Distance Education: Technology and Connectivity as Preventive Resources in the COVID-19 Pandemic at Public Higher Teacher Training Schools in Baja California Sur, Mexico

José Luis Arcos Vega[1], Fabiola Ramiro Marentes[1], Gustavo Rodolfo Cruz Chávez[2], Marissa López Paredes[3]

[1]Universidad Autónoma of Baja California, Mexicali, Mexico
[2]Autonomous University of South Baja California, La Paz, Mexico
[3]Polytechnic University of Baja California, Mexicali, Mexico
Email: fabiolaramiro@gmail.com

Abstract

We shall present a descriptive, quantitative study with the purpose of analyzing the technological and connectivity resources that teachers had during the preventive period of COVID-19 in the year 2021. We analyzed the technological and connectivity resources at home; the resources, tools or strategies used by teachers, the platforms used to communicate, as well as the difficulties that students faced to be able to carry out distance education. A survey was applied to 225 teachers in the Public Teacher Training Schools in the state of Baja California Sur. We found that most of the teachers had connectivity (Internet) and computer equipment at home. The main technological resource used was the cellular phone and their main support was the Google Classroom platform. They communicated with their students through WhatsApp; most of the students had lack of connectivity and access to equipment.

Keywords

Information and Communication Technologies (ICTs), Distance Education, Teachers, Higher Teacher Training School, COVID-19

1. Introduction

The Ministry of Public Education of the State of Baja California Sur (BCS) in Mexico, applied the State Survey to the teachers of the Public Teacher Training School subsystem in BCS (SEPBCS, 2021), with the purpose of finding out more

about the existing conditions for the teachers designated to Information and Communication Technologies during the preventive isolation due to SARS-CoV-2 (COVID-19). For this, we analyzed the technological and connectivity resources that teachers had at home to carry out their activities, the tools and strategies utilized, the media or platforms used to communicate with their students to conduct Distance Education. The study took place in order to understand if the distance education strategy done by this education sector has been functional from their perspective to offer a proper education attention. Therefore, part of the question was: What were the technological and connectivity resources that teachers had available to them during the preventive isolation due to SARS-CoV-2 (COVID-19) in 2021? In addition to this, the objective of the study is to describe the technological and connectivity resources that teachers in the Public Teacher Training School subsystem in Baja California Sur had access to during the prevention period due to SARS-CoV-2 (COVID-19) in 2021.

Due to the confinement resulting from COVID-19, in Mexico, all the education system had to migrate to online education, where it is calculated that there were 35 million Mexicans from every school level that went from the face to face to the online system. Teachers were forced to learn how to use technology to be able to provide that education (INDS, 2020). Coronavirus which broke out in Wuhan, a Chinese city, extended to every country in the world. By April 21, 2022, there were 508 million coronavirus (SARS-CoV-2) cases recorded in the world. China, the country where it was considered that coronavirus first broke out, has confirmed up to this moment about 196,100 COVID-19 cases. However, the classification is led by the United States with around 82.6 million confirmed positive cases. Regarding Europe, the 47 European countries have reported infected citizens, where France, Spain, Russia, the United Kingdom, Italy, and Germany hold the highest figures (Statista, 2022). In Mexico, by April 23, 2022, according to the information provided by the Mexican government, there were 5,733,514 reported cases (Gobierno de México, 2022). Due to the fact that education centers are contagious points, in March 2020, the governments decided to bring classes to a halt from preschool level all the way to the university. For that reason, State ministries and secretariats, together with the cancelling of classes, issued recommendations to save the school year and teachers were forced to choose innovative solutions through distance education and maintain communication with students and families to lessen the impact that the sudden interruption of the school year (Baptista et al., 2020). In accordance to this, Public Teacher Training Schools that are part of the Higher Education subsystem in the state of Baja California Sur, with the participation of 12 state institutions that are located in the municipalities of Mulegé, Loreto, Comondú, La Paz and Los Cabos. According to the figures of the National Institute of Statistics and Geography (INEGI, 2021a), due to the COVID-19 pandemic, 33.6 million people, ranging from the ages of 3 to 29 years, interrupted their face-to-face education. These students were enrolled in the 2019-2020 school year, and reported that at

least 740 K (2.2%) did not complete the school year due to a reason related to COVID-19 (Medina et al., 2021). Hence, the Mexican students and teachers of the Mexican National Education System sought to adapt to the sanitary emergency situation by implementing distance education, according to the instructions provided by the Ministry of Public Education, with the support of Education Institutions (Medina et al., 2021).

