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Artículos científicos

Sars-CoV-2 en México y su efecto en los modelos educativos áulicos: una perspectiva crítica y reflexiva

SARS-CoV-2 (COVID-19) in Mexico and its effect in classroom educational models: a reflexive, critical perspective

Sars-CoV-2 no México e seus efeitos nos modelos educacionais em sala de aula: uma perspectiva crítica e reflexiva

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"En memoria de Salvador Pérez Alaníz (1950-2020)"

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Resumen

El objetivo de la presente investigación es ofrecer un análisis teórico, crítico y descriptivo en torno a las prácticas educativas que han debido implementarse debido a las restricciones de interacción social generadas por la covid-19. El estudio se enfoca en analizar la implementación de estrategias pedagógicas basadas en los recursos digitales (p. ej., el *e-learning*). La reflexión que se ofrece procura llamar la atención sobre las posibilidades que estas herramientas ofrecen, pero también sobre las dificultades que implican, lo cual se hace más evidente en las zonas rurales de México. En definitiva, en este contexto de drásticos cambios pedagógicos, el docente de la actualidad debe esforzarse no solo por adaptarse a las nuevas tecnologías, sino también por fomentar la motivación y la interacción virtual de los estudiantes para potenciar el aprendizaje y para disminuir los índices de deserción escolar *on-line*.

Palabras clave: competencias docentes, cuarta revolución industrial, educación tradicional, estrategias digitales, tecnología virtual.

Abstract

We are all living an event nobody expected: the health emergency due to SARS-CoV-2 (COVID-19) which has launched the using of virtual technology on educational environments to continue with schoolwork. “Stay Home” policy has brought physical distance towards changing our social dealing with others. This research focuses on presenting SARS-CoV-2 (COVID-19) phenomenon, its relationship and effect on classroom educational practices in general (elementary, middle and higher),on teacher’s training performance and its technological innovation facing urgently this eventuality with virtual technology support to improve educational quality. This article’s goa list to reveal a theoretical, critical and descriptive work on the impact, pros and con son classroom educational models and its virtual tools compulsory implementation in education by a review of current scientific literature on several free-access electronic sources (recently published index magazines and Google news) about SARS-CoV-2 (COVID-19) in México. Hence the authors rely on the contrast to dig deeply even beyond on the subject to contribute to a new, constructive, and reflexive view. In the presence of this situation, we have observed education is one of the activities which incurs in more mobility. This fact causes all the actors

to adapt to a new reality nobody is expecting to face which leads us to consider new skills and competences for practical effects.

Keywords: teaching competences, fourth industrial revolution, traditional education, digital strategies, virtual technology.

Resumo

O objetivo desta pesquisa é oferecer uma análise teórica, crítica e descritiva em torno das práticas educativas que tiveram que ser implementadas devido às restrições de interação social geradas por covid-19. O estudo centra-se na análise da implementação de estratégias pedagógicas baseadas em recursos digitais (por exemplo, e-learning). A reflexão oferecida busca chamar a atenção para as possibilidades que oferecem essas ferramentas, mas também para as dificuldades que elas implicam, o que é mais evidente nas áreas rurais do México. Em suma, neste contexto de mudanças pedagógicas drásticas, os professores de hoje devem fazer um esforço não só para se adaptar às novas tecnologias, mas também para estimular a motivação e a interação virtual dos alunos para melhorar a aprendizagem e reduzir os índices de aproveitamento. abandono online.

Palavras-chave: habilidades docentes, quarta revolução industrial, educação tradicional, estratégias digitais, tecnologia virtual.

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Introduction

Covid-19 is a disease that has caused drastic changes in the educational systems of any country, which have seen the need to implement didactic strategies based on the use of digital resources. The problem, however, is that in many cases the teachers were not prepared to implement these technologies in the classrooms or outside of them. In other words, the use of digital technology applied to education requires preparation and new teaching skills and competencies to try to continue with the development of academic activities that must now be carried out virtually.

