REVIEW

Distance learning and its relation to medical education in the present times

Enseñanza a distancia y su relación con la educación médica en los tiempos actuales

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ABSTRACT

This scientific text addresses the evolution of distance education, highlighting the crucial role of information and communication technologies (ICT) in virtual education. The COVID-19 pandemic accelerated the transition to distance education, especially in Latin America, although challenges are faced due to the lack of infrastructure and Internet access in remote areas. The text introduces key concepts such as distance and virtual education, as well as ICTs. It explores pedagogical theories, such as cyberculture and connectivism, that support online teaching. Connectivism is highlighted as a theory that emphasizes the importance of connections and learning in changing and uncontrolled environments. Suggestions for applying connectivism in medical education are provided, including the use of blogs, social networking, and the creation of online communities. The text also emphasizes the need to constantly adapt teaching strategies to keep up with advances in the field of medicine and health sciences. Several tools applied to virtual teaching are described, such as the Zoom and Google Meet videoconferencing platforms, as well as the Moodle and Google Classroom learning platforms. In addition, design and gamification tools are mentioned, along with the importance of clouds for online storage and collaboration.

Keywords: Distance Education; Virtual Education; Videoconferencing Platforms; Design Tools; Gamification.

RESUMEN

Este texto científico aborda la evolución de la enseñanza a distancia, destacando el papel crucial de las tecnologías de la información y comunicación (TIC) en la educación virtual. La pandemia de COVID-19 aceleró la transición a la educación a distancia, especialmente en América Latina, aunque se enfrentan desafíos debido a la falta de infraestructura y acceso a internet en áreas remotas. El texto presenta conceptos clave como la educación a distancia y la educación virtual, así como las TIC. Explora las teorías pedagógicas, como la cibercultura y el conectivismo, que respaldan la enseñanza en línea. El conectivismo se destaca como una teoría que enfatiza la importancia de las conexiones y el aprendizaje en entornos cambiantes y no controlados. Se proporcionan sugerencias para aplicar el conectivismo en la educación médica, que incluyen el uso de blogs, redes sociales, y la creación de comunidades en línea. El texto también enfatiza la necesidad de adaptar constantemente las estrategias de enseñanza para mantenerse al día con los avances en el campo de la medicina y las ciencias de la salud. Se describen varias herramientas aplicadas a la enseñanza virtual, como las plataformas de videoconferencias Zoom y Google Meet, así como las plataformas de aprendizaje Moodle y Google Classroom. Además, se mencionan herramientas de diseño y gamificación, junto con la importancia de las nubes para el almacenamiento y la colaboración en línea.

Palabras clave: Educación A Distancia; Educación Virtual; Plataformas De Videoconferencias; Herramientas De Diseño; Gamificación.

INTRODUCTION

Distance learning has a long history, starting in the nineteenth century with correspondence education as described in the literature.[1] Since then, it has evolved and gone through transformations. Today, information and communication technologies, known as ICTs, allow us to interact with other people regardless of distance, using tools such as virtual classroom platforms, videoconferencing applications, and others that we have in the palm of our hands, that is, in our cell phones or computers such as laptops, tablets, and desktop computers.[2]

Numerous courses and seminars are currently developed virtually,[3,4] with many advantages that facilitate the teaching-learning process and mainly break the barriers of distance between people since it is possible to carry out an academic activity developed in any country.[5]

The COVID-19 pandemic began in 2019 in the city of Wuhan, Hubei province, China;[6] the etiology of the disease is viral, the main culprit being a virus of the coronavirus family, SARS-COV-2.[7] Millions of infected people are already worldwide,[8] and many universities have been forced to interrupt activities,[9] which has led to the migration of practically all education from face-to-face to distance education.[10,11,12] In the medical field, many undergraduate and postgraduate programs were reinvented and adapted to the situation with all the limitations present in virtual education.[13,14,15,16]

In Latin America, medical students continue to be trained virtually, curricular and extracurricular, which is a challenge.[17] In Paraguay, distance learning is complex because the educational system needs to have adequate infrastructure. There are still many limitations regarding the reach of Internet services in remote locations, and the costs are high for people with limited resources.[18]

