
AULA VIRTUAL: HABILIDADES EN EL DOCENTE PARA IMPULSAR EL ENGAGEMENT EN EL ESTUDIANTE

VIRTUAL CLASSROOM: TEACHER SKILLS TO PROMOTE STUDENT ENGAGEMENT

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RESUMEN

El Aula Virtual es la herramienta principal para el aprendizaje mixto, ya que permite romper las barreras de tiempo y espacio entre profesor y alumno. Para desarrollar y poner en práctica un módulo de estudios superiores a través de esta herramienta, los docentes necesitan una serie de habilidades relacionadas con el dominio de las tecnologías digitales, la comprensión de las percepciones y conductas de los estudiantes y la aplicación de las estrategias de comunicación apropiadas para distribuir los contenidos del módulo y preparar a los estudiantes en este innovador enfoque de aprendizaje. Este trabajo revisa la literatura de investigación educativa en aulas virtuales, comportamiento del docente y el engagement en el estudiante para establecer un modelo teórico que explica el tipo de habilidades que los docentes deben desarrollar para lograr el engagement del estudiante en las actividades educativas. Estas habilidades se

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clasifican en tres categorías: técnicas, afectivas y comunicativas. Además, se revisan diferentes teorías educativas para llevar a cabo un diseño e implementación del Aula Virtual adecuados que se adapten a las necesidades de aprendizaje específicas del estudiante. Asimismo, se presentan líneas de investigación futuras y propuestas empíricas para profundizar en estas proposiciones teóricas.

PALABRAS CLAVE

aula virtual, entornos de aprendizaje virtual, engagement del estudiante, comportamiento del docente, relación profesor-estudiante

ABSTRACT

The Virtual Classroom is the main tool for blended learning, since it allows the breaking of time and space barriers between the teacher and the student. In order to develop and put into practice a higher studies course through this tool, teachers need to have a series of skills related to the command of digital technologies and an understanding of students' affective and behavioral states: and to then apply appropriate communication strategies to deliver course content and prepare students for this innovative learning approach. This study reviews educational research literature on virtual classrooms, teacher behavior and student engagement to establish a theoretical model that explains the type of abilities that teachers must develop to achieve student engagement in academic activities. These abilities are classified in three categories: technical, affective and communicative. Furthermore, several learning theories (objectivism, constructivism and connectivism) are reviewed to conduct an appropriate Virtual Classroom design and implementation that can adapt to each student's specific learning needs. Future study lines, as well as empirical proposals to go deeper into these theoretical propositions, are presented.

KEYWORDS

Virtual Classroom, Virtual Learning Environments, Student Engagement, Teacher Behavior, Teacher-Student Relationship

INTRODUCTION

Distance learning, defined as the provision of education to students who are separated by distance and in which the pedagogical material is planned and prepared by educational institutions, is a topic of regular interest for academics and education managers (Arbaugh, 2018; Kaplan & Haenlein, 2016).

A report issued by the Babson Survey Research Group (Seaman, Allen & Seaman, 2018), reveals that, up to 2016, distance student enrolments have grown for the fourteenth straight year. Due to the continuous growth in online education, teachers' skills need revision. The analysis of teachers' skills is of importance because most of them have been trained and are experienced in face-to-face learning processes. New generations of students, including

millennials and generation Z, are expected to be accompanied by huge changes in the classroom. Teachers will face “real digital natives”, who are (i) comfortable with technology and wish to use it in the classroom, (ii) able to perform several tasks effectively at the same time, (iii) are accustomed to socializing through digital means, (iv) interactive and (v) fast and eager, but at the same flexible, in task performance (Fernandez-Cruz & Fernandez-Diaz, 2016).

The present study establishes the pillars for the design of an interactive Virtual Classroom (VC) training program for higher studies, discusses the skills teachers require to manage this interface for a university course, considering the students’ needs, engagement and feelings of identification with the situations proposed. There is an interrelation between platforms and pedagogies. As tertiary institutions rely more heavily on digital platforms to structure learning experiences, it is important to carefully consider how pedagogical practices need to change in order to enhance student engagement. The success of a learning platform is dependent upon the pedagogy adopted by teachers using it (Heggart & Yoo, 2018). The role of the teacher in this new learning system is, therefore, central, since the effectiveness of the VC depends partly on the teacher’s input, including technology domain, teaching style, self-efficacy and intention to assist and guide students (Piccoli, Ahmad & Ives, 2001).