Indeed, everything we have experienced in the so-called “new normal” —whose correct term should be “new reality” - has generated innumerable problems, since we have had to change

our habits and lifestyles both in family life and in the countryside. labor. However, limiting or dispensing with face-to-face activity goes against human nature, since man was born to live in society, and not to be in confinement and social distancing. Despite this contradiction, it seems that there is still a long way to go to break the chains of contagion of this disease, which continues to spread at accelerated levels. In this regard, Barón (May 16, 2020) points out:

> The new coronavirus Sars-CoV-2, the cause of the Covid-19 disease, has the potential to become an endemic virus and never go away […]. This is the recent statement of the director of health emergencies of the World Health Organization (WHO), Michael Ryan […]. We have a new virus entering the human population for the first time and therefore it is very difficult to say when we will be able to overcome it (párr. 1).

Face-to-face educational panorama in Mexico in the face of covid-19

The problem generated by covid-19 is so great that in Mexico there is no federal entity in which the pandemic has not arrived. Given this reality, the Mexican government's policy has focused on giving priority to health, so the economy will gradually reestablish itself, although in the near future an increase in infections is predicted. The latter is due, to a large extent, to the disrespect of the civilian population for health regulations (eg, wearing face masks, respecting social distancing, staying at home, not touching one's face, etc.), coupled with the fact that there are likelihood of flares and complications in summer related to dengue, chikungunya and Zika. As Gutiérrez indicates (May 21, 2020), “until there is a vaccine against Covid-19, Mexicans must continue to comply with the health recommendations to avoid contagion” (para. 4). In this same sense, López Gatell (June 17, 2020), undersecretary of prevention and health promotion, points out that the pandemic will possibly “continue active for years”.

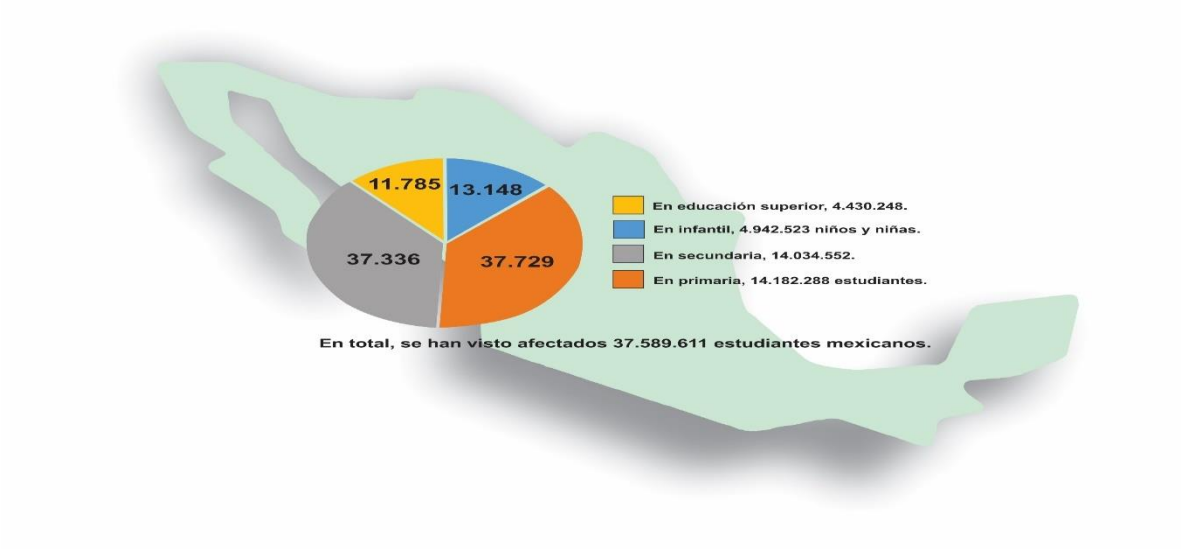
Due to the described scenario, in Mexico the first sector that closed its doors to flatten the transmission curve was classroom education at all levels, and - according to Alcocer (May 27, 2020) - most likely when the time comes to the post-pandemic “will be one of the last activities to be incorporated” (para. 1). Faced with this situation, the actors who participate in the face-to-face educational model require more support for academic-technological management. So far, it is observed that in the case of children it is the parents who have

played a fundamental role in this direction. However, the problem is compounded when parents lack the preparation, time, or willingness to support their children.

