Is Connectivism A Better Approach To Digital Age?

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Abstract—We are facing an era in which children - through their new skills accumulated very early - dictate the way of learning, in which the digital world has become a natural learning space. This new universe is, however, barely touched by the concerns of the education system. The interaction with the new technology allows the child to acquire knowledge autonomously, but also to control the learning process. Education is not imposed from the outside, but engages students in the relationship with technology. Understanding this relationship is what should determine the practices of the education system. The role of today's educational institutions is to submit to an introspective questionnaire. Internet access has become fast and so a large number of people who use high speed internet have an increasing rate of information acquisition. In addition, there is now the possibility of creating blogs, wikis, exchanging programs, forums and various tools to facilitate learning and teaching. Social networks are spreading rapidly, and these facilities allow the development of collaborative content. This flow of information that adapts to technological changes is not possible for the school curriculum, as curricula need constant updating in parallel with new changes.

Keywords—connectivism, digital native, learning process, community, implication

I. INTRODUCTION

The literature highlights some relevant aspects: many skills seem to have acquired a new value for children, but only a few of them develop new skills. Among these skills, which new technologies favor assertion and development, are:

1. Autonomy. Considered by Piaget the heart of any educational system, today more than ever, the digital world imposes it as an essential skill.

2. Responsibility for the learning process. Children are much more interested in what they can do with technology than with what technology can do for them. When students take an active role in learning, their motivation increases, and their ability to explore the digital world puts them in a position of power over their learning abilities.

3. Strengthening self-esteem. When there are opportunities to change and act in the virtual environment, in search of opportunities that match the needs of each individual, the feeling of confidence in their own success is strengthened, hence the belief "yes, I can".

4. Curiosity and exploration. They turn into natural learning mechanisms and gain more value with the digital environment.

5. Collaborative problem solving. Used especially in virtual games, children take the initiative and actively cooperate with others to achieve their goals. Collaboration is incorporated in most activities in which, out of the need for acceptance by others, evaluation by colleagues and their help become important.

6. Critical thinking. This aptitude is exercised, on the one hand, by the continuous evaluation of the others, on the other hand, by the courage of exposure on social networks.

7. Exposure to various encouragements. Students read, listen, interact, see and analyze content, practice skills that are essential for preparing for the future workforce.

8. Customizing. Students, without assuming special objectives, develop ways to individualize the learning process, looking for new ideas and ways of understanding appropriate to their needs.

9. Diversity of the knowledge source. If the teacher was the main source of knowledge, now new technologies often play a more important role, because through them, information becomes more accessible than ever to students. Many teachers see the new technologies as an additional information resource, which gives students the chance to bring additions, thus strengthening their motivation. Teachers are no longer data carriers, but mediators, facilitators, bearers of meaning.

10. Relevance. Bringing the world, with its aspects, inside the classroom, the new source has an impact on school activities. Not only examples from everyday life can be capitalized on in the classroom, but also the community as a whole can participate in the learning course.

11. Freedom of choice. New technologies develop the ability to select those activities that are conducive to achieving goals.

12. Learning space flexibility. The whole concept of educational space is amplified by the knowledge of new educational models and the different needs of the individual. Schools are designed to respond to new pedagogical concepts as a community based on common interests and revolutionary possibilities.

Of course, many works also present dangers that may occur in the context of new technologies. Some dangers identified in these studies refer to the fact that, for example, the apparatus, the teaching medium, monopolizes the debate, the trainer forgetting to specify the purpose and expected results, or that the requests of participants to resume a content are no longer taken into account. their power of analysis. On the other hand, it is considered that the teacher may be on the verge of misinterpretations, because he puts his mark on the use of new technologies through skills dependent on his previous training [10].

We are witnessing a growing discrepancy between the learning styles that are cultivated in formal education and those that characterize students' experiences outside of school. Students are immersed in a consumerist culture that determines their sense of autonomy and activity, although much of their learning is passive and directed [4]. This situation is a challenge for teachers and decision-making institutions called to change the behaviors generated by the need to have as much as possible of all offers in favor of the need to be their own holder of the selection criteria favorable to becoming. It is a task that we can accomplish even by using technology to find solutions capable of showing us the possible variants and their effects.

Reints [12] says that students are differentiated by their learning styles, motivation and cognitive abilities. These differences are important both for the student, for the whole group of students, and for their teachers. Many students tend to learn in a practical way, preferring tasks that contain elements of everyday life.

In this context, the approach of digital natives, at home and at school, cannot be achieved without using a language common to them. Digital natives are seen by many authors as different from previous generations, preferring speed, multiple tasks, and social learning, habits that have developed through early exposure to computer games, online video, and other digital technologies [16].

II. METHODS

This paperwork focuses on theoretical research and study cases, as the theoretical aspect is defining the conceptual features, and the empirical aspect aims to analyze the trends on educational societies in Europe, understanding the best practices to apply on.

III. RESULTS

These results were collected following the literature review wanting to complete and improve the theory of connectivism through new research. Each study approached was analyzed from the perspective of the theory of connectivism, moving towards a deeper understanding of the phenomenon of digitalization in our lives.

