International Research Journal of Management, IT & Social Sciences
Available online at https://sloap.org/journals/index.php/irjmis/
Vol. 7 No. 6, November 2020, pages: 1-8
ISSN: 2395-7492
https://doi.org/10.21744/irjmis.v7n6.1002

The Contribution of Connectivism in Learning by Competencies to Improve Meaningful Learning

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Article history:

Submitted: 9 February 2020
Revised: 18 August 2020
Accepted: 27 September 2020

Keywords:

competencies;
connectivism;
learning networks;
meaningful learning;
technology;

Abstract

Currently, technology influences the evolution of cultural, social, and educational changes is no exception, there is an evolution in the ways of learning and teaching, which has become a challenge, especially in social spheres where technology was unlikely to be used as an educational means since there was no access to it. That is why this article seeks to expose the role that connectivism has as a learning theory of the digital age and highlight its contribution in the formation of competences to achieve meaningful learning, based on the results obtained through a desk study. o Desk Research which allowed a critical and reflective review of previous research on the subject. Finding that technology plays a fundamental role in the integration of connectivism where students will discover knowledge using strategies and skills to act or apply solutions to simulated or real cases, discovering, transforming, creating, or applying competences.

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1 Introduction

"Connectivism: a theory of learning for the digital age" as George (Siemens, 2004) one of its authors has named it, together with Stephen Downes**,** aspires to postulate itself as the innovation in the evolution of behavioral, cognitive, and constructivist theories describing as adaptable to technological reality and the accelerated rate of knowledge development (Universidad del Norte de Colombia, 2013). Through connectivism, interpersonal experiences, and the meaning given to the information found have been enhanced (Torres & Barnabé, 2020).

This theory indicates that the cycle of knowledge development begins from the individual where their knowledge is integrated by networks that nurture the organizations in charge of feeding back the network, allowing students to stay renewed through the developed connections; therefore, teaching strategies must be parallel to the competences demanded by the information and knowledge society (Siemens, 2004). The applicability of connectivism in learning through interaction in educational networks implies not only cognitive but also motivational, social, and cultural processes (Torres & Barnabé, 2020; Rostovtseva & Nizkodubov, 2020; Steensma, 1996).

The learning strategies under the irruption of technology have an informational bias towards connectivism, where skills such as self-regulation, self-reflection, criticality, and autonomy are highlighted to make the choice and acquisition of new knowledge applicable in its integral development (Alpizar & Hernández, 2017). The experiences that the student acquires in the network through the internet, provide the ability to make decisions, join networks, apply strategies, achieve learning objectives with the application of instructional methods that have been socialized in advance by their counselor (Borna & Fouladchang, 2018). The courses, subjects, or modules mediated by the Tic, require the application of active methodologies focused on developing skills in the apprentices, which requires a technological preparation combined with pedagogical strategies, you must choose a tool or web application that allows you to acquire and evaluate non not only knowledge but also abilities, skills, and attitudes that can be applied to the real contexts where the student operates.

Focusing teaching-learning from connections to networks as learning plots allows improvements to social conditions, mixing the technological with the pedagogical, helps the individual and is therefore influenced by external stimuli, in this case, technology because of being in contact with other people and actions shared with other users, allowing them to be at the forefront in modern times (Solórzano & García, 2016).

Connectivism as a theoretical perspective that offers an ideal understanding of this type of learning, where the student forms his learning through an interconnected digital world, being learning influenced by his environment, being self-shaping of his learning in the digital age we live in (Sánchez *et al*., 2019). Through the expansion and facilities of web 2.0, it has helped education through massive open courses (MOOCs), allowing many people to educate themselves without being part of an institution that has a set schedule, allowing online that Many people prepare and specialize in topics of their interest such as masters, doctorates, others, however, we must keep in mind that technologies are not the solution to all the educational and social problems that surround us (Islas, 2017). Connectivism refers to the integration of individuals to knowledge and learning networks through networks personified for meaningful learning in individuals who are permanently interconnected, allowing changes in society since we are influences by the environment around us, it allows us to browse different sites to communicate, demonstrate, explore, learn, and show our ideas (Bernal, 2019; Real *et al*., 2006; Rieckmann, 2012).