In the case of teachers, it is important that they adapt to the current labor reality using different training modes (face-to-face, blended and distance), for which the mastery of technological resources is essential to strengthen teaching and research work (p e.g., videoconferences, online tutorials, among others) (Flores, Loaiza and Rojas de Ricardo, 2020, p. 122).

This transition, logically, has not been easy, since too many teachers were not prepared for it. In addition, it must be foreseen if there are spaces and technological resources in homes to successfully implement virtual teaching initiatives (Rodríguez, April 22, 2020). Otherwise, both parents and teachers will be forced to improvise.

Figura 1. Efecto de la crisis del coronavirus en todos los niveles educativos



Fuente: Organización de Estados Iberoamericanos para la Educación, la Ciencia y la Cultura (OEI) (2020)

In the case of higher education levels, it would be expected that the situation would be less problematic due to the training that these teachers should have in the use of these tools. However, and even when these technologies dominate, reality shows that virtual attention to a certain number of students represents a complex and exhaustive task.

It is true that before covid-19 virtualization was already in operation, since activities that previously were done exclusively in person had been consolidated. However, with the arrival

of the pandemic, we have had to learn to optimize the tasks that can be carried out from home, since this will bring us advantages such as reducing mobility, pollution, crowds, etc.

In addition to the above problems, it should be noted that the situation is more critical in rural areas, where there are more difficulties related to connectivity, parental education, infrastructure, electricity, etc. This has led to an exclusion that must be addressed as soon as possible.

The irruption of e-learning

Virtuality, as a synonym for e-learning, is a very common expression nowadays. We have heard of certain processes that use that term to refer to virtual relationships, virtual companies, virtual libraries, virtual reality, virtual conference, virtual learning communities, virtual classes, virtual education, virtual world, among others. This concept has changed the visionary paradigm of reality in terms of its practical effects.

It is evident that the fourth industrial revolution has brought to education technologies in permanent evolution, technological platforms for learning, updating and constant teacher training, in addition to new roles assigned to the teacher and improvements in the didactic methodology and its contents. All this is part of modernization, of educational evolution, so it can be said that the concept of education has been digitized since before the start of the pandemic.

In the nineties, the door was opened to an open innovation educational modality called e-learning (Begoña, 2018), a technology that is constantly evolving and developing to promote new spaces for training. One of its objectives is to achieve the quality of teaching by applying virtual channels and methodologies, so it can do without face-to-face socialization. Despite this smallness, the interaction of virtuality breaks all boundaries and barriers in time and space.

> This formative evolution has raised the need to analyze whether the models with which we are currently working will have to be capable of being modernized and transformed in the face of a new educational reality caused by an era that increasingly tends to digitization (Pérez, Partida, Pérez y Mena, 2016, p. 94).

Virtual learning platforms as a cognitive instrument that supports the construction of knowledge have been growing at an excessive rate and in a short term. Its flexibility and constant innovation create an attractive environment for online work that is largely channeled to the educational-pedagogical area. This means that this instrument is based on three variables: support for e-learning education, b-learning and as a complement to classroom education.

All this indicates that the success or failure of a society depends on improving educational practice. Effectively training students virtually has become an alternative to meet a primary need such as learning. The training demands of contemporary students at all levels, as well as their intention to improve, make us rethink the possible improvement processes that imply how to be more efficient in the training area.

One must always seek to extract the greatest educational potential from e-learning. Not enough with all the advantages that connectivity brings us with this educational modality. Work should also be done on developing more friendly, dynamic and interactive platforms, and integrating elements such as artificial intelligence and gamification. Teachers, for their part, must be very efficient in providing personalized attention so that students feel accompanied and motivated by the planned didactic actions.