The abilities needed to master the VC and attract and retain student attention and create enjoyment within the learning platform can be grouped in three domains: technical or computer abilities, affective or emotional abilities and communicative abilities. Technical and affective skills, in turn, positively influence the communicative results of teacher-student interactions. Where the teacher has these abilities, student engagement can be enhanced (Zanjani et al., 2016).

Our study is expected to have a broad scope, a variety of theoretical learning approaches are discussed. Objectivist, constructivist and connectivist learning approaches are examined within the teaching styles that can be used with the VC (Darling-Hammond, 2006).

We present an updated overview of the multidimensional skills that can provide the teacher with the resources to assist students in Virtual Learning Environments (VLEs). From this starting point, we analyze the literature since 2013 to verify the theoretical relationships presented. Our study is embedded in the KA2 Erasmus + project “Future-proof your classroom: Teaching skills 2030”. The aim of the project is to create an interactive eBook targeted at higher studies teachers to improve their skills and competences for the challenges they are expected to face in the next decade.

We aim to define the antecedents of the teachers’ domain of the VC. Moreover, the consideration on student learning through the VC is approached from three different theoretical perspectives: objectivism, constructivism and connectivism. Finally, student engagement is considered as a consequence of the appropriate VC training based on these three approaches to learning. The contribution of this study will help to develop a VC program that will be centered in synchronous interfaces.

CONCEPTUAL FRAMEWORK

Three learning theories are proposed for inclusion within the curricula of the VC course design and implementation: (i) objectivism, (ii) constructivism and (iii)

connectivism. A complete conceptualization and differentiation of objectivism and constructivism as the two extremes of a continuum of the philosophical understanding of the learning process is thoroughly described by Vrasidas (2000). An overview of the three concepts is provided in Table 1.

Table 1. *Learning theories, principles and application to the classroom*

Learning theory	Principles	Proposed classroom activities
Objectivism	<ul style="list-style-type: none"> • Reality is one and only • The teacher is able to transmitting this reality in the classroom • Learning should be efficient, based on standards and learning outcomes • The importance resides in knowledge assimilation by the student 	<ul style="list-style-type: none"> • Master class • Individual written assessments • Oral presentations
Constructivism	<ul style="list-style-type: none"> • Reality is interpreted by each person according to its idiosyncrasy • The teacher is up to facilitating and moderating communication and active participation in the classroom • Learning depends on the context, is individualized and is not based on closed learning objectives • The importance resides in the way that knowledge is transmitted 	<ul style="list-style-type: none"> • Participative debates • Forums or wikis • Creation of a course glossary • Students as teachers
Connectivism	<ul style="list-style-type: none"> • Reality and its knowledge exist because of connections between individuals and technology • Learning can take place outside of the human being and at the organizational level • The importance resides in acquiring critical skills to access and filter information 	<ul style="list-style-type: none"> • Instruction on digital literacy • Use of software for education • Fake news identification • Knowledge management

Source: Based on Vrasidas (2000)

Objectivism as a learning theory is based on behaviorism and considers reality to be external and objective; in other words, there is only one veridic reality that can be understood through scientific method principles (Lakoff, 1987). Knowledge about reality is obtained through experience, and to check whether it has been obtained, one should focus on observable behaviors and their change when exposed to specific stimuli (Siemens, 2005). This learning approach assumes that, applying the scientific method, theoretical models are the key to understanding reality once assimilated by the learner. From this perspective, reality is the result of rigorous empirical research and thus is not open to different considerations or points of view. Learning is understood as a process that is intended to be as efficient as possible, based on straightforward standards to be fulfilled by all educational institutions.

Several models on objectivism have been suggested in the literature. The first is that of Tyler (1949), who presented an objectivist model of curriculum development with four coordinated but sequential and differentiated steps: 1) identify learning objectives, 2) design learning activities to achieve these objectives, 3) organize learning activities to be implemented in the most efficient

way and 4) assess the consecution of learning objectives. As a result, the teacher has the central role in the course, as he/she decides on the topics, the materials and the activities that will be used by the students. The teacher will be the only reference point for the student to learn and progress in the academic process.

