Original Article

Scientific Literacy and its Effectiveness in the EaD Mode

Alfabetización Científica y su Efectividad en el Modo EaD

Alfabetização Científica e sua Efetivação na Modalidade EAD

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Abstract

Distance Learning (DL) grows rapidly in the country, leading us to reflect on the progress of distance education in the effectiveness of understanding the scientific language. Science is a language that can be conducted through the Scientific Literacy as a basis to promote a more effective popular engagement as citizens in the struggle for rights and expansion of the interpreters for various issues and in various sectors. Thus, to explore the Scientific Literacy and its effectiveness in the distance education mode, we used the literature in order to answer the proposed questions. The researches when compared, exhibit positive reinforcement within the analyzed totality. It is therefore concluded that the theory evolution and practice of science is a necessary process, and in the context of distance learning through virtual environments and collaborative learning, these are fundamental tools to aid the students in the development of individual skills.

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Resumen

La Educación a Distancia (EaD) crece de forma acelerada en el país, llevándonos a reflexionar sobre los avances de la EaD en la efectividad de la comprensión del lenguaje científico. La ciencia tiene un lenguaje que puede ser conducido a través de la Alfabetización Científica, como base a impulsar una participación más efectiva de la población como ciudadana en la lucha por los derechos y ampliación de los intérpretes de varias cuestiones y en varios sectores. De esta forma, con el objetivo de explorar la Alfabetización Científica y su efectividad en la modalidad EaD, se utilizó la investigación bibliográfica con el fin de responder a las cuestiones propuestas. Las investigaciones, cuando comparadas, presentan refuerzo positivo dentro de la totalidad analizada. Se concluye, así, que la evolución entre la teoría y la práctica de la ciencia es un proceso necesario y, en el contexto de la EaD, a través de los ambientes virtuales y de aprendizaje colaborativo, herramientas fundamentales en la ayuda al desarrollo de las capacidades individuales de los alumnos hace -si es posible.

Palabras clave: Alfabetización Científica. Enseñanza a Distancia. Inclusión Social. Apalancamiento.

Resumo

A Educação a Distância (EaD) cresce de forma acelerada no país, levando-nos a refletir sobre os avanços da EaD na efetivação da compreensão da linguagem científica. A ciência tem uma linguagem que pode ser conduzida por meio da Alfabetização Científica, como base a impulsionar uma participação mais efetiva da população enquanto cidadã na luta pelos direitos e ampliação dos intérpretes de várias questões e em vários setores. Desta forma, visando explorar a Alfabetização Científica e sua efetivação na modalidade EaD, utilizou-se a pesquisa bibliográfica no intuito de responder às questões propostas. As pesquisas, quando comparadas, apresentam reforço positivo dentro da

totalidade analisada. Conclui-se, assim, que a evolução entre a teoria e a prática da ciência é um processo necessário e, no contexto da EaD, por intermédio dos ambientes virtuais e de aprendizagem colaborativa, ferramentas fundamentais no auxílio ao desenvolvimento das capacidades individuais dos discentes faz-se possível.

Palavras-chave: Alfabetização científica. Ensino a distância. Inclusão social. Potencializar.

Introduction

Understanding the effectiveness of the relations between Distance Education and Scientific Literacy (AC) constitutes an academic demand and a requirement for the target of educational policy in the present time. Its consummation among these themes still remains little realized and publicized. Authors such as Trajano (2011) and Santos (2007) have pointed out the opportunities for empowerment of AC through Distance Education.

According to Bonfim and Hermida (2006), Distance Education (EaD) is not a new teaching system at the global level, and has now grown exponentially due to the emergence of the New Information and Communication Technologies (ICT), transforming our society to the point where each demands new skills and knowledge on the part of the productive force, as well as new "products" of the system (new professions, interdisciplinarity, etc.), thus requiring, every day, more qualified professionals. In Brazil, the regulation of Distance Education is very recent, being mentioned for the first time in Article 80 of the Law on Guidelines and Bases of Education (LDB) n. 9.394 dated December 20, 1996.

In addition, in a country with continental dimensions both in the latitudinal and longitudinal sense, it is believed that through Distance Education, the democratization of teaching can occur, enabling and enhancing accessibility to Higher Education and Postgraduate Education.

> The number of public and private educational institutions that offer courses in this modality has grown significantly in Brazil after the publication of the Law of

Guidelines and Bases - LDB in 1996. According to data from the Brazilian Association of Distance Education - ABED, the number of institutions that offer higher education courses in Distance Education modality increased 36% in the period from 2004 to 2006. Moving from 166 to 225. The number of students increased by 150%, from 309,957 to 778,458 in the same period (MUGNOL, 2009, p. 336).