> In this sense, higher education institutions (HEIs) are making use of technologies as an element of support for education, to correct limitations of traditional education, such as the lack of classroom spaces, availability of schedules, teachers, mobility , etc. E-learning is an educational model supported by virtual platforms that function as a technology at the service of education with the idea of strengthening it (Pérez, Mena y Pereida, 2019, p. 63).

It should be understood that firstly e-learning aims to enhance learning by preventing it from being less passive and, secondly, to channel the techniques or styles that each student has to assimilate the contents, since it is known that not all people learn from the same way due to the wide range of individual cognitive abilities. This process of change is implicit in directly influencing the way in which technology has been transformed within a context that contributes to how children and young people of the future are educated and trained.

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Virtual media for education in times of pandemic

The implementation of the various forms of virtual inclusion as a resource in the teaching-learning processes generates new scenarios for a large part of the students and teachers in Mexico. In order to avoid the detriment of learning or the school cycle, it has been shown at the national and international level that we are not for improvisations in education. We have simply seen classroom teaching collapse dramatically.

The attempt to implement "virtual strategies" without prior training and abruptly makes us reflect on the need for significant changes in face-to-face training methodologies and in the way of teaching in the face of the new reality. The technological factor and its exponential growth is having an increasingly computerized and constantly evolving humanity. This has allowed us to enhance the generation of knowledge and information. This has been very well perceived by the school, academic and scientific community because it offers a more innovative educational practice.

Currently, learning design schemes must be supported by the inclusion of technology as a means to transform education, since they offer a great diversity of pedagogical methods and strategies. Now, didactic technologies and their potentialities bring with them more advantages than limitations by helping to solve the increasingly complex demands of the objectives set to improve education.

Technology, as an auxiliary element in educational contexts, will always strengthen them at all levels and modalities, since it changes the conventional of teaching in order to achieve meaningful learning that reinforces cognitive skills. Current demands transform education, which must also include didactic and methodological changes when moving from face to face to digital. In general, both in the way the teacher develops his role from a perspective with a didactic approach and in the way the student behaves, thinks, communicates, learns and takes advantage of the exponential changes that virtual technology brings, we can point out that virtual education in the platform mode is not an easy task, since not all students respond satisfactorily to this new self-learning profile.

In this context, technology helps to promote education in all its modalities and levels. In the case of higher education students, one must have the facility to adapt to the needs of autonomy, planning and organization; set your own work hours and chart your work rhythm according to established schedules. In the case of the foray of the preschool and basic education student to educational technologies, we can mention that in the first place they are

dependent on the parents -as mentioned above-, hence the implementation of playful technology is required to attract plus your attention and interest. In addition, access to technology is becoming very natural for them. Therefore, evaluations of the various technological strategies should be carried out and determine which ones may work best to choose the digital tool that best suits each of the educational levels.

Another notable aspect is the lack of design and creativity in the delivery of virtual education, which can generate a climate of routine performance. If we add to this the lack of interest of the teacher, we can ensure that it will cause the same effect in the students as a reflection. However, "if the online training activities are well adjusted, the methodology and content are adequate, and the teachers have adequate training, the results do not have to differ from face-to-face education" (Sanz, Sáinz, and Capilla, 2020, p. 12).

Interestingly, the virtual models already established before the pandemic follow their regular process, as is the case with virtual platforms. After all, they were not affected in their operation by the contingency. In fact, it can be said that virtuality at this time has been consolidated in the educational field, as it has become a solid complement to education. This may be an indicator that a new educational revolution is brewing in the world.