The contingency generated by COVID-19 in Mexico, forced teachers to have to suddenly have to use digital tools to give continuity to their courses through virtual education (Baptista et al., 2020). This form of education is seen as the result of new Digital Communication and Information Technologies along with the creation of web access systems. This form of education offsets the classroom towards the web and incorporates a set of changes in learning, as well as establishing a wide range of coverage, thus becoming the scenario for the society of access. Web-based training is a distance training form that facilitates the communication between the professor and the students as determined by synchronous and asynchronous communication tools. This refers to the fact that technological change promotes the virtualization of education as part of a teaching model that incorporates technology, the acquisition of different competencies by the participants, and it also allows organizing the learning. In the form of virtual education, information technologies (ICTs) are considered as a support in the generation of a new space for education and, a new education form that functions by using electronic education resources in charge of fostering new skills and abilities in the individuals. According to Fernández (2014), in the learning supported by online education, several variables conjoin, among which are mainly the contents and activities, the interaction and communication of the participants, the technological platform utilized, and the technological devices connected to the internet.

Several analyses have been carried out on the matter, trying to record the most relevant events, among which we have the one conducted by the Benemérita Universidad Autónoma de Puebla (BUAP) regarding the *Development of an Integration Model of the Information Resulting from the Evaluations and Actions Conducted by Each Professor in the BUAP Digital Platforms* (*El Desarrollo del modelo de integración de la información resultante de las evaluaciones y las acciones realizadas por cada profesor en plataformas digitales de la BUAP* (BUAP, 2020); the study on the *Math Solving Activities with the Support of the Animated Series Renata y Los Problemas in the Context of the SARS CoV-2*1 *Emergency* (*Actividades de resolución de problemas matemáticos con apoyo de la serie animada Renata y Los Problemas en el contexto de la emergencia sanitaria SARS CoV-2*1) by Cabello, Arriaga and Felmer (2021). The study "Issues, Challenges, and Suggestions for Empowering Technical Vocational Education and Training Education during the COVID-19 Pandemic in Malaysia" by Yeap, Suhaimi and Nasir (2021). The study called "*COVID-19 and the Closing of Universities, Prepared for Quality Distance Education*? (*COVID-19 y Cierre de Universidades*?

Preparados para una Educación a Distancia de Calidad?) by Quintana (2020); the study on the *Impacto f the Pandemic in Middle-Higher Education in Mexico: An Analysis from the Pedagogical, Psychological, and Technological Perspective*" (*El impacto de la pandemia en la educación media superior mexicana: un análisis desde lo pedagógico, psicológico y tecnológico*) conducted by Medina et al. (2021); "*The Effects of the COVID-19 Pandemic on Learning and the Emotional Situation of University Students in Mexico*" (*Los Efectos de la pandemia del COVID-19 en el aprendizaje y situación emocional de estudiantes universitarios mexicanos*) by Erosa, Guzmán and Villaseñor (2021). This information was presented at the 16th National Research on Education Convention on November 17, 2021; and the study on "*Academic Continuity During the Global Sanitary Emergency Due to COVID-19: Education 4.0 and the Flexible and Digital Model of the Tecnologico de Monterrey in Mexico to Support Junior High School Education*" (*Continuidad académica durante la emergencia sanitaria global COVID-19: Educación 4.0 y el Modelo Flexible y Digital del Tecnológico de Monterrey en México como apoyo a la educación secundaria*) carried out by Molina et al. (2021) and published in the National Association of Higher Education Universities and Institutions (ANUIES). These studies analyze the monitoring of academic activities carried out by teachers through digital platforms, in the context of the health emergency due to COVID-19, to understand the barriers and facilitators for multimedia resources in emergency distance learning in different contexts, *mainly finding deficiencies in the technological skills of the teachers, as well as the lack of infrastructural resources.*

According to the UNESCO, the closing of universities accelerated the abrupt entrance to the new learning era. The almost immediate digital transformation demands of education institutions not only required the incorporation of ICTs, but it also required the creation or modification of processes and the availability of people with the adequate skills and abilities to carry out the aforementioned processes and technologies. However, since there was not enough time to prepare for these conditions, teachers implemented creative and innovative solutions, acting and learning as they went, thus showing the adaptability and flexibilization of course contents and design for the learning in the different training areas (IESALC-UNESCO, 2020).