Education needs to be accessible, thus ensuring the improvement of society and social inclusion for all. On this, Bonfim and Hermida (2006, p. 171) warn that Distance Education should be constituted "as a social practice based on philosophical principles that aim at the construction of knowledge, autonomy and critical awareness of students" Having said that, it is possible to recognize the link that encompasses the objectives of Distance Education, within the context of Distance Education, since the same discourse is also widely used by those who demand scientific and technological literacy as a basic component of a citizenship education here in Brazil (CHASSOT, 2011, DEMO, 2010, SASSERON, 2008).

In addition, as from the World Science Conference for the 21st Century, under the auspices of UNESCO and the International Council for Science, it was stated:

> In order for a country to be able to meet the basic needs of its population, science, and technology education is a strategic imperative. [...] Today, more than ever, it is necessary to promote and disseminate scientific literacy in all cultures and in all sectors of society, [...] in order to improve the participation of citizens in the adoption of decisions concerning the application of new knowledge. (BUDAPEST DECLARATION, 1999, our translation)

In UNESCO's discourse on the UN Literacy Decade, the role of science and technology is discussed as tools that empower the means of access that people can use to understand the world and its role in it. Education for All (EPT) in these areas reports that:

> [...] it goes beyond the educational process, emphasizing strategic links with other aspects of life - the acquisition and use of literacy have an impact on mother and child health, fertility rates, income levels, and less tangible effects, such as increased self-confidence, initiative, participatory citizenship, and cultural self-esteem. (UNESCO, 2005, p. 32.)

In this way, the importance of the expansion of knowledge is clear, but mainly of the dissemination and application of knowledge of quality, that provides social inclusion to the human being, who, in this way, can fully exercise their citizenship. Education gives access to science and technology and through this knowledge people can understand the world by actively imposing themselves on all issues.

There is some evidence for the effectiveness of AC in Distance Education through ICT. However, it is important to recognize the process by which these relationships are configured, identifying how the use of ICT contributes to the AC process, and which aspects can enhance these relationships and/or how they may be harmed. According to Trajano (2011: 21), "the technological contribution to advances in several areas, including education, is undeniable, which is not to say that society is exempt from the possible consequences of this technology.". Considering these aspects, it is necessary to reflect on the ways in which this pattern of behavior can be implemented in the student community.

For Resende (2013), after its survey on the educational goals as articulating departments of UN development reports, it is clear that universal access to education leads to an increase in the participation of subjects in political, economic, social, and cultural life.

It is understood that each society has its priorities, but also limitations, especially regarding education. In this way, to reflect on "how" and "if" the AC process occurs in Distance Education system becomes an imperative.

Based on these assumptions, we intend to explore here the context of the possibilities and limitations of the AC's effectiveness in Distance

Education system. The study was based on a deductive approach to the issues associated with the implementation of AC, structuring the paper into five sections, including this introduction. Distance Education is addressed in the second section, while evidence is presented about the importance of AC in the third section. In the fourth section, the association between AC and Distance Education is demonstrated through ICT. Finally, final considerations are presented.

2. Distance education

Each day, more Brazilian people have chosen distance education courses, mainly in higher education. Contrary to what happened over time, today's Distance Education has a much diversified offer, being considered a valid education option throughout the national territory (MUGNOL, 2009).

But, what were the paths that this system of teaching followed? Has it always been considered quality? When compared to face-to-face, does it have the same quality?

We do not intend to be controversial here, but to reflect on the ways of Distance Education in Brazil.

In an article by Bonfim and Hermida (2006), the history and trajectory of this teaching system are reported, in which they, through quoted authors, evidence the invention of the press as a propeller of this modality of education, and that later, with the mail process, this process started to count on a great auxiliary, culminating in the emergence of correspondence teaching.

Following the line of thought of the abovementioned authors in the article, they explain that World War II and the inventions of the time, such as radio, television and Internet, among others, improved and improved the methodologies and experiences applied to this modality of teaching (BONFIM; HERMIDA, 2006).

In Brazil, Distance Education appears in:

> [...] 1904, when the International Schools (representation of a North American organization) launched some courses by mail, but from the 1930s onwards, emphasis was placed on vocational education, working as an alternative especially in non-formal education. It was then used to make knowledge accessible to people who lived in isolated areas or were unable to attend regular school in normal time periods (BONFIM; HERMIDA, 2006, p. 173).

