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Artículos científicos

Efectos de la covid-19 en la educación superior en línea en el estado de Guerrero, México: percepción de los estudiantes

***The COVID-19 Effects on Online Higher Education at The State of Guerrero,
Mexico: The students Perception***

***Efeitos da covid-19 no ensino superior online no estado de Guerrero,
México: percepção dos alunos***

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Resumen

El avance de la covid-19, ocasionada por el virus Sars-CoV-2, obligó a los países de América Latina y el Caribe a cerrar la puerta de las instituciones educativas en los niveles de preescolar, primaria y secundaria. En México, se cerraron también las universidades públicas y privadas; por esta razón, es importante hacer un diagnóstico del impacto de las medidas de confinamiento y distanciamiento social. El objetivo de este estudio fue analizar los efectos de la covid-19 en el desempeño académico y en la salud emocional de la población estudiantil de la Escuela de Ciencias Naturales de la Universidad Autónoma de Guerrero, en el contexto de la transición de la educación presencial a un modelo de educación en línea.

Los resultados del estudio muestran que 53.4 % de los encuestados disponen de un espacio cómodo para atender sus clases en línea, pero solo 25 % cuenta con un ambiente suficientemente agradable para lograr la concentración necesaria para un aprendizaje efectivo, 52.3 % cuenta con los materiales necesarios para la realización de sus actividades, 26.1 % tiene contacto con el profesor y 56.8 % solo tiene contacto con algún compañero de grupo para resolver las dudas del curso, Asimismo, 43.2 % tiene un dispositivo digital con mala conectividad, 27.3 % con una buena conexión, y 3.4 % no tiene computadora ni conexión a internet; igualmente, 23.9 % carece de un espacio adecuado para realizar sus actividades, 15.9 % no está capacitado en materia de competencias digitales y 14.8 % no tiene computadora, lo que refleja un escenario poco promisorio, puesto que 28.4 % de los encuestados tienen poco contacto con el profesor y 10.2 % casi nunca. De acuerdo con estos resultados, se concluye que los factores que ponen en riesgo la continuidad de la educación son la carencia de una computadora, el acceso limitado a internet, la limitada interactividad por parte de los profesores con los alumnos y el desempeño de actividades extracurriculares prioritarias para apoyar la economía familiar, lo cual pone de relieve la brecha tecnológica entre las diferentes regiones geográficas.

Palabras clave: coronavirus, covid-19, educación en línea, educación superior, pandemia.

Abstract

The advance of COVID-19 caused by the SARS-CoV-2 virus, has forced the Latin America and the Caribbean countries to close the door of educational institutions at the preschool, elementary and Junior High School levels. In Mexico, public and private universities were also closed. For this reason, it is important to carry out a diagnosis of the impact of confinement and social distancing measures. The aim of this study was to analyze the effects of COVID-19 on the academic performance and emotional health of the student population of the School of Natural Sciences (ESCN) from the Autonomous Guerrero State University, within the context of the transition from face-to-face education to an online educational model.

The study was conducted on a sample of 88 students by applying an online survey. The results of the study show that 53.4% of the respondents have a comfortable space to attend their online classes, but only 25% have a sufficiently pleasant environment to achieve the concentration necessary for effective learning, 52.3% have the materials necessary to carry out their activities, 26.1% have contact with the teacher and 56.8% only have contact with a classmate to answer questions about the course, 43.2% have a digital device with poor connectivity, 27.3% have a good connectivity, and 3.4% do not have a computer nor internet access, 23.9% have no adequate space to carry out their activities, 15.9% has not enough training on digital skills and 14.8% do not have a computer, which reflects an unpromising scenario since, 28.4% of all those surveyed have little contact with the teacher almost always and 10.2% almost never. According to these results, it is concluded that the factors that put the continuity of education at risk are: The lack of a computer, limited access to the Internet, limited interactivity by teachers with students and the performance of extracurricular activities to support the family economy, which highlights the technological gap between the different geographic regions.

Keywords: coronavirus, covid-19, online education, higher education, pandemic.

Resumo

O avanço da covid-19, causado pelo vírus Sars-CoV-2, obrigou os países da América Latina e do Caribe a fechar as portas das instituições de ensino nos níveis pré-escolar, primário e secundário. No México, as universidades públicas e privadas também foram fechadas; Por esse motivo, é importante diagnosticar o impacto das medidas de confinamento e distanciamento social. O objetivo deste estudo foi analisar os efeitos da covid-19 no desempenho acadêmico e na saúde emocional da população estudantil da Faculdade de Ciências Naturais da Universidade Autónoma de Guerrero, no contexto da transição do presencial educação. a um modelo de educação online.