Constructivism, also referred to as interpretivism, presents a radically different layout of reality and its grasp. It argues that reality is internal and particular to each human being, and therefore knowledge is built by the perceptions and skills of each person (Piaget & Duckworth, 1970). According to constructivism, knowledge is created as a way to make sense of complex external experiences. This is why knowledge is built by the individual and is largely influenced by the environment in which he develops, thus not representing the sense of an absolute reality. It can be created in the brain of the human being as a result of individual cognitive structures and the processing of experiences, or on the social references that surround the person through his/her interaction with them. Learning is conceived as *meaning-making* or creating a sense of what the individual lives and experiences, which will originate choices, actions and reactions for this particular person. The role of the instructor is completely distinct according to this paradigm. This figure is focussed on monitoring how students create their perspectives on meaning and interpret their share of reality. For instance, the adoption of a collaborative technology, Wiki, into learning within a course in a teacher education program (Li, 2015). The mobile response system enables core principles of constructive learning theory by allowing students to create their own knowledge by active interaction with the problem-solving exercises in their preferred device of interaction (Fuad et al., 2018). Adopting a constructivist learning environment, Alt (2015) examined how educational efforts based on constructivist theory were associated with the self-efficacy beliefs of students within higher education settings. This study found that “stimulating meta-cognitive and reflective aspects of learning could bolster students’ confidence in their ability to accomplish an inquiry-based task which requires higher-order thinking skills” (Alt, 2015, p. 62).

The combination of learning methods has positive outcomes. In the context of a support-based online learning environment, a blended approach combining objectivist and constructivist instructional strategies, Chen (2007) revealed that students had a positive learning experience in the course and were highly satisfied with their learning outcomes.

Connectivism was proposed by Siemens (2005) and Downes (2007) as an alternative to the other, ruling learning theories and is based on their limitations, particularly focusing on their poor consideration of the impact of technology on the learning process. Downes (2007) presents the concept of connective knowledge, that derives learning out of the interactions established between different entities, and is heavily influenced by the pre-existing beliefs of each individual. It is closer to the interpretivist perspective of reality. According to connectivism, objectivism and constructivism fail to explain the role of technology in accumulating learning outside of the individual and at an organizational level, and they assume a linear learning process. Moreover, the dramatic increase in volume and variety of information, the need to know about different knowledge areas, or the required performance with no previous understanding of activities, may also provide future theoretical contributions.

Connectivism endorses a series of ideas that makes it different from the other two learning theories. According to this current of research, learning and

knowledge are created and enriched by different opinions and perspectives. Moreover, knowledge is obtained from different areas of interest. What one knows up to now is not as important as the capability to keep on learning in the future, and to keep on learning is fundamental to the establishment and maintenance of a network of contacts. The core abilities that students should develop are condensed into two: first, to identify relationships and meeting points between (apparently) different fields, ideas or concepts, and second, to decide on what to learn and up to which point the information is reliable and applicable at present. In short, the main objective for the student from a connectivist point of view is to hold up-to-date, current and recently informed knowledge (Siemens, 2005). Other studies have explored the validity of connectivism as a distinct theory. According to Kop & Hill (2008), connectivism can fill in the gaps in current teaching that older theories have left. In particular: (1) adaptation to Millennials' singularities; (2) filtering of all the volume of information available; and (3) establishment of learning networks without direct relation to the formal education process.

Based on this theoretical background, this study aims to assess four research questions to be addressed through the literature review:

RQ1: What is the evolution of the literature on VCs in higher education during the last five years?

RQ2: What type or combination of skills is required for teachers to master the VC?

RQ3: How can the VC be managed when different learning theories are applied by the teacher?

RQ4: What is student engagement and which are its antecedents in the VC?

As a result, we propose a theoretical model of teaching skills to enhance student engagement in a VC setting. Our proposal is anchored in the literature review. Certainly, its validity must be tested in different contexts and courses, but it proposes a basis for further refinement.

METHODOLOGY

In order to answer these research questions, a systematic literature review was performed to provide a theoretical framework prior to our empirical steps. Research articles from 2013 until March 2018 on the topic of VC education and educational research were identified.

The study follows a two step-process. First, a selection of articles was based on a Boolean search in specialized search platforms, such as Google Scholar or Web of Knowledge, combining keywords such as "Virtual Learning Environment", "Virtual Classroom", "Teacher Skills", "Student Engagement", "Objectivism", "Constructivism" and "Constructivism" and "Teacher". Both, recent articles and seminal papers, were considered in order to know the state-of-the-art and to identify the key concepts respectively. Second, the research team examined the content of the papers by reading either the abstract or the full paper and considered only those that were related to the studied topic. As a result of the