Known by means of supplementary education projects, popularly acquiring the meaning of "television education", the implantation of the Radio Monitor Institute in 1929 and the Brazilian Universal Institute in 1941 (BONFIM; HERMIDA, 2006) occurred in parallel.

In this same perspective, in the article written by Mugnol (2009), it is reported that in Brazil

> The first formal programs, created under the regulatory perspective of the 1990s, were aimed at the Continuing Education of Public School Teachers. [...]. As iniciativas de oferta de cursos de Lato Sensu, cursos de extensão e cursos livres marcam o início da educação em ambientes virtuais de aprendizagem no Brasil. Distance education in Brazil has been the object of research and work carried out in the last decade (MUGNOL, 2009, p. 344).

It can be said that Distance Education in Brazil was developed slowly and necessarily, aimed at the public that does not have the opportunity to be present in the modality of face-to-face school. The State began to organize this modality from Law n. 9.394/96 of December 20, 1996, which establishes the Guidelines and Bases of Education for all levels of education (LDB); distance education, as provided in paragraph 4, item IV, of article 32, is now defined as a modality used to "complement learning or in emergency situations"; and according to item 2, article 87, each municipality should be responsible for "providing in-person or distance education courses to under-educated youth and adults". Article 80 of the same law establishes that "the public power shall encourage the development and delivery of distance education programs at all levels and modalitiess of education and continuing education" (BRASIL, 1996).

In this context, through the National Education Plan, required by LDB, which came into force in January 2001, with the approval of Law 10.172/01, in the chapter that addresses distance education and Educational Technologies, it refers to this modality of education "as an auxiliary means of indisputable effectiveness" to address "educational deficits and regional inequalities."

This clarifies the concern about the great distances of Brazil and the impossibility of serving education through the face-to-face system, besides the possibilities that this modality of teaching could propitiate to the Brazilian education.

In Decree No. 5.622, dated December 19, 2005, the government established the recognition in the official education system of the courses offered in the modality by institutions accredited by the Ministry of Education (MEC). As a result, the process of producing knowledge about Distance Education in Brazil expands and new course projects begin to be developed, initially proposing to meet specific interests and needs for the training of teachers of Basic Education and Higher Education.

Thus,

> [...] it is necessary to develop a normative system capable of regulating this type of education by integrating it with Face-to-face Education, as well as with the blended Education, respecting the particularities of each modality (MUGNOL, 2009, p. 345).

For Mungol (2009), the beginning of the 21st century characterizes the end of the initiatives particularized in the Distance Education, and although a significant part of the educational community still disregards this modality of teaching, MEC has been publishing a series of normative directives that are demarcating spaces, forms of the institutions and characteristics of the courses in Distance Education.

In an exciting work, Trajano (2011) warns that care must be taken, so that Distance Education is not just a policy of government. In his text, he reports on Distance Education in the governments of:

> [...] FHC (Fernando Henrique Cardoso) began a medium-level distance training program for in-service teachers, the Proformação. In Lula's administration we had the implantation of the Pro-Licenciatura (graduation degree), later the formulation and implementation of the UAB System public policy (demonstrating this capacity of continuity, but with adaptation to become a public policy) and of PARFOR, being that we have the continuity in the Dilma government of UAB System and PARFOR, demonstrating the capacity of stability throughout the governments, as both are regulated, the first by a Decree and the second by Ordinance, substantiated by a Decree. But, at the same time, it does not demonstrate the stability of proposals, as it substitutes actions for others. (TRAJANO, 2011, p.153, 154).

Thus, it is perceived that the federal government itself has envisaged a very interesting solution to the question of our continental dimension, and that although much remains to be done, we understand that through this system we can integrate and consolidate education in our territory, since it is common sense that we cannot buy nation without quality education is not built.

According to Arantes, Valente and Moran (2011), Distance Education in Brazil is in a phase of changes with increased quality of teaching directed to diverse areas. Its most important activity is in the private sector when compared to public institutions. Facing difficulties in adapting both teachers and students to this modality of teaching, for the authors, only institutions that bet on updated pedagogical projects and with attractive and challenging methodologies will be able to establish themselves in the market.

3. Scientific literacy and its importance

Common sense is the thinking of others, the opinion of a group. It has no form, mode or method of knowledge; thus, it cannot discuss cause or effect (DEOCO, 1995; LACKATOS, MARCONI, 2010). Knowledge,

in turn, can be a laborious, yet forceful activity. Although the scientific world seems to the popular world as a universe with an inhuman character and having a great deficit of meaning, to practice science is to construct and to serve as adequate, tested and standardized representations of the lived situations (FOUREZ, 2008).

