REFLECTION ARTICLE

Social Networks as a Tool for Collaborative Learning in Architecture Education

Las redes sociales como herramienta de aprendizaje colaborativo en la formación en Arquitectura

Redes sociais como ferramenta de aprendizagem colaborativa em treinamento de arquitetura

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ABSTRACT

This research work studies the role of social networks as an instrument of knowledge appropriation to motivate university students of the architecture program and focused on the design of a didactic strategy to promote collaborative learning. The analysis of the results allowed to detect Facebook as the network of greater application and use, to generate appropriation of knowledge through the implementation of this social network, to obtain a positive performance regarding collaborative learning in students and to formulate and implement a methodological strategy of teaching-learning of architecture that can serve as a basis to optimize the formative processes.

RESUMEN

El trabajo investigativo estudia el papel de las redes sociales como instrumento de apropiación del conocimiento para motivar a estudiantes universitarios del programa de arquitectura y se enfocó al diseño de una estrategia didáctica para promover el aprendizaje colaborativo. El análisis de resultados permitió detectar a Facebook como la red de mayor aplicación y uso, generar apropiación de conocimiento mediante la implementación de esta red social, obtener un desempeño positivo respecto al aprendizaje colaborativo en los estudiantes y formular e implementar una estrategia metodológica de enseñanza-aprendizaje de la arquitectura que puede servir de base para optimizar los procesos formativos.

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RESUMO

O trabalho de pesquisa estuda o papel das redes sociais como instrumento de apropriação de conhecimento para motivar estudantes universitários do programa de arquitetura e focado no desenho de uma estratégia didática para promover a aprendizagem colaborativa. A análise dos resultados permitiu detectar o Facebook como a rede de maior aplicação e uso, gerar apropriação de conhecimento por meio da implementação dessa rede social, alcançar um desempenho positivo em relação à aprendizagem colaborativa nos alunos e formular e implementar uma estratégia metodológica de ensino-aprendizagem de arquitetura que pode servir de base para otimizar os processos de aprendizado.

Introduction

This work is based on the approaches of Vigotsky (sociocultural theory), Ausubel (significant learning theory), Siemens and Downes (Connectivism theory) and Collaborative Learning in general. Vigotsky's sociocultural theory indicates that the development of human beings is linked to interaction with their socio-historical-cultural context (Mattos, 1995) and is supported by social constructivism to affirm that what happens in the minds of individuals is nourished by the social environment (Carretero, 1997) and that only through social interaction is cooperative learning achieved, both in the relationship between thought and language, as well as in the use of mediating instruments that guide human action based on the appropriation of cultural manifestations that have meaning in the community (Castorina, 2004).).

Ausubel's theory of meaningful learning is a key to understanding new approaches and paradigms that influence the teaching-learning process (Mosquera, 2009). This theory focuses on the student (Ausubel, Novak & Hanesián, 1983) and states that learning depends on his previous cognitive structure and how this relates/connects with the new information through the interaction between the most relevant knowledge of both parties (Moreira & Masini, 1982), so that these acquire a meaning favoring the evolution and stability of his entire cognitive structure.

Siemens' connectivism, in turn, draws on the perspectives of learning, epistemology and pedagogy to highlight the need for other explanations for the learning that is taking place through technologies and social networks in the digital era (Siemens, 2004, Gutiérrez, 2012 and Zapata-Ros, 2015); highlights that learning is continuous, co-creative, complex, connected and uncertain (Escobar, 2011) and the importance of analyzing the connections that may arise to ensure learning and innovation in an interconnected world (Barbasi, 2002 and Landauer and Dumais, cited by Aparici, 2010); explores the strategic role of access to information to recognize, cultivate and increase collective cognitive capacity (Kleiner, cited in Siemens, 2004), so that the task of any trainer is to create and foster environments and networks that allow learners to enhance their learning in a free, dynamic and adaptive way).

Collaborative learning (CL) is based on the postulates of Piaget's psychology and Mead's psychosociology (Roselli, 2011), as well as on Vigotsky's social constructivism, as an instructional process that is supported by the knowledge of the characteristics of group dynamics and seeks, through the joint work of students (Garibay, Concari and Quintero, 2013), that they make the most of their own learning and become responsible for their joint learning (Zañartu, 2003) with maturity and creativity. The basic principles of CA are positive interdependence, interaction, individual contribution and personal and group skills (Lucero, 2003), prior generation of an environment of individual and group motivation, solidarity and mutual cooperation. Thanks to CA, students obtain outstanding results: they remember the content longer, develop higher reasoning and critical thinking skills, and feel more motivated, confident and accepted by themselves and others (Millis, 2010).