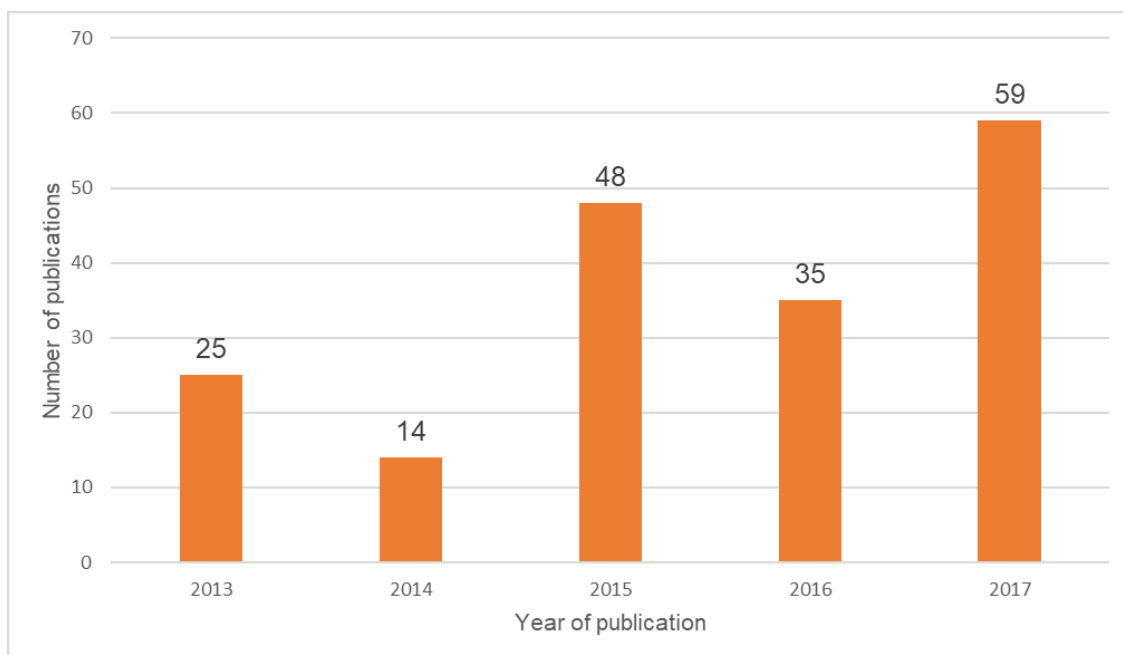
process, 67 articles were chosen to develop the theoretical explanatory model presented in Figure 2.

RESULTS

RQ1: Evolution of publication in VC in the higher studies context

First of all, and based on the systematic review, the authors wanted to acknowledge the importance that the VC and its application holds in educational research. Consequently, an additional article search in Web of Science was performed including the topics “Virtual Classroom” and “Higher Education” in the content of the articles (either the abstract or the body of the article) that were published from 2013 to 2017. This list of papers was larger than the one carried out to build the theoretical model and consisted of 183 papers. Figure 1 sorts the papers derived from this search by year of publication, showing the increasing yet unstable attention to this topic, which has lately risen.

Figure 1. *Chronological evolution of the “Virtual Classroom” and “Higher Education” topics (2013-2017).*



Source: Adapted from Web of Science (2018)

RQ2. Required skills for teachers to master the VC

The second objective of the review was to determine the most relevant skills teachers need to understand and control the VC for educational purposes. Firstly, technical or computer skills are fundamental to work in an environment mediated by technology in all communication processes between students, materials and the teacher.

Therefore, it is important to be familiar with the tools and functionalities that the VC offers; that is, to understand the range of possibilities that the teacher can exploit to establish successful synchronous and asynchronous

communication, such as chats, forums, resource storage and sharing and audio and video streaming. Moreover, this software can usually be combined with other applications such as Microsoft Office or video-sharing websites such as YouTube, that should be familiar to the teacher. If this change in teaching style does not quickly take place, there is the risk that students will perceive a “digital disconnect” in the classroom. This learning process is mutual and continuous for both students and teachers: one can always learn how to use new technologies and adopt them for educational activities (Greenhow, Robelia & Hughes, 2009).

The bases for developing teacher’s digital literacy also include writing skills on the web. The way in which one writes on the computer or the mobile phone is radically different from traditional discourse, mainly because of synchronicity and its similarity with face-to-face oral conversation, including emojis, abbreviations and hyperlinks as speech alterations (Merchant, 2007). In addition, social media are great tools to combine formal and informal learning adapted to the pace of each particular student. Beyond being useful for managing their own tasks, social media will help students to be in contact with others, collaborate in group tasks and build the information they obtain so that it has a general meaning (Dabbagh & Kitsantas, 2012).

Secondly, the affective skills that will be required for teachers in a digital environment are highly relevant for the new generations of students and their particularities. They will face a majority of Millennials as learners in the Virtual Classroom, who are digital natives and completely accustomed to the use of the Internet and the different gadgets used to access it. Because of this relationship with the new technologies, their psychology and behavior in society change with respect to older age demographic segments (Hauptfeld & Kummer, 2018).