IV. DISCUSSION

As digital technology evolves in rapid cycles, its functionality depends on an evaluation at each stage. Now that new needs and technology have reorganized the way we live, communicate and learn, a new theory is emerging, appropriate to a digital age: connectivism. Initially, as an idea, not as a theory, connectivism and networked learning emerged in the 1970s, when Ivan Illich presented his ideas on "out-of-schooling" education and encouraged a move toward student-centered social learning opportunities. In *Deschooling Socities*, Illich [8] states: "A good education system should have three purposes:

- "Would offer everyone who wants to learn access to resources at any time in their lives;

- to empower all those who want to share what they know, those who want to learn from them;

- to mobilize all those who wish to present to the public a problem with the possibility of making their challenge known. "

However, George Siemens is considered the founder of the theory of connectivism. This theory refers to the integration of the principles explored by chaos, connection, complexity and self-direction. Learning, says G. Siemens, is a process that occurs in a nebulous environment, which is not under the total control of the individual. This theory is determined by the understanding that decisions are based on rapid changes, new information being constantly updated. The ability to recognize what information can influence yesterday's decisions is very important. The ability to know more than what is known today is a vital principle of connectivism. Moreover, the choice of one's own information, as well as the possibility to establish connections between ideas, domains and concepts are the main coordinates of the new theory. According to connectivism, knowledge is distributed in an information network and can be stored in a variety of digital formats. It is said that learning and knowledge "rest in the diversity of opinions" [15]. Learning transpires through the use of both cognitive and affective domains; cognition and emotions contribute to the learning process at important levels.

As information is constantly changing, its validity and accuracy may change over time, depending on the discovery of new contributions on a topic. By extension, the understanding of a subject, the ability to learn about the subject in question will also change over time. Connectivism emphasizes that two important skills that contribute to learning are: the ability to search for current information and the ability to filter secondary and external information. Simply put, "the ability to know is more critical than what is actually known" [15] . The ability to make decisions based on the information obtained is considered an integral part of the learning process.

Connectivism is seen as a reflection of our rapidly changing society. Society is more complex, more global and

mediated by the advancement of technology. Represents the orchestration of a complex disorder of interconnected ideas, to form specific sets of information. The ways of knowing are derived from a diversity of opinions. The one who issued the idea is no longer in control of it; rather it is a collaboration of current ideas, seen from a present reality. The basic ability is to see the connections between sources of information and to maintain the connection to facilitate lifelong learning. Decisions are supported by rapidly changing principles as new information is quickly integrated to create a new climate of thinking. This constant updating and change of knowledge can also be done without the presence of the learner, such as supporting a database or other specialized source of information. For the student, being connected to this environment of knowledge is more important than his state of knowing. The first point of connectivism is the individual. Personal knowledge consists of a networking system, which supports an organization and which in turn provides back to the system. The individual continues the cycle of knowledge growth through his access back to the system. The advantage is that the student (student) can stay connected with any other subject, through the connections he has created. Social networks focus on groups of people with a common goal that can promote and support a well-organized flow of knowledge.

The learning process is cyclical, in that students will connect to a network to share and find new information, change their beliefs based on new learning, and then connect again, a network to share these achievements and to find new information once again. Learning is considered "the process of creating knowledge. . . not only a consumer of knowledge". Siemens states: "The ability to see the connections between fields, ideas and concepts is a basic skill." The connectivist metaphor is particularly timely, as browsing the Internet and the means by which information is disseminated on the Internet now provide a benchmark for Siemens' claims.

With the increase of the technological connection through the Internet, the digital cities that collaborate in a wide range of fields, have become a collective network that makes community connections both locally and globally. This paradigm shift and the proliferation of social media have led teachers to embrace this new knowledge option for use in the classroom.

From his point of view, Siemens [14] pointed out that knowledge has changed from categories and hierarchies to diverse networks and environments. Knowledge is based on the two ideas that explain a part of our existence and therefore, knowledge is useful to perform multiple actions.

Even if connectivism could be applied to all fields of knowledge, it would not be universally valid for all subjects. Knowledge cannot be acquired solely on the basis of a system available 24 hours a day. Teaching or guidance must take place in such a way that the learner learns the concepts and applies them to specific real-world circumstances. Even if he has a useful and necessary data source at hand at any time, sometimes the learner has to update certain knowledge centers. For example, a hospital patient would not be happy to see their doctor consulting their iPod for a diagnosis. The latest technological improvements available are not a

substitute for the experience and personal knowledge of the doctor, in order to obtain the best treatment [7].

Connectivism provides a teacher with a mental model or representation that depicts something that cannot be directly observed or experienced [13].

While the debate on the theory of connectivism will continue to be debated for many years, it is undoubtedly important to think about the applicability of technology in the classroom today. On the other hand, there is no doubt that online learning is a direct technological response to different cultures and learning methods. The combination of interactive 3D graphics and technologies (Web3D) will allow teachers to create an interactive, realistic environment for the student in an online environment [5].