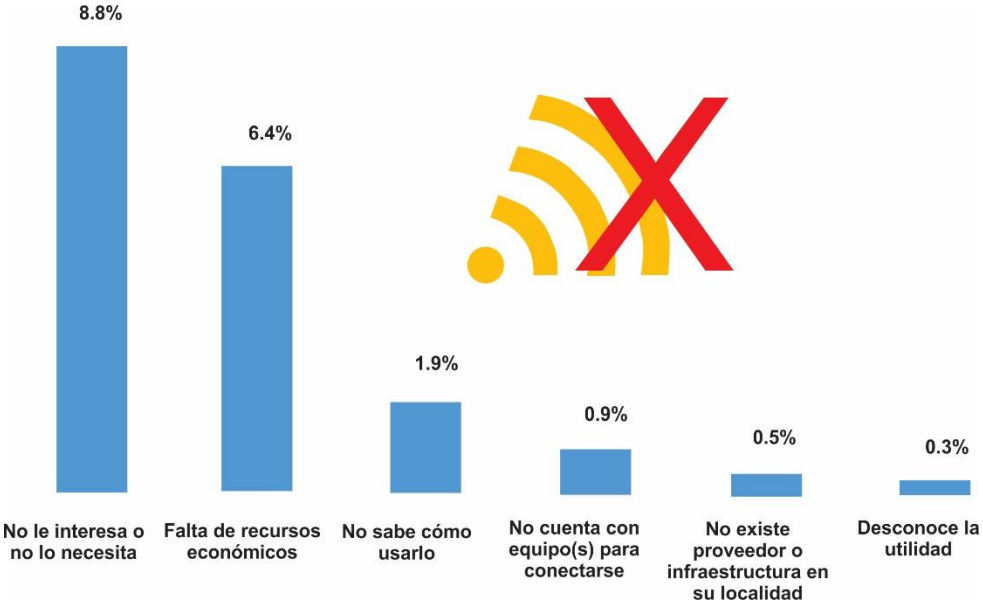
Given the impediment of the provision of face-to-face teaching, there are numerous open source tools designed to offer educational institutions in general and teachers in particular support for the successful realization of their learning purposes. Some of them are WhatsApp, Zoom, Google Classroom, Skype, Google Meet, Hangouts, Microsoft Teams, Messenger Rooms, Telegram, Youtube, email, Google Drive, Google Duo, Wordpress, Indelibly, Moodle, among others.

In an opinion study on the most widely used platforms and devices, the instrument was applied to a population aged 15 years or more living in the state of Jalisco. The sampling that was carried out was of the stratified random type. The sample size, 432 cases applied in 29 municipalities (cities or towns) with a statistical reliability of 95% and a degree of statistical error of +/- 4.7% (Martínez, May 13, 2020). The survey was conducted by telephone, separating the following data due to its importance in the achievement of this study.

Figura 2. ¿Tiene conexión de internet en su casa? (población de 15 años o más del estado de Jalisco)

Fuente: Martínez (13 de mayo de 2020)

Figura 3. ¿Cuáles son los principales motivos por los que no cuenta con internet en su casa?



Fuente: Martínez (13 de mayo de 2020)

Tabla 1. ¿Qué plataformas usa para realizar sus actividades de aprendizaje o estudios en línea? (Del 25.8 % que mencionó usar "mucho" o "poco" internet para el aprendizaje propio)

Plataforma	Porcentaje
Whatsapp	8.2
Zoom	5.8
Facebook	4.2
Google Meet	2.1
Hangouts	1.3
Microsoft Teams	0.9
Skype	0.6
Messenger Rooms	0.3
Twitter	0.1
El 2.0 % no contestó	

Fuente: Martínez (13 de mayo de 2020)

Tabla 2. ¿Qué plataformas usa para realizar las actividades de aprendizaje o estudios en línea de sus hijos? (Del 41.6 % que mencionó usar "mucho" o "poco" internet para el aprendizaje de los hijos)

Plataforma	Porcentaje
Google Clasroom	14.1
WhatsApp	13.4
Zoom	8.7
Facebook	8.2
Google Meet	3.1
Microsoft Teams	2.1
Twitter	1.3
Hangouts	0.7
Messenger Rooms	0.6
Telegram	0.5