Os resultados do estudo mostram que 53,4% dos entrevistados possuem um espaço confortável para assistir suas aulas online, mas apenas 25% possuem um ambiente agradável o suficiente para atingir a concentração necessária para um aprendizado eficaz, 52,3% possuem os materiais necessários para carregar fora de suas atividades, 26,1% têm contato com o professor e 56,8% só têm contato com um colega para tirar dúvidas sobre o curso. Da mesma forma, 43,2% possuem dispositivo digital com conectividade ruim, 27,3% com boa conexão. não possuir computador ou conexão com a internet; Da mesma forma, 23,9% carecem de espaço adequado para realizar suas atividades, 15,9% não são formados em habilidades digitais e 14,8% não possuem computador, o que reflete um cenário pouco promissor, pois 28,4% dos entrevistados têm pouco contato com o professor e 10,2% quase nunca. De acordo com esses resultados, conclui-se que os fatores que colocam em risco a continuidade do ensino são a falta de computador, acesso limitado à Internet, interatividade limitada dos professores com os alunos e a realização de atividades extracurriculares. economia familiar, o que evidencia o fosso tecnológico entre as diferentes regiões geográficas.

Palavras-chave: coronavírus, covid-19, educação online, ensino superior, pandemia.

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Introduction

Due to the global crisis caused by the covid-19 pandemic, caused by the Sars-CoV-2 virus, schools and universities around the world suddenly closed their doors, affecting 1.57 billion students in 191 countries (Unesco, 2020a). The closures, as a measure to contain the pandemic, led to a deployment of alternative solutions to ensure educational continuity through the implementation of online education. However, the obstacles have been multiple, such as the lack of connectivity, the incompatibility of national curricula and the poor training of teachers to face this "new normal" (Unesco, 2020b).

For their part, the students, who are at home, must share the digital devices and the Internet network used by the whole family, and they need to continue their learning activities of the various subjects enrolled through homework, lectures and a number of overlapping duties. In addition, those who get sick have to face the effects of the pandemic on their own health, emotions, physical activities and those of youth (The Chronicle of Higher Education, 2020).

Since March 23, 2020, the Mexican government, through the Ministry of Public Education, as a protection measure for students, teachers and the population in general, decided to suspend face-to-face classes (National Commission for the Continuous Improvement of Education [Conamece], 2020). This forced teachers to use various instruments to continue promoting learning, so they had to change their traditional role of teaching in the classroom to become mediating entities between the student and the information provided through the use of technology (Quintero, May 19, 2020).

Given the panorama of covid-19, without a doubt, the way in which education is currently imparted was transformed, since the school and the home became the same space (Anuies, 2020). Naturally, this abrupt change has represented an enormous challenge for educational equity with consequences that affect the lives of the most vulnerable students. (Villafuerte, 19 de marzo de 2020).

More than a year after the start of the pandemic, declared by the World Health Organization (Cucinotta and Vanelli 2020), it is necessary to know the impacts that preventive social isolation has had on students, as well as the main challenges that have arisen in the transformation process from a face-to-face model to a virtual one (Ballén Cifuentes et al., 2021). Although students are digital natives, the same is not true of teachers, who in many cases still had reservations about the use of technology in the

classroom, although it should also be noted that for others this has been the opportunity to experiment with creative formulas and resilient with amazing results (Marín, June 8, 2020).

The global crisis due to the covid-19 pandemic has triggered a rethinking of education at all levels, as well as the intensive use of platforms and technological resources (Valverde-Berrocoso et al., 2021) either synchronously or asynchronously. (Moorhouse and Wong, 2021). However, the urgency of the change in teaching methodology, in various parts of the world, has seen this transition as the most daring experiment in educational technology due to the lack of planning and the unexpectedness of the event (Unesco, 2020a). Consequently, it is of the utmost importance to evaluate the results of the lessons learned to reinforce inclusion, innovation and cooperation in teaching (Giannini, 2020).

In this context, it is important to bear in mind that learning in the circumstances imposed by the pandemic presents challenges due to the abrupt change implied by the suspension of face-to-face classes and the adaptation to the online education modality, that is, "learning from house" (Delgado, April 6, 2020). To this is added that university didactics in virtual teaching environments is inappropriate (Santos-Baranda y Armas-Velasco, 2 de marzo de 2020; Quintero, 2020; Unesco, 2020c).

The sudden move to online teaching was implemented as a measure to ensure academic continuity; however, this fact has implied a series of challenges for universities. It was necessary to make hasty changes and, moreover, for an uncertain period that has not yet ended. Decisions made in these circumstances run the risk of not being the best, so it is imperative to analyze the situation we are in now in order to assess and predict future repercussions (Philip and Hans, 2020).

Based on the above, the objective is to analyze the effects of the pandemic and the closure of educational institutions on the academic performance and emotional health of the university population in the state of Guerrero, Mexico, in the context of the transition from face-to-face education to an online education model.

Materials and methods

This is a non-experimental exploratory and descriptive study, carried out through the application of an online survey-type instrument, aimed at students of the Higher School of Natural Sciences (ESCN) of the Autonomous University of Guerrero (UAGro), in the transition from a face-to-face education system to an online system. This was designed to explore the perception of the effectiveness in the implementation of the teaching strategies used during the covid-19 health emergency and its psychosocial effects or emotional alterations of the personality of the students; Likewise, an attempt was made to specify the changes in behavior caused by the pandemic and the stress associated with the change in strategies to guarantee the continuity of education.