On the other hand, since the 80's of the last century and with the information revolution produced by the Internet, new knowledge societies (Unesco, 2005) or "network societies" have emerged with horizontal relationships that transcend social boundaries (Castells, 2009) and that need to expand the formative notions as to what, how, where and for what is taught, to the way of understanding education (García, 2006) and to the collaborative work among peers using the network according to a specific subject (Cobo Romaní, 2007), where and for what is taught, the way of understanding education (García, 2006) and collaborative work among peers who use the network in terms of a specific subject (Cobo Romaní, 2007), taking into account that groups constitute the basic cell of information and knowledge production in the knowledge society (Fernández, 2005-2006).

At the same time, social networks can configure learning communities to the extent that they allow grouping people around their own educational projects, transforming pedagogical practices and promoting solidarity work through an open, participatory and flexible training model (Díaz and Navarro, 2012) that enables collaborative group learning (De Gouveia, 2012 and Barbasi, 2002) and facilitates the achievement of achievements associated with an emerging humanity, made up of networks of people, data and connected services (Bryant, 2009). In this sense, Web 2.0 online resources, in addition to being tools that optimize information management, become instruments that favor the formation of innovation networks, the generation of knowledge based on reciprocity and cooperation (Quintina Martín-Moreno, 2004) and the formative use of the Internet with new ways of recreating learning.

This requires taking into account Vigotsky's theory, since the Internet, Web 2.0 and Web 3.0 are interactive communication tools that can become a source of conceptual training and knowledge appropriation, and that combined with face-to-face training obtain better academic results than those of traditional training (De Freitas, 2008; Morocho and Santamaría (2022)..

Currently, there are already works developed in university contexts regarding the use of social networks as a strategy to emphasize collaborative learning (Díaz, 2012) and to analyze social skills in virtual collaborative work environments, with their respective representation in the teaching-learning processes (Villasana and Dorrego, 2007). There are also works directly related to integral calculus and architectural design (Velandia Rayo, 2009 and Gutiérrez, 2009), which highlight the importance of teacher accompaniment for an adequate and pertinent use of ICT; as well as recent studies on teachers' digital competences (Colás-Bravo et al., 2019; Engen, 2019), on the impact of ICT use on student performance (García-Martín & Cantón-Mayo, 2019; Gee & Esteban-Guitart, 2019) and on the implications of social networks on students' emotions and behaviors (Galbava et al., 2021).

Regarding ICT and their relationship with learning, the learning process has generated great debates in education as it has moved from the classical structure of bookish and individual training to a more open, group, social and dynamic training procedure (Rubia, 2014), influenced by the way ICTs expand the physical and mental capacities of human beings, conditioning cognitive processes and possibilities of social development (Tejada and Barrutia, 2021), and forced by the pandemic generated by covid-19 (Prada Núñez et al., 2021).

The above has promoted multiple ways of learning collaboratively through technologies available in Web 2.0 and Web 3.0, identifying their effects in the teaching phase and promoting active and cooperative learning (Erpenbek, 2007). In this regard, Wesh (cited by Rittberberg, 2009) assumes that the information culture of students has changed due to new technologies and that learners will be able to effectively acquire the knowledge they require through multimedia application; Downes (2006) formulates that the value of Web 2. 0 lies in the embrace of social networks and communities, which makes the consumption and decentralization of content take a back seat; and Morocho and Santamaría (2022) argue that Web 3.0 enables the interpretation and interconnection of information in a more agile and interactive way.

Some ways associated with the implementation of connectivism are given by Media Wiki and Blogs. The former focuses on the creation and maintenance of a systematic and coherent knowledge base as a single module in a Web 2.0 environment that is developed through subjects, activities and learning roles. Blogs, on the other hand, contain simpler units of information with a low threshold of interaction and communication that allow the exchange of experiences and collection of ideas and, according to Martín and Montilla (2016), become valuable tools to foster collaborative work and enable the expansion of knowledge.

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With the irruption of new technologies, especially those related to Web 2.0 and Web 3.0, education has been favored, essentially through group work and peer-to-peer collaboration. However, digital literacy is required to recognize the social phenomenon behind each application and the educational possibilities in terms of knowledge construction in a distributed but autonomous manner, as well as the possibilities of collaborative and solidarity work offered by virtual communities (García, 2006). Similarly, 3.0 tools and their proper implementation contribute to strengthening meaningful learning to the extent that they imply the adaptability of students to their needs, expectations and interests and make them play an active role in the individual and collective learning process (Páez Quinde et al., 2022).

