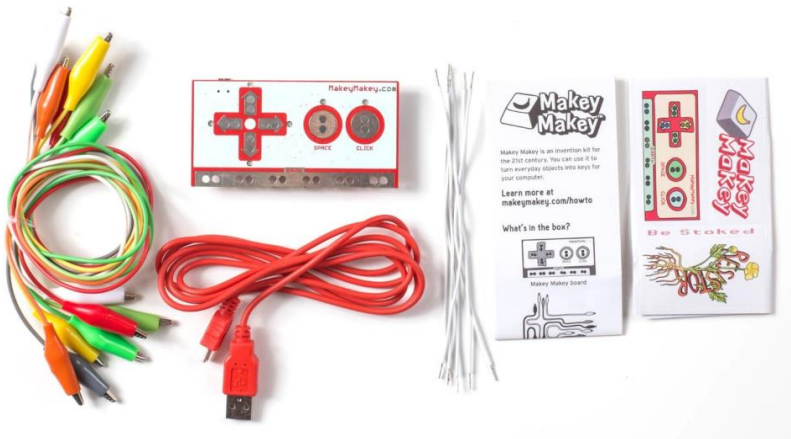

Figure 3. Makey-Makey board by Joylabz (http://bit.ly/placa-makey-makey)

9.2. Educational robotics and computational thinking: didactic possibilities

Currently, there is still no generally agreed definition in the scientific community to clarify the concept of educational robotics, pedagogical robotics or didactic robotics. In this sense, Pittí

(2014) stated that educational robotics is a tool at the service of learning, capable of generating collaborative environments where the participants can practice the skills of the 21st century, which are known as the "4Cs": "Collaboration, Creativity, Communication and Criticism (critical thinking)".

Acuña (2012, p. 8), on the other hand, defines it as a "learning context that promotes a set of performances and skills directly related to the creation, design, construction, programing and dissemination of one´s own creations, first mental, then physical, using different technological resources and materials, which can be programmed and controlled from a computer or mobile device".

Therefore, different elements are considered in both cases, such as:

- It is regarded as an interdisciplinary field.
- It requires the creation of a technological object with a specific purpose that is given, depending on the author, different names, such as educational robot, robot prototype and even those who refer to the creation of automatisms, among other considerations.
- It is used in the field of education.

It contributes to the development of key competences and skills for the students of the 21st century.

According to Bravo & Guzmán (2012) and Román & Hervás (2017), robotics in the field of education turns out to be a resource that facilitates the learning process and the development of general competences such as socialization, creativity and initiative; these competences will allow students to respond with increasing efficiency and adaptability to the shifting environments that characterize today's society. For these authors, the presence of robotics in the classroom is not exclusively limited to the mere training of students in the field of robotics. On the contrary, they aim to use its multidisciplinary nature to generate learning environments in which students can perceive the problems of the real world and, from them, imagine and formulate the possible solutions, and put them into practice to stimulate their level of involvement and motivation for the subjects they are working on.

Programing and robotics involves Computational Thinking (CT), that is, how machines and computers work, since these are

programmed by human beings. According to the European Commission (2017), programing is today's literacy and it helps developing new skills such as problem solving, team work or analytical thinking.

Atmatzidou & Demetriadis (2014) consider CT as a fundamental skill that promotes, among students, new ways of thinking in the different scientific disciplines. Yadav, Mayfield, Zhou, Hambrusch, & Korb (2014) define CT in a wider way, considering it as a mental activity that allows visualizing problems and formulating automated solutions.

In a society like the one we live in nowadays, increasingly based on information, CT is becoming an essential skill for everyone, as stated, for example, by An & Lee (2014) through the creation of an initial training course for teachers, whose purpose was the familiarization, understanding and use of CT in the classrooms.

However, despite all the highlighted virtues, the contributions of Alimisis, Moro, Arlegui, Pina, Frangou, & Papanikolaou (2007) demonstrate how most teachers still refuse to acknowledge the benefits that robotics can bring to the educational processes in the classroom and even, when they do acknowledge so, many of them claim that they are not ready to use and integrate robots didactically in their teaching and learning processes (Mataric, Koenig, & Feil-Seifer, 2007) and, consequently, to incorporate projects of educational robotics in their classrooms.

Therefore, this multidisciplinary nature of educational robotics requires teachers to acquire knowledge in this field, as well as methodological and didactic strategies, for its curricular integration in the classroom. Thus, according to Alimisis *et al.* (2007), teachers will have to accompany their students throughout the entire learning process, calculating and adjusting its needs as it develops. This process will require a constant reflection that offers the necessary information to transform the traditional method, directing it toward the promotion of activities that stimulate in students the need for learning through exploration and the search for knowledge and, thus, contribute to the development of their creative thinking and intelligence.

In fact, the study by Sullivan & Moriarty (2009) demonstrated that some teachers still feel unprepared to carry out teaching activities that involve the use of educational robotics, even after being trained in it. Kim, Choi, Han, & So (2012) also showed these

flaws in Korean ICT teachers (considered, a priori, as skilled professionals in this field) and analyzed their training needs, both in programing and educational robotics and in the applicability of these in the classroom. In this regard, Greenberg, McKee, & Walsh (2013) recommend also as a strategy to limit the number of recruits for the teacher training programs.

According to Fredricks, Blumenfeld, & Paris (2004), the interest of the teacher leads to an active commitment, in general, whereas uninterested teachers have less chances of making an impact in the classrooms (Kim, Kim, Lee, Spector, & DeMeester, 2013). Therefore, robotics can be an effective tool in which teachers should become interested and learn about it (through initial and/or continuing education), at first, and then use it in their teaching processes.

Bers (2008) stated that teacher training in robotics can also produce other positive influences in the teaching practice, such as student-targeted teaching. According to Bravo and Guzmán (2012), educational robotics can keep the attention of students. The fact that students can handle and experiment directly contributes to focus, at all times, their attention, perceptions and observations about the activity being carried out.

Despite the importance of including educational robotics in teacher training (Pittí, Curto, Moreno, & Rodríguez, 2013), there are still very few studies that focused on this matter. According to Gorman (2016), in order for educational robotics to settle naturally in the classrooms, teachers need more conviction and a lot more training.

Perritt (2010) described professional development using a learning approach based on problems along with robotics. Thus, the more confident the teachers were, the more they used robots and critical thinking in their teaching. Likewise, Osborne, Thomas, & Forbes (2010) highlighted the importance of teacher training, although they only mentioned the fact that there were workshops for teachers.

Arlegui, Pina, & Moro (2013) explained more about their teacher training, although they only provided testimonial reports about what the teachers learned and did. Therefore, teachers need to be efficiently trained in order for them to make a proper use of robotics (Bers, 2010:1).

On the other hand, in the study by Agatolio, Pivetti, Di Battista, Menegatti, & Moro (2017), the participants showed greater willingness and better attitude toward robotics after receiving a training course. The teachers coincided in the conviction that robotics can improve student motivation to learn. Regarding implementation in the classroom, approximately two thirds of the participants declared that they already had an idea of how they would integrate robotics in the curriculum.

According to Artym, Carbonaro, & Boechler (2017), computational thinking has been identified by some researchers as a skill desired by students of the 21st century. The challenge for teachers will be to create learning environments that can foster the development of CT in students. Teacher training programs are a unique vehicle to integrate CT skills in their pedagogical practice. It is a clear fact that the growth and creation of employment is linked to the development of innovation in education; thereby, the introduction and training of teachers in basic knowledge of robotics in the present will have a positive impact in the progress of tomorrow´s society. However, as stated by Ferreira, Ryan, & Davis (2015), the institutions that regulate the initial training of teachers are large and complex organizations, and thus, difficult to change.

Lastly, to talk about robotics involves doing so about personal skills and STEM competences, or its STEAM evolution, which is where educational environments are stressing the curriculum and programs of science, technology, engineering and mathematics. In fact, it was because of the narrow approach of STEM (Science, Technology, Engineering and Mathematics) that educators requested a less technical approach that allowed arts, design and humanities to be included (<http://bit.ly/youtube-stem>).

This demand created the space for education in Science, Technology, Engineering, Arts and Mathematics (STEAM), a more transdisciplinary approach focused on problem solving whose primary objective is to prepare students to solve urgent problems of the world through innovation, creativity, critical thinking, efficient communication, collaboration and, lastly, the active generation of new knowledge (Quigley & Herro, 2016).

9.3. A didactic experience of innovation with university students

The experience of innovation presented in this chapter was carried out during the academic year 2016-2017 in the Faculty of Education Science at the University of Seville, Spain. Two groups of students from the Degree of Early Childhood Education and another two groups from the Degree of Primary Education participated in the experience.

The groups of participants from the Degree of Early Childhood Education were constituted by fourth-year students who undertook the 6-credit basic training subject (<http://bit.ly/tic-infantil-us>): "Information and Communication Technology Applied to Early Childhood Education".

The groups of participants from the Degree of Primary Education were constituted by first-year students that undertook the 6-credit basic training subject (<http://bit.ly/tic-primaria-us>): "Information and Communication Technology Applied to Education".

The experience began with a first session in which we explained to the students the meaning of CT and educational robotics (Figure 4). During this session, they were given a document that contained both the computerized collective presentation used in the session, and different texts that expanded the information presented, which they had to use during the different sessions that covered the entire experimental process.

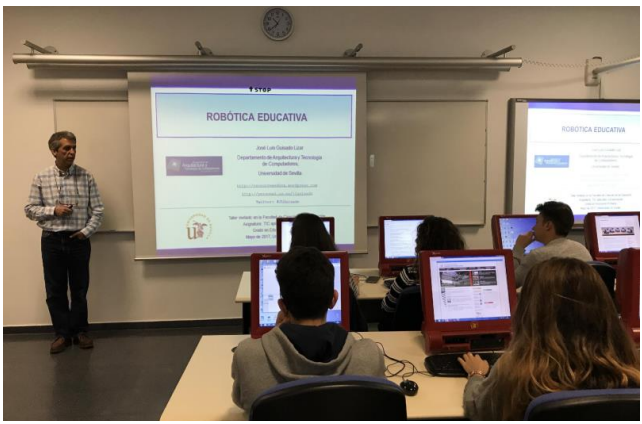

Figure 4. José Luis Guisado, lecturer at the University of Seville, explaining what educational robotics is

Next, they were introduced to the Scratch and mBlock programing language (the Scratch version to program mBot robots), they proceeded to the assembling of the robots and then they started programing them from the basic notions received (Figure 5).

The practical lecture with mBot consisted in programing the robot in a way that this would move in different directions and even detect obstacles with the ultrasound sensors and avoid them. They also had to make the color LEDs in the top and front of the robot switch on. The following videos (<http://bit.ly/mbot-video>) show the interaction of the different groups of students with mBot.

Figure 5. Students programing the mBot with the mBlock programing language

For the learning of Scratch programing language, a simple template was used, which was provided by the non-profit organization "programamos.es" (<https://programamos.es>). Through it, the students programmed a videogame related to healthy eating, in which the famous cat had to stand beneath the fruits falling down the screen and discard the bowls full of sweets (Figure 6).

In the next stage, the students were taught (Figure 7):

- The functioning and purpose of the second robot: Mouse Robot.
- The procedure to assemble the circuit.
- How to use the orientation chips.
- How to program didactic units with Mouse Robot.

The following video (<http://bit.ly/mouse-robot-video>) shows all the details about the interaction of the students with Robot Mouse.

Figure 6. Students programing with the Scratch programing language

Figure 7. Students interacting with Robot Mouse

The third and last stage of our experience was designed for the students to learn (Figure 8):

- The functioning of the Makey-Makey board.
- Its different purposes.
- The most suitable methodological and didactic procedure for its curricular integration in the classroom program.

The practical lecture with Makey-Makey consisted in drawing arrows using a pencil (electricity conductors) and programing the board in a way that, when the different arrows touched each other, the computer would reproduce the musical instrument they had assigned: drum, cymbals, etc.