Younger students’ natural relationship with new technologies and interactive platforms explain why they find simple and intuitive interfaces more convenient and engaging for educational purposes (Giambatista, Hoover & Tribble, 2017). They are also open to diversity and evolution in the events that surround their daily life, mainly because they have grown up in an environment characterized by multiculturalism and dynamism (Becton, Walker & Jonas-Farmer, 2014). Furthermore, they are result-oriented rather than process-oriented, which means working longer hours on a task does not mean that results are optimal from their perspective (Anderson et al., 2017). New generations of students also feel more prepared than their predecessors to solve successfully any challenge proposed in the classroom. This attitude, considered as narcissism by some studies in the field of social psychology, also causes them to be more susceptible to comments and assessments that go against their preconceived beliefs (Hoover, 2014). For this reason, feedback is fundamental in VC communication, provided constantly and with an adequate and always positive point of view (Tribble, Hoover & Giambatista, 2016). Another relevant behavior that is highly appreciated by Millennials during lessons is enthusiasm, for both the verbal and non-verbal communication situations. Enthusiasm rekindles positive emotions in the student, and also leads to a higher attention rate and positive results in cognitive engagement (Liew, Zin & Sahari, 2017).

Thirdly, and together with skills related to the technical and emotional expectations for the creation and implementation of a successful blended learning course, a series of abilities related to communication from the teacher to the student and the roles that the teacher is expected to fulfil are of relevance. Two ideas are highlighted here: first, in order to achieve fruitful communication in

a virtual environment, a fundamental prior step is to accept and make an appropriate use of the technology that mediates the entirety of the process. Second, communication in the teacher-student domain has to be grounded on emotional awareness and understanding of the counterparty to make it a fluent and reciprocal process.

The instructors will be regarded as guides in the introduction of new technologies in the learning process. Previous research sheds light on the fact that *digital nativeness* is not always absolutely correlated with *digital literacy*, since students lack the command of educational technologies and how they can be used toward meaningful purposes, even though they can be quick at adapting to these new environments (Ng, 2012). It is for the teachers to guide them through this digital literacy process for educational tools. This knowledge can be combined with the active use of social media to foster engagement and participation in the VC as something more than an email and notification platform. The teacher cannot help them using this software (since most of the students will know far more about it) can help by managing knowledge and developing self-regulation abilities to build personal learning environments from their own social communication means (Dabbagh & Kitsantas, 2012).

Furthermore, the teacher will act as a coach or facilitator during the learning process, that itself provides and receives knowledge from its students. In a virtual environment, the teacher will be the main engager or stimulator of conversation to make students recognize the process of knowledge acquisition as a social and not an individual matter. Precisely because teamwork is one of the unfinished businesses in education today (Giambatista, Hoover & Tribble, 2017), the teacher should establish intermediate objectives, organize regular meetings and communicate with each and every student from time to time to ensure motivation and engagement for all of them. Actually, it is the students themselves that prefer the teacher to guide them in the use of resources and tasks, to acknowledge that their information is correct and to boost their participation (Kop, 2011). An additional challenge is set, since the teacher will have to apply, and even combine, different learning approaches to improve the student's engagement and measurable results.

Nevertheless, the role of the teacher as a provider of knowledge must be present in either of the learning styles selected. Even in constructivist or connectivist settings, where knowledge does not depend that much on what the teacher considers to be appropriate for learning, the concept of "cognitive apprenticeship" is still present: the teacher must be an expert in that field to help create experts from students (Collins, Brown & Holum, 1991). The teacher can resort to his/her own experience to deliver insightful real-life examples and stimulate debate out of them.

RQ3: Learning theories applied by the teacher in the VC

The third aim of this study is to consider the different learning theories that can be applied by the teacher and how the VC can be managed with these three different approaches, even with a combination of them. Indeed, it should be borne in mind that all theories can be combined in the same course; in fact, all objectivist designs contain constructivist elements (Perkins, 1998). Next, the three learning theories considered in this model (i.e. objectivism, constructivism and connectivism) are presented.

Two core ideas are highlighted in this section. First, teachers who display the three types of skills described above will be able to perform well at VC management. Since the aim of an enriched learning process is to apply VLEs to as many university contexts as possible, a variety of VC course design and implementation possibilities is presented according to the learning theory that is proposed by the teacher. Second, integration between learning theories is possible and demonstrated by the experience of instructional designers that have used elements of the different theories, even in the same course (Elander, 2012).