This was proved by exploiting the teacher's ability to organize in times of pandemic, which no one anticipated. Each teacher had to ask himself, how could he use the handy hardware devices and software applications he can master as efficiently as possible, so as to keep in touch with the students, to evaluate their performance correctly, and his messages to not be disturbed by the mediation of technological means.

In a personalized learning environment, teachers act as mentors, distributing tasks adapted to new skills, and students, through their experiences in the digital age, ask the teacher for new skills because they have other learning skills early in school. Every current student - through the digital tools he has used and the behaviors he has already formed - can have a new perspective [9] on learning:

- *play*: the ability to experience the environment as a form of problem solving;

- *performance*: the ability to adopt alternative identities for the purpose of knowledge;

- *simulation*: the ability to interpret and construct dynamic models of the real world;

- *possession*: the ability to combine media content with one's own meaning;

- *multi-tasking*: the ability to analyze different environments through a distributive attention to special details;

- *distributive knowledge*: the ability to interact with tools that expand mental abilities;

- *collective intelligence*: the ability to extract collective knowledge and compare it with others to achieve a common goal;

- *judgment*: the ability to assess the authenticity and credibility of sources of information;

- *media browsing*: the ability to track the flow of information in various ways;

- *networking*: the ability to search, synthesize and disseminate information;

- *negotiation*: the ability to cross different communities, recognizing and respecting multiple perspectives.

It was emphasized that digital textbooks are suitable for both cognitive and learning style adaptation.

[1] starting from these facilities, define the individualized digital environment as "a set of tools, sources of information, connections and activities that anyone can use to learn" [1] . In digital textbooks, all activities can be placed in a separate screen, by categories such as: preparation, planning, monitoring, evaluation. Students can be guided to this screen, from other screens, via a link. In this newly created context, the student becomes the author and protagonist of his own learning process. At the same time, the authors say that in creating a personalized digital learning space, teachers must take into account five dimensions [3]:

- **the instrumental dimension** - the ability to manage various resources, their creation and systematic use;

- **the cognitive dimension** - the creation of authentic contents, valuable to the specifics of each student, as well as the evaluation of digital products;

- **socio-communicative dimension** - providing feedback, communicating available information, creating collaborative tasks through media networks;

- **the axiological dimension** - the system of values, attitudes and beliefs regarding the placement of activities, respecting the cultural and spiritual background in the interaction with the students;

- **the emotional dimension** - empathy, gratitude generates feelings of belonging and social integration that are necessary in creating a connection in the classroom, through digital tools.

In cognitive constructivism, Jean Piaget defined two principles for learning. First, learning is actively presented, and second, learning must be authentic and connected to real life [11]. Connectivism accepts this definition by providing specific technological opportunities through which the student is actively involved in the presentation of a body of knowledge. Students are able to recognize and interpret patterns by connecting to a variety of representative networks. In addition, they are able to acclimatize personally to a social network that includes experts in certain fields of knowledge.

Learning theories devoted to behaviorism, cognitivism and constructivism, each contribute in unique ways to the design of online materials through their ideas about how learning takes place: behavioral strategies emphasize facts and what is needed to understand concepts, cognitive strategies focus on how to which process must be implemented for successful learning, constructivist strategies use the transfer to real-life application, where the pupil is, having the opportunity to build personal meanings from what is presented. Connectivism can be used as an important instructional guide by developing prior learning theories for application in a globalized and networked world, but not as an autonomous learning theory [2].

These connectivist socializations help the student to structure (cognitivism) and to create the meaning from what is observed (constructivism), following to establish certain patterns to be used in future situations (connectivism). Although Siemens [13] emphasizes the limitations of existing learning theories, the rapid advancement of new technologies and the association of previous ideas will permanently transform methods and expectations regarding the acquisition of knowledge.

V. CONCLUSIONS

Connectivism comes to offer a new perspective on learning skills and tasks, necessary for students to develop in a digital age. A century ago, Dewey did not foresee a world of the Internet, digital resources and textbooks, and yet his message is still valid: "If today we teach students as we were taught yesterday, we will take them tomorrow" [6]. Therefore, the school must use technology, not only to provide the existing paradigm of education, but also to launch new approaches in training [17].

The Internet presents itself both as a comfortable and relaxing environment, and as a creative, innovative one, in which the cultural-educational market and the economic market intersect and acquire international values. In this context, the internet or digital age is often presented as a puzzle city, in which each participant contributes, debates, builds and deconstructs, destroys. The task of the school always remains the same that the whole history of mankind has given it: to be able to offer training contexts in which the destructions are as close as possible to zero.

While the theory presented by George Siemens and Stephen Downes is important and valid, it is a tool that should be used, rather, in the learning process for instruction or curriculum, than as a singular theory. It also forced educators to look at what can be achieved with technology in the classroom and to rethink how to fit each one. Continuous assessment of how the new generation learns, in terms of methods and curriculum, keeps education at high standards.

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