It should be noted that, according to Ortegón and Delgado (2021), digitally mediated learning processes require virtual learning environments (VLE), such as "e-Learning platforms, blogs, wikis and social networks" (p. 2). In this sense, it is necessary to take into account that social networks are structures composed of a set of individuals or organizations connected by common interests or relationships of friendship or kinship, these have become powerful places of interaction that make it possible to articulate people and form virtual communities and peer-to-peer collaboration networks (Cobo Romani, 2007), as well as to move from spectator or consumer to a content producer or "prosumer" (producer+consumer) who contributes content, shares resources, interacts with other users and creates communities through social networks or microblogging; generates and publishes content through blogs, wikis and other collaborative applications (Google Apps); and retrieves information through semantic searches such as tags (folcsonomics), social bookmarking (Digg or *del. ici.ous*) or subscriptions (syndication), through RSS aggregators or e-mail.

While this new social landscape permeated by the digital revolution of the Web increases the possibilities of generating collaborative learning, it is necessary to recognize the importance of active methodologies in the teaching process (Cruz and Hernández, 2022) and the need to change teaching strategies and, consequently, the roles of teacher and students.

In recent years, proposals for the application of ICT in the classroom are being made mostly in primary and secondary education (Maldonado, 2018), and their results show the strengthening of knowledge appropriation, autonomous and collaborative learning, among other aspects (Ortegón and Delgado, (2021). However, it is often unknown that the goal of higher education is to achieve the construction of advanced knowledge in a collaborative environment between teachers and students. According to Borras Gene (2013a), new social networks are emerging that would allow effective collaborative learning, each with their respective advantages and possibilities for configuring Personal Learning Environments (PLE). In this regard, among the social networks and web applications the following stand out: Tuenti, Foursquare, Google+, Hangouts, Pinterest, LinkedIn, YouTube, Blogs, Tumblr, OpenStudy, HootCourse and Facebook.

Additionally, as a result of the pandemic generated by covid-19 and the consequent decision of governments to determine periods of preventive isolation, advances related to pedagogical innovation have been taken advantage of, which provide strategic tools for the development of synchronous and asynchronous virtual classes, such as Google Meet, Zoom, Microsoft Teams, Jitsi Meet and BigBlueButton (UTadeo, 2020). Therefore, new studies associated with processes and learning outcomes emerge on these recent teaching tools that respond to the current guidelines established by the national government of Colombia (Colombia. Decree 1330, 2019; Cruz Ardila et al., 2022), as well as new forms of collaborative learning through the use of digital platforms (Bonami, et al., 2020), and applications of collaborative learning in conditions of preemptive isolation (Chanchí Golondrino et al., 2022) and remote teaching (Valbuena, 2021).

Regarding the use of Facebook in education, it responds to the "edupunk" position (neologism devised by Jim Groom and used to refer to the application of the "do-it-yourself" attitude in teaching and learning practices), which seeks to dissociate itself from educational policies in the use of ICT and corporate interests that offer "mold" type solutions. According to Steve Hardgon, quoted by Borras Gené (2013b), the personal profile page has importance in education because it becomes a form of "personal" portfolio, where the contributions of the members, together with the profile, help to define them. Thus, the introduction of videos (and to a lesser extent, photos) become, within educational settings, more than creative contributions and become a shared repository. In addition, the directory of members becomes a list of possible connections to reach other people with similar interests. Finally, as a result of the rise of collaboration and videoconferencing tools that have scaled up as instruments for teaching

during the isolation required for the prevention of the coronavirus, Facebook also offers the Messenger Rooms functionality, for virtual meetings (Computerworld, 2020) and allows the implementation of emerging and innovative training initiatives through the Facebook metaverse that account for the transformative and inclusive irruption that has been reinforced in the context of the post-pandemic (Cuevas-Molano & Iglesias, 2022).

According to the above, the question was posed: How to teach students of the Design Workshop of the Architecture program at the University of Pamplona through a social network? In this regard, the study was oriented to identify the use of social networks in training processes, implement a social network in disciplinary training and propose the initial design of a didactic strategy to promote collaborative learning and serve as a contribution to the theoretical and practical bases that underpin the integral development of academic processes.

Methodology

The research had a cross-sectional qualitative approach for the production of descriptive data and the understanding of students' behavior in the academic environment (Rodríguez, Gil & García, 1996), complemented with a constructivist interpretive framework aimed at showing the subjective reality in which human behaviors and actions are inscribed (Moral Santaella, 2006). The method used was the instrumental case study (Stake, 2010), which was applied semiannually in the period 2013 - 2015 through a process of systematic and in-depth inquiry of collaborative learning of students from different courses of Design Workshop of the Architecture program, which was focused on understanding the use of some social networks as a pedagogical phenomenon, through a grounded interpretation.