As we advanced through the pandemic, the most affected role players were education institutions, teachers, and students. This activated the survival mode in the involved parties, this invited them to create a more cautious environment that would ensure, which invited them to create a more cautious environment that would ensure the learning environment and would provide the necessary measures to address future contingencies. Therefore, preparation programs for teachers must be generated (Katz et al., 2020; Reimers & Schleicher, 2020), due to the minimal preparation that they have on these issues (Eklund et al., 2018). Experts predict that health crises will happen again in the future, and for that reason it is really important to keep in mind the lessons learned, among other

important aspects such as social, emotional, cultural, etc. It is of great importance to strengthen the educational structure, as well as supporting the stakeholders. (Darling & Hyler, 2020).

2. Teacher Training Schools and Teacher Training Institutions in Mexico

In Mexico, higher education is a right which contributes to the individual welfare and development. It is compulsory in accordance with Article 3 of the Constitution. According to the General Law of Higher Education (LGES), the higher education level is the one taught after middle higher level, and is composed of the following levels: University Professional Technician (Associate's Degree or its equivalent), Bachelor's Degree, Specialization Course, Master's Degree, and PhD. This includes university, technological, teacher training, or teacher development education (Diario Oficial, 2021).

According to Article 20 of the LGES, higher education is part of the National Education System. A branch of it is the National Higher Education System (SNES), which is the organic and articulated set of stakeholders, institutions, and processes to provide the higher education public service taught in different ways, provided by the State, its decentralized entities and offices, also taught by private parties with the proper authorization and official studies validation. According to Article 28 of the LGES, the SNES is integrated by the following subsystems: universities, technological, and teacher training and development schools (Diario Oficial, 2021). In the 2020-2021 school year, according to the National Institute of Statistics, Geography, and Informatics (INEGI), there were in 129,251 students enrolled in the higher education institutions in Mexico (INEGI, 2021c).

Regarding the Teacher Training and Development Education Subsystem, the LGES establishes that the purpose of it is to integrally prepare education professionals from the different school level: basic, middle higher, and at a higher level in Bachelor's, Specialization, Master's and Doctoral degrees so that they contribute to the construction and development of a fair, inclusive, and democratic society. Likewise, to contribute to the strengthening and continuous improvement of basic and middle high education to achieve inclusion, equity, and education excellence; as well as to develop research, outreach, and training activities in their own areas of expertise. The Teacher Training and Development Education Subsystem is integrated by public and private teacher training schools, pedagogical universities, rural teacher training schools, and teacher training centers (Diario Oficial, 2021).

According to the Ministry of Public Education (SEP), the Teacher Training Subsystem, is in charge of preparing preschool, elementary, and middle school teachers. This is done through the national teacher training school network. Teacher Training Schools offer, among other things, bachelor degree programs for teachers in preschool education, elementary, bilingual intercultural elementary, middle school, special education, initial education, physical education, and

arts (SEP, 2021).

In Mexico, during the 2019-2020 school year, according to higher education statistics, the teacher training school subsystem had 92,187 students enrolled in their bachelor degree programs in the on site form in public teacher training schools, and 11,464 in private teacher training schools, together with 14,262 teachers in 405 schools (SEP, 2020).

3. Available Connectivity and Equipment for Home Schooling in COVID-19 Times

As a result of the COVID-19 pandemic, on-site education was forced to migrate to distance, where the education stakeholders had to act immediately and provide virtual education under the new existing conditions. Virtual learning has involved education leaders, teachers, students, as well as other role players. A great amount of planning and preparation was required to be able to provide virtual learning and breach the education gap (Harris, 2020). But there were still situations pending that have become important issues, such as the problems that higher education institutions are facing to maintain the health of their students, teachers, and administrators (Aguilera-Hermida, 2020; Aliyyah et al., 2020; Bacher-Hicks, Goodman, & Mulhern, 2021; Day et al., 2021; Kaden, 2020).

Some higher education institutions were in the position to migrate from the traditional scheme to a hybrid one, focusing on virtual and distance learning for the execution of their courses. In order to carry this out training, facilitation, and guidance of e-learning sessions was required (Camilleri, 2021).

Also, adequate home connectivity and internet were required to be able to use the learning management systems such as: Moodle, Massive Open Online Courses (MOOCs), Coursera, EDx Zoom, Webex, Skype, Amazon Web Services, Microsoft Onedrive, GoogleDrive, and other resources to work synchronically and to promote learning (EUA, 2020).