Science is the way man has found to read Nature, and the world is deep-rooted in science. Thus, the role played by science and technology is fundamental and essential in the lives of all of us, affecting various aspects of our civilization, such as education, economics, health, environment, among others (FOUREZ, 2008; (FOUREZ, 2008; DEMO, 2010; CHASSOT, 2011).

For Freire (1992, p. 79), education is related to "critical knowledge of reality", with "a critical reading of the world", literacy is much more than reading words, it should provide "reading the world". In another work, Noris and Phillips (2003, our translation) emphasize the need to teach scientific language, because learning to read scientific writing means knowing how to use these strategies to extract information, cause interferences, express different ideas, understanding that their interpretation implies non-acceptance of certain arguments.

It should be noted that AC (Scientific Literacy) is not just a reading, a decoding, but an interpretation of graphs, diagrams, tables, among others. It is using science as a facilitator of being part of the world (DEMO, 2010; CHASSOT, 2011).

According to Praia, Gil-Pérez, and Vilches (2007), the AC is an essential dimension of a culture of citizenship, in order to face the serious problems facing humanity today and in the future, building practical benefits for the people, society, and the environment. This movement is related to the change in the objectives of science education, towards the general formation of citizenship.

For Sousa and Sasseron (2012:596):

> [...] a scientifically literate citizen, like the scientist, does not need to know everything about the Sciences, but must have sufficient knowledge in various fields

and know how these studies become advents for society, in order to understand how such knowledge can affect his/her life and that of the planet.

Auler and Delizoicov (2001) warn that neither science nor technology are levers for changes that always affect, in the best sense, what they transform. Thus, although scientific knowledge is with us, it needs to be stimulated, and for that, specialists who popularize and demystify scientific knowledge are necessary. In this way, Lacerda (1997: 98) states that AC would be:

> [...] grasp of basic scientific principles, essential for the individual to understand, interpret and interfere properly in discussions, processes and situations of a technical-scientific nature or related to the use of science and technology.

As Pozo (2002) suggests, acquiring scientific knowledge does not simply consist in accumulating new knowledge; thus, one must consider the relation between this knowledge that must be acquired and the initial implicit representations. In this way, the literacy process should enable the student to develop an understanding of the symbolic character of writing, as well as identify all the social possibilities of their use. Segundo Furió et al (2001, p.366, our translation):

> [...] scientific literacy prepares future citizens, including future scientists, who can acquire democratic values and awareness, respect and zeal for the environment within an education aimed at achieving sustainable development on the planet. Contributing to the formation in informed decision making when addressing environmental and social problems, solving daily problems, improving self-esteem and autonomy, as well as their critical interest in science.

The media and, especially, schools can contribute consubstantially so that the population has a better public understanding of Science. Thus, according to Santos (2007, p. 480), a person scientifically literate:

> [...] would know, for example, how to properly pre-
> pare dilutions of cleaning products; satisfactorily un-
> derstand the specifications of a drug product package
> insert; adopt prophylaxis to avoid basic diseases that
> affect public health; require that the goods meet the
> legal requirements of marketing, such as specifying its
> expiration date, technical care of handling, indication
> of the active components; operate electronic products
> [...], position itself in an assembly, [...] arrange for pub-
> lic agencies to address problems that affect their com-
> munity in terms of science and technology... it implies
> the active participation of the individual in society,
> from a social equality perspective.

In this way, it is estimated that, through AC, it becomes possible the more forceful formation of the students, transforming them into citizens and more skilled in the decision-making process, since the scientific language becomes used as cultural tool in understanding our modern culture.

Nascimento-Schulze (2006, p.99) warns that "it is important to consider that subsequent generations will live in cultural environments even more committed to scientific issues and technological artifacts".

Within this context, scientific education is now being questioned, regarding the real value for students and their role within society. For Lemke (2006, p.6, our translation), education "means greater opportunities to develop skills and talents and to use them in the service of a harmony between the global society and the rest of the ecosystem of our planet".

In this perspective, Freire (1992, p. 79) states that education is related to "critical knowledge of reality", with "a critical reading of the world", literacy is much more than reading words, it should provide a "reading of the world". In another work, Noris and Phillips (2003, our translation) emphasize the need to teach scientific language, because learning to read scientific writing means knowing how to use these strategies to extract information, cause interferences, express different ideas, understanding that their interpretation implies non-acceptance

of certain arguments.

