kriativ.tech

Edição Nº 8 – 02 de Julho de 2020
ISSN Print: 1646-9976 | ISSN Online: 2184-223X |
http://www.kriativ-tech.com
DOI: 10.31112/kriativ-tech-2020-06-29

Connectivism, Information Technologies and Distance Learning

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Abstract: *The theory of connectivism and its relationship with E-learning and distance learning. The characteristics of the new teaching paradigms based on students and distributed knowledge, as well as the technologies that support these paradigms. The evolution of concepts within E-Learning teaching.*

Keywords: *George Siemens, connectivism, e-learning, distance learning*

I. Introduction

In the last decade, much has been said about the fluidity of knowledge and distributed knowledge. Especially by two authors, George Siemens and Stephen Downes, who stood out in the scope of this discussion. Siemens developed and grounded a new learning theory, Connectivism: a learning theory for the digital age. According to him, the existing learning theories are insufficient to understand the characteristics of the individual as a 21st century student, given the new realities of technological development and society organized in a network. Therefore, Connectivism has a direct relationship with the methodologies to be used in distance learning in the current technological context. It is this relationship that will be develop in a synthetic way in this article, giving special focus to the exploration of the concept developed by George Siemens.

II. Connectivity Theory

Although network structures have been used in human learning since remote times, long before the appearance of information and communication technologies, it was with the development of these technologies and mainly because of the possibility of their integration,
that there was a considerable explosion in their applicability in learning and in which these processes became more evident, both in their use and in their potential. The popularization of social software raised the importance of networks, transforming them into a cognitive agent. As noted by Siemens, the concept of networks as we understand it today is the result of previous phases, which go through the development: of the physical and infrastructure aspects; development of theoretical and transformative views on learning, knowledge and cognition; popularization of social network services assisted by technology and, lastly, the phase in which networks are considered the true means by which knowledge is distributed to meet complex situations (1). Stephen Downes, another important theorist of connectivism, postulates that learning occurs in communities and that the practice of learning is participation in the community itself (2). For Downes, a network resulting from connections between people, communities and content, constitutes the fundamental aspect of learning and can be qualified as a successful network when it has the following characteristics: decentralization, distribution, disintermediation, with disintegrated content and services, democratic, dynamic (fluid) and inclusive. At the heart of connectivism, therefore, is the idea that knowledge is distributed over a network of

connections, and learning consists of the ability to circulate through these networks. According to the authors of connectivism, the originality of this approach is in the fact that it is placed as a learning theory that is consistent with the new technological reality and the network society. For Siemens, the exponential growth of knowledge, emerging research (mainly in information technology and information technology), are new philosophies of knowledge, and the increasing complexity, which requires distributed knowledge and interpretation, no longer finds enough answers in the great existing learning theories (1).

In the past twenty years, technology has reorganized the way we live, how we communicate and learn. Learning needs theories that describe learning principles, and processes must reflect the underlying social environments.

Only forty years ago, students, after completing the required formal education, entered a career that would normally last their entire lives. Information development was slow.

Knowledge life was measured in decades. Today, these fundamental principles have been changed. Knowledge grows exponentially. In many scientific areas, the life of knowledge is now measured in months and years. One of the most persuasive factors is the reduction in the average lifetime of knowledge. The average life of knowledge is the time that elapses between the moment when knowledge is acquired and the moment when it becomes obsolete. Half of what is known today was not known for ten years. The amount of knowledge in the world has quintupled in the past 3 years and currently doubles every eighteen months, according to the American Society for Teaching and Documentation (ASTD) (3).

To combat the reduction in the average life of knowledge, organizations were forced to develop new methods of training (or teaching/education) (4).

Constructivism assumes that students are not simply empty containers to be filled with knowledge. On the contrary, students are actively trying to create meaning for knowledge. It is the students who usually select and research their own learning. Constructivist principles recognize that real-life learning is chaotic and complex. Classrooms that emulate the "ambiguity" of that learning will be more effective in preparing students for lifelong learning, this ambiguity can encompass distance learning (1). A central principle of connectivism is that learning takes place within a person. Even approaches to social constructivism, which maintain that learning is a social process, promote the individual's role (and his physical presence, that is, based on the brain) in learning. These theories state that learning can take place outside of people (for example, learning that is stored and manipulated by technology) (1). These learning theories deal with the learning process itself, not with the value of what is being learned. In an interconnected world, in a network based on technology and at a distance, it is worth exploring the form of information we acquire.

III. Theories of learning and the impact of technology

The inclusion of technology and the identification of connections as learning activities, begins to change the theories of learning towards the digital age, with reflexes in the teaching models, giving special value to distance learning and e-Learning.