On the other hand, the procedural development was carried out inductively, while the analysis data came from the observable behavior and the practices developed by the students in their project works of the subject design workshop with the help of ICT, simultaneously covering the understanding and interpretation of the general complexity of the formative process, the particularity of the specific case of the use of some social networks with predominance of the use of Facebook through a grounded interpretation of the formative findings according to the specific type of learning (Learning to communicate, Learning to do, Learning to be, Learning to learn and Learning to serve), the categories of analysis and the resulting subtle differences in events presented with the use of Facebook as a mediator for collaborative learning.

The conceptual support on collaborative learning, the interview as a tool for data collection and the use of social networks as a learning method and strategy, allowed the development of cognitive structures necessary to guide data collection, information analysis, and the interpretation of the phenomena studied through a naturalistic approach. In this sense, the categories of analysis associated with the enunciated instruments correspond to Interaction, Receptivity, Participation, Privacy and Socialization. It should be noted that the instruments for the collection and analysis of the information related to the entire research process were carried out within the framework of ethical principles and norms such as the handling and protection of the identity of the participating students and teachers, contained in international agreements and regulations in force in Colombia.

Results

Scope of the Research

The role of technology in the configuration of networked societies and new forms of knowledge construction has had an impact on the disappearance of rote learning and the need to develop the ability to filter information in a relevant manner. For this reason, the Colombian Ministry of National Education (MEN), within its Ten-Year Education Plan 2010-2026, proposes a series of policies and strategies for the incorporation of ICTs in Colombian education as a productivity tool and as a resource for learning. For its part, the policies of the Universidad de Pamplona contemplated in the Institutional Development Plan (PDI) 2021-2030 and the Institutional Educational Project (PEI), address the importance of combining technology with the institutional constructivist pedagogical model as a basis for streamlining training processes.

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As for the Architecture program at the University of Pamplona, the disciplinary transformation resulting from the widespread use of digital tools implies changes in its teaching. In this regard, the active role of the subject in the process of construction and reconstruction of knowledge that exceeds its quantitative accumulation and conceives it as a conceptual network is highlighted (Gutiérrez, 2009). Therefore, the greatest challenge is related to the generation of conditions to approach reality as a complex fact, in which the intervention of the inhabited space, so important in the thinking of the 21st century, allows a clear relationship between the local and the global, the ephemeral and the perennial, the new and the old.

It should be noted that the formative processes carried out in the area of architectural design of the Architecture program at the University of Pamplona, seek to involve students in the search for solutions to environmental problems through autonomous learning by means of individual and group work. However, it is observed that a deep discussion or reflection on the problem addressed is not obtained, the cognitive advantages derived from the knowledge exchanges that take place when working together are not enhanced, and the authority and responsibility for group actions are not shared with the teacher, so that the objective of problematization as a pedagogical strategy is lost. In addition, some students tend to delegate to their classmates the development of activities assigned in group work, which is why neither a shared responsibility nor a balanced realization of the academic products is achieved.

On the other hand, although some teachers and students use Information and Communication Technologies (ICT) and social networks in academic practices, these environments are limited to the distribution of information, but do not contribute to the interaction of students with the environment and with their own classmates, nor do they allow them to carry out their own learning in a conscious, responsible and effective way. Therefore, the need to promote the use of such technologies and virtual environments to optimize the performance of collaborative work within academic practices is evident.

The context for the development of the work corresponds to the Design Workshop as a structural subject of the curriculum of the Architecture program, where although the teaching-learning process has been taking place during the last years in an organized manner, at the same time the students' position is not always achieved in the approach to the problem, nor the collaborative and consensual construction or application of knowledge.

The context of the case were the courses Design Workshop III, IV and V, consequently corresponding to semesters III, IV and V of the curriculum of the Architecture program at the University of Pamplona, subjects that were used instrumentally to illustrate collaborative learning.

The study period was four sequential semesters and was applied to students of the Architecture program as follows: second semester of 2013 Design Workshop III and IV, first semester of 2014 Design Workshop V, second semester of 2014 Design Workshop IV and first semester of 2015 Design Workshop IV.

Data Collection and Analysis

Data collection was carried out through interviews, direct observations and physical artifacts, while the analysis of information was carried out in a holistic manner, taking into account the description of the phenomenon, the resulting categories and the assertions regarding the phenomenon studied. Thus, the interpretative and naturalistic approach made it possible to find the meaning and interpret the phenomena associated with collaborative learning in terms of the meanings given by the students of the subjects under study.