Scientific knowledge is already with us, but it needs to be stimulated; experts are needed to popularize and demystify scientific knowledge. In this way, Lacerda (1997, p.98) affirms that Scientific Literacy would be the

> [...] apprehension of the basic scientific principles essential for the individual to understand, interpret and interfere properly in discussions, processes and situations of a technical-scientific nature or related to the use of science and technology.

As Pozo (2002, p. 260) suggests, acquiring scientific knowledge does not simply consist in accumulating new knowledge, for it is necessary to consider the relation between this knowledge that must be acquired and the initial implicit representations. In this way, the literacy process should enable the student to develop an understanding of the symbolic character of writing, as well as identify all the social possibilities of their use.

Students live in a "techno-nature", since they are confronted with situations in which technologies and nature are articulated, in a universe of purposes (FOUREZ, 2003, p.117). It is up to teachers to provide students with the view that science, like other areas, is part of their world, not a separate content, dissociated from their reality (LORENZETTI; DELIZOICOV, 2001, p.7).

But, does Distance Education make the process of AC (Scientific Literacy) effective? It is known that this modality of teaching has limitations related to face-to-face meetings between teachers and students, unique moments that can limit the process of scientific practice; but there are already researches that divulge the possibilities of classes that are not necessarily in the locality, but which, through the ICT, propitiate the experience and experimentation of the fact itself.

Salvador (2002), when conducting his research, uses a group of students from the 3rd cycle of basic education in Portugal, to create a science club and, thus, to test the process that leads to AC through

outdoor activities outside the classroom, but not necessarily in the natural environment).

At the end of his research, he obtained positive results, mainly in relation to the AC dimension, because, as the social, affective and scientific-technological objectives of outdoor activities were reached, developing expected attitudes and values in the construction of knowledge.

Researches on AC, performed by means of Distance Education is effectively limited. We find authors working on the subject, such as Suely Aparecida Galli Soares, which entitled her book as O ideal de inclusão pelas tecnologias de informação (The ideal of inclusion by information technologies), discusses the democratization of knowledge as a possibility of social emancipation of the individual and sees Distance Education as a means to achieve this practice. This same author considers the possibility of making inclusive and liberating learning feasible through the distance modality, as one of the motivations for Distance Education is the search for vocational training in regions far from the centers, for low income people, overcoming precariousness of education in a democratic perspective and contextualized in an unequal Brazil (SOARES, 2006).

In her book, the author warns about the proper methodologies that Distance Education system needs, such as interactivity tools, the student's maturity for self-learning and the need for Distance Education to know its target audience, the job market for an effective inclusion in this system of education.

In this way, it is estimated that AC becomes possible through Distance Education, transforming students into more skilled citizens in the decision-making process, since the scientific language becomes used as a cultural tool in understanding and practice within modern culture.

4. Information and communication technologies, tools of the scientific literacy process in distance education

In the search for the links between AC and Distance Education, it is important to highlight that ICT functions as guiding and leveraging elements of learning, fostering integration among the subjects involved and the desired knowledge, promoting growth, because today, teaching is not knowledge transmission - and, through ICT, we have new concepts of social interaction (LEITE, 2014; POCINHO; GASPAR, 2012).

In the area of education, many technologies have offered a range of methodological options that can influence educational practice at all levels and areas of education. The greatest impact arises with the Internet, which enables universal communication through communication and learning networks, with its characteristics of interactivity, hypertextuality, multimedia content, wide availability and low cost (TEIXEIRA, AGOSTINHO, 2012).

Several authors, such as Dias (2012), Orlando and Ferreira (2013), Silva (2014), and Szundy and Oliveira (2014) point to multi literacy as a watertight reality in the direction and effectiveness of quality learning. Through the use of ICT as tools to support learning, it is possible to achieve efficiency in learning, since

> [...] pedagogy of multiliteracy is built by interweaving between theory and ethical act inscribed in the existing-event, representing, therefore, an epistemological alternative for a work of the mind with the languages in the sense of contributing with the construction of able subjects of transiting, understanding, interpreting, and responding, from valued positions, (a) the discourses produced and circulating in this society. (SZUNDY; OLIVEIRA, 2014, p.199)

For Pereira and Perlin (2015), digital social networks play the important role of sociability, because it drives the need to be together, weakening the logic of the fixed and individualistic, offering interaction

to the most diverse people, complemented and fulfilling certain needs, enabling the transmission of various linguistic signs, interactivity between communities and social life, thus contributing to constant readjustments of participants and cyberspace.