Figure 8. Students programing the Makey-Makey board with Scratch

9.4. Conclusions

In order to know in more detail the results obtained from the didactic experience of innovation, with the university students of the Faculty of Education Science at the University of Seville, Spain, we created a satisfaction survey that was administered at the end. From its analysis, the following conclusions were drawn:

a) The general degree of satisfaction shown by the students was very high, since they claimed to be very satisfied with the opportunity that the experience had offered them to interact with the robots and their corresponding applications; they even showed their desire to spend more time doing this kind of activities. Thereby, at this point, we formulate the following

question: why must teachers have knowledge related to robotics?

b) First of all, because, in the near future, society will require different jobs related to programing and machines. This will be driven by a humanity that will be increasingly computerized, as is already happening in the present, which is also leading many companies to resort to robots for the realization of logistic or marketing activities (assistant robots).
c) The second justification is related to the development of competences (both basic and specific) in the field of education that are acquired or reinforced through programing, among which we can highlight the following: motivation, curiosity, interest, participation, collaborative work, self-learning, critical thinking, shared building of knowledge, access to new means of information and communication, application knowledge, creativity, imagination, learning how to learn, skills in and with ICT, as well as frustration tolerance, among others.
d) Both programing and robotics constitute a booming market driven by the development of new and improved services and products. This is not only happening in sectors like manufacturing, search and rescue, health, housing, transportation and logistics, environment and agriculture, but also in compulsory education, which is where future researchers and scientists will come from.

The transversal nature of robotics is an advantageous aspect to efficiently approach the main concerns that affect us all. Thanks to this characteristic, students can involve in daily matters, such as climate change, sustainable transportation, affordable renewable energies, food safety and even safety itself. Therefore, we must hope that funding for research and innovation will grow exponentially in these areas with the aim of improving the quality of life of all citizens.

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10

Training of Communication Skills in Social Education Students Through an Innovative Experience

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Abstract
This chapter presents an innovative experience carried out through a university extension course in the 2016-2017 academic year for Social Education students of the University of Huelva. The main objective has been to facilitate the acquisition of communication skills by the participating students (a total of 21 students). A participative, interactive and expository methodology has been followed between professors and students. The analysis of the data will be made thanks to the results obtained from the satisfaction surveys that the same university uses for this type of workshops that are offered in these calls. The results show a high students motivation in this type of initiatives as well as a very positive attitude on the part of participating professors.

Keywords: communication skills, pedagogical innovation, social education

10.1. Introduction

The Social Education professional must develop various skills which have been described through the abilities that should be acquiring throughout their training, according to the profession-

alization document of Asociación Estatal de Educación Social (ASEDES, 2007) and Consejo General de Colegios de Educadores y Educadoras Sociales (CGCEES, 2007). Communication skills are the basis of all other abilities and these are develop throughout the life of the human being, but this does not mean that it is done correctly because we understand that there is a great difference between speaking and communicating correctly what is wanted to be expressed. To communicate is to give form and meaning to a message through a context, a culture and its interpretation of the different signs which are presented in the message, this refers to the non-verbal communication that gives full meaning to the verbal message. This helps to contextualize the message, giving it credibility. In addition, the management of communicative skills facilitates the learning or training of social abilities which are very significant for the professional social education development. It is true that students know what these skills are, but they have lack of training to launch it.

Therefore, it was intended to provide students with tools and specific training in communication and social skills, because they are essential for their day to day as students and future professionals who will live stress and conflict situations, where emotional intelligence and the use of these tools are essential to develop an impeccable work with the diversity of users that will be presented throughout their careers. For this, a workshop was offered in a transversal way to the credits demanded by the study programme, being the main protagonists the students of Social Education in the University of Huelva.

10.2. Brief review of the university degree in Social Education.

Antecedents of the degree

It is necessary to do a historical review of Social Education and the background of the social educator to understand how this degree appeared, due to the necessity caused by social changes, which were produced over the years, and its evolution to the present. For this reason, this professional has been attributed new func-

tions and therefore the need to develop new professional skills, such as communication skills that will be discussed throughout this project. To understand the progress of these professionals we briefly delve into their history, indicating that in 1947 the Asociación Nacional de Educadores de Jóvenes Inadapados (ANEJI) was founded in France to mitigate various problems arising from industrialization, the Second World War and previously the "paternal houses", causing that young people were introduced in the delinquency owing to the system left them without any protection. This association, from 1948 developed international actions in countries such as Holland, Belgium, Germany, the United States and Canada. As a result of all the above, in 1951 the Asocioación Nacional de Jóvenes Inadaptados (AIEJI) was created, being currently known in Spain as the Asociación Internacional de Educadores Sociales (Allah, 2013).

According to Allah (2013), Germany together with France, were one of the pioneering countries in the configuration of Social Education as a profession. This profession arises in the German country as a result of the political, social and economic changes that arose in the modern stage (Cánovas, 2012). In this way, the first specialized training schools were opened as a response to the disorganisation of human life, marginal neighbourhoods, accumulation of social problems due to industrialization that are accentuated in the post-war period, where the interest group nationally and internationally is that of young people because of the crime that had been generated by social maladjustment (Allah, 2013).

These causes are considered the historical reconstruction of Social Pedagogy, this being the discipline that offers models, strategies and techniques to Social Education so that through this profession they are put into practice. In Riera's words (as quoted in Galiano, 2008, p. 31), by Social Pedagogy it is understood that it is: "The foundation and normalizing science of the educational action specifically oriented to Social Education and the integral social welfare of people, groups or communities, in any context and throughout their life and circumstances". Since the assimilation that Social Pedagogy is the founding science of Social Education, these have always gone hand in hand (Cánovas, 2012).

On the other hand, Spain in the 60s and 70s was immersed in a complicated social situation for diverse reasons such as emigration, a deficient policy that implied a constant social conflict,

marginal groups, maladjustment, illiteracy, social inequality, juvenile delinquency and a scarce social sensitivity. For these reasons the population mobilized to achieve a democratic reform and achieve the welfare state. These facts encourage the emergence and configuration of the figure of the social educator in the 80s, taking for its development guidelines of the Training Center for Specialized Educators (CFEEB) created in 1969 in Barcelona. These social and political changes arise through the need of the social demand for greater equality to deal with the process of socialization, transmission of norms and educational values to the population and, in this way, achieving the integration of the most disadvantaged sectors of society, minimizing conflicts and social problems (Allah, 2013). In conclusion, according to ANECA (2004, p.114) "the changes that have occurred worldwide, as well as in Europe have been very profound and have affected the labour market, the economy and the lifestyle of citizens. The breadth and depth of these cultural, social and economic transformations are such that, experts believe that knowledge and information have become fundamental factors to manage the differences between people, organizations and countries". It is understood in this way that the changes and social movements in the 20th century led to the development and specialization of professionals who would cover the needs that occurred at the time, such as the professionals of Social Education.

For these reasons, the Ministry of Education and Science officially incorporates the title of social educator after the approval of Royal Decree 1420/1991 of August 30 (BOE of October 10, 1991) by which the Official University Degree is established of Diploma in Social Education, thus providing basic training to these future professionals, acquiring skills and competencies adapted to that professional profile and social contexts where this figure must intervene, being generators of change (ANECA, 2004). Thus, graduates in Social Education in their scientific training are oriented to develop their profession in the field of non-formal education (Galiano, 2008).

Social Education has been based on three different pillars throughout its trajectory, based on socio-educational principles developed in individuals at a social, educational and cultural level. In this way, these aspects are the following: the specialized educator, the sociocultural animator and the adult educator (Cáno-

vas, 2012). In this way the State Association of Social Education (ASEDES) and Professional Association of Social Educators of Castilla La Mancha (APESCAM) define this profession as a right of citizenship and a profession of pedagogical nature, so the definition established by ASEDES (2004, p. 37) picking up this character is as follows:

> ... a right of citizenship that is materialized in the recognition of a profession of pedagogical nature, generating educational contexts and mediating and formative actions that are the domain of competence of the social educator and enable: i) The incorporation of the subjects of the education to the diversity of social networks, both as regards the development of sociability and the possibilities of social circulation; ii) cultural and social promotion, understood as an opening to new possibilities for the acquisition of cultural goods that broaden educational, work, leisure and social participation perspectives.

Social Education at the University of Huelva

Previously, there was no formal academic training to be professionals of Social Education as such. Therefore, the university degree in Social Education is relatively recent, as it has been indicated in the previous section, since it was approved in 1991 in Spanish national territory through Royal Decree 1420/91 of August 30 (BOE of October 10 of 1991), being called the professional: Diploma in Social Education.

On the other hand, the University of Huelva had this degree in its study programme on June 27, 2002 under the compliance of the provisions of article 10.2 of Royal Decree 1497/1987 of November 27 (BOE of August 27, 2002), on its common general guidelines of the study programme of the official character titles and validity in all the national territory with his corresponding modifications, being his first academic course the year 2002/2003 developed in the Faculty of Sciences of the Education.

Meanwhile, the European Space for Higher Education initiated in 1999 the Bologna Declaration to harmonize the universities belonging to the European Union (BOE of October 30, 2007). In this way, the change for the aforementioned Bologna Declaration for the full achievement of its objectives was scheduled for 2010 through the adoption of specific regulations that would guaran-

tee the new educational construction under a legal framework. In this way, the Organic Law 4/2007, of April 12, modifies the Law 6/2001, of December 21 of Universities to establish the precise bases and thus make a deep modernization of the Spanish University (BOE of October 30, 2007).

In 2010, the BOE number 161 of July 3, 2010, includes Royal Decree 861/2010 of July 2, which modifies Royal Decree 1393/2007 of October 29, by which establishes the organization of official university education. These changes became a great adaptive challenge for Spanish universities towards the transformation of their teaching offer to achieve the new provision. The changes were carried out during the 2010-2011 academic year by implementing the new Bachelor, Master and Doctorate degrees, many of which had already begun to be implemented in some of the Spanish universities.

Then, once we have seen the legal framework of the academic development of the graduates in Social Education, we will focus on the professional competences required of the graduate in Social Education for the optimal development of their profession, because, according to the verified report of the Degree in Social Education (University of Huelva, 2012), this title allows the social educator to develop professionally the scientific knowledge necessary for the understanding, interpretation, analysis and explanation of the theoretical and practical foundations of education in different social spaces and times. It is understood as a social educator according to said verified report (2012, p.19) which is: "the professional who carries out socio-educational interventions with people and in their contexts, in order to achieve full personal and social development, participate in responsible mode in the different social and community spheres, playing with other professionals a role of social and educational intervention ". Within the achievement of this professional profile are specified a series of functions that are well explained both in the verified report (University of Huelva, 2012) that is being treated, as in the "White Book" of Degree in Pedagogy and Social Education (ANECA, 2004), but here only two of them will be cited, since they are the most relevant to justify the purpose of this workshop:

- social, cultural and educational mediation;
- training of socio-educational intervention agents.

On the other hand, considering the general objectives that support this degree and that justify the need to enhance communication skills and social abilities, we are left with the first objective that appears in the verified report of the Degree in Social Education (University de Huelva, 2012), being this the following:

> Qualify students in knowledge, skills, work tools and attitudes that contribute to the development in the implementation and evaluation of educational projects aimed at different subjects and groups, emphasizing communication dynamics, participation, integration and socialization, as well as promotion of a civic coexistence.

After knowing one of the general objectives of the degree, we will focus on the basic skills to be acquired by the students. As can be seen in point B.7 of the verified report (University of Huelva, 2012), this refers to Social Education students must: acquire the skills, abilities and attitudes for socio-educational intervention. Observing the transversal competences, it can be seen that T.1 indicates the use of information and communication technologies in their professional practice (Universidad de Huelva, 2012).

Furthermore, within the list of specific competences which appears in the report (University of Huelva, 2012), we conveniently highlight the following for justifying this workshop:

- E12: know, understand and manage the main concepts, resources and strategies for the development of integral educational actions in community contexts.
- E15: know and understand the concept of sociocultural animation, as well as to manage its techniques for the management of groups, equipment and socio-cultural resources in the development of groups and communities.
- E18: management of audio-visual languages and means of expression and social communication.
- E23: ability to plan, direct and coordinate integral educational projects, learning communities and professional intervention networks.