The instrument was sent to recipients registered in the groups previously selected for the study via email, and they were invited to respond voluntarily on the Google Forms platform. The instrument was sent to 95 students officially enrolled in the eighth semester of the ESCN Pharmaceutical Chemist Biologist and Experimental Biology educational programs, of which only 88 questionnaires (n=88) were returned through the Google Drive online system. official used by the virtual system of the UAGro, which represents 92.6% of responses received.

The questionnaire was answered online voluntarily, so it was considered to be a non-probabilistic, intentional and quota sample of students. The results of Google Forms were exported to Google Sheets to generate the statistics and graphs of the results.

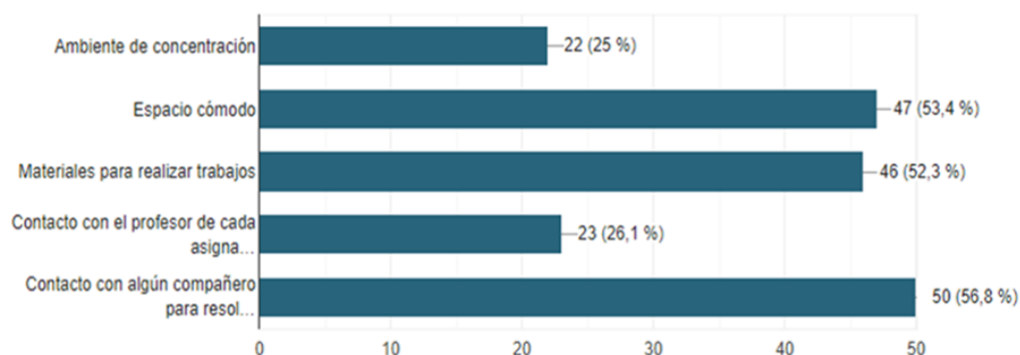
The response options of the instrument questions focused on four dimensions: 1) habits and perception of the covid-19 phenomenon, 2) the technological conditions of the students, 3) the emotional effects of confinement and 4) proposals for educational innovations for teaching improvement. The open question was asked through an analysis of the answers, which involved reading them, differentiating the topics, classifying them and grouping them semantically (van Dijk, 2000), to later group them into categories (Han, 2008) that would allow identifying other problems to be addressed. those that the students are facing, as well as the concrete proposals that they have so that the university provides them with the pertinent support.

Results

The results of this study were derived from a survey sent through the virtual platform Google Drive of the UAGro to 95 students of the eighth semester of the educational programs of Pharmaceutical Chemist Biologist and Experimental Biology of the ESCN, of which only 88 answered. questionnaires (n=88), which corresponds to 92.6 % of the total number of forms sent.

The statistics of the results of this study show that 56.8% of the students who participated in the survey only have contact with a classmate to resolve doubts about the course, 53.4% have a comfortable space to attend their online classes, 52.3 % have the basic materials necessary to carry out their academic tasks, 26.1% can establish contact with the teacher to solve their doubts and 25% have in their home an optimal concentration environment for the performance and development of their educational activities (figure 1).

Figura 1. Condiciones materiales y de comunicación con los que disponen en el hogar los estudiantes de la ESCN



Fuente: Elaboración propia

Regarding the availability of digital devices and connectivity to a network line, 43.2% have a medium screen computer or tablet, but have irregular or poor connectivity, 27.3% have at least one computer or tablet and good connectivity in their home , 26.1% only have a cell phone with a connection and 3.4% do not have a digital device or connection to the network (figure 2).

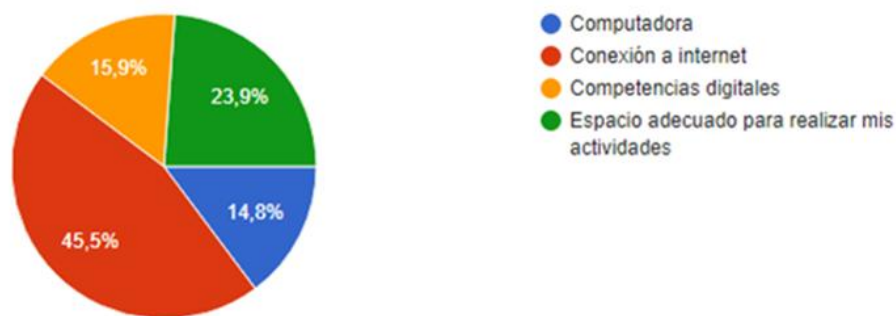
Figura 2. Dispositivos digitales e interconectividad disponible para el aprendizaje virtual en el hogar de los estudiantes



Fuente: Elaboración propia

Regarding the main needs that students do not have covered at home and that, according to their perception, mean a high risk of dropping out of school, the following results were obtained: 45.5% do not have access to an internet line, 23.9% lack a adequate space to carry out their school activities, 15.9% lack digital skills and 14.8% do not have computer equipment (figure 3).