Skype	0.3
La sumatoria de menciones es mayor a 41.6 % debido a que los entrevistados podían elegir más de una opción.	
El 5.5 % no contestó	

Fuente: Martínez (13 de mayo de 2020)

To strengthen the void left by the face-to-face educational model, the Ministry of Public Education in Mexico (SEP) has resorted to television with national coverage and a wide catalog in its programming, which is implemented as a solution strategy for technological gaps and connectivity. Taking the school to television requires remote learning and the great effort made by integrating a great variety of strategies with scripts that provide a great production in their contents is perceived, with the sole aim of ensuring that the classes are not so passive. However, and despite all efforts, television is only a complementary support for education, since one of its biggest drawbacks is the lack of interaction to clear doubts and unify criteria.

In this context of changes, the problem really is in how it is taught, which leads us to reflect on how to innovate technologically to improve the quality of education. Therefore, an intense and rapid penetration of the various virtual applications and an adaptation between the various actors that make up the educational entities is needed. For this, educational policies, together with their regulatory aspects, must seek at all times the professional development of teachers and today, more than ever, integrate technology as a support to their academic work in the new didactic-training strategies to allow students to develop their competencies.

Intrinsic motivation and increased learning capacity in e-learning students

One of the main motivating actions in virtual education is the teacher's attitude. In other words, learning experiences are experiences that make pedagogical contributions through the teaching guide in order to enthuse students to participate in the construction of their own learning. Changing the role of teachers is an essential role in facilitating new ways of teaching and learning. This means that the intrinsic motivation process constitutes a basic tool to avoid dropping out online. In this regard, Charchaoui, Cachón, Chacón and Castro (2017) point out:

> It is necessary to know and be able to identify what types of motivation the students have when participating in the classroom, since the difference between extrinsic or intrinsic motivation and demotivation is wide. The objective of the teacher is that the subject participates as a result of an intrinsic motivation; that is, through a voluntary intervention that arises from the interest, satisfaction or pleasure obtained in the development of the activity (p. 39).

Motivating action, broadly speaking, can be understood as an internal stimulation that arises from a dynamic action in human behavior and that, in general, occurs spontaneously; that is, when this action occurs, the desire to achieve goals or objectives increases. Motivation predisposes students to increase their initiative and, consequently, makes them improve their behavior and skills, fundamental factors for the cognitive process.

The main motivation of the student's entry to an online career is to achieve true learning and, therefore, to complete a goal. This implies that both learning and motivation complement each other. Therefore, the motivational process in virtual models should be one of the great goals to take into account. In this way, students can avoid dropping out and combat the limitations that underlie this way of teaching.

The teacher, therefore, must make a constant effort to promote an active and participatory attitude in students. For this, the facilitator must promote constant interaction and foster strategies that allow the student to function successfully in the virtual environment, because only in this way can student dropout be fought, which in many cases is directly related to the ability of the student. teacher to maintain interest in the student.

The student will always look to the tutor for a “shelter” to respond to their learning needs. This relationship has a very important influence that must be valued. Therefore, if a teacher observes that he manages to awaken the receptivity of the students, his mood-motivational state will increase and his teaching skills will subsequently improve.

Tutor-led teaching who demonstrates enthusiasm and enhances tolerance and flexibility, and reflects an interest in the learning of his students will substantially enhance the relationship of trust and affectionate harmony. Conversely, if students perceive in the tutor a figure with a measured, passive, apathetic or disinterested attitude about what he himself is teaching, it is very likely that the students' motivation levels will decline considerably, hindering performance in their cognitive drive , intellectual and academic.

Regarding the thematic contents, they should awaken the desire to learn and cause pleasure by stoking a deep need for motivation. Otherwise, if the content is boring and tedious, motivation will decrease and, most likely, will cause student performance to decline greatly. Consequently, the desired learning objectives cannot be achieved.

The methodologies implemented in didactics, the logical organization of content, multimedia, gamification, ICT, etc., increase motivational levels in the action of learning. However, teachers are not always directly responsible for attending to the total design that makes up an online course. This process requires joint work where pedagogues, technologists and disciplinary experts must join forces.