It is considered that teachers are the right ones to stimulate the skills in the use of ICTs, to extend productivity in students, taking into account that not everyone can access technology for various reasons and currently Internet services do not supply the needs of users, so it must be analyzed from a pedagogical and not just an economic approach, adapting the contents to current changes where you can interact from anywhere in the world through the internet (Melo *et al*., 2017).

2 Materials and Methods

For this research, the Desk Research methodology was used, carrying out a systematic review of previous research on connectivism and learning by competences, then analysis was carried out to determine the valid conclusions to the problem that arises. . The chosen technique seeks to create new knowledge from previous studies. The Desk Research methodology contemplates a series of steps among them: a) planning the inclusion, extraction, and synthesis criteria of the documents found, considering the quality of the databases to be selected, b) search using the keywords as criteria

defined in the research and in some cases research guiding questions, c) initial selection of the appropriate articles according to established criteria, d) evaluation of the quality of the article according to the context and search criteria, in this case, the last 5 years, d) synthesis of the most relevant data found and metadata, and subsequently the statement of conclusions (Revelo-Sánchez *et al.*, 2018; Astuti *et al.*, 2018; Besançon & Lubart, 2008; Mak *et al.*, 1999).

3 Results and Discussions

Connectivism

Connectivism is defined as a theory of learning for the digital age, the same that has been developed by George Siemens and Stephen Downes, basing the analysis of the limitations existing in traditional theories such as behaviorism, cognitivism, and constructivism, to sustain the effects and benefits that technology currently offers humanity both in communication and in learning. Here the apprentice plays an active role, as the need to continuously innovate in a changing environment, through connections and sharing of lived experiences (Siemens 2006; Siemens & Conole, 2011).

This theoretical approach is currently capable of offering adequate learning, since for the other paradigms learning is always individual and voluntary, quite the opposite of learning in the digital age (Islas & Delgadillo, 2016). Traditional theories were developed in an era when technology had no major impact on learning. These theories were created when knowledge grew very slowly, instead, now knowledge is growing by leaps and bounds (Siemens 2004). Connectivism has given way to the breakdown of barriers that existed in education, for example, nowadays people who decide to study can do it from home, taking classes online, this electronic learning does not require the physical presence to develop a Correct learning process, distance education is almost forgotten, where it was studied in a blended way, which often involved moving from one city to another and using technology only in sending assignments. The main differences between traditional distance education and e-learning, according to Rivera et al. (2017), would be:

1) E-learning is possible if there is the presence of the Internet and ICT.
2) Education is asynchronous.
3) Physical presence between learners and educators is not necessary.
4) Learning communities or networks develop between educators and learners, only learners, or only educators.

Advantages and disadvantages in the learners

Advantages

1) Take advantage of the time, because the information they want will be almost immediately on their computer and in this way they can come to knowledge quickly.
2) Cooperative Learning, learners create learning networks, in which they can share information and work in teams both with their peers and with teachers.
3) Enthusiasm and interest in learning, students are currently digital natives, which means that they have a more natural interest in watching a video than reading a text.
4) Discerning information, when researching on a particular topic, the internet provides us with a wide variety of answers, through technological strategies we can develop skills to select the appropriate information and exclude the information that is not.

Disadvantages

1) Due to the large amount and variety of information provided by the internet, the student can be distracted and waste time visiting pages that do not offer true content.
2) In a group of students, there may be the comfort of one of the individuals who are not responsible for fulfilling the task assigned to him, this will produce a failure in cooperative work, as this will not be consolidated.
3) Interest in learning can be disturbed by visiting different non-academic pages such as videos, music, movies, or social networks.
4) When finding a great variety of information, students choose to “copy and paste”
5) Work already is done without first reading and analyzing whether or not the content is according to what they are looking for.