It should be noted that, when proposing collaborative learning experiences in the classroom, the suitability of the resource to be proposed as a work tool was verified: the social network Facebook was determined, since 90% of the students not only had Facebook, but were also unconditional users. For the definition of the indicator of participation in Collaborative Learning (CL) through Facebook, the behavior of the activities proposed was observed, taking into account some strategies related to the different stages of the formative process of the Design Workshop, in accordance with the programmatic contents of each subject. It is worth noting that the Design Workshops contemplate the sequential, creative and logical formulation of an architectural project, which includes three stages that define it. An investigative or theoretical stage in which concepts, trends and general norms that will form the basis of the creative process are identified;

a diagnostic stage aimed at establishing the positive and negative determinants of the context that condition the technical and semiotic aspects of the project; and a propositive stage that uses the two previous stages to lead the design process to the formulation of an urban-architectural object complemented with technical aspects that lead to the final concretion of the design project.

In 2013, for the Design Workshop IV course, where Facebook was first used, a closed group was created that operated as a virtual classroom with information related to activities, relevant topics, support texts and images of the results of group work. In this course there was great receptivity in using Facebook as a means of information and communication, but in the process carried out, neither knowledge nor collaborative learning was generated.

According to the aforementioned partial results, it was necessary to design a complementary strategy represented in personal blogs to induce students to participate more actively in the socialization of results and discussion of them through the Facebook wall. As a result of the final process, it is worth noting that, although some students created individual blogs (e.g., http://proyectokatebaez.blogspot.com/) and then added them to the wall, the expected collaboration did not occur and students did not access information beyond the wall. In addition, it should be taken into account that, in order to make comments on the wall, it is necessary to link through an e-mail, which made the process more complex.

In 2014, for the Design Workshop IV and V courses, the wall was used as a classroom. There, the information of activities was provided by the teacher and the students exhibited their progress and results so that the whole group could observe the progress in the design process of urban-architectural projects and make the respective comments and contributions for their optimization.

This procedure was carried out in two ways: (i) through the incorporation of files in PDF and DWG format of the advances in the project exercises as a means of support for the presentation that each student made on the partial design achievements and that was carried out through face-to-face discussion in which he made reference to the contributions presented on the wall and the consequent evaluation of each project, which was carried out by teams of two people, in the case of Design Workshop IV and (ii) through the realization of the same process above, but with feedback on the project from the students, through questions and comments on issues related to aspects such as correspondence of existing architectural projects used as references for the design process with respect to each academic project presented, quality of public space, congruence between form, function and structure, and other project components; In this way, more collaborative activity and peer support was generated, in the case of Design Workshop V).

In 2015, because of the analysis of previous experiences, a group blog (http://taller4arquitecturaup.blogspot.com) was created for Design Workshop IV in order to visualize each project in a more agile way, linking the activity through Facebook. This strategy proved to be more efficient, as it achieved greater dynamism and depth in the contributions and generated greater appropriation of knowledge through the social network.

As can be seen, there is a marked difference with the use of forums and work groups through platforms such as Moodle and Blackboard Learn, to the extent that these require certain training parameters, both for teachers and students and, in the case of the University of Pamplona, their use is more frequent in the programs offered in virtual mode. On the other hand, the implementation of Facebook as a pedagogical strategy is more flexible and intuitive and its agile implementation lies in the usability of the network by students and teachers.

According to the results obtained, it was evident that the social network generated great dynamism among the participants and a positive and motivated response from the students, which ratifies the role that this tool can play in Collaborative Learning.

It is also necessary to emphasize that, due to the lack of culture that existed in 2013 to make a social network act as a training tool, there was initially a logical resistance to its use. However, as the development of the course progressed, during 2014 and 2015, a more active and effective participation in the different training activities proposed took place.

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Then, in 2016, with the aim of expanding the results, a structured interview was designed and applied on aspects related to: I) definition, knowledge and use of social networks for general and specific academic purposes of the Design Workshop subjects; ii) definition of Collaborative Learning and possibility of using a social network for its application; iii) use and results of Facebook for academic purposes; iv) methodological clarity of the teacher to generate collaborative dynamics in Facebook; and v) experience and usefulness of the implementation of Facebook in the Design Workshop in terms of knowledge generation and personal cognitive development.

This questionnaire was applied to different groups of the Design Workshop subject located in different semesters of the curriculum in the Architecture Program of the University of Pamplona and, among the results of its systematization, the following findings stand out in formative terms according to the type of learning (see table 1).