In an *objectivist approach* the totality, or at least part, of the classes are not taught in a shared physical space: some guidance is presented to undertake the three main steps of course development (Vrasidas, 2000): (i) design, (ii) implementation, and (iii) evaluation. In terms of design, four issues have to be considered. First, content analysis: the teacher should formulate relevant content and make it possible for students to achieve the desired knowledge. Second, task analysis of the proposed activities and how they should be approached to be fulfilled in the most efficient way. Following this approach, the goal is to get the best results in the shortest time. Several methods have been proposed by the research, such as the stop-watch technique by Callahan (1962). Third, the teacher should analyze the profile of his/her students, including their characteristics, previous knowledge, abilities and the gaps that need to be filled to meet the required criteria for the course (through pre-tests or initial tests). Finally, there should be specific statements about the performance objectives that the learner must fulfill in the course. These goals should be formulated so that they can be objectively assessed at the end of the course.

Regarding implementation, focus is on the interaction of the student with the teacher and with the available materials. The VC is mostly used in a positivistic way, as a resource storage. Students have at their disposal a series of assignments in the shape of readings, literature reviews and paper analyses with questions about content and format. The teacher is available to answer question and give feedback on assignments, even synchronously by using real-time chat. VC allows personalized feedback and comments, so that each and every student can know how to improve in their specific situation (Novo-Corti, Varela-Candamio & Ramil-Díaz, 2013). It should be noted that it is the teacher who establishes all the parameters and contact possibilities between the students in a collaborative task.

Goal-driven evaluation is consistent with this learning approach, which is based on the fulfilment of learning objectives by means of the proposed activities and exercises. Test evaluation will reflect these pre-established learning outcomes, although other possibilities such as open/essay questions, student presentations or direct observation can be applied as well. The ultimate objective is to achieve knowledge about reality rather than the pathway (i.e. cognitive processes) followed to achieve this knowledge.

For a *constructivist approach*, Vrasidas (2000) also presents three major phases on the development of distance learning that, unlike the objectivist perspective, are simultaneous and can be combined one with another.

The analysis stage has four main dimensions: (i) content analysis, by proposing knowledge areas that are not closed and totally defined, (ii) context analysis, by encouraging students to behave like an expert in the topic they are studying and answer the question of how do professionals make decisions or organize resources in practical situations?, (iii) learner's prior knowledge, focused

not on hard, theoretical knowledge, but on the cognitive processes and self-reflective skills displayed during the learning process (i.e. how does the student learn and how could the activities proposed make him learn better?), and (iv) learner control, as a combination of independence (i.e. freedom to choose inside the proposed outline of activities), power (i.e. possibility to actively engage in the learning process) and support (i.e. provision of materials and guidance to succeed at acquiring the expected skills) offered to the student. From this point of view, students are not all expected to learn in the same ways and to the same degrees since motivation, intelligence and previous experience cannot be controlled (Cziko, 1989), but are expected to obtain the skills to study the topic in depth whenever they are ready.

The design stage, in a solely constructivist approach, prepares the student for interaction with the environment and other students in contexts similar to reality. Four concepts are highlighted to create a VC course that is based on constructivism. First, situated cognition considers the situation in which knowledge is attained as important as the knowledge itself. The limits of the debate cannot be fixed, as new, interesting topics may emerge as it develops. Second, anchored instructions put the focus on a real-life example that helps the student to acquire useful knowledge, eases students' interactions, and justification of arguments. Third, cognitive apprenticeship requires the teacher to set him/herself as the example. Departing from his/her own experience, the teacher can give interesting insights that inspire new discussions. Fourth, cooperative learning involves collaboration for all the students' psychological development. The main option is to create groups in which more capable and experienced students can boost less the experienced.

The evaluation stage in a constructivist course is goal-free and context-driven and does not involve having only one correct answer. The teacher should focus on problem solving and knowledge construction capabilities rather than on searching for the only correct answer. Continuous assessment is an appropriate methodology, but feedback is not only recommended for the learner, but also for the teacher to help him/her understand the student's perspective and improve the VC in the future. Different evaluation methods have a place with this approach: traditional tests accompanied by reflection papers and self-reflective journals, participation in online discussions, negotiation, moderation of discussions and peer evaluation are some of the most used.

The *connectivist approach* focuses on the new tools that can be incorporated through the learning process and the new uses that can be provided for them. Some of the proposed learning tools by Hung (2014), which can be found in the majority of VC software alternatives, are the following: repository of learning materials, web-based blogs, wikis, social media, semantic software, mind map builders, 3D simulations, bookmarking software and scientific database software. The main learning outcomes under a connectivist perspective are also presented: formal learning from established, reliable sources, informal learning from other colleagues' contributions, critical skills in information research and media literacy, self-learning, support learning enriched by others' points of view, specialized knowledge about terminology in an area of interest and strengthened connectivity and relationships between VC members.