In the White Book of Degree in Pedagogy and Social Education (ANECA, 2004), the specific competences of disciplinary

and professional training in its thirteenth acceptation are also detailed, indicating that the social educator must: identify and diagnose the usual factors of family and social crisis and develop a mediation capacity to deal with socio-educational communities and resolve conflicts. To develop this competence according to ANECA (2004), the future professional of Social Education must have in their knowledge the processes of mediation and their practices, in addition to knowledge of techniques and resources for communication as the most important process involved in mediation. To develop this knowledge, you must have the skills to be able to communicate effectively, use different negotiation techniques and have the ability to actively listen and interact. In addition, the attitude that the educator must maintain to achieve all this is to know how to be empathetic, assertive and respectful with the diversity of positions before a conflict, to value diversity as a source of wealth and to have a positive thinking.

As you can see, the Social Education professional requires in his training the ability of certain skills to carry out his work properly. It is true that they are competencies that students believe they have because they know what they are for their academic training, but when they need to put them into practice, they find themselves with a lack of techniques and resources to be assertive and empathetic in the face of a conflict in their daily lives or when they are asked to show a work and take a lower grade because they have not developed the communication skills to express effectively all their knowledge. These are examples of the day to day that happen to these students that because of the nature of their profession they need to manage, for that reason, a workshop was proposed for the promotion of communicative competences destined to those students who considered that they should put them into practice to be a good professional in the future, because as Eduardo Galeano says (as was cited in the Certified Memory of the Bachelor's Degree in Education at the University of Huelva, 2012, p.5): "we are not what we are / otherwise what we do / to change what we are".

10.3. Description of the innovative experience called "Taller Comunica-Te"

Then, it is presented in detail what this workshop consisted in, which was carried out at the University of Huelva in a cross-sectional way to the credits required to obtain the Social Education title, as the authors Gómez, Gómez and Rodríguez (2011) indicate., p.154): "Communication is a basic professional competence at the service of education professionals and as such should be instructed". For this reason, it is important to refer to communication as a fundamental tool for formulating social change, this approach being one of the most recent dependency theories and approaches to communication, taking into account that it is a complex process that depends on the context and of the cultural conditions in which it develops (Pérez, Marion Cataño, & Franco, 2009). In addition, the study conducted on social skills in students of Social Education of Rojas (2010, p. 235), indicates that "students who have received training in these skills, improve their interpersonal behaviour in social acceptance among their peers / as, assertiveness, repertoire of social skills, self-concept and self-esteem".

The basic principle that sustains communication for social change is dialogue as Paulo Freire indicated (as cited in García, 2011), since there is no communication without dialogue. For this reason, the ultimate goal of communication is to favour social changes to allow people to be better, have a better quality of life and make decisions for themselves, because until now decisions have been made by marginal groups or in social exclusion, but it is necessary to support them so that they have their own voice (Pérez, Marion Cataño, & Franco, 2009). Hence, the importance of training social educators as agents of change specialized in these skills to successfully exercise their professions, in addition to optimizing interpersonal relationships through training in social skills to promote both personal and professional through active listening processes, dialogues, interviews, persuasion techniques, etc. among many other issues that will be detailed below.

The objectives that were marked for compliance in the "Taller Comunica-Te" are the following:

- General Objectives:
  - To strengthen in communication skills the student of the Degree in Social Education.
  - To optimize social skills in the student of the Degree in Social Education.
- Specific Objectives:
  - To develop the management of social skills.
  - To encourage the ability to speak before a professional future.
  - To optimize the self-confidence of the students participating in the workshop.
  - To favour the quality in the academic formation of the students of the University of Huelva.
- Transversal Objectives:
  - To discover and strengthen the strengths of students regarding communication.
  - To manage different communicative situations to adapt to the public.
  - To learn schemes and strategies to orally convey information in a complete, attractive and rigorous way.
  - To train the participants in the correct use of the different means of support for oral dissemination, applying each one in the appropriate situation.

Regarding the structure, the workshop is divided into six blocks, which cover everything relevant to communication skills and social skills. The blocks were distributed as follows:

- Block 1: Oratory Capacity
- Block 2: Non-verbal components.
- Block 3: Training in social skills.
- Block 4: To speak in public.
- Block 5: To speak in public in different contexts.
- Block 6: Exposition of works + Remember.

This workshop was developed for three weeks and a half, two classes per week of three hours each class. Block 3 will be developed during two consecutive days because the training in social skills required more time for its optimal learning. On the other hand, the students had an hour and a half each day of the work-

shop to do autonomous work outside of the hours in a non-contact manner. The workshop had a total duration of thirty certifiable hours by the University of Huelva.

10.4. Some methodological aspects

In this workshop, an attempt was made to use a participative, interactive and expository methodology, being the participation undoubtedly the leading role:

1. **Participative**: it was based on previous ideas, experiences and beliefs, attitudes and practices. All the members were involved in the process and the plurality of knowledge present in it was used, enhancing the dynamizing techniques that helped achieve the objectives. It was tried that they were always motivating, mobilizing, playful, creative and democratic, so that they generated the possibility of personal transformation and cultural-social change. The process was addressed with the students being active agents of the same, building and reconstructing their knowledge, skills and abilities. We worked learning by discovering, for this, the students obtained the information in an active and constructive way. It was Carried out two modalities or variants; the 'active-reproductive discovery' or 'active-productive discovery'.
2. **Interactive**: This methodology highlighted the exchange between the professor or speaker and the student through the debate to delve into a topic. There was an open interaction where the professor or speaker stimulated participation and dialogue with the student. In order to achieve a positive interaction quality criteria were guaranteed for this, the professors or speakers were specialists in the subject, facilitating a climate of relaxation to intervene, fostering a relaxed atmosphere that facilitated participation and guaranteed a positive assessment of the topic occupy In addition, we must bear in mind that the same students were an active part of this teaching-learning process, being mentors of their peers, which means, of other students.
3. **Expository**: Explanation of the marked contents. The professor or speaker had a leading role and the students were placed at a level of content and information receiver. This is a forma-

lized and systematic knowledge, which focused on learning about the aspects of the topic addressed that were considered relevant.

This methodology helped the construction of knowledge, the interaction and exchange of opinions and ideas, to collect of experiences, to immerse oneself in reality, to generate reflections on it, to enable students to act as tools to become active subjects of this social transformation. Therefore, the role of the professor in this workshop was to guide and facilitate the learning process, as well as being a motivating and energizing agent throughout the change process. On the other hand, the speakers were responsible for evaluating the work and activities that were carried out in the classroom.

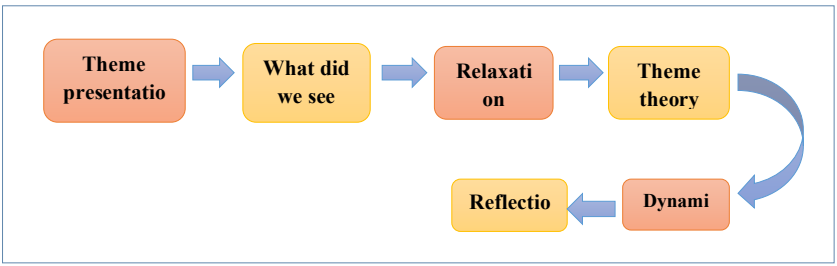
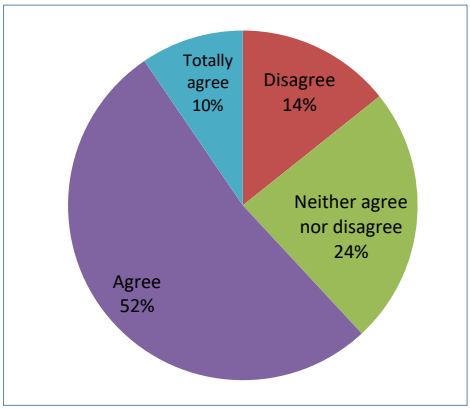


Figure 1. Organization of the different sessions. Source: Own elaboration

10.5. Some of the results

Some of the results obtained thanks to the satisfaction surveys of the participants which are relevant to the issue addressed in this chapter are the following:

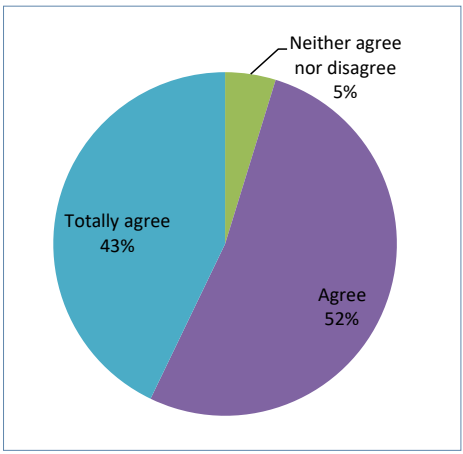
- Regarding organizational issues of the workshop.
  - More than half of the participants think that they agree with the workshop duration, because it is enough for them. However, 14% say that they disagree and indicate that a greater number of hours would be necessary. In the following graph you can see what is discussed.



Graph 1. Satisfaction of the participants in relation to the duration of the workshop. Source: Own elaboration

- 57% of students who have participated think that the schedule in which the workshop has been given is adequate (3 hours, two days a week).
- 62% of students totally agree that the classroom that has been carried out the workshop is appropriate and 38% think they agree. This is because the space where it has been developed is a very functional and versatile classroom, with mobile tables and chairs, and a space that is not too big, making it easier to create a cosy and close atmosphere

- Regarding the level of satisfaction of the didactic material delivered and used in the presentations.
  - 95% of the participants agree or totally agree that the materials and resources have been adequate.



Graph 2. Degree of satisfaction of the materials and resources used. Source: Own elaboration

  - On the other hand, 90% of students indicate that the presentations used, Power Point, Prezzi, as well as the videos that have been exposed, are adequate.
  - All students think that the information provided is up-to-date with respect to the topics addressed in the different sessions.
- Level of satisfaction in relation to the methodology used.
  - All participants agree or totally agree that they have been given the option to ask all the questions they deem suitable.
  - It is also very positive that all students indicate that professors responsible for the workshop, have promoted interaction among all the participants.
  - 90% of students totally agree that the practical dynamics used have been adequate to understand the theory explained.
  - 81% completely agree that professors have clearly explained the contents worked on.
  - 71% express that the training received has been relevant to their needs.

10.6. Conclusions

This study has described an innovative university proposal through a workshop that has been developed at the University of Huelva with students of the Social Education degree, in order to improve their communication skills. From the results that have been obtained after carrying out the experience, the following conclusions are reached:

- The degree of satisfaction in relation to the methodology used, the didactic material provided as well as the rest of the organizational issues is quite high, reason why it can be concluded that this type of initiatives is motivating for students.
- The participating professors, after evaluating the sessions that have taken place, determine that the totality of the participating students has positively overcome the challenges that were proposed to them.
- All participants - both students and professors - emphasize that the theme dealt with (communicative competence), the space

used as well as a low ratio (21 students) have been very important aspects so that the different sessions of the workshop have been productive, dynamic and motivating.

Regarding the limitations, it should be studied how to offer in future workshops, greater numbers of sessions in order to give answers to 14% of the students who think that the number of hours has been less than their needs.

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11

Working with Networks on the University Campus

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Abstract
The universal education is today a reality. Trough the e-learning system we can access to diverse educational system for all the educational level. In this case the technical revolutions have suppose that the higher centre changes their point of view and think how arrived at all the student or possibly pupils. In this case the social networks have became in the best too to get the principal objective of the universities, the communicate with all the student and teachers. In this chapter we presented different social nets for all the world and how the universities made themselves known to the world.

Keywords: social networks, University, teacher, student, innovation

11.1. Introduction

The era of information and communication is currently experiencing a time of constant revolution (Bidarrian, Bidarrian, & Davoud, 2011), although in past times this circumstance was the result of diverse and profound changes in all areas in which society was developed, today it comes hand in hand with the continuous changes that take place in information and communi-

cation technologies (ICT).The new social, political, educational, and economic organization, which is presented, revolves around the absolute power of the demonstrations (hardware and software) that ICTs show. This new panorama demands, in consequence, on the one hand the remodeling or reformulation of the already existing professional profiles and on the other the design of new ones, circumstance that to a large extent affects the educational systems under many and various aspects of its detailed expression.

According to Uzunboylu, Bicen, & Cavus (2011) there are three elements that have accelerated this new society and that therefore affect the educational systems, both in their organization and in their classroom dynamics – concerning the teacher-, namely:

- the rapid growth of scientific knowledge;
- the growth of the popularity of digital culture;
- learning can be done anytime, anywhere.