Table 1. Findings from the use of Facebook by type of learning

Type of learning	Description of the formative finding
Learning to communicate	1. Validity of the appropriation of social networks as an interactive medium to communicate and share information according to common interests. 2. Feasibility and relevance of the use of Facebook by students to streamline communication channels.
Learning to do	3. Differential contribution of Facebook to the development by stages of the Design Workshop subjects with the following specific observations: in the initial conceptual stage, Facebook interaction contributes immediately to the subsequent contextual and normative analysis; in the intermediate stage of trend and situational diagnosis, network communication speeds up the conceptual feedback in the analysis of referents and conditioning factors of the environment: and in the final stage, critical collaboration contributes to the consolidation of architectural projects. 4. Adequate interpretation of collaborative learning in the process of creation and conscious appropriation of knowledge.
Learning to be	5. Applicability of Facebook in the theoretical and practical enrichment of learning with a critical sense. 6. Recognition of the complementarity of face-to-face and virtual processes to obtain the expected results. 7. Possibility of obtaining new results to derive new knowledge.
Learning to learn	8. Awareness of the importance of connectivism in the collective creation of results in the different phases of the architectural project. 9. Opportunity to learn to learn from connectivity and interaction.
Learning to serve	10. Possibility of learning to collaborate in the design processes of other colleagues. 11. Freedom to express and contribute to others, without the insecurity or fear of rejection that is often detected in the classroom.

Source: own elaboration, based on Higuera (2016.

Subsequently, in order to establish the correlation between the categories initially proposed for the study and the results of the application of the methodological instruments, information was cross-checked between the analysis of the implementation of Facebook, the interviews and the theoretical references, which allowed visualizing the effectiveness of the procedure and the way in which new technologies, mediated by the chosen social network, generate collaborative learning and new ways of producing knowledge. The results of this interrelation of factors are shown below (table 2).

Table 2. Correlation of proposed and resulting categories

Initial category	Interaction		Receptivity		Participation	Privacy	Socialization
Resulting category	Collaborative learning indicator	Relationship between the social and the cognitive	Appropriation of knowledge	According to the location of the course in the curriculum	According to internal stage of the course	Closed group as an alternative classroom. Streamlines processes	Blog after the course
Media							
Facebook	X	X	X	X	X	X	X
Interview	X		X	X	X	X	
Theoretical Framework	X	X	X				

Source: own elaboration, based on Higuera (2016).

Finally, the interpretation of the findings obtained according to the type of learning and their relationship with the results of the categories of analysis allowed us to establish transversal findings of the training process (Table 3).

Table 3. Formative cross-cutting findings resulting from the use of Facebook

Category	Description of the formative finding
Interaction	Communication through social networks has become a phenomenon of growing coverage, in which collaborative learning is agilely manifested through the social network Facebook, thanks to the natural way in which students relate to each other.
Receptivity	During the development of the Design Workshop with the help of Facebook, the relationships between the cognitive and the social are strengthened, as new ways of spontaneously sharing knowledge and dynamizing the formative process.
Participation	The higher the student's level, the more receptivity to employ this methodology is obtained, while in lower semesters the receptivity is lower, however, by reinforcing the motivation, a high degree of encouragement and collaboration is obtained.
Privacy	During the Design Workshop, the conceptual stage and the situational diagnosis stage are the most active in the network, while at the beginning of the propositive stage (project stage) participation is reduced, reappearing at the final stage of the design proposal.
Socialization	It is convenient to create a closed group in the social network Facebook so that students do not feel inhibited in the face of possible criticism. The creation of a blog that allows the projects to be made public offers the possibility for students from other Design Workshops who have participated in some of these classes, to feed their knowledge and in this way collaborative learning is also produced afterwards.

Source: own elaboration, based on Higuera (2016).

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Learning Strategy

The learning proposal of the Workshop through the Facebook social network is based on the analysis of the results obtained in terms of the observation of different behaviors according to the learning level and according to the different ways used to promote Collaborative Learning among students. The didactic strategy aims at the creation of support networks for such courses, so that they can become essential elements of a hyper-open curriculum learning model, capable not only of assembling episodes of a course but also of creating them.

In that sense, the proposal is oriented towards state-based learning, where the formative objects are not organized as sentences in a paragraph, chapters in a book or books on library shelves, but are the very form and content of communication. Moreover, their use depends on the context and does not obey pedagogical imperatives fixed in advance.

Considering that Facebook can be a powerful and simple digital literacy tool, the steps for the didactic strategy that allow generating collaborative learning within the Design Workshop subjects in the Architecture Program are framed in the methodological phases of Preparation, Implementation, Evaluation and Socialization, and correspond to a series of sequential and complementary activities, as presented below (see table 4).