Following the proposal of Redondo-Duarte et al. (2017), the VC design could be based on three core steps, defined in advance but which can be restructured as the course continues and new opportunities and/or challenges arise: the first

is preparation a structured learning plan, in which it outlined are the tools that will be used together with the potential application of each of their functionalities. This is followed by a list of strategies that dynamize and motivate the participation in the community. The authors highlight once again the role of the teacher in this process, suggesting that (s)he stimulates participation and the structuring of convincing arguments, formalizes and acknowledges the generated content in a methodical way, establishes respectful, tolerant and positive communication, so that all members feel comfortable with intervening, propose activities to guide and stimulate the debate and make positive contributions and suggest participation for those who are less active. Finally, gamification is proposed as an excellent means of raising interest about proposed subjects, to obtain knowledge in an engaging way that endures through the academic and professional career. For this purpose, three elements of games should be made clear: normative systems, badge systems and reward systems.

RQ4. Achievement of student engagement in VC

Engagement is gaining importance in the education field, as a measurement of the student's interest and participation in a specific educational activity or in the whole learning experience (Skinner & Pitzer, 2012). It is semantically close to other concepts in this stream of research, such as commitment, active participation or involvement in the learning process. Moreover, the construct has been shown to result in higher student persistence in learning, satisfaction with studies and academic achievement (Henrie, Halverson & Graham, 2015).

Engagement in educational research has been found difficult to conceptualize and measure. It has been compared with flow, another concept that considers how the student is aligned with the teacher's instructions and remains focused on the task. Even though engagement is similar, the participation is not considered as deep as it is in the case of flow (Gobert, Baker & Wixon, 2015). It has also been analysed together with student achievement, finally being considered as a reliable indicator for this outcome (Kaiser et al., 2013). When dealing with technology-mediated environments, and especially those in which a constructivist style is applied, it is difficult to study the students' reactions to all the different relationships established through the VC with materials, other students and the teacher.

Engagement is not something inner and static, but open to modifications as an effect of social relationships, the formative environment and the proposed tasks. It can be measured in different ways: student self-report surveys (e.g., Yang, 2011), field observations and teacher ratings, log-file and activity-based measurements and mixed methods, each of them with their own advantages and drawbacks. Previous researches have conceptualized engagement as a multidimensional construct with two, three (Fredricks et al., 2004) or four dimensions (Appleton et al., 2006).

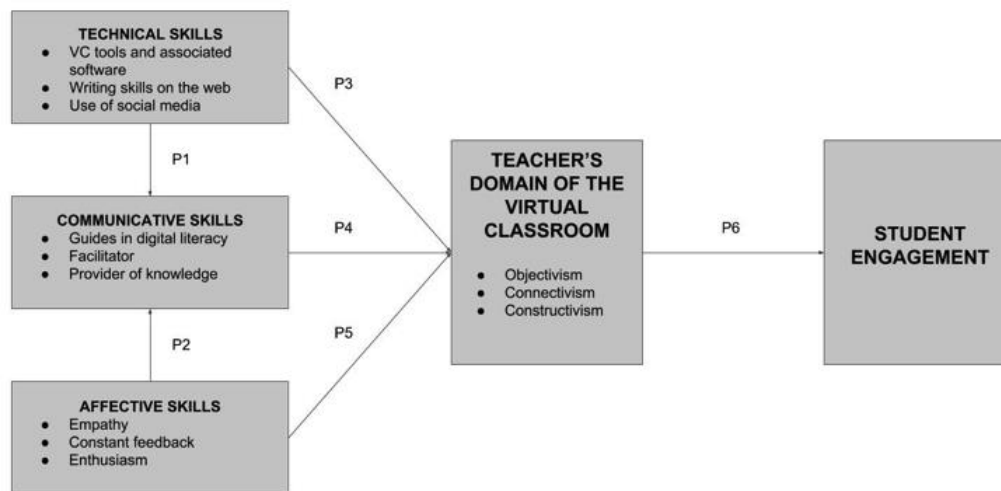
Henrie, Halverson & Graham (2015) represent three dimensions of student engagement, that is, focusing only on learning taking place in academic settings: (i) cognitive, which focuses on non-observable behaviors, including self-recognition and metacognitive behaviors, (ii) emotional, which includes feelings and social links with the teacher and other students, and (iii) behavioral, which measures observable actions such as attendance, active participation and task solving. This approach to student engagement was originally formulated by Fredricks et al. (2004). In the case of Sinha et al. (2015), four dimensions

(cognitive, behavioral, social and causal-to-consequential) are employed when defining student engagement, and these differ on the level of engagement achieved. Moreover, causal relationships are established between the dimensions themselves: behavioral and social engagement will boost cognitive engagement, which in turn will favour causal-to-consequential engagement.