The first one involves the development of the necessary skills for the progress of information. While the second element implies a new vision of the digital dimension, which entails redefining the roles that consumers of these resources have. Finally, the possibility that is given to learning not only throughout life, but that this can be done 24 hours a day, 7 days a week (Prensky, 2008). As we see everything revolves around the conception of information, how it is recovered, reused, and redefined, in addition to the new conceptions that we assign to the protagonists of the teaching-learning processes, in the case of education, and a variable that every day is assuming more force: the so-called digital competence.

With respect to the way of working with information, the appearance of new tools that try to bring it more available and open new fields of knowledge, implying that it is understood as something flexible, fluid and variable. Hence the conception that we mentioned before the 3Rs (recover, redefine and reuse) link with the idea of 24/7 and the need to know how to combine both concepts (digital competence).

The incorporation of ICT in classrooms in general, and particularly in universities, will imply, on the one hand, a modification of traditional teaching models-transmissive, student-centered and

collaborative (Cebrián, 2003) -and on the other, the design of a new teaching format in which the main feature will be accessing a greater number of primary information sources.

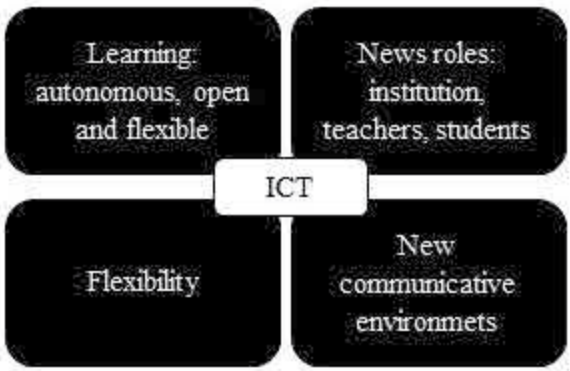

Figure 1. Incorporation of ICT to education. Source: Meneses (2006)

Along with this we also find positive aspects of this methodological approach as they are, among others, greater personal and professional growth of individuals, greater knowledge generation and theories, as well as promoting collaborative and cooperative learning among students and teachers, autonomous learning processes (Muñoz, 2004; Bidarrian, Bidarrian, & Davoud, 2011; Álvarez, 2012). But not all are beatitudes, we also find the lack of time to be up to date on the technological developments that are generated. We believe that it is necessary to overcome the problematic conception that supposes that these tools are linked to the curricular development, as well as to understand that they are a complexity (Gómez-López and Cano, 2011), since they are a social reality of both the students and teachers of today.

However, as Bates (2004: 33) maintains, "if teaching with technology means at least initially more work, the benefits should be considerable", together with the versatility of ICTs, we believe that the benefits of their employment in the university classroom are greater than their disadvantages.

Under this framework European Higher Education Area there is no doubt that Information and Communication Technologies (ICT) will play a very significant role the possibilities they can offer multiple possibilities building international collective knowl-

edge clusters, provide contextualized and meaningful experiences for students, promote decision making and solving social problems, promote collaborative projects investigation, develop the ability to adapt to new situations, etc. (Cabero, López Meneses, & Ballesteros, 2009).

As Lorenzo, Trujillo, Lorenzo and Pérez (2011) argue, ICTs are presented as a challenge, but also an opportunity to interact with intelligence, appropriating its complexity and innovating consequently transforming in a meaningful way our society. Perhaps for this reason its knowledge, usefulness and use. Without forgetting the instructional level, also students show marked interests and motivation for using ICT both in their formative processes (Guerra, Gonzalez, & Garcia, 2010), as well as towards educational resources for mentoring and monitoring didactic processes (García, Gros, & Noguera, 2010).

11.2. From the Internet to social networks

The growth of the Internet has meant that under its umbrella have been generating an infinite number of tools that, initially, are created for Internet as an integral part of the network itself, more so if given the possibilities of today. Its use within the world of higher education has led to the development of a new way of looking at teaching, and as one of its main advantages, is the growth of online training plans, which, as Gavari (2006, p. 190) pointed out, can range from the "promotion of digital literacy; the European virtual campuses; the electronic twinning of European schools and the promotion of teacher training; and the transversal actions for the promotion of e-learning in Europe".

However, using the Internet in the university classroom is not without drawbacks that Barroso already identified in 2004:

- the cost of equipment-means;
- the need to train and maintain a technical staff – and as well, the training of teachers;
- See the students as technicians, and also the adaptation to new teaching-learning methods;
- the excessive belief that there is total security, and the concretion of scientific authorship.

- the bandwidth;
- the various static environments used for the distribution of information (we refer to files of type pdf or txt);
- the development of a rote approach to learning;
- lack of educational experience does not consider the network as a formative medium.

But this same author also indicates a series of benefits such as:

- training focused on the student;
- communication between the students and the teachers, and in addition the institution;
- the reduction of costs, economic and personal flexibility of the teaching-learning process, as well as the rhythm of the same marked by the students;
- expansion of work scenarios;
- increase in the number of students per teacher and classroom;
- combination of different resources and the possibility of using them in a synchronous and asynchronous way of communicating

Rieh (2004) considers that the combination of factors such as the context, the characteristics of the subjects, and the use of different ICTs provides diverse learning opportunities as a result of the search for information

The Internet or Web 2.0 network, as they have called it since O'Reilly (2005) coined the term 2.0, which has also been transferred to education, since there is already someone who talks about a 2.0 education (Cabero, 2009), a university 2.0 (Freire & Brunet, 2010) or a student 2.0 (Thomas & Li, 2008) -, is presented to the educational community as a platform for the exchange of information and ideas, which is in continuous growth, where programs , or a large number of them, with free access trying to overcome new concepts that the Internet or Web 2.0 has brought as it is the digital divide, as well as the management of data that Internet users acquire during their participation .

Holcomb & Beal (2010) point out that the rapid growth of Web 2.0 implies, at an educational level, that teachers must be critical when choosing the tools, they will use, they must also be very selective and aware of the potential and limitations may present

itself, both for the development of the curriculum by students, qualified by some as digital natives, by others as part of the Einstein generation (Boschman, 2007; Prensky 2008). The tools have been called 2.0, as well as the network itself, that we usually refer to as Web 2.0.

However, if they are considered as a cardinal tool in their learning process, proof of this is the data collected by Holcomb & Beal (2010) on the 2.0 tools. In their study, these authors recognize that these are a vehicle for the student to develop a learning based on curiosity and creativity, acquire knowledge through problem-based learning, provide opportunities for their interactive learning, regardless of their geographic location, or their socio-economic status.

Social networks are a new way of being and being present in the world, digital or not.

11.3. University social network scenario

The advancement of the Internet in general, and of social networks in particular, has caused higher education to find a space in said communicative universe. Secondary education has developed various actions that allow a resource such as social networks with a large presence in the personal and family life of students to take on an educational aspect.

This situation has reached a great extent in the university training levels, and there are already numerous networks created around various topics aimed at both professors and university students.

A clear example is found in the REDDOLAC network (image 1), Teachers' Network of Latin America and the Caribbean. This, although it covers teachers from all educational levels, offers a great variety of resources and information at the level of higher education.

Users can generate their own pages, in which they can insert information, videos, create a blog or open chat sessions with different themes or participate in existing ones. The incorporations made by the web may arrive easily at the email account with which the user has registered in the network, this being a fluid way of communication.

Image 1. REDDOLAC network input. Source: <http://www.reddolac.org/>

Image 2. Network session RECUED. Source: <http://redcued.ning.com/?showAddContent=1&xg_source=msg_wel_network>

Another example of an educational social network is Redtecnologiaeducativa. This virtual community is supported by the association RUTE, University Network of Educational Technology. Created in the Ning environment centers its attention and content, as indicated by its title, in educational technology. It involves teachers and people interested in the world of information technology and communication. Like the previous network, it allows users to create their own page, participate by uploading photos, videos, creating forums, reporting events and designing blogs around technological topics of interest.

Among the groups created (7), the so-called *university e-learning*, consisting of 62 members at the time of the consultation, stands out.

Image 3. Rute Portal. Source: <http://redtecnologiaeducativa.ning.com/>

Like the previous two networks, the Internet in the classroom revolves around technology. You can also engage both teachers and interested 2.0 tools that can be used or can affect education at any educational level. In it we can find a section called *Good practices 2.0* designed to expose those practices that are being developed in schools and that are considered as an example to be followed by other teachers.

Image 4. Internet portal in the classroom. Source: <http://internetaula.ning.com/>

Focused on university levels, we find the network created by the Menéndez Pelayo International University (UIMPE 2.0) (see image 5).

Image 5. Social network of the UIMP. Source: <http://redsocial.uimp20.es/>

In addition, to the aspects indicated in the other networks of a more general scope, it informs us of the courses and meetings that the UIMP develops throughout the academic year, mainly in its summer school, allowing to participate through the chats in a direct way in the conferences that take place in it. With the simple registration as a user, the network will keep the Internet informed about everything that happens in those areas in which the UIMP participates.

Image 6. Portal University in Cloud.com. Source: <http: //www.universityin-cloud.com/>

In the network Universityincloud.com is oriented, fundamentally to university or pre-university students. In it, Internet users can find information from all the universities in the world. Once registered one can locate information about campuses, residences, exams, contact various professors or deans of different universities, open a blog, participate in the forums created or generate a new one, as well as being able to track the university where one can best develop one's learning, from one's needs and/or expectations

Following this line, we also find Gonway. This social network aims to bring the world of business to university students, giving a twist to the proposal that frames the Linkedin network.

Image 7. Gonway Portal. Source: <https://www.gonway.com/>

Through its slogan "Stop being invisible, show your talent, choose your company" it tries to help seniors and recent graduates seek employment by offering competence to various companies, but knowing in advance the reality of these entities.

We also find in the network the SPQR proposal, a project through the network that aims at raising awareness around the initiative sponsored by the Orange Foundation that is being developed for the inclusion of subjects with hearing loss. Through the use of QR codes you can access information that otherwise, given your situation you cannot access.

Image 8. SPQR Portal. Source: <http://www.specialqr.org/index.php>

The National University of Colombia, like many others, has created a Facebook profile (see image 9) created through the UN News Agency, of the university itself. Through this page university students are informed of everything that happens on the campus of the National University.

Image 9. UN Facebook page. Source: <https://www.facebook.com/pages/Agencia-de-Noticias-UN/193658967327822>

Finally, we want to highlight the DIPRO 2.0 network. This network is the result of the development of an R & D & I research project, which focuses on the world of technologies, specifically around personal learning environments (PLE). Composed of more than thirty teachers both university and not, whose common points are information and communication technologies. The substantial difference of this network against the others is, in addition to the specific theme (PLE), that the participant in it can directly select the subjects from which it wishes to receive information, when these incorporate some content into the network, and is able to manage all of this through the *make friends* option. The greatest difficulty of this network is the ignorance of the Internet users of its software, as opposed to the advantage of being free of charge.

Image 10. Gate DIPRO 2.0. Source: <http://tecnologiaedu2.us.es:8083/>

11.4. Final reflections

The development of the information and knowledge society, and in particular of the Internet network, has led to the creation of new tools, called 2.0, which have gradually been incorporated into the educational world.

This situation has revealed not only the gaps that teachers can present to apply them or incorporate them into classroom dynam-

ics. In addition to this, we can find the use by students of these tools for both social and educational purposes. And this is what this communication wants to emphasize. Tools such as social networks are transcending the conception with which they had been originally created, taking now to the educational field. So, we raised the first question that gives title to this communication: "Are they really necessary social networks for the development of university teaching; "Do they make sense as a resource for the implementation of new study plans?" "Should they be incorporated into the university teaching methodology?" Given the examples we have shown, in addition to all those which have remained in the pipeline, social networks are vital for the development of academic and social life on university campuses, bringing academic life closer to students, to teachers, and to the citizen community. As far as university teaching is concerned, we find the same reality as on the campus, bringing teaching closer to the learning process of the daily reality of the student, forming him or her in all the teaching-learning processes; this is why we can consider that the ICT approach to the network is becoming a cardinal tool in the growth of the study plans resulting from the implementation of the European Higher Education Area.