Currently, the information that allows us to act stems from our competence in forming connections (5). Experience has been considered the best teacher of knowledge. As we cannot experience everything, the experiences of other people and, consequently, other people, become substitutes for knowledge. I" keep my knowledge in my friends" (5), it is an axiom to collect knowledge through the collection of people (5).

Chaos is a new reality for knowledge workers. Chaos is the interruption of the possibility of prediction, evidenced in complex configurations that initially defy order (6). Unlike constructivism, which states that students try to develop understanding through tasks that generate meaning, chaos indicates that meaning exists and that the student's challenge is to recognize patterns that appear to be hidden. The construction of Knowledge and the formation of connections between specialized communities are currently important activities. The ability to form connections between information sources, in order to create useful information patterns, is necessary to learn in our knowledge economy (6). Information technologies, the WEB, digital

repositories, E-Learning, structured multimedia can be excellent mechanisms to achieve this.

IV. Current trends in learning processes

Students work in a variety of different areas to achieve their goals; it can even be seen that these areas of expertise are not related. Currently, informal learning is a very relevant aspect, a relief that it did not have fifteen years ago. Current learning processes occur in very diverse ways, through technical communities, personal networks, scientific networks, social networks, through labor processes, etc. Learning has become a continuous process, in which technology plays a central role, in this continuous process the teaching of E-Learning presents itself as the perfect tool, because using asynchronous mechanisms it will always be available to anyone who wants to take advantage of it. Today, this learning tends to continue throughout life (7).

The visible increase and interest in knowledge management demonstrates the need for a theory that explains the link between individual and organizational learning. However, regardless of this theory, a fact is already visible, E-Learning fits perfectly with the individual and organizational objectives of obtaining knowledge through learning.

Many of the processes previously studied by learning theories (especially those that refer to the cognitive processing of information) can now be carried out or supported by technology, therefore by E-Learning (7).

IV. The ElGG Platform

"*Elgg is an award-winning open source social networking engine that provides a robust framework on which to build all kinds of social environments, from a campus wide social network for your university, school or college or an internal collaborative platform for your organization through to a brand-building communications tool for your company and its clients*." (8)

According to George Siemens, E-learning has the top infrastructure and technology to achieve quality objectives in E-Learning, the so-called Elgg platform. This author considers this technology a paradigm for the type of education that they propose applied to distance learning. It is based on the essential use of the Web, Blogs, Wikis, Forums and specific tools for the development of multimedia content, however in essence it is a PLE (PLE - Personal Learning Environments) (8). It is an open source platform, a reference in the area, with no network relationship with so-called social networks, such as Facebook, or Twitter, an important fact because it isolates certain technical and governance constraints and problems.

In its genesis is the concept of collaboration, developed by George Siemens (1), allowing for example students at the same time as their profile, curriculum and learning to be able to publish their work and share their knowledge and discoveries, in a perspective of scientific dissemination, in a way, besides being a learning structure, it can also be an individual knowledge portfolio that, added to the others, creates a community knowledge portfolio.

This distance learning platform is characterized by providing formal education and informal education simultaneously, that is, it allows the clear definition of learning objectives, administers and manages that learning, both the contents and the learning processes are easily manageable, have pipelines of easy communication between the entire educational community, easily sponsors mutual assistance between the teaching and student community, or between trainers and trainees.

Examples of this are today very explored to allow learning centered on the student and on the principles developed by Professor George Siemens. More than ever, it is justified to analyze the potential of a platform like Elgg.

VI. Conclusion

The social and cultural impact of the modern Web and its effects on teaching and learning, in which the concept of E-learning 3.0 emerges, are convergent in the need to create personal learning environments (PLE - Personal Learning Environments). The basic principle is to give more power and autonomy to students versus more demand for responsibility, as well as the systematic sharing of content, supported by their collaborative development, increased and

permanent valuation of informal learning and systematic training throughout life.
Virtual learning environments, of institutional origin and still supported by the traditional teaching paradigm (a teacher who transmits knowledge to several students) are no longer able to respond to the new reality that emerged with the mass dissemination of new technologies and immeasurable knowledge. The new century brought a new paradigm, the information went from scarce to volumetrically immense and impossible to be apprehended by a human being.
Therefore, the perspective of e-learning, of an institutional nature, supported exclusively by a virtual learning environment (VLE - Virtual Learning Environment), where the LMS was the central tool, evolves towards a view supported by personal learning environments (PLE), where news technologies from the web prevails.

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