DEVELOPMENT

Conceptual definitions

In a certain way, we have to differentiate the concept of distance education from that of virtual education since the former has been used for more than a century, and the latter began with the computer revolution and the Internet, which made this distance connection, through virtual tools focused on the teaching-learning process.[19]

Another current concept that is much talked about is information and communication technologies, more commonly known by their acronym "ICTs." Chávez Bautista defines ICTs as services, networks, and software that improve people's quality of life by establishing links and interconnecting them.[20]

Paradigms and pedagogical theories

Cyberculture and education

Pierre Levy reflected on the future of education, about the changes and technological advances, as well as the demand for training, where the number of students would increase exponentially and surpass universities.

He mentions in his work "La cibercultura y la educación" [21] that the world is advancing so fast that students acquire knowledge at the beginning of their careers that later becomes obsolete at the end of it; he also alluded to the dynamic and evolving nature of work where knowledge and its acquisition played an increasingly important role.

A third observation in which he reflects on the virtual world, its capacity for information flow, data storage, and analysis, among other capabilities that influence the cognitive nature of human beings, such as memory and reasoning, through tools such as search engines, dynamic data maps or the use of simulation as a new style of reasoning.[22]

Connectivism

Connectivism integrates principles explored by chaos, network, and complexity theories and self-organization. Learning is a process that occurs within nebulous environments of changing core elements, not entirely under the control of the individual. Learning (defined as actionable knowledge) may reside outside of us (within an organization or database), is focused on connecting specialized sets of information, and the connections that enable us to learn more are more important than our current state of knowledge.[23,24]

Connectivism is driven by the understanding that decisions are based on rapidly changing fundamentals.[25,26,27,28] New information is continually being acquired. The ability to make distinctions between important and unimportant information is vital. The ability to recognize when new information alters the landscape based on decisions made yesterday is also critical.[29]

Application of connectivism in medical education.

Suggestions for applying connectivism in medical education

As already explained in this thesis, implementing technologies in teaching can bring favorable results to medical education. [30] Education that integrates current technologies in medical education, such as medical simulation, distance learning, e-learning, and other strategies, have the potential to improve the learning of

their students; here are some guidelines mentioned by Goldie John in an interesting article:

- *"Follow the blogs of those who innovate with educational technologies.*
- *Experiment (within your comfort zone) with web services and tools that could enrich teaching and learning in your practice.*
- *Encourage students to use the web for scholarly resources by being critical, selective, and attributing sources. Teachers can offer scaffolding and support and provide opportunities for reflection.*
- *Use, post, and share resources through blogs, wikis, photo and video-sharing sites. This can help create flexible learning environments incorporating authentic context, e.g., using problem- and case-based material to build collective resources and share best practices.*
- *Assign activities to learners that enable effective use of media to inform the process and, where appropriate, the outcomes.*
- *The creation of online communities using social networks promotes connectivity. Studies have shown that using social networking in medical education promotes learner engagement, feedback and collaboration, and the development of professionalism. However, it has its challenges. The review by Cheston et al. found that students and teachers experienced technical problems with social networking platforms, variable student participation, and issues with privacy, professionalism, and patient confidentiality, especially if they were on unsecured networks.*
- *In establishing online learning communities, it is helpful to look at recognized models, e.g., the ParkinsonNet program in the Netherlands, which was established to promote multidisciplinary care delivery for patients with Parkinson's disease."*

Likely, much research is still needed to continue advancing and generating evidence on the usefulness and effectiveness of the application of didactic strategies based on new technologies for teaching in medicine, as well as in other health sciences careers, but what is clear is that education is a dynamic science, so it is essential to continue testing and developing new ways of teaching.[31,32]