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12

Citizenship Oriented to Justice in Higher Education: Didactic Experience and Revision in the Bachelor's Degree in Primary School Education

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Abstract
Inequality is a relevant issue related to politics, society, culture, economy or history. In this way. Critical thinking is considered an essential step to allow teachers to educate for a citizenship oriented to justice in a school understood as the engine of social change. Moreover, several studies have shown the effectiveness of debates and argumentation in social sciences classes in other to teach significantly. This is possible starting from conflicts and socio-environmental realities in order to construct a truly democratic citizenship. According this, it is presented one of the latest versions of the didactic experience design, "let's buy!", in addition to the evaluation and reflection of this experience based on the information collected by the teacher's diary, peer assessment and interview sheets for classroom group with a sample of 317 third-year students of the Bachelor's Degree in Primary School Education at the University of Huelva. In general, in coherence with the results of some relevant researches on citizenship education and initial training of teachers and taking as a reference the reflection on the action, it is concluded that didactic experiences where socio-economic problems of the daily environment of students are analyzed can

contribute to awareness and professional predisposition of future teachers to consider situations that could affect the teaching and learning process.

Keywords: citizenship education, teachers training, equality, didactical experience, teaching of social sciences

12.1. Introduction

According to data from the National Institute of Statistics (2016, 2017), the Spanish population, in 2014, presented a 29'2% risk of poverty or social exclusion. On the other hand, the population below the poverty risk threshold (or percentage of people with low incomes in relation to the population as a whole) decreased slightly to 22.1% in 2015 (compared to 22.2% in 2014). However, despite the fact that between 2014 and 2015 the poverty risk rate decreases more sharply for the population under 16 years of age, this would be the group most affected with risk figures close to 30%.

In contrast to these data and based on the Annual National Accounts of Spain, UNICEF has echoed the impact on households with children and adolescents the reduction of 11,500 million euros in investment for the social protection of families and childhood between 2009 and 2015. According to the organization, and as was published in *El País* newspaper (April 15, 2017), this reduction has placed Spain as the third country in the European Union, behind Romania and Greece, with an "anchored" poverty of almost 40% in the infant population.

The inequality of wages is the one with the greatest weight in the income of households. In this situation, didactic of the social sciences where the relevant issues are addressed in relation to politics, society, culture, economy or history is considered desirable. In this way, it is necessary to refer to the Gini coefficient in addition to contributing to the orientation of public policies of equality and economic development because they help us to justify the need to be aware to the problems related to the family economies at school.

Although according to Eurostat data, in the last 3 years, in Spain, inequality has decreased significantly, in general terms, we must speak of an increase between 2007 (31.9) and 2016 (34.5)

due in large part to the destruction of employment and the flexibilization of labor rights that have occurred throughout this period.

According to the data, it is very probable that, in the classroom, the teacher meets students with depressed socioeconomic background, with family members who are unemployed or who have difficulties in satisfying their basic needs. It is pertinent to consider the importance for teachers to develop an attitude of commitment to the relevant problems linked to the socioeconomic reality of families; supporting the construction of a critical through the promotion of empathy, solidarity and a vision oriented to justice (Delgado-Algarra, Bernal-Bravo, & López Meneses, 2019), a vision in the face of the humanization of neoliberal policies. That is why we present the analysis of the implementation of a proposal for the initial training of teachers in bachelor's degree in Primary School Education that has been designed during eight academic years.

In this chapter, we present the latest version of the didactic experience design, "let's buy!"; in addition to the evaluation and reflection of the didactic experience based on the information collected by the teacher's diary, peer assessment and interview sheets for classroom group with a sample of 317 third-year students of the Bachelor's Degree in Primary School Education at the University of Huelva from two academic years (2016-2017 and 2017-2018).

In general, in coherence with the results of some relevant researches on citizenship education and initial training of teachers and taking as a reference the reflection on the action, it is concluded that the didactic experiences where socio-economic problems of the daily environment of students are analyzed can contribute to the awareness and professional predisposition of future teachers to consider situations of social injustice that could affect the teaching and learning process.

12.2. Epistemological bases of experience: theoretical and research review

This section describes the theoretical references and researchers on which it is based the design and the practical experience "let's buy!".

Theoretical bases: education for a citizenship oriented to justice and social commitment

Critical thinking, in general, implies sensitivity to social and environmental problems. Therefore, based on the model of emotional competence defined by Bisquerra and Pérez (2007) and supported by the conceptions of citizenship proposed by Delgado-Algarra (2015), a desirable citizen profile is configured. Citizens able to identify and self-regulate their own emotions and able to develop social skills such as use of effective persuasion tactics, listening to others and the elaboration of convincing messages, resolution of disagreements with others, inspiration and guidance to others, initiation and administration of new situations, reinforcement of interpersonal relationships within the group and work with others.

Linked to the profile of a citizen oriented to justice, we also highlight the adaptation of the "demand for global distributive justice" of cosmopolitan citizenship as one of the epistemological references on which the didactic experience is based. In this dimension, underlies the so-called egalitarianism of luck that distinguishes between luck (circumstances) and agency (decisions), so that:

> An unequal distribution is legitimate only if it can be traced back to the agency of individuals, while deviations that go back to luck (not assumed by agency) are illegitimate. This implies that egalitarian justice should aim to neutralize the effects of undeserved circumstances in the lives of individuals. The possibility of realizing one's life plan should not depend on the natural and social lottery (Loewe, 2015, p. 162).

On the other hand, and from a perspective more directly linked to citizen action in the public sphere, an alternative to "consensus in the center"" (center-right and center-left) is proposed, which, according to Mouffe (2016), serves as a way to humanize a neoliberal globalization to which most parties have surrendered, convinced that there are no other alternatives.

Thus, there is a need to reopen the democratic debate on the ways in which public institutions and social relations can be organized. In this line, as indicated by Westheimer and Kahne (2004), the citizen oriented to justice must learn to question and

look for the causes of problems, catalyzing the change in the systems and structures established when they reproduce injustices over time. In this way, in the aforementioned experience, it was considered as a fundamental axis the need to educate competent citizens to drive profound changes in systems that reproduce structural inequalities over time.

Research bases: citizenship education and justice

Below are several investigations that have been especially relevant for the design, justification and updating of the didactic proposal to develop the experience "let's buy!". In this sense, some studies have shown the effectiveness of the debate and the argumentation in social science classes when it comes to teaching significantly starting from conflict and social reality in order to construct a truly democratic citizenship (Yeager and Humphries, 2011).

These results are coherent with the research on the social representations of Law, Justice and Law previously carried out in the Spanish context by Pagés and Oller (2007). Among other issues, the results of this research, highlight the potential of interactive methods, the inclusion of relevant problems for responsible citizenship education in the teaching of social science. Taking into account the aforementioned research results, we present an experience around an intentionally unfair daily situation where intra-group and inter-group interaction predominate.

Delgado-Algarra and Estepa-Giménez (2017), meanwhile, through an extensive study, show that teachers in Huelva and its province (Andalusia, South of Spain) have a sensitivity towards social intervention and criticism, although not towards the transformation of reality. On the other hand, some aspects of the majority profile of the teachers surveyed in this research suppose the existence of very significant divergences between the thinking and the practice, which could be negatively influencing the citizen's education of the students.

This fact, converges with the extensive study developed by Trafford (2008) in the United Kingdom, whose conclusions show that the democratic school is a minority model, reflecting the existence of a disciplinary tradition where the experiences in which the student is encouraged to make use of critical awareness and to assume the role of a citizen committed to social reality has no

place. That is why, from the experience that is presented, it has been considered essential to encourage students to make use of their critical capacity during the development of the proposal and sharing.

Critical thinking is essential to take the step towards education for a citizenship oriented to justice in a school understood as the engine of social change. Thus, in terms of social justice, Lazar (2013) carried out qualitative research of an interpretative nature based on case studies where 3 new teachers were followed up for 2 years. To do so, teachers who had participated in educational programs related to social justice were selected.

The research concluded that the design of teacher training programs and activities that analyze everyday situations such as poverty and basic aspects related to social justice provide greater security to new teachers who work for the first time in high poverty districts. The results of this study have been very important for updating and justifying the design of the proposal presented in this chapter and practice. This is because, in this didactic experience, the different groups have assumed the role of families with budgets assigned with an intentionally unequal criterion based on the egalitarianism of luck.

Finally, consumerism, closely related to responsible consumption and with a supportive attitude, is present in our proposal. In this sense, Caurín, Morales, & Solaz (2012) carry out research on sustainable development where it is concluded that, when designing programs to achieve a change of attitude regarding consumption, it is necessary to take into account the socio-economic aspects of the students.

12.3. Design of the proposal "let's buy!"

In this section a description of the general aspects of the proposal will be made. In addition, it will be presented the structure of the activity, some numerical data related to the selection and organization of the participants and instruments of information collection from an approach that integrates in a natural way the didactic action and the research activity for the evaluation of the experience development and for its improvement in the future.

General description and structure

In general, structuring teaching around problems allows breaking the rigid structure of traditional school knowledge, facilitating the integration of concepts, procedures and values; opting for a school research model where a triangulation is established between problem, daily knowledge (previous ideas) and scientific knowledge that allows to build a meaningful school knowledge (García-Pérez, 2017).

Through the design of a healthy menu with a specific budget, the aim is to develop teamwork and make decisions about everyday situations such as making a responsible purchase. Nowadays the terms that define a healthy diet are well defined. In this sense, research in Nutrition such as Nestle (1995) and Aranceta (2001) have repeatedly and consistently demonstrated that the best diets are those that are based mainly on the consumption of fruits, vegetables, cereals and legumes, using food from animal origin with moderation. There is an urgent need work on issues such as food and nutrition in schools; educating teachers, children and their families in healthy eating habits, in order to prevent the obesity of children and adolescents and improve their health and quality of life Salinas *et al.* (2014). Moreover, in the classroom, we must insist on the existence of a set of solid criteria of sciences, mainly because students are conditioned by everyday knowledge or beliefs (Lorca-Marín, González, & Velo, 2019).

On the other hand, through the emotional potential of the process of adopting roles in simulation (before an intentionally unfair budget distribution), the decision-making, sharing and confrontation of different socioeconomic realities is intended to achieve the following purpose "to raise awareness and sensitize future teachers about the situations of social and economic injustice that may be faced by the families of some of their future students" (table 1).

In other words, taking into account the difficult situation that many families face daily in our country (and in the world), the main purpose of this activity is that teachers in training face situations of social injustice in a simulation, awaken their sensitivity to real problems that can go unnoticed, problems that, from the area of social sciences, are fundamental in order to construct a critical, committed and justice oriented citizenship for the configuration of a fairer society.

Table 1. Structure of the didactic proposal

<table>
<tr><td colspan="3">NAME OF THE ACTIVITY: Let's buy!</td></tr>
<tr><td>Time: 1h.30min.</td><td>Organization: Grupal</td><td>Space: Classroom</td></tr>
<tr><td>Objectives:
Define a healthy menu based on a budget.
Make decisions in groups around daily consumption situations.
Raise awareness and raise awareness about the disparity of the family economy and social injustice.</td><td colspan="2" rowspan="3">DEVELOPMENT
PHASE1: Diagnosis of previous ideas
Task 1. Diagnosis of ideas and previous experiences in relation to the purchase, usual consumption foods, weekly budgets, daily problems, etc. Teacher diary is used in all tasks.
PHASE 2: Decision making
Task 2. Distribution of the group work sheet, explanation of the activity, how it will be developed and what roles will be assumed.
Task 3. Distribution of group budgets, selection of volunteer co-evaluators and meeting with co-evaluators outside the classroom where they are given their respective co-evaluation sheets.
Task 4. Group discussions and decision making regarding the purchase trying to respect the conditions indicated in the group worksheet. At the same time, co-evaluator students guide and support the groups with which they assume the responsibility for co-evaluation by taking annotations (max 2 groups per co-evaluator).
PHASE 3: Sharing and reflection
Task 5. Sharing and reflection in a large group with support from guiding questions. Interspersed with teacher's explanation when necessary.</td></tr>
<tr><td>Contents:
Responsible consumption.
Design a healthy menu according to a limited budget.
Group decision making in situations of consumption to meet the needs of food.
Awareness and awareness about the disparity of the family economy and social injustice.</td></tr>
<tr><td>Competences:
Social and civic competences</td></tr>
<tr><td colspan="3">Resources:
Team work sheet (appendix 1)
Co-evaluation sheets (appendix 2)
Sample issues (appendix 3)</td></tr>
</table>

The activity called "Let's buy!" is planned for the development in a single session, but it can be integrated into a sequence of activities. Likewise, although we present the version aimed at teachers in training, as has been demonstrated in practice, it can be easily adapted to the primary and secondary school by reducing the number of menus, adding manipulative elements such as money or objects as a shopping workshop, adapting the rules or even agreeing them previously, etc.