The role of the teacher is fundamental to fostering engagement in online platforms, where dialogue is fundamental to improve education performance (Chen et al., 2018). A review of studies on teacher-student relationships have demonstrated how a stronger relationship leads to improved student engagement in all its measurements and with no difference between cross-sectional and longitudinal studies. This means that the effect on student engagement can be noticeable in the same academic year, but its effects also increase along the years of academic experience (Quin, 2017). The results are notable on the psychological dimension, since the teacher creates an inviting and respectful environment based on his/her initiative to assist and accompany the student through the learning process. This beneficial climate causes the feeling of belonging to the learning community and promotes engagement in learners (Kahu, 2013). Furthermore, the effects of teacher support can go beyond student engagement and can impact positively on the academic results of the student (Klem & Connell, 2004). The role of the teacher is not separate, since the support of other students and the consideration of the course as a means to achieve a purpose are fundamental for engagement in an academic program (Xerri, Radford & Shacklock, 2017).

Based on the previous literature review, a theoretical explicative model is proposed, as Figure 2 reports. In this model, we group the required skills for a VC teacher into three categories: technical, affective and communicative. We propose relationships between the different groups of skills and propose them as key antecedents in the achievement of effective management of the VC. The direct consequence of such a demand on this environment is student engagement, and explanations for this connection have also been developed.

Figure 2. Theoretical explanatory model of teacher skills to enhance student engagement in a VC setting



Source: Own research

CONCLUSIONS

This literature review has analysed the role of the teacher in a blended learning environment, even if (s)he is not directly present in the classroom or does not hold the traditional role of knowledge provider. Based on this review a model of teacher skills to enhance student engagement in a VC setting is proposed.

With respect to RQ1, the role of the VC as an integral part of digital technology in the classroom in higher education remains important and relevant for both researchers and practitioners who wish to adapt to the reality that will evolve in the classroom in the next decade. As to RQ2, three types of skills are required to properly manage the VC: (i) technical or focused on computer and new technologies' literacy, (ii) affective or centered in the understanding and management of the student's psychology, and (iii) communicative or attentive to the verbal and non-verbal relationship with the student before, during and after the classes. When these three domains are fully developed, the teacher can make an appropriate use and management of the VC, including the application of different learning styles of their choice, even in different stages of the same course: objectivist, if the teacher decides that part of the knowledge that has to be provided by him/her and in circumstances that (s)he considers to be optimal for its assimilation; constructivist, if the teacher wants to foster student interaction and responsibility for their own contributions; and connectivist, if a full exploitation of new technologies and development of new learning skills regarding information acquisition and storage is sought. Regarding RQ3, all three learning theories are still valid and applied in educational curricula. The main reason for the combination of the three styles is that constructivist and connectivist learning still relies on achieving learning outcomes proposed beforehand by the instructor. Consequently, all three, objectivism, constructivism and connectivism, can be combined in VC design so that students can enjoy an improved learning experience that considers all their different, individual situations (Imenda, 2017). As to RQ4, the proposed VC training model aims to achieve student engagement

either in particular course activities or in the learning experience as a whole. The role of the teacher is highlighted as an antecedent of student engagement, and also of other effects related to academic performance.

This study has some limitations that open future research lines. Further empirical research is needed, in particular, empirical testing of the proposed theoretical relationships through self-reported questionnaires for students and teachers, revealing potential gaps. Other qualitative approaches, such as in-depth interviews, should also be considered to unveil new constructs that foster teachers' VC domain and explain additional effects at the student level. It would be advisable to search for measurement scales that can be adapted to the analyzed constructs and used to obtain empirical evidence of the theoretical relationships proposed in this study, in order to discover the students' actual perspective on a training program based on this theoretical approach. Another research line is to undertake the empirical stage of the study with actual university or other higher education students that are currently using VCs as part of their learning process. Finally, it would be of interest to include a wider variety of learning theories in the model, since other relevant ones are now valid, such as social constructivism (Vygotsky, 1978) or the 21st Century Skills (Rotherham & Willingham, 2010), and these can be of use to (i) consider new variables that might play a role in the implementation and use of VC and (ii) to provide further applicability to the results of the model. We also propose to include dependent variables that reflect teachers' personal characteristics and attitudes towards this proposal, since it is they who will be in charge of designing, implementing and evaluating the VC for teaching.

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