Medicine and the sciences linked to the health field are advancing daily by leaps and bounds, so knowledge is becoming increasingly vast and even obsolete in less time. We cannot be unaware of improving how this knowledge is taught; just as there are medical challenges such as a pandemic, so is the fact of continuing to train future professionals under these new contexts, which are generating new paradigms; the generations and their environments also evolve, and so everything is so dynamic that there is no choice but to keep moving forward, since continuing to apply the same strategies as always would be a nonsense for this progress and sooner or later could bring consequences, and in the worst case scenario, the consequences in the field of health almost always translate into the loss of human lives, lives that could probably be avoided.[33]

Tools applied to e-learning
Videoconferencing platforms
Zoom®

The Zoom videoconferencing platform is one of the most used nowadays; this is probably due to its features and the fact that it has very intuitive software, which makes it very easy to use, even for children in their virtual classes. In its free version, Zoom allows up to a maximum of 100 viewers, which in this case would be the students and the teachers or facilitators. The maximum duration of a videoconference in this version is 40 minutes; extending it by acquiring the paid version is possible.[34,35] Another exciting feature is the ability to share the teacher's screen and write on the presented screen. Even the viewers can take control of the screen of the person presenting the class, almost as much as the situation where a teacher invites the student to come to the front to solve a problem on the blackboard.

Zoom makes it possible to create small working groups simultaneously within a videoconference, which is very useful for group dynamics, and it is also possible to record videoconferences.[36,37]

Google Meets®

This tool is free, but unlike Zoom, it has few features. However, it is entirely compensated with the opportunity to have an unlimited video conference in terms of time and participants; it also has the same functions of screen sharing and recording a video conference session. Something very optimistic about this tool is that it articulates directly with other Google® applications, such as the Google Drive® cloud, the Google Classroom® classroom platform, and even with Youtube®.[38,39]

Learning Platforms
Moodle®

Moodle allows us to design a virtual classroom, allowing the teacher to upload recorded classes, reading material, and audio and video files. Developing evaluations and creating questionnaires with varied item options such as multiple choice, multiple checkboxes, and descriptions is also possible.[40]

In Moodle, one can divide the uploaded material into sections, creating modules or phases for different subjects. Students are added to the Moodle classes with the teachers, meaning that each class designed is exclusive for each group of students/teachers, and they can also be part of multiple classes simultaneously.[41,42]

Google Classroom®

With classroom, we can do almost everything that Moodle does, but it has a different interface; there is a kind of start palette where any member of the virtual class can publish, then something like a Facebook® "wall," a Twitter® "timeline," information of interest to the group can be published, or students can start debates or discussions. All members can comment as in a forum.[43]

Classes can also be uploaded and articulated with Google Meets to develop virtual synchronous sessions; they can be automatically recorded and available to students on the platform, something beneficial when eventualities arise, and they cannot attend a synchronous session or are also interested in developing asynchronous sessions, where the student owns his time, giving him days or weeks so he can adapt to his needs and observe the class at any time to develop some task or evaluation subsequently.[44]

A variety of tools

Many applications of a diverse nature can help us make our classes interesting, practical, and innovative—for example, platforms to design an interactive class session or attractive slides. Canva® is a very intuitive design tool for amateurs, where we can become experts with simple tools to create exciting classes and presentations; other useful platforms are Genially® and Padlet®, among others.[45]

It is also possible to use gamification for teaching. A very appropriate use is in evaluations, where platforms such as Kahoot® or Quizziz® make exams enjoyable since they usually generate stress and anxiety in students. These tools allow us to create questionnaires in the form of interactive games, where participants accumulate scores and compete healthily. It is possible to quantify the correct answers, and they generally have a response time that can be modified.[46]

Other handy tools are the clouds, such as Google Drive or Microsoft's One Drive, which provide essential storage spaces in their free versions, where you can create shared folders with other users to upload files, such as tasks, presentations, videos, audio, and everything you can imagine.[47,48] You can also create work files simultaneously using the Google Docs tool, which is articulated with Drive, and users can work on the same text document, for example, simultaneously and from home, without the need to meet in person.

These are just some of the most commonly used applications. However, many educators worldwide are discovering ways to improve their teaching methods in response to the constant changes required by the current situation.

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