Learning networks

Currently, learning networks are used frequently, as a space to share information and resources that facilitate the teaching and learning process, which favors intellectual and participatory growth. These networks allow innovating and solving problems that arise in the educational field, promoting the participation and exchange of experiences and experiences. As stated by Antonio Bolívar (2008).

> Groups of schools working together allow disseminating educational knowledge and good practices, they are a means to promote professional learning and to increase social, intellectual, and organizational capital; at the same time that they are a structure to support innovation, breaking with the traditional isolation between schools (p. 310).

A learning network is made up of individuals with similar interests, being the main teaching actors, learners, mentors, educational analysts, educational psychologists, educational managers, etc., the resources used are files, links, videos, blogs.

The role of technology in connectivism

In the digital age, people have taken different lifestyles, where technology plays a very important role for those who have it and for those who use it appropriately, "The technology revolution of information has transformed the ways of doing business, the nature of services and products, the meaning of time at work, and learning processes "(Fenwick, 2001: 4), in these transformations educational theories are questioned, and connectivism emerges, which is considered a learning theory for the digital age (Siemens, 2004) that seeks to describe how students use personalized and collaborative tools in search of new forms of learning that are also considered to be for life, informal and that with the use of these technologies learning is distributed outside the student and within learning networks.

Among the tools that enable the ability of connectivism for competency learning, we can mention blogs, wikis, among others. According to (William, 2008; Richardson, 2007), blogs are tools of online social networks that allow the exchange of information between users and constitute collaborative spaces, where people negotiate and build meaningful learning. The tools of social networks promote a way of thinking that transcends the isolated and individual experiences of students, the online tools that have been mentioned belong to the domain that is known today as Web 2.0, which facilitates social connection on the web, where each person can add and edit information (Andersson, 2007). In the same sense, Mason & Renie (2007) indicate about Web 2.0 that "Users are less passive in receiving information, and more active in co-creating content." The greatest importance of the theory is that the members of the educational communities can find the available knowledge, the value of digital media being its capacity for distribution, but it is the student who must develop its tools, environments, networks, and learning communities and thus develop their skills and prioritize learning models such as competencies.

Competency-based teaching

The main argument of a competence approach is the training of human resources where its base is constituted by general education that develops basic education and the transversal axes applied in the different educational modalities that develop key competencies for life. and the world of work; Under this training system, not only is "knowing" validated by referring to the academic or cognitive but also "doing", putting performance before knowledge (Valdez, 2006). Training through competencies recognizes experience as an instrument of learning, focuses on the application of knowledge, abilities, skills, and attitudes to existing contexts.

In teaching practice, when applying the teaching methodology by competencies, planning is required that enhances not only the knowledge but also the capacities, procedures, and attitudes of the students adapted to their contexts, changing the designs of evaluation and training; and not only be satisfied with the achievement of objectives but the application of them, where the capacity of the apprentices to use that knowledge, skills, and attitudes efficiently before such and such circumstances arises (Cepeda, 2015). In this scenario where technologies are the most striking tool, a student is glimpsed who, from the acquired knowledge, realizes creations or transformations such as publishing an

essay in a digital newspaper, collaboratively working on the creation of the website of his educational institution, in To put into practice what you have learned and that this is known by the educational community.

When referring to the development of competencies, it is described to create knowledge with added value that resists over time, that students can solve proposed problems by analyzing and choosing the most effective solution strategy, autonomy in the procedures is acquired, demonstrating skills to develop the proposed practical work that contributes to the training of skills; ICT in the educational field has influenced the roles of teachers and students, one as a counselor or facilitator, content curator, and virtual classroom manager and the student improving their communication, teamwork disposition, developing self-confidence, creativity and innovates (Tumino & Bournissen, 2016). When implementing competency-based teaching, knowledge, or (knowing), procedures (doing), and values and attitudes (being or being) that once developed will allow learners to apply a variety of strategies or procedures to find the solution is included of various problems posed according to their context and available resources.