Participants

In the academic year 2016-2017, the proposal was carried out with 117 initial training teachers of third course of the Bache-

lor's Degree in Primary School Education and within the subject Didactic of Social Sciences I. In the academic year 2017-2018, it was carried out with another 200 initial training teachers of the same course, grade and subject. Thus, we have worked with initial training teachers distributed in 5 shifts and organized as indicated in table 2:

Table 2. Information about the participant students of the Bachelor's Degree in Primary Education experience

BACHELOR'S DEGREE IN PRIMARY SCHOOL EDUCATION Area: **Didactic of Social Sciences**				
School year	**Shifts**	**Initial training teachers**		**Team groups**
3º 2016 - 2017	Shift 2 (Afternoom)	50	117	33
	Shift 5 (morning)	67		
3º 2017 - 2018	Shift 1 (morning)	78	200	46
	Shift 3 (morning)	70		
	Shift 4 (Afternoom)	52		
TOTAL			317	79

Information Collection

Information collection is integrated into the design of the proposal itself and as indicated above, has been adapted and improved throughout different academic years since 2009-2010. This adaptation has been possible thanks to a parallel spiral action research process that has been developed through four consecutive phases in order to improve the proposal and the quality of the teaching practice every year.

A spiral process implies that the reflection phase of an action research process leads to decision making to be implemented in the planning phase of the next one (Delgado-Algarra, 2017); this approach has made possible the progressive improvement of the proposal and its implementation year after year. Thus, integrating the action and observation phases, the information collection instruments would be the observation grid (co-evaluation sheet), semi-structured group interview (see table 3) and teacher's diary.

Table 3. Information about the evaluation and information collection instruments

Instrument	Description	Task	Appendix
Observation grid	Completed by students who assume the role of volunteer co-evaluators who, in addition to observing the development of the session, have supports the assigned groups.	3	2
Semi-structured group interview	Developed by the teacher taking as initial reference a basic script that is specified and adapted for different groups of the classroom and depending on the answers.	5	3
Teacher's Diary	Additional information is collected.	1-5	-

12.5. Development, analysis and discussion

The proposal presented, previous adaptations and successive improvements, has been carried out both with primary school students and with initial training teachers of the Bachelor's Degree in Primary School Education; however, we will focus on the latest version implemented between the academic years 2016-2017 and 2017-2018 with the students of the aforementioned university degree.

Phase 1: Diagnosis of conceptions

It corresponds to **task 1**, after a brief introduction about the design of the session, and without going into detail about the final purpose of this activity. It is asked about issues related to the purchase and about previous economic experiences. It should be noted that a considerable number of initial training teachers in the University of Hueva (Andalusia, Spain) come from towns and reside in the city of Huelva during their study period, so, most students indicate that they have experience with the purchase and with the adaptation to a tight budget.

They affirm that, although they take into account the price, they pay attention to the quality of the food. To reach a desired level of critical reflection in an autonomous way, it was necessary not to indicate the ultimate purpose of the experience; directed to

the sensitization of the future teachers around the possible situations of social and economic injustice to which some of the families of their future students will face.

The importance of awareness and the value of the proposal that has been put into practice, to date, is supported by the research of Caurín, Morales, & Solaz (2012), Lazar (2013) and Delgado-Algarra & Estepa- Giménez (2017). Thus, converging the conclusions of these investigations, it is clear the need for an empathic teaching practice, aware and committed to the economic and social problems that could be present in the daily environment of their own future students.

For all of this, from the beginning, and following Estepa (2007), an approach based on school research and resolution of relevant problems is assumed. From this approach, desirable school knowledge is not based only on scientific (or disciplinary) knowledge; in addition it is necessary to take into account metadisplinary knowledge and it must be based on an enrichment of everyday knowledge; knowledge constituted by systems of ideas that evolve after overcoming the difficulties raised during phase 2.

Phase 2: Decision making

The decision-making phase of initial training teachers corresponds to tasks 2, 3 and 4. In this phase, to achieve the ultimate goal of the proposal, it is necessary that some teams experience a simulated situation in which they see themselves forced to sacrifice the nutritional quality of food to be able to make the purchase of 3 days adapting to an indicated budget.

The 117 teachers in third year of the 2016-2017 academic year and the 200 in the 2017-2018 academic year were organized in a total of 33 and 46 working groups, respectively. In this way, taking as reference Loewe (2015) and from the approach of the "egalitarianism of luck", illegitimate unequal distribution is made based on luck (circumstances) and not on agency (decisions), a luck that affects both to families in the first world as to a great social majority in the third world.

This phase was especially impressive for all those students who, in the diagnosis phase, affirmed that "the priority is the quality of the food although the price is taken into account". In contrast to

this situation of economic deprivation, a minority of groups were assigned an exaggeratedly high budget.

In **task 2**, the group work sheet is distributed (appendix 1) and the activity dynamics are explained, how it will be developed and what roles will be assumed. In **task 3**, group budgets are distributed (between 5 and 150 euros for 3 days) and voluntary co-evaluators are selected (one for each two teams, never coinciding with their own group).

During the time of reading the worksheet by teams, in the meeting with the co-evaluators outside the classroom they are given their respective observation grids (appendix 2), making clear the following message "as a reviewer of the development of the activity "let's buy!" you should observe the operation of the team, talk with members, ask what is necessary and complete this table with total sincerity. Your work is also supportive; that is, when the group needs it, you must resolve doubts as long as you do not give the final answer".

The implementation of the figure of the co-evaluator that offered support to the groups, did not only serve to gather an enriching information about the internal functioning of the groups and with a view to the continuous evaluation; but it offered relevant information for the evaluation of the proposal itself. In convergence with González-Bellido (2015) and Moral, Amores, & Ritacco (2016), respectively, and based on the decisions made in previous years, it has been understood that the action of this support figure based on the cooperative learning method of peer tutoring and distributed leadership enhances the dynamism of the session and it is accepted by students in a natural way.

During **task 4**, the decision-making of the groups took place. Thanks to the work of support and collection of information on the functioning of the groups carried out by the co-evaluators, it was possible to understand to what extent the groups respected the conditions indicated in the group work sheet both in quantitative terms (table 4) and in qualitative terms.

Except for 3 groups where part of its members did not participate actively, it was possible an active participation for almost full students in decision making (f.2.1). However, coinciding with the groups that were assigned low or very low budgets, 41.8% managed the purchase for a healthy menu partially or, directly, did not take into account that aspect.

Table 4. Level of development of the different items by the groups during phase 2 of decision making (tasks 2, 3 and 4)

Phase	Cod	Item	Op	f	%
f.2. Decision making	f.2.1	The members of the group listen to each other and make decisions together	Yes	76	96,2%
			S/t	3	3,8%
			No	0	0%
	f.2.2	When buying, group is taking into account that the food is healthy	Yes	46	58,2%
			S/t	26	32,8%
			No	7	9%
	f.2.3	When buying, group is taking into account that all members of "the family" should eat	Yes	67	84,8%
			S/t	9	11,2%
			No	3	4%
	f.2.4	The group adapts to the indicated budget	Yes	72	91,1%
			S/t	7	8,9%
			No	0	0%
	f.2.5	The group completes a menu for 3 days	Yes	59	74,6%
			S/t	18	22,7%
			No	2	2,7%
	f.2.6	The shopping list is filled in and the data is correct	Yes	68	86%
			S/t	11	14%
			No	0	0%

The qualitative information in the observations column corroborates the relationship between allocated budget and the configuration of a healthy menu. Some observations make direct reference to this issue, so that in order for all the members to eat, some groups were forced to sacrifice the quality of the food. Complementing the information obtained about item f.2.2 and regarding item f.2.3, 4% of the lower income groups opted to guarantee the quality of the food. However, they did it in exchange for some family members skipping meals. The difficulties to complete the menu (f.2.5) and adapt to the budget (f.2.4), as expected, were more pronounced in the groups with low budgets assigned.

Phase 3: Sharing and reflection

It corresponds to the task 5 of sharing and reflection in class group supported by guiding questions. Thus, the problems registered in the decision-making phase were shared in phase 3, taking as reference 4 **questions for sharing** from a semi-structured approach. Questions 1, 2 and 3 are linked to item f.3.1 and the question 4 is linked to item f.3.2 (appendix 3, first half).

Thanks to the responses of the respective teams, the co-evaluation students were able to record information on the reflection phase (table 5). This record was contrasted with the notes recorded by the professor in his teacher's diary and in the context of the parallel action research process.

Tabla 5. Level of development of the different items by the groups during phase 3 of reflection (task 5)

Phase	Code	Item	Op	f	%
f.3. Sharing and reflection	f.3.1	The group is aware that it has problems when buying / that other groups have problems when buying.	Yes	77	96'7%
			S/t	0	0%
			No	2	3'3%
	f.3.2	Group members look for solutions with partners	Yes	67	80'2%
			S/t	12	19'8%
			No	0	0%

As we can see 77 of the 79 teams came to show awareness of the problem. This is corroborated through qualitative records, so that the students were able to recognize their situation and the contrast between different situations. On the other hand, based on Bisquerra (2007), the experience was considered taking into account the potential of the emotional factor in learning.

In this sense, in relation to question 3 "What did you feel during the preparation of the purchase?", important differences were observed between groups with lower budgets, which indicated feeling of helplessness and stress, and groups with a larger budget. Although the climate during the sharing was deliberately relaxed,

the move to **questions for reflection** radically changed the tone of the session (appendix 3, second half).

These exclusive questions of the 2017 version were not present in any item of the co-evaluator's record sheet and were intended to contrast with what had been done so far. In general terms, they concluded that you cannot expect a high school performance of students whose families are in critical socioeconomic situations unless they receive some kind of social support, which as indicated in the introduction of the chapter, has been reduced in recent years. Most acknowledged that, although he was aware of something that may seem so obvious, this activity had made them feel in first person the seriousness of the matter and had made them understand that you must to be professionally prepared for when you meet with this type of cases in the classroom.

12.6. Conclusions

Through the simulation initial training teachers have been able to experience first-hand situations that many families experience in Spain in addition to families of some of their future students. Due to the experiential character of the experience, its connection with the professional reality and the data and information obtained in situ, we can highlight the success of the proposal in terms of the purpose "to raise awareness and sensitize future teachers about situations of social injustice and economic situation that the families of some of their future students may face".

Likewise, apart from the recognition by future teachers of the significance of the experience presented here with regard to their professional future, the conclusions reached in this respect are coherent with those of Lazar's research (2013) where it is considered that teachers' training activities integrated with everyday situations such as poverty or injustice provides new teachers with greater preparation, greater security and a high predisposition for service with the community when they enter to work for the first time in high poverty districts.

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Appendix 1: Team work template

LET'S BUY!

Imagine that your group is a family and that you have a budget.

- Decide **3 menus** (breakfast, lunch, snack and dinner) taking into account the food pyramid.
- Complete the **shopping list** for that menu taking into account the budget you have.

Rules:

- The menu should be balanced, healthy and all family members should eat.