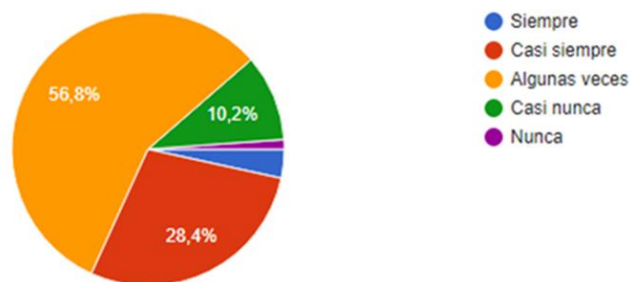
Figura 3. La principal necesidad que no tienen cubierta en su hogar los estudiantes encuestados y que pone en riesgo sus estudios



Fuente: Elaboración propia

In relation to the accompaniment, support and feedback of school activities by teachers, the statistics indicate that 56.8% of students received support sometimes, 28.4% almost always, 10.2% almost never, 3.4% always and 1.1% never. (figure 4).

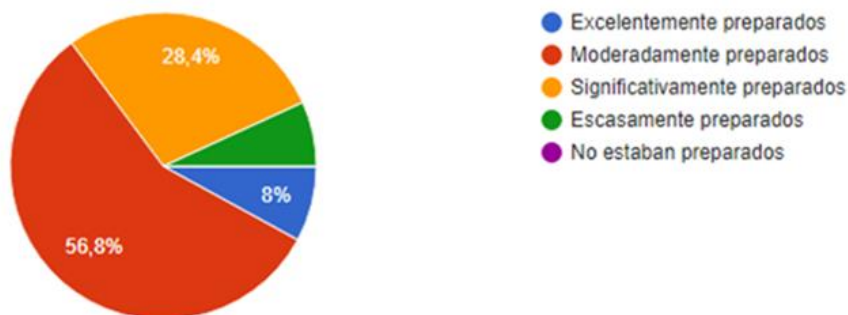
Figura 4. Actividades de acompañamiento, apoyo y retroalimentación a los estudiantes por parte de la planta docente de la escuela



Fuente: Elaboración propia

Regarding the level of preparation of teachers regarding the tools, sites and routes to implement digital strategies for online education, it was another of the items that were subjected to scrutiny by students and the following statistical data was found: 46.6% perceive that most teachers are prepared, 35.2% that only some are, 13.6% that few are prepared, 4.5% that all are (figure 5).

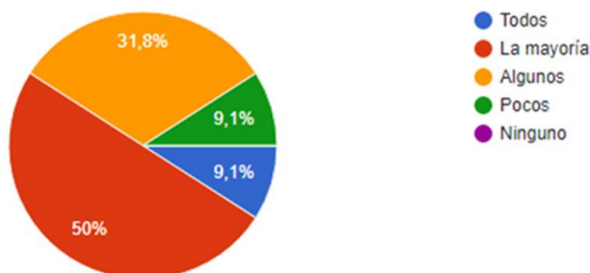
Figura 5. Preparación de los docentes para implementar las estrategias digitales de la educación en línea



Fuente: Elaboración propia

Regarding teaching planning —associated with the development of content, tasks, dynamics and evaluations— 50% perceive that most of their teachers showed appropriate class planning, 31.8% indicated that only some, 9.1% that few and 9.1% that none (figure 6).

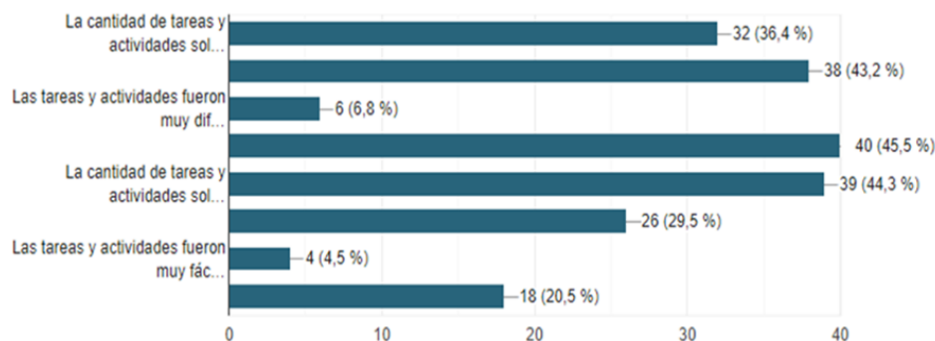
Figura 6. Proporción de los integrantes de la comunidad docente que mostraron una planeación apropiada en los contenidos de las tareas, dinámicas y evaluaciones en el nuevo modelo de educación en línea



Fuente: Elaboración propia

In the new online education modality, 45.5% report that the teachers did not provide the instructions during the assigned theoretical, practical and exercises classes, 44.3% that the number of tasks and activities requested by the teachers was appropriate, 43.2% that the time delivery of academic activities was not enough, 36.4% perceived that the number of tasks and activities was excessive, 29.5% reported that the time to deliver the tasks was sufficient, 20.5% indicated that the teachers provided appropriate explanations to carry out the theoretical and practical exercises of school work, 6.8% that the tasks and activities were very difficult and only 4.5% mentioned that the tasks and activities were very easy (figure 7).