Based on the fact that Distance Education depends on these mechanisms, it is possible to combine amplification and quality in this modality of teaching through these instruments, because Distance Education of contemporaneity is related to interactive and collaborative environments, due to the agility and horizontality used in developing activities that are carried out through ICT, as well as the possibility of handling of informational and informational contents, through digitalization and communication in networks.. In this scenario, we can see the importance of ICT in Distance Education, favoring the teaching-learning process centered on the possibilities of insertion, performance and permanence of the student in the educational process (LEITE, 2014).

Having these questions as background, Salvador (2012, page 13), in his study on the evaluation of outdoor activities, states:

> With a view to scientific literacy of students, outdoor activities aim to achieve social, affective, and scientific-technological objectives and can be developed in different learning environments: the outdoor environment (natural environment, e.g. Wilderness areas), (ii) the indoor/outdoor environment (semi-natural environment, e.g. zoos) and (iii) the indoor environment (man-built environment, e.g., science museums).

We understand that through ICT, we can perform this type of activity (outdoor, outdoor/indoor, and indoor) in the distance learning mode, creating, and recreating the scenario according to its own needs, without necessarily visualizing, touching or being in the natural space in this way, propitiating the AC.

Thus, the appropriation of ICT by the teachers in the scenario of Distance Education makes the concept of knowledge a new meaning. Through these technological tools, and from active mediations that potentialities arise, time and space are no longer problems, providing an

education without distance, without time, leading the educational system to assume a role of not only training of citizens belonging to that space, but to an inclusive space of formation in a society of differences (LESSA, CHAGAS, 2016).

According to Tornaghi, Prado, and Almeida (2010), training processes aimed at the use of ICT must have contextual and real situations, taking into account the previous experiences of the students and valuing them. Therefore, it creates a framework of inclusion and multiculturality, in which new learning acts as an object of continuous integration, constructing knowledge as an open spiral that takes back and reaffirms the set of experiences of the subject.

In this understanding, ICTs provide effective resources to attend and motivate those involved in the teaching-learning process, enabling AC, since they empower the criticality of the student. However, for many teachers, these resources still present themselves as strangers, although it is recognized that using in the process is becoming increasingly relevant. Thus, the presence of these resources is necessary in teacher training courses and/or as a pedagogical means to enhance the skills and abilities of educators (LESSA; CHAGAS, 2016).

In Distance Education, an open plan to cooperative mediations, with a flexible character, and with an instructional design fixed to the contextualized design, becomes important. It is also pertinent to start from a new conception of a pedagogical act that is committed to a space of exchanges in which the autonomy of the construction of knowledge plays a significant role in what an educational process refers to. Preocupado com a atuação do indivíduo, totalmente, crítico-reflexivo e consistente, ou seja, alfabetizado cientificamente (DIAS; RODRIGUES, L.; RODRIGUES, P., 2014).

According to Lessa and Chagas (2016, p.4), the relationship between the efficacy of AC and the intensive use of the new ICTs in the EDA can be further deepened,

> In virtual learning environments students use sources for research, participate in discussions in the forum which allows the circulation of knowledge and the

exchange of information. And when there is a big difference in training and culture, this process is increasingly enriching.

Therefore, it can be concluded that ICT contributes to the effectiveness of the AC process; Moreover, as Soffa and Torres (2009) state, ICTs provide new languages in educational space, in which intentionality has a meaning to what its potentiality refers to.

5. Final considerations

In this article, we could identify and characterize the relationships between Distance Education, AC and ICT, which allowed recognizing the various possibilities that, through ICT, occur in the accomplishment of this process. Through this bibliographic research, it can be observed that the practice can be replaced by alternatives that are more accessible to this modality of teaching, because, using Information and Communication Technologies; we take control of tools that act as instruments for this purpose. Greater emphasis was placed on the consolidation of distance education in Brazil, the processes that shape scientific literacy, as well as the possibilities of its implementation in a distance education system, considering aspects ranging from the qualification of the educator to the use of instructional design. On the other hand, it was possible to illustrate links between AC and ICT from elucidations about indoor work. Theorists demonstrate how this enables important achievements in improving education with conscious practices. What is perceived is that this entire technological advance that we have achieved so far, coupled with a great desire to hit, can improve the asymptote that measures our educational results and practices. Thus, it is possible to build knowledge from what we already know and from what we are able to do, using resources from new technologies.

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