Shopping list					
Healthy frequency	**Food**	**Price**	**Quantity**	**Price**	**Our money**
Every day - several times	Tomato (1/2 kg.)	0.50 €			
	Parsley (a bunch)	0.30 €			
	Leek (1/2 kg.)	1.50 €			
	Cauliflower (1/2 kg.)	1.50 €			
	Pimiento (1/2 kg.)	1 €			
	Milk (1 liter)	0.80 €			
	Yogurt (4 units)	1 €			
	Fresh cheese (1/4 kg)	2 €			
	Nuts (10 units)	2.50 €			
	Garlic (1 unit)	1.10 €			
	Olive oil	5 €			
	Onions (1 unit)	0.50 €			
	Apples (1 unit)	0.60 €			
	Oranges (1 unit)	0.60 €			
	Strawberries (1/2 kg.)	1.50 €			
	Pears (1 unit)	0.60 €			
	Raspberries (150 g.)	2 €			
	Pineapple (1 unit)	3 €			
	Loaf of Bread (1)	0.50 €			
	Patatoes (1 kg.)	1 €			
	Pasta (1/2 kg.)	0.80 €			

Shopping list					
Healthy frequency	**Food**	**Price**	**Quantity**	**Price**	**Our money**
Every week - several times	Pork (1 steak)	1 €			
	Beef (1 steak)	3 €			
	Chicken (1 thigh)	1 €			
	Eggs (6 units)	1 €			
	Cheese (250 g.)	6 €			
	Fish (500 g)	2 €			
	Prawns (200g)	4 €			
Occasionally	Soft drinks (1.5 l.)	1.50 €			
	Chips (200 g.)	1.50 €			
	Chocolate (1 unit)	0.50 €			
	Cake (1 unit)	1.50 €			
	Sauce (1 can)	1.50 €			
Frequently	Water (2 litres)	0.50 €			
				Total Price	Remaining money

Appendix 2: Co-evaluation template (observation grid)

LET'S BUY!

Group ___ Shift ___ A B

As a **reviewer** of the development of the activity "let's buy!" you should observe the operation of the group, talk with the members, ask what is necessary and complete this table with total sincerity. Your work is also **supportive**; that is, when the group needs it, you must resolve doubts as long as you do not give the final answer.

Phase	Item	Y	S/T	N	Observations
Decision making	Group members listen to each other and make decisions together				
	Group is taking into account that the food is healthy				
	group is taking into account that all members of "the family" should eat				
	The group adapts to the indicated budget				
	The group completes a menu for 3 days				
	The shopping list is filled in and the data is correct				
Sharing	The group is aware that it has problems when buying / that other groups have problems when buying.				
	Group members look for solutions with partners				

Appendix 3: Questions for sharing and reflection (guidance)

Questions for sharing:

- Did you have problems when scheduling the purchase? If yes, which?
- Do you think that other families live a different situation? Why?
- What did you feel during the preparation of the purchase?
- What can we do individually and in groups to look for solutions?

Questions for reflection:

- Are you aware that some of the families of the students you will be teaching could live similar situations?
- Do you think that this situation affects the student's school performance?
- Is it important that we take this factor into account when carrying out our professional work? Why?

13

Gamification in Primary Education Grade. A Project of Gamification in Tutorial Action Subject to Increase Motivation and Satisfaction of the Students

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Abstract
Nowadays, one of the challenges in education is to maintain students motivated and participating in class. Teachers generally say that students are not involved in class, they do not take part in activities as they are not motivated... One of the new methodologies in education is gamification, which is presented as an active, original methodology, and as an appropriate methodology to get students motivated in their learning process. Gamification is a learning technique that moves the mechanics of games to the educational field. In addition to a theoretical approach, a summary of the activities that have been developed during the course are presented. This chapter presents the experience of a gamified project with students of Primary Education Degree, more specifically in the subject of tutorial action. This project was proposed to try to respond to the need of students of the Primary Education, so that they are motivated and active in the learning of the subject and to foster their participation and satisfaction with their learning. The results have shown an improvement in students' motivations.

Keywords: gamification, motivation, Primary Education, satisfaction, tutorial action

13.1. Introduction

Today one of the main challenges in education is to keep students motivated and attentive in class. One of the most heard complaints among teachers is that students are not involved, they are not motivated, and they do not like to participate in class activities...

All of this is a problem, because if the student is not motivated, he will hardly want to get involved in activities, they will have difficulties when it comes to learning and even that learning can be difficult for them to transfer or use in real life, as it will not be significant to them. In addition, there are learnings that are done by rote, leading to an empty learning, which will be forgotten in the not too distant future.

Educational reforms arise as attempts to respond to society's educational needs, as a measure to address the potential inconveniences of previous education systems.

In addition to educational reforms, within the faculty and research in education, teaching methodologies arise or develop as well. Within this framework of methodological innovations, current methodologies emerge, where the use of technologies and new teaching methods come into play.

It is now fashionable to talk about active methodologies, which are the methodologies that require students to be active in their learning process (Méndez, 2008; Mendez & Trillo, 2010).

Getting students active and more involved during the teaching and learning process depends on teachers, as teachers we have to get students motivated. In addition, this would be one of the main obstacles, how to get our students motivated? How to make our students want to be active participants in classes? How to make them want to get involved in the teaching-learning processes that they do not care about it? How to bring learning closer and make it more attractive to students?

This chapter will answer many questions.

Currently one of the methodologies that are booming is gamification, which is presented as an active, original methodology, and as an appropriate methodology to get students motivated in their learning process (Kapp, 2012; Zichermann & Cunningham, 2011).

There are authors like Lister (2015) who argue that gamification is one of the most powerful and useful tools for attracting and maintaining students' attention in class. Gamification is the use of elements, designs or game structures in non-playful contexts (Deterding, Dixon, Khaled, & Nacke, 2011).

This type of learning gains ground in training methodologies due to its playful nature, which facilitates the internalization of knowledge in a more fun way, generating a positive experience in the user (Goethe, 2019; Reiners & Wood, 2015). A series of mechanical, dynamic and aesthetic techniques extrapolated from the games are used too.

Some of the mechanical techniques that can be included in our gamified experiences are the following (figure 1):

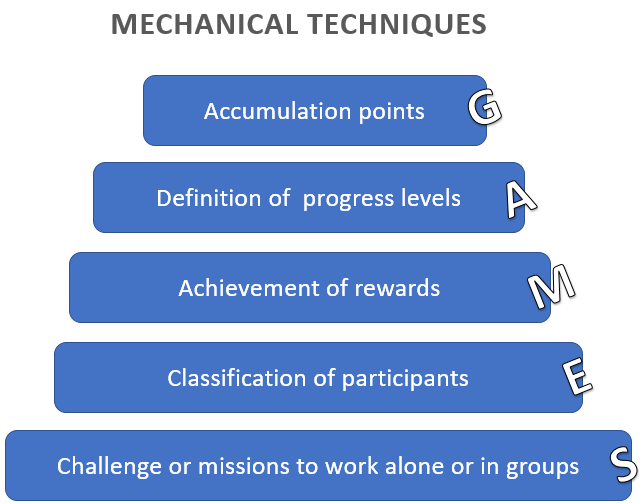

Figure 1. Example of mechanical techniques extracted from games

Some of the dynamic techniques that can be included in our gamified experiences are the following. All of these are related to motivation:

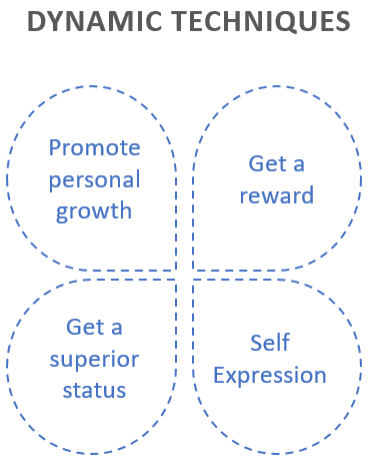

Figure 2. Example of dynamic techniques

Some of the game aesthetic examples (figure 3) that can be included in our gamified experiences are the following. Aesthetics evoke emotional responses by the player when interacting with the video game (Hunicke, LeBlanc, & Zubek, 2011):

Figure 3. Example of game aesthetics

In addition to this, some authors emphasize that apart from using the design, strategies or mechanics of the game, using gamification in the classrooms, it encourages, promotes and motivates for the student's action, their learning and even the resolution of problems (Kapp, 2012), so gamification would lead to work towards meaningful and contextualized learning.

Many authors claim that, with the use of gamification in education, the climate for students' motivation levels to improve is created (Erenli, 2013; Lee & Hammer, 2011; Shneiderman, 2004), an element that facilitates and encourages their learning. Authors such Lee and Hammer (2011) point out that games have great potential to provoke and work on the development of certain emotions such as curiosity, optimism, pride, or security through the positive treatment that is made of the failure through the game, which allows learning through repetition without taking risks.

In the same line of argument, De Freitas (2018) argues that the use of gamification in education promotes and encourages a high commitment on the behalf of students, motivational and wilful that favours that the student will have a need and interest in knowing and learning more so they can understand things in order to win the game.

As we see, this methodology achieves positive effects in the students, but there are authors who warn about the importance of this methodology. As Buckley and Doyle (2014) say, it is true that the games and this methodology create a commitment on the part of the students and it increases their motivation in learning experiences. However, it should be kept in mind that the methodology must be implemented in class correctly, because if not, the benefits fostered by that methodology could become negative effects arising from its misuse

Because of the above, teachers should first know all the ins and outs of this methodology at the theoretical level and then plan with care, attention and consistency all the activities, tasks or projects to be carried out in a practical way within their classrooms (Von Ahn & Dabbish, 2008).

This results in a change in relation to the use or idea of the games. These will go from being an element or resource only of recreation or leisure, to being used in education, since it has become clear that they can be a useful and effective tool or resource for training and motivation (Hamari, 2017).

Gradually more and more teachers and researchers are seeing the potential of this methodology in education and some defend it by encouraging its use and others spreading their experiences (Balducci, Grana, & Cucchiara, 2016), which, in our view, also promotes the use of it.

After this review of gamification as a methodology with these benefits that seem to respond to problems regarding the lack of motivation and involvement of students, it is not surprising that gamification is adopted as a methodology in the classroom (Piñeiro-Otero & Costa-Sánchez, 2015).

Therefore, if as teachers we need students to be active, to obtain different responses or behaviours from them, we have to try to motivate them; we must encourage and develop the capacity to solve challenges. This is how we work to prepare students for life, for the outside world around us, and not just to limit learning to the classroom.

The outside world is changing and needs people prepared to be able to face and respond to the challenges that will arise in life. This will encourage meaningful learning for students.

One of the keys to be able to use this method effectively are marked Pérez-López & Rivera (2017) who emphasize that three elements must be taken into account for the good use of this methodology and to be able to achieve the optimal effect of it. These elements are creating a good environment in class, implementing the methodology in a way that is focused on experience and play, and the use and importance of a shared assessment.

As can be seen, all these gamification researches are current. It is an active methodology with an increasing use as well as research nowadays.

The findings of one of Quintero, Jiménez, & Area (2018) latest researches, state that, through the use of gamification, the levels of motivation and cooperative work of students are improved and that students are more involved in their learning and have worked more during the process.

For all this, this chapter presents the experience of a gamified project with students of the Primary School Year, more specifically in the subject of Tutorial Action. This project is proposed to try to respond to the need for students of the Primary School Year, so that they are motivated and active in the learning of the subject.

A gamification project was developed using different strategies for active elaboration of the contents of the subject and working the different techniques and strategies through gamification. An evaluation process was also built through gamification, as we must always keep in mind that we cannot work through a methodology and evaluate otherwise.

13.2. Methodology

Participants

Participants have been all third-year students of the Primary Education Degree, enrolled in the subject of Tutorial Action in Primary Education. The average age of the participants is 21 years old. The total number of participants during the experience was 46 (figure 4).

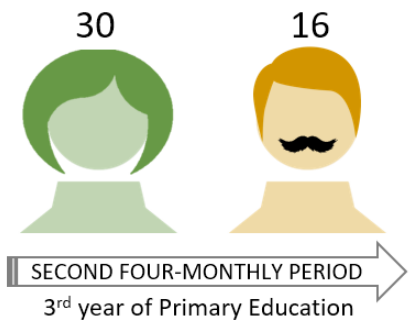

Figure 4. Participant sample in the experience

Gamification project carried out with the students

During the 2017/2018 academic year, there was a low motivation towards the subjects of the students of the Primary Education Degree and some disenchantment and lack of involvement on the part of the students.

Therefore, at the beginning of the 2018/2019 academic year, a questionnaire is distributed to students, with only three questions about their level of motivation, participation or involvement and their level of satisfaction with the subjects they take in general

and last question for final questionnaire, what do you think of the experience?

After needs detection and diagnosis, and given the benefits of using the gamification methodology in other areas after the literature review, it is decided by the teachers to design and carry out a gamification project in the subject of Tutorial Action in Primary Education.