Table 4. Learning strategy using Facebook

Phases	Methodological Activities
Training	Creation of a closed Facebook group, where all the students of the workshop are present, as an opportunity to extend learning outside the traditional classroom. Parallel generation of a blog to support the group with the purpose of posting more specific information, including graphics, texts, videos and complementary links. The blog was chosen because it is more technical, creates a more concentrated environment than the Facebook wall itself, and fosters another type of much deeper connectivity among the participants. Establishment of rules of coexistence in the group so that it is used exclusively for topics and issues relevant to the workshop
Implementation	Use of the group wall as a classroom board where direct annotations are made regarding information on schedules, evaluations, and some texts that directly support the projects. Development of feedback meetings on the topics being discussed in the classroom, as needed for convenience. Use of the chat to solve individual doubts or to carry out communications of unforeseen events or personal academic permissions. Complementary use of a group chat through a popular network such as WhatsApp. Connection of the blog to the group wall to make the entry to the group more agile and once everyone has joined the blog, the feedback dynamic begins in each of the stages of the Design Workshop. Preparation of the partial deliveries of each of the three cuts in which the formative process of the semester is divided as the most dynamic scenarios in the blog in which the interrelation of data between users is carried out without having to be in person in the classroom to obtain information.
Evaluation	Definition of the moments of the process in which the formative evaluation is carried out, considering what is posted both on the blog and on the Facebook wall.
Socialization of results	Opening of the group to the public once the formative process of the semester is completed for the visibility of the process and social appropriation of the results in accordance with the current dynamics of interconnection in the knowledge society.

Source: own elaboration, based on Higuera (2016).

Challenges and Opportunities for the Use of Facebook in Light of Recent Changes

The results obtained acquire greater relevance if we take into account the isolation generated by the covid-19 pandemic and the consequent unforeseen dynamism that imposed and encouraged the use of emerging or unusual media such as Zoom, Google Meet, Microsoft Teams, Jitsi Meet and BigBlueButton, or applications that enable collaborative learning, such as WhatsApp, Kahoot, Wix and Canva.

In the case of the University of Pamplona, the academic community currently has virtual tools such as: Moodle virtual tools, *Digitales*, Microsoft *Digitales*, Microsoft Teams, Google Classroom, Zoom and SharePoint for the development of the form processes, within which Microsoft Teams and Share Point occupy a privileged place in what corresponds to the development of regular courses and degree work, respectively.

According to what was expressed and to evaluate if Facebook is still being used by students of Design Workshop IV and V, a survey on the use of social networks, the use of Facebook and its potential to be used in their academic training was elaborated and applied. Likewise, a survey was applied to the professors of the Architecture program in order to determine their degree of familiarity and confidence in the use of Facebook, in terms of interest, functionality, communicability and privacy, among others.

The systematization of data products from the surveys applied to 39 students currently taking Design Workshops IV and V of the Architecture program at the University of Pamplona, showed that more than 76 % prioritizes social networks as a means of communication; they prefer to use Twitter and Facebook over other social networks; they mostly use Facebook to share publications and entertainment in percentages of 36. 7% and 33.3% respectively; they post images and photographs more regularly on Facebook; they consult and share more frequently on Facebook topics on architecture, humor, sports and culture; and they consider that Facebook's greatest potential is represented by the ease of communication, group interaction and ease of feedback.

The above allows us to deduce that, for students, Facebook is an option that complements the tools and applications available, in an agile and effective way; it is close to their disciplinary interests; and it can be a useful tool in their formative process given the recognition of its role in communication, group interaction and possibilities of feedback that it provides.

On the other hand, the perception of 32 teachers of the Architecture program of the University of Pamplona regarding the use of Facebook as a complement to the training process, showed that more than 93% connect more frequently to the Internet by cell phone; they prefer, similarly to the students, the use of Twitter and Facebook over other social networks; they consider that the main functions of Facebook are to entertain, inform and share publications; they post images and photographs more regularly on Facebook; they consult and share more frequently on Facebook topics on architecture, humor, culture and sports; they consider that the potential of Facebook corresponds to the ease of communication, widespread use and group interaction; and they divide their perceptions on the limitations for the use of Facebook in academic training in terms of low interest on their part, poor traceability and low privacy.

Consequently, the use of Facebook is also considered as an option that complements the tools and applications available, in an agile and effective way; it is related to their professional interests; and, despite their reservations in the use of Facebook due to insufficient interest, traceability and privacy, they consider it an agile means of communication and with wide use that allows group interaction, which is why it can be suggested that an update in the unexplored possibilities of Facebook, such as Messenger Rooms, could motivate them to use it for academic purposes.

Conclusions

The Sociocultural Learning, Meaningful Learning and Connectivism theories proposed since the last century by Vigotsky, Ausubel, Siemens and Downes, respectively, as well as the trends proposed by Castells (2009), Barbasi (2002), Brayant (2007) and Zapata-Ros (2015) to promote the use of social networks in learning processes, contribute to understand the logic of human development, show the complexity of the formative processes associated with the mechanisms that our brain has to mature and have allowed the evolution of pedagogical models towards processes of cooperation and learning among equals.