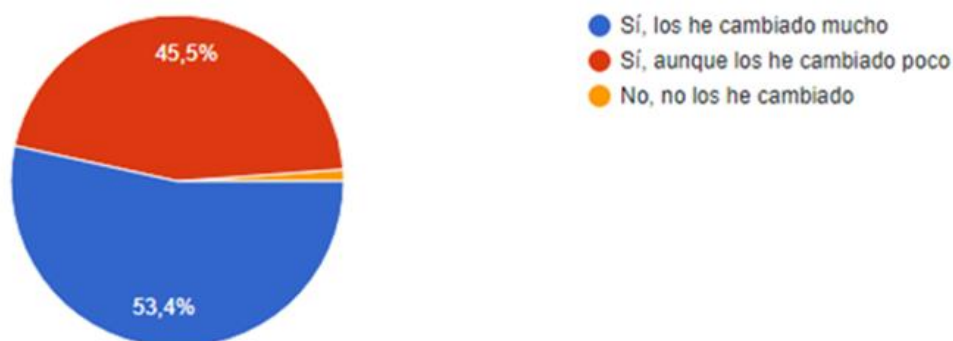
Figura 7. Principales motivos que dificultaron el proceso de enseñanza-aprendizaje asociados con el desempeño de las actividades docentes



Fuente: Elaboración propia

Regarding the changes in behavior and life habits of the students surveyed and the emotional stability caused by covid-19, the statistics indicate that 53.4% report that their life habits have changed a lot, 45.5% that they have changed little and only 1.1% have not modified them (figure 8).

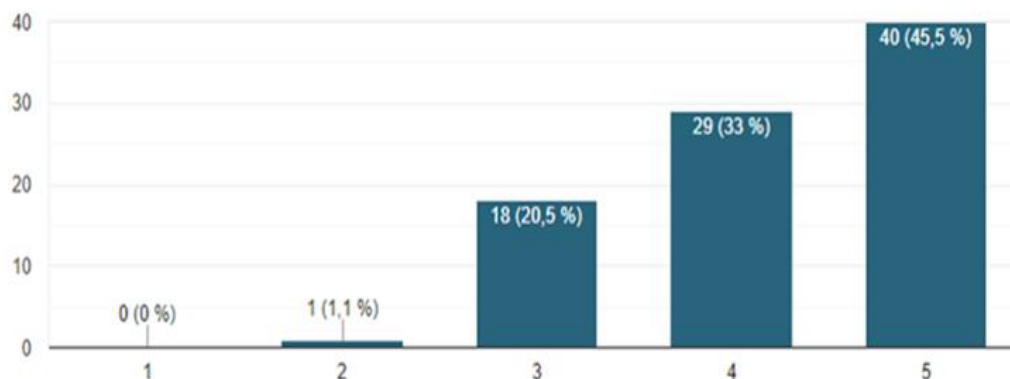
Figura 8. Cambios de comportamiento y hábitos de vida de los estudiantes universitarios debido a la covid-19.



Fuente: Elaboración propia

In this context, 45.5% of those surveyed consider the covid-19 outbreak to be extremely serious, 33% that it is a very serious disease, 20.5% that it is serious, and only 1.1% that it is moderately serious (figure 9).

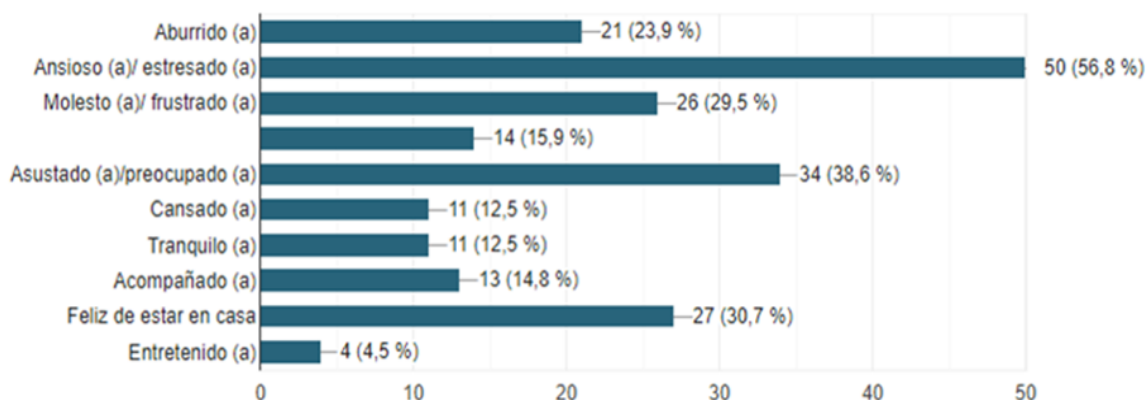
Figura 9. La covid-19 como una amenaza para la salud pública



Fuente: Elaboración propia

Finally, the emotional and behavioral effect of the crisis generated by the pandemic reflects that 56.8% of respondents feel anxious and stressed, 38.6% scared and worried, 30.7% happy to be home, 29.5% upset and frustrated, 23.9% bored, 15.9% alone, sad and depressed, 14.8% accompanied, 12.5% calm, 12.5% tired and 4.5% entertained (figure 10).