Conclusions

The health contingency generated by covid-19 has required the implementation of new teaching practices and functions in order to offer a variety of alternatives and strategies to overcome the pedagogical obstacles that arise. A traditional professional training is no longer sufficient due to the new models of teacher participation that require it. The role that teachers play now transcends their disciplinary area, so efforts must be redoubled. Today more than ever, basic, secondary and higher education institutions require a workforce with new perspectives and skills to take advantage of the benefits of the digital world. Whoever does not adapt to these changes will stop being competitive and will be left behind in the face of the transformations that will take place.

The need for the services of current teachers and their importance warn us of their clear commitment to their professionalization and updating. The pedagogical training and the efficient management of the technological complement constitute great advances, although this is not enough. Circumstances have changed for teaching models. Contemplating new pedagogical-cognitive strategies is important for educational institutions.

The new role of the teacher requires contemplating the promotion of the appropriate methodological-pedagogical use of the most appropriate technology to further encourage the participation of students in order to achieve more easily the learning that corresponds to their training needs. Faced with this reality, the integration of virtual technologies as tools to support education must compensate and enhance teaching practices and strategies, which are now presented in digital format. We know that implementing gamification, playfulness and

artificial intelligence will not be an easy or cheap task, but it will undoubtedly represent an investment that will bring positive effects.

Another point that must be considered to change the classroom model for virtual education is the motivational element of people, since it is known that this aspect is an invaluable variable to develop any activity. In other words, apathy, disinterest and reluctance are feelings that can hardly support the fulfillment of the established goals. Therefore, the enthusiasm of the teacher as an external agent is an element that must be cultivated and strengthened to try to increase the internal stimulation of the student.

This impulse is essential because it implies an affective relationship that motivates and impacts the cognitive. In other words, in virtual education, constant interaction should not be neglected, as this will make students feel that they are accompanied and that there is concern for their learning process. In addition to this, the teacher's work in the virtual mode must always find a way to adjust to the times and needs of the students.

In this context, the teacher must create the conditions to facilitate proactive tutoring that revolves around the students in order to produce results that promote interest in learning experiences. This helps a lot to define the learning style of the students.

Given the omnipresence of technology, educational institutions are obliged to design and strengthen digital strategies that reinforce educational quality. Consequently, the power of reconversion of educational institutions in the face of this public health phenomenon also requires a new architecture in their organization.

In the case of Mexico, it is worth noting that covid-19 has served to exalt two completely opposite contexts: on the one hand, we see the possible saving effect that technology has in urban areas, but at the same time we observe the lack of development technology in rural schools. Faced with this situation, teachers in the most marginalized areas have to redouble their efforts and resort to their creativity to establish an improvised teaching methodology with the few educational tools available to them.

To change this scenario, the academic services offered to students, such as a laptop loan system, must be expanded. The courses must also be taught online or in a hybrid way (virtual-face-to-face). Given the importance of virtual education, connectivity is a project of the President of Mexico, Andrés Manuel López Obrador, "to bring the internet to the most marginalized areas of the country" (*El Financiero*, 18 de junio de 2019).

This, logically, represents an important challenge to respond to the demands of technological growth in educational institutions with the implementation of digital strategies that are necessary. This trend makes it essential to develop an avant-garde vision not only to respond to these changes, but also to anticipate them. The modern conception of education demands an open system that incorporates innovative digital services, integrated into teaching, that are aimed at promoting digital education strategies and the services offered by cutting-edge technology.

Contributions to future lines of research

Among the most outstanding aspects, to be considered as future lines of research, we can highlight the following: Connectivity, as a priority project to achieve the inclusion of the most marginalized areas. Implement an update and teacher training, in the different modalities (face-to-face, blended and distance). Innovation in the design of virtual platforms that favor the interaction and integration of elements such as Luddism, artificial intelligence and gamification. Teachers who implement virtual media, must seek at all times to enthuse and motivate students.

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