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As can be seen in the works developed by Cuevas-Molano & Iglesias (2022) and Ortegón and Delgado (2021), globalization and interconnectivity have generated new scenarios for the appropriation of knowledge, such that the use of virtual tools and social networks for educational purposes, demonstrated by Páez Quinde, et al (2022) and Borras Gené (2013b), offers the possibility of involving new ways of learning in basic, middle and higher education, combining traditional methodology and taking advantage of network connectivity to articulate teaching-learning processes and produce alternatives to generate knowledge.

Regarding disciplinary training, the network interconnection and the audiovisual culture approached by authors such as Cobo Romaní (2007) and Gutiérrez (2009). allows the visualization of the teaching-learning process from a global perspective, forces to restructure the training processes and makes think about the possibility of other alternatives of knowledge appropriation and dynamization of learning focused on the use of these resources to exchange experiences, concepts, situations, which in turn requires changes in the conception of teaching.

The results obtained are in agreement with what was stated by Díaz and Navarro (2012), Rubia (2014) and Mora-Vicaroli & Hopper-Simpson (2016), regarding the contribution that social networks can make in the generation of Collaborative Learning among peers, from their unlimited possibilities of sharing images, texts, solutions and projects, for the present architectural urban research, from different contexts that, connected and appropriated, facilitate a more global vision and create new forms of knowledge.

It was also corroborated by Prada Núñez et al. (2022) on the way in which the growing incorporation of ICT in training developments has prompted a major review and transformation of the teaching methodologies and strategies used in educational training, since the new generations of students who join this disciplinary learning process have an intense handling of digital media and resources. The above confirms the necessary reconsideration of the ICT competences stated by Valbuena (2021), as well as the social skills contemplated by Villasana and Dorrego (2007) in the formative process mediated by virtuality.

Similarly, the validity of the statements made by Rittberberg (2009), Páez Quinde, et al (2022), and Morocho and Santamaría (2022) concerning the importance that socialization has gained with the development of Web 2.0 and Web 3.0 could be verified, since they make everything revolve around connections between users. In this regard, interaction and collaboration among students show how they increase their mastery of critical concepts and how it is possible to achieve transfer of learning responsibilities, but it also requires the updating of teachers in the management of social networks and virtual environments.

In this sense, although the process offers an opportunity for the modernization of higher education with the incorporation of ICTs and the use of the possibilities they offer for the development of new competencies, it is necessary to recognize that the strategy is impracticable without a horizontal participatory pedagogy articulated to a pedagogy of training for life, accompanied in turn by evaluation strategies and control of distributed and empowering learning outcomes, away from the dominant models of retention and repetition. Therefore, concomitant with what Zapata-Ros (2015) pointed out, in order to achieve its implementation and within the framework of the integration of the new with the traditional in the educational experience, a new frame of reference must be generated to be able to choose episodic learning events, as part of a much more intricate and complex sequence.

Currently, as Prada Núñez et al. (2022) point out, the pandemic caused by covid-19 and the necessary periods of preventive isolation, generated conditions that have allowed taking advantage of recent advances in pedagogical innovation through strategic tools for the development of synchronous and asynchronous virtual classes, which in turn requires the monitoring of these processes and the corresponding learning outcomes. Thus, hand in hand with the role of mobile technology in university learning proposed by (Tejada and Barrutia, 2021), the recent Facebook Messenger Rooms functionality, associated with recent communication platforms and Web 3.0 tools, can also be part of such dynamics, studies and results.

The findings associated with the use of Facebook according to the type of learning confirm the opportunity that social networks, in general, and Facebook provide for communication and interaction; the applicability of Facebook as a complementary tool that promotes collaborative learning in the formative process of architecture students. On the other hand, the correlation of the proposed and resulting categories shows the effectiveness of the research process in terms of its contribution to collaborative learning.

The transversal formative findings related to the use of Facebook allow us to confirm its effectiveness in terms of dynamic interaction, receptivity in its use for formative purposes, active participation, privacy, socialization, and feedback of learning results.

Finally, the proposed learning strategy using Facebook, with its corresponding phases of preparation, implementation, evaluation, and socialization of results, takes advantage of the results obtained from the systematization of the experience, incorporates the adjustments made in its execution, allows the evaluation of the learning results and the social appropriation of knowledge. In this regard, it is necessary to consider that, although face-to-face conversations and interactions are indispensable, they are not enough to generate an integral formative process, an aspect that could also be demonstrated by the recent application of the survey whose results attest to the real possibilities to continue considering the use of Facebook to strengthen collaborative learning. Therefore, this strategy can be considered as an initial step, not only to create a network that allows the location of punctual or episodic learning, but a living network that learns, adapts, self-designs and integrates these synchronous and asynchronous encounters.

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