Figura 10. Estado emocional de los estudiantes asociado a las medidas del confinamiento por la covid-19



Fuente: Elaboración propia

The main difficulties faced by students in the pandemic scenario and the effects on online education strategies are summarized in six areas: 1) lack of internet connection and computer equipment, 2) unclear and insufficient teacher instructions, 3) absence of teacher-student interactivity, 4) rigidity in deadlines and delivery dates, 5) excess of tasks and activities, 6) performance of priority extracurricular activities. In the same way, the proposals for actions by teachers and students are described to solve the difficulties that both actors face in order to improve the conditions of the teaching-learning process towards online education (table 1).

Tabla 1. Propuesta de acciones para reducir las dificultades que enfrentan los estudiantes y profesores para mejorar las condiciones del proceso de enseñanza-aprendizaje ante el escenario de la pandemia y la transición hacia una educación virtual

Área de oportunidad	Propuesta de acción
Falta de equipo de cómputo y acceso a internet.	Los estudiantes deben establecer estrategias que les permitan garantizar la continuidad de su proceso de formación profesional. Conocer dónde y cómo se puede tener acceso a la red, solicitar apoyo a los docentes, a sus compañeros de clase o a la institución.
Instrucciones por parte de los docentes insuficientes o poco claras que dificultan las actividades del curso.	Formación como docente en línea mediante cursos de capacitación.
Falta de apoyo para el aprendizaje en línea y ausencia de interactividad significativa de los estudiantes con los profesores para exponer sus dificultades.	Asegurarse de que los materiales que se proporcionan a los estudiantes como recursos de aprendizaje son adecuados y funcionales. Promover el dialogo y la comunicación activa por diferentes canales para captar las inquietudes de los estudiantes.
Rigidez de los docentes en plazos y fechas para que los estudiantes cumplan con las actividades asignadas.	Mostrar accesibilidad y flexibilidad con los estudiantes. Demostrar empatía ante las dificultades.
Asignación excesiva de actividades y tareas durante el curso.	Diseñar y programar de forma adecuada los contenidos, actividades, tareas y evaluaciones de las unidades de aprendizaje.
Desempeño de actividades prioritarias para el soporte de la economía familiar y actividades domésticas.	Gestión por parte de los estudiantes para disponer del espacio que cada unidad de aprendizaje requiere, acordar con los demás miembros de la familia el apoyo para contar con el tiempo necesario para atender todas las actividades académicas sincrónicas y asíncronas.

Fuente: Elaboración propia

Discussion

Due to the presence and transmission of covid-19, educational institutions — including public and private universities — suspended academic activities (Unesco, 2020a) to prevent contagion between students and teachers. In the specific case of the state of Guerrero, it was resorted to confinement and social distancing to mitigate the effects of the pandemic and reduce its impact on the population, which forced to change face-to-face education to an online model to guarantee the conclusion of the February-July 2020 semester and the start of subsequent semesters.

These events substantially modified the schemes of traditional education and forced students to face the challenge of implementing a learning environment, located in the same physical space as the home. However, according to the data collected in this work, it can be affirmed that 75% of the respondents do not have the optimal conditions of the learning environments, since only 25% of the students have a space that is pleasant enough to achieve concentration that guarantees effective learning. Additionally, only 52.3% have the basic materials to carry out their work online (figure 1).

Another limiting element in the teaching-learning process is the teacher's relationship with the students. In this sense, it should not be lost sight of the fact that education in developed countries has been massified since the 19th century, while in Mexico the same thing happened only until the second half of the last century. In addition, the distance between the teacher and the student becomes more noticeable when the conditions of poverty of the marginalized communities in the state of Guerrero prevent effective communication between them. This is reflected in the results of this study, which show that only one in four students has contact with the teacher (26.1 %) of each subject and approximately half (56.8%) have contact with a classmate to resolve their doubts. (Figure 1).

This scenario is not different from that of other countries in Latin America, such as Ecuador, where the same educational pattern is observed in which the availability of ICT is a fundamental condition to guarantee online education and the development of student skills (Corral and Corral, 2020).

On the other hand, it is also evident that the teachers were poorly prepared to face the transition from face-to-face classes to online education, although they invested time and dedication to achieve an optimal teacher-student connection, in order to guarantee a

meaningful education throughout the course. from online tools.

In the new paradigm of virtual education, the use of communication technologies mediated by electronic devices and the development of increasingly sophisticated programs are clarifying the differences between face-to-face education and online education.

This evolution has resulted in a model in which, with the application of telecommunication and computing techniques, a new "telematic" paradigm has been built, which includes the bases of distance education and open education, in the format of an online educational model.

However, the evolution of this model presupposes a certain level of technological development that contrasts with the social reality of the state of Guerrero, which according to the National Ranking of Science and Technology 2011, published by the Scientific and Technological Consultative Forum, is in the last place of the national evaluation. These data coincide with the results of this study regarding the use of technologies and connectivity available for learning in a virtual modality. Of the students surveyed, two out of five (43.2%) have at least one device with regular or poor connectivity, approximately three out of ten (27.3 %) have at least one device and good connectivity at home, and three out of every ten (26.1 %) only cell phone with connection. Consequently, it is estimated that out of a total population of 800 students, 27 (3.4%) will drop out of the degree because they do not have a digital device or internet connection (figure 2) as a consequence of the pandemic.