Therefore, problem-based training is conducive to the development of competencies, where the understanding of it is required in its multiple contexts, the construction of procedures or solution strategies, assuming the consequences of the problem and the impact of the output to reuse such experiences in analogous problems; clarifying that the problems can refer to negative scenarios in the environment or challenges that generate improvement or innovation without excluding the essential component of the "partner training" approach (Tobón, 2013). This contribution should not be interpreted as a logical algorithm, on the contrary, competency training requires a reflection on the procedures and the consequences of the possible solutions that are proposed in search of continuous improvement.

With the advancement of technologies, traditional paradigms must adapt to new trends and active methodologies that are applied in virtual learning environments. ICT at a level of integration of learning, allows the presentation of the content of various kinds (text, image, video, audio, etc.), communication and propagation of information, at an advanced level its use becomes a tool that It generates dynamics in the construction of knowledge, but in its best application, it should be given a mediating use for the training of competences with the pedagogical dimension applied by the teacher, making meaningful learning possible (Valencia *et al.*, 2016).

To develop competencies through web tools or applications, it is necessary to have planning that contains the proposal of conceptual, procedural, and attitudinal contents with the development of activities and defined evaluation criteria, especially knowing in detail the application that has been chosen to develop the know-how to be and do; Professor Ferran Gandol from Canigó School (Sant Just Desvern) in Barcelona- Spain recommends My Doodle Game, an application where students can create a video game without going to programming, in which a story must be created, solving problems and planning strategies.

Significant learning

The concept of meaningful learning interposed by Ausubel (1968), is of the particular application to be considered as a basis in the designs of current teaching methods, as a key to learning to learn and to learn to think, being that the student is reflective when relating the new ideas that you want to integrate into your cognitive structure (Chrobak, 2017).

Meaningful learning relates to the previous learning that an individual has with the current learning that is developed through the activities or tasks to be solved taking into account the dimensions: motivation, understanding, functionality, active participation, and the relationship with current life, whose learning is built from individual experiences and the way of teaching-learning by digital means (Carranza, 2017). Meaningful learning is a process where the student learns from their previous knowledge, their experiences, their knowledge and at the same time is the result of new cognitive elements that last longer, uniting the two knowledge for the best development of the individual, building knowledge meanings that endure creating new paradigms (Luisel, 2014).

Some factors prevent significant learning such as lack of study habits, lack of time, night work, rotating work, also among the factors that favor this type of learning we have; motivation, wanting to learn, taking advantage of experiences, the influence of neuroscience on education, the teacher-student relationship, their attention, perception, memory, ability to solve problems and decision-making, allowing them to be an analytical, interpretive person, achieving learning remains in time (Chavarro, 2015). It is learning represented by an integrated system, starting from an idea to generate a concept, establishing a link with the information, knowledge, and content that are necessary to obtain meaningful learning where the teacher is a mediator, who directs the execution of teaching in the apprentice (Nieva & Martínez, 2019).

4 Conclusion

The integration of connectivism in the educational field as a theory of learning requires that teachers incorporate ICT in a systematic and planned way so that students build their environment where they join learning networks and the acquisition of competencies is evident (know, do and be) that become tools to solve specific situations according to the environment where they operate. Connectivism appears to motivate learners to find knowledge informally through devices where the core is the creation or transformation of the information obtained to later distribute it through the networks, therefore the teacher is a facilitator or guide and the student develops autonomy to obtain meaningful learning.

Conflict of interest statement
The authors declared that they have no competing interests.

Statement of authorship
The authors have a responsibility for the conception and design of the study. The authors have approved the final article.

Acknowledgments
We are grateful to two anonymous reviewers for their valuable comments on the earlier version of this paper.

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