Students are informed of the type of methodology with which they will work in the classes and they welcome them with expectation, since they have never had such an experience of these characteristics and the novelty puts them on alert. Different strategies are started to be used to make students know how gamification is worked, materials are started to be created among all the students, and teachers involved, which will be used during the subject.

Therefore, students are actively creating the materials they will then use for their own learning. This will help them see how they would do in a class, just as they will be able to do in the near future when they are teachers, have their classrooms and their students (figure 5).

The materials and activities that were created were digital, through computers and Tablets, and adaptations of board or traditional games were also made. All the contents and the process are carried out taking into account the elements of the gamification.

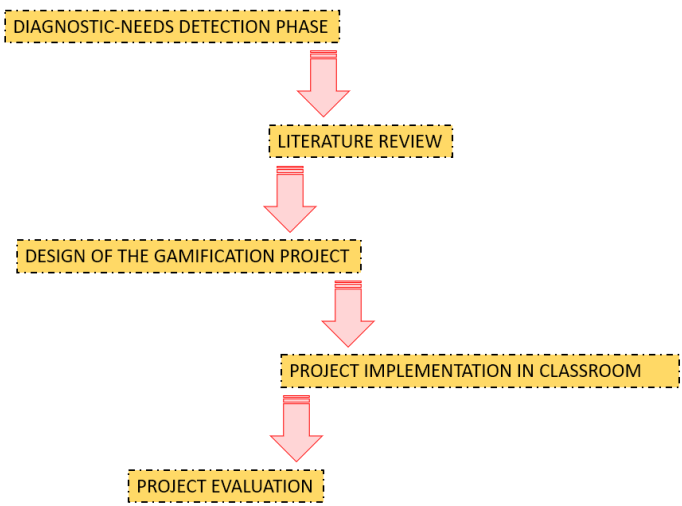

Figure 5. Flow of the gamified project in Tutorial action

The materials created by the students were digital and physical games, which were created to gamify the subject with the teacher's guidance.

Games were created such as the Pasapalaba, the game of humor (to work the emotions), the taboo... all with the aim of working the contents of Tutorial Action, whose main areas of work were covered.

Students have needs that tutors and teachers must attend from the tutorial action, and all of them have been covered from this methodology, with this project. These needs have been worked for undergraduate students in a way that they can then learn to work with their students in a classroom. These needs or work guidelines, according to Expósito (2013, 2018) are that the work from the Tutorial Action is:

- Generalized and individualized: Students should be treated individually, as they
- Have needs, although they must also be treated in a general way, as action is taken on the group.
- Planned and flexible: To achieve the objectives set, optimally, the work must be planned, organized and structured, but at the same time it must have some flexibility, because it must adapt to the different situations that can happen in a classroom.
- Preventive and post-active: Knowing the possible problems that may occur in the classroom, try to avoid them, thus having less risk and even being solved before they occur or cause more problems that are possible.
- Procedural: It is not an action of a specific moment but is carried out throughout a process.
- Systemic: It must be governed by a structure, which is established and organized in the teacher's planning.
- Specific and integrated: It occurs within a specific context and at a certain time, allowing integrating different knowledge.

This project has maintained all these aspects and integrated them into the knowledge of the subject.

It should be remembered, on the other hand, that one of the elements of gamification is the establishment of score rankings. The students have also drawn up these rankings. It was they themselves who developed it and even designed the badges they were

earning for their work. It should be remembered in this section that gamification badges are achieved by effort, not achievement, as in traditional learning.

However, as we have said not only the content and learning process of the subject was gamified, but also the methodology itself was used for evaluation, since we cannot work in one way and evaluate another.

An example of the evaluation shows the use of the Plickers application, where through the computer, a projector and each student with his or her toothed cards. As shown in figure 6, with a mobile phone or tablet, the students' responses are captured and after scanning them, which takes a matter of seconds, the correct or incorrect results of the answers come out, a highly motivating element for the participants, to have an instant feedback.

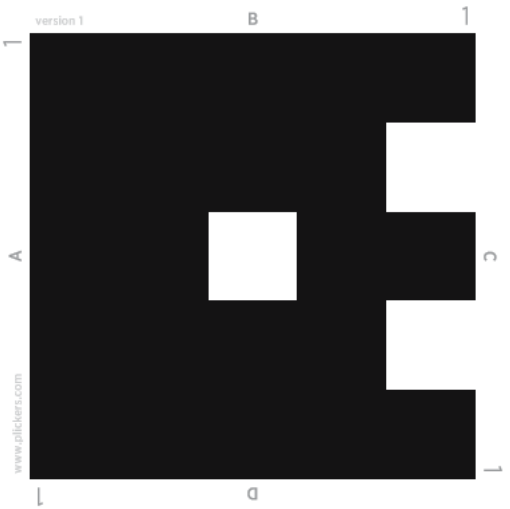

Figure 6. Student cards generated for the Plickers evaluation applicationAvailable at: <https://plickers.com/>

Finally, and following the same methodology, the teacher organized an Escape Room with the purpose of the students knowing their grades at the end of the subject. The Escape Room activity consisted of having the students in their classroom, the teacher had designed and prepared the class so that. For an hour, students

had to solve riddles and clues, all related to the subject and how it had been worked throughout the semester and the students had to solve the riddles and follow the clues until they reached the end that had double reward: being able to leave the classroom and know their final grades.

13.3. Results

This section presents the results of the variables analyzed before and after the gamification experience. At the beginning of the course, a few questionnaires were passed to the students to learn the levels of motivation, participation and satisfaction. The answers given to the question are also presented, what do you think of the experience?

At the end of the gamification project explained in the previous section, the questionnaires with the same items were passed again to see if the values of the degree of motivation, participation and satisfaction of the students had suffered any alteration. Possible answers to items ranged from scores 1 to 10. The results obtained are shown below.

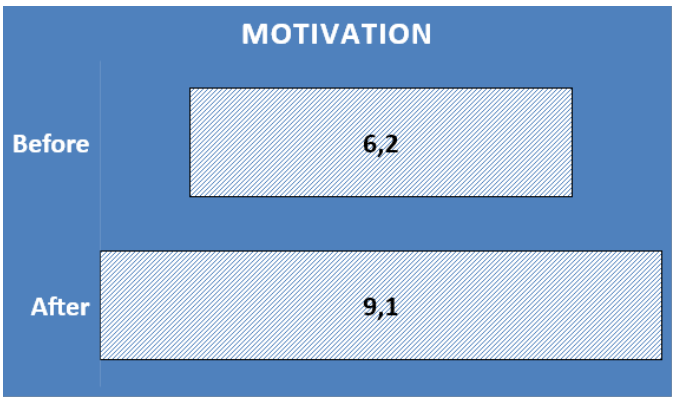

Figure 7. Motivation levels before and after of gamified project

As seen in Figure 7, students have shown an obvious difference between the motivation values obtained before the project, with an average of 6.2 and after applying it, obtaining an average value of 9.1.

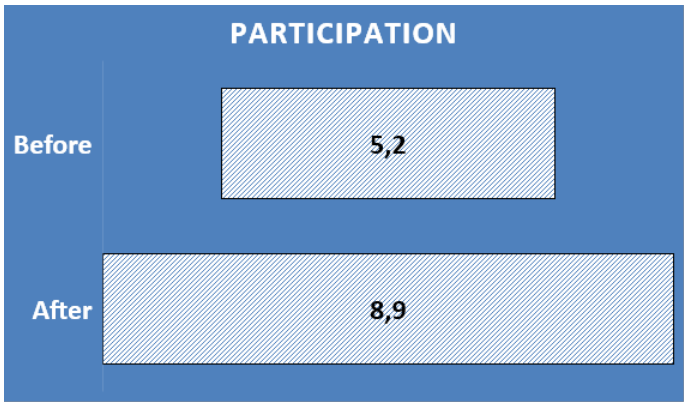

Figure 8. Participation levels before and after of gamified project

As with motivation and, as shown in Figure 8, students have shown a significant difference between the participation values obtained before the project, with an average of 5.2 and applying it, obtaining an average value of 8.1.

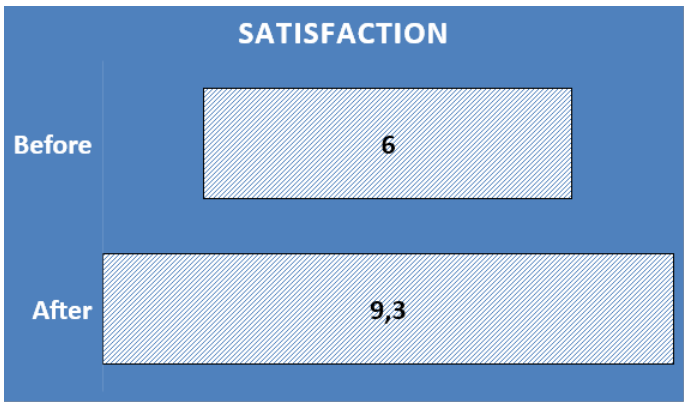

Figure 9. Satisfaction levels before and after of gamified project

Regarding what happened with the two dimensions for which it was previously asked, there is an increase in the general satisfaction (figure 9) presented by the participants in the experience.

As shown in Figure 10, the answers collected in the qualitative part are positive. Ninety-two percent of students think that all subjects of their current career should follow a similar methodology. Eighty-nine percent think that the time spent during the devel-

opment of the subject has been worthwhile. On the other hand, eighty-five percent indicate that they have been able to learn while having fun. Finally, ninety percent indicate that they would like to repeat this experience throughout their university career.

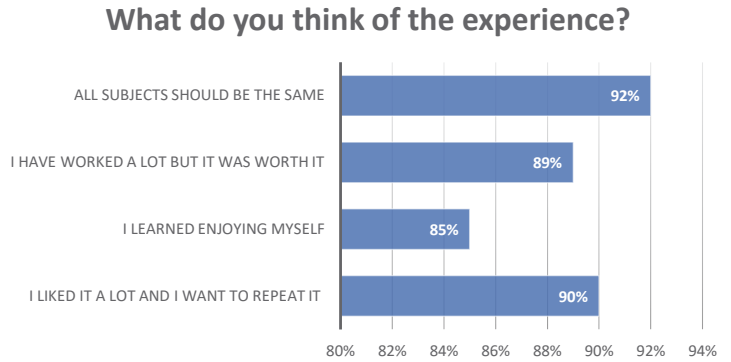

Figure 10. Satisfaction levels before and after of gamified project

13.4. Discussion and conclusions

As it has been seen in the previous section, students have high levels of participation or involvement and with the help of the teacher, they build the subject's project. With regard to this development by students, the results are supported by those found in other studies on gamification and the involvement of the participants (Roth, Schneckenberg, & Tsai, 2015).

The development has been linked to intrinsic motivation (Csikszentmihalyi, 2002; Hanus & Fox, 2015), so in these kinds of experiences the values of motivation and development are important related to each other.

The motivation and satisfaction of students regarding their learning presents high levels in the score obtained. All the members involved have thus built significant and active learning.

The different variables analyzed show high satisfaction values, which has led to the good results in the subject, to the motivation of the students (Erenli, 2013; Lee & Hammer, 2011) and the faculty.

It can be said that the levels of the variables analyzed have been increased after the implementation of the gamification pro-

ject in the Primary Education Degree, thus proving the benefits of this project.

It is thus confirmed that a well-designed gamified project, with mastery of methodology, is beneficial for the motivation, participation and involvement of students.

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Trends and Good Practices in Research and Teaching. A Spanish-English Collaboration

Manuel León-Urrutia, Esteban Vázquez Cano, Nicholas Fair, Eloy López Meneses (coords.)

The use of digital technologies in education presents a great deal of challenges, opportunities and implications. Enabling effective learning in the current information and network society requires research-informed, evidence-based practices. This book aims to contribute to this field by disseminating research findings from a range of educational experiences in the United Kingdom and Spain. The editors of this book have strong ties with both countries and their educational systems. As such, they have compiled thirteen chapters based on high quality research projects, with topics focussed on the use of emerging technologies in education, both online and in the classroom. This book will prove useful and informative to those professionals in education who are interested in the practical application of digitally enabled pedagogies in a variety of contexts, from Higher Education to Primary Education.

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