Additionally, the results of this survey (figure 3) suggest that approximately six out of ten students (60.3%) are in a situation of vulnerability because they do not have a computer (14.8%) or the Internet (45.5%). In addition, a significant proportion expressed their limited training in digital skills (39.7%) and that they do not have appropriate spaces to carry out their academic activities (23.9%) (figure 3).

These results show that the socioeconomic conditions that prevail in our state do not favor the levels of competitiveness that are required to insert ourselves in a society in which knowledge and globality demand a better prepared population.

In this context, the accompaniment of students as an integral part of the teaching practice, which aims to advise and guide the student during their studies, to contribute to their comprehensive training, through systematic attention to a student or a group of them, is also in a less favored situation, since the results of this study (figure 4) show that

approximately half of the respondents (56.8%) received accompaniment sometimes from teachers, while three out of ten (28.4%) received accompaniment almost always. The results also indicate that in real terms, one in ten participants (11.3%) never received accompaniment (1.1%) or hardly ever (10.2%), that 85.1% received accompaniment occasionally, and only 3.4% stated that they had received accompaniment. always (figure 4).

The covid-19 pandemic disrupted the organizational structure of educational institutions, as they migrated to an online education system (Ministry of Public Education [SEP], 2020), a teaching system for which the teaching staff and the students. This represented a challenge for both of them because they had to update themselves in the use of information technologies, which are commonly used in online teaching models (Shivangi, 2020). Given this fact, the university took on the challenge and suddenly changed the traditional pedagogical approach for an online teaching-learning system (UAGro, 2020).

In this sudden change it is important to recognize the strengths, weaknesses, opportunities and challenges of the new teaching model implemented in this time of crisis. The results of the survey indicate that, according to the perception of the students, the teaching performance was not optimal, since the results reveal that only one of every two teachers (56.8%) is in the category of moderately prepared, while one in three (28.4%) are significantly prepared, one in ten (8%) were classified as excellently prepared and 6.8% of teachers are poorly prepared (figure 5).

The foregoing suggests that it is necessary to redouble efforts to improve the training of the teaching staff in order to optimize academic performance and move to the next category of significantly prepared and increase that of excellently prepared, through the implementation of a continuing education program. that encompasses all the teachers that make up the teaching staff of the school.

According to the students' perception, one out of every two teachers (56.8%) is moderately prepared (figure 5). This data is consistent with the organization of the programmatic contents of the subjects, where one of every two students (50%) declares that the programmatic contents, tasks, dynamics and evaluations were not prepared with the required planning criteria, and one of every two every three (31.8%) recognizes that only some teachers showed a level of planning consistent with the online education scenario:

planning of programmatic content, tasks and evaluations (figure 6).

The reasons that hindered the learning process were the following: the students perceived that the amount of tasks and activities requested by the teachers was excessive (36.4%), that the time to deliver the requested tasks was not enough (43.2%), that the teachers did not send clear explanations for carrying out the theoretical, practical and exercise activities (45.5%), and that the assigned tasks and activities were very difficult (6.8%) (figure 7).

In contrast to the above, four out of ten students (44.3%) perceived that the number of assigned tasks and activities were sufficient, three out of ten (29.5%) that the time to deliver the tasks to teachers was sufficient, and 4.5% considered that the tasks and activities were very easy (figure 7).

As can be seen, the elements that hinder the teaching-learning process are diverse. Currently, it has also been shown that many psychological problems and important consequences in terms of mental health (such as stress, anxiety, depression, frustration and uncertainty) have arisen during the covid-19 outbreak (Duan and Zhu, 2020). The pandemic, in general, has generated feelings of isolation, frustration, boredom, anxiety and stress in students (Pedró, 2020). This, added to the closure of educational institutions, have had consequences that affect the mental health of students (UNICEF, 2020) and the population in general. (WHO, 2020).

Information has been published on the psychological impact of the pandemic and its effects on the population (affected and unaffected patients, medical personnel, children and older adults) (Cao et al., 2020; Duong et al., 2020), who have had to modify their lifestyles in one way or another. In this regard, the results of this study show that half of the respondents (53.4%) acknowledge that they have substantially changed their lifestyles due to confinement due to covid-19, and the other half (45.5%) have changed them substantially. smaller measure; that is, practically all of the respondents (98.9%) reflect changes in behavior (figure 8). The fact of staying at home and carrying out their studies, in the best of cases, by electronic means, causes emotional consequences associated with the feeling of isolation, frustration, boredom, anxiety or stress (Duan and Zhu, 2020).

The issue of mental health that is emerging may become a public health problem in the medium term. The impact of the severity and the medical repercussions of covid-19 in the world are of such a dimension that they could hide the psychosocial consequences

derived from the contagion and transmission of this disease. In the Middle East respiratory syndrome (MERS-CoV) epidemic, which occurred in 2012, it was shown that 40% of affected people required psychiatric intervention (Ferrel and Ryan, 2020). Social isolation and restricted mobility are known to lead to psychiatric complications ranging from isolated symptoms to the development of a mental disorder, such as insomnia, anxiety, depression, or post-traumatic stress disorder (PTSD) (Chan et al., 2020).

In this context, it can be predicted without a doubt that the current pandemic may have a potential collateral effect such as loss of functionality that can be compared to a state of mourning, and if a sad mood persists, a major depressive disorder (Chan et al., 2020). The results of this study highlight two important aspects of the pandemic: the threat of covid-19 as a public health problem (figure 9) and the effects of confinement on the emotional state of the respondents (figure 10). From this it follows that to deal with the pandemic, an approach that unifies society in a common cause is necessary, but awareness and sensitization is needed to face this health emergency situation, for which it is of the utmost importance to have an overview on the perception of the seriousness represented by the spread of the virus (Khan *et al.*, 2020; WHO, 2020).

In this sense, the perception of the risk of contracting covid-19 is related to the adoption of preventive behaviors (Dryhurst et al., 2020). In this regard, the results on the perception related to the threat posed by covid-19 indicate that three out of ten respondents (33%) perceive that the disease represents a serious threat to public health in the state of Guerrero and approximately half (45.5%) reported that the epidemiological condition of the pandemic in the population constitutes an extremely serious threat (figure 9). This reflects, in short, that eight out of ten of the respondents (78.5%) perceive concern that may have repercussions on the emotional and academic performance, in the medium and short term, due to changes in habits and behavior associated to confinement, while only one in five participants (20.5%) considers covid-19 to be a moderately serious disease (figure 9).

This scenario is consistent with the perception of the emotional state of the students surveyed, since more than half (56.8%) show symptoms of anxiety and stress, and four out of ten (38.6%) are scared and worried. In contrast, three out of ten (30.7%) feel happy to be at home, one out of ten is calm (12.5%) and three out of ten (31.8%) feel accompanied (14.8%), entertained (4.5%) or tired (12.5%) (figure 10).

The main difficulties that students have faced in the traditional model of online education before the pandemic remain the same problems that have limited the virtual education paradigm during the pandemic. This educational model depends on two fundamental variables; firstly, from the student's proactivity to prevent or avoid inappropriate actions or shortcomings on her part, and secondly, from the teacher's communication possibilities and teaching skills (Borges, 2005).

The areas in which the teacher has a direct influence, in order of importance, are the following: their own education and training, their ability to respond to students, their presence in the classroom, the clarity of instructions, the closeness with students and the flexibility, interaction and collaboration with them (Borges, 2005).

The results obtained in this study show that in the current scenario of the pandemic, the problems of online education remain very similar (table 1) and are summarized in six main areas: 1) lack of internet connection and computer equipment , 2) unclear and insufficient teacher instructions, 3) absence of teacher-student interactivity, 4) rigid deadlines and delivery dates, 5) excess of tasks and activities, and 6) performance of priority extracurricular activities (Table 1).

In short, the proposals for corrective actions will depend on the proactivity of teachers and students to face the difficulties that affect the development of the teaching-learning process in the face of the pandemic scenario and the transition to online education.

Conclusions

Based on the results obtained, it is concluded that the technological resources and the academic environment in the online education scenario are not optimal to guarantee effective learning because the students do not have comfortable spaces or the basic materials for learning. the development of their academic activities.

It is necessary to strengthen the training of both students and teachers to ensure the transition to non-face-to-face education, since there are deficiencies on the part of students and teachers regarding knowledge about virtual platforms and online education resources.

Regarding interconnectivity, more than half reported that they do not have computer equipment or internet access and/or lack training in digital skills.

In relation to the organization of the programmatic contents of the subjects, tasks, dynamics and evaluations, the respondents refer that they were not prepared with the planning and knowledge criteria in virtual learning environments.

Regarding the effects of the pandemic, they were not only related to physical health, but also reported changes in behavior, repercussions on mental health, emotional state and academic performance; the foregoing related to the perception of considering the situation as a serious or extremely serious event that caused changes in life habits, symptoms of anxiety, stress, anguish and worry.

The main difficulties that students face and that limit online education, but also put educational continuity at risk, are the following: a) limited access to digital educational platforms, b) the technological equity gap between the different geographic localities of the state of Guerrero, c) the limited knowledge that students and teachers have about the different digital tools available for online education, d) the few offline initiatives to respond and solve the problem related to university students without internet access and e) the psychosocial effects of confinement associated with covid-19.

Future lines of research

The federal proposal of the Anuies proposes to generate new lines of action that structure and define the new educational models, the emergence of new paradigms and best educational practices. Given this perspective, various strategies have been implemented to guarantee educational continuity in the transition from the face-to-face class modality to the online modality, and to identify areas that allow optimizing learning and innovation in education in the new educational model. The results and the methodological tools used in this study can serve as a platform for carrying out situational diagnoses of online education that allow detecting strengths and weaknesses in the teaching-learning process and help increase educational quality.

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