According to the UNESCO (2020), half of all students—about 826 million—who were unable to attend school as a result of the COVID-19 pandemic, did not have access to a computer at home, and 43% of them (706 million) did not have internet access at home at a time when digital distance education is used to guarantee continuity in teaching in most of the countries. Even for teachers in countries that have a reliable ICT infrastructure and home connectivity, the rapid transition to e-learning has been difficult. In the case of professors in regions where access to ICTs and other distance learning methodologies are more reduced, transition has been even more difficult or even impossible.

In Mexico, the *National Survey on Availability and Use of Information Technologies at Home* (ENDUTIH) 2020, conducted by the National Institute of Statistics and Geography (INEGI), in collaboration with the Ministry of Communications and Transportation (SCT) and the Federal Institute of Telecommunications (IFT), published its results in the month of June 2021, and the estimates of the ENDUTIH 2020 allow us to characterize the phenomenon of IT availabil-

ity and use at homes nationwide in the urban environment, as well as in the rural. The survey showed that, in Mexico in the year 2020, there was an estimated internet user population of 84.1 million, which represent 72% of the population 6 years of age or older; 78.3% corresponds to the population located in urban areas, and 50.4% in the rural sections. The three main media used by user to go online in the same year were: smartphones 96%, laptop 33.7%, and Smart TV 22.2%. The main activities that internet users performed were: communicate 93.8%, look for information 91.0%, and access social media 89.0%. There were 88.2 million cell-phone users (75.5% of the population aged 6 years or more). 9 out of 10 cell-phone users had a smartphone. It was estimated that there are 44.4 million computer users, which represents 38% of the total population within that age range. The main activities conducted by computer users at home were school tasks (54.9%) (INEGI, 2021b).

In spite of the apparent optimistic figures, problems in the education field when it came to facing the COVID-19 pandemic posed a series of challenges. So, in that same year, 2021, the INEGI, was highlighting the new challenge that represented measuring the impact of the pandemic in different sectors that countries around the world have to face, especially in education (INEGI, 2021a) due to the home connectivity and equipment situation. According to the results of the *Survey to Measure the Impact of COVID-19 in Education* (*ECOVID-ED*) 2020 *National Data* presented by the INEGI (2021a); 55.7% of all higher education population used a laptop as a tool to take classes, and to have access to equipment, 28.6% of households with individuals ages 3 to 29 years old enrolled in education had to make an additional expense to purchase smartphones, 26.4% had to hire fixed internet service, and 20.9% to purchase furniture such as chairs, tables, desks, or to adapt a place to study (INEGI, 2021a).

Even though ECOVID-ED 2020 results show advantages and disadvantages of distance classes, the survey indicated that 56.4% think that a benefit of distance education is that the students' health is not at risk, in addition to the advantages that family connection entails 22.3%, and savings in several expenses such as fare and school supplies 19.4%. However, the main disadvantages are that 58.3% of the people said that they feel that you do not learn, or that you learn less than in face-to-face classes, in addition to the lack of student progress follow-up (27.1%), along with the lack of technical or pedagogical skills of parents or tutors to transmit knowledge (23.9%) (INEGI, 2021a).

As a result of the pandemic, public and private education institutions implemented programs to continue with distance education through the use of ICTs, tools that have played an important part in the communication between teachers and students. The digital tools most widely used by higher education students during the school year 2019-2020 were laptops (52.4%) desktop computers (12.9%) which altogether represented 65.3%; smartphones were used by 33.4%. 67.7% of higher education students were able to have access to the device that they used for distance classes or activities, 28.5% shared their device with other

people in their household (INEGI, 2021a).

In addition to equipment and connectivity, the ECOVID-ED 2020 results showed among other things, that the percentage of people who did not conclude the school year due to different reasons, the ones resulting from the COVID-19 pandemic were 44.6%; the percentage that did not finish the 2019-2020 school year due to lack of resources or because they had to work was 17.1% (INEGI, 2021a).

All of these situations had an effect in the teaching-learning process in higher education institutions, and the Teacher Training Schools were no exception.

According to these examples, the following was determined as the study's objective.

4. Method

The analysis method was quantitative, non-experimental, transactional, descriptive (Hernández, Fernández, & Baptista, 2014). The analyzed variables were: 1) The technological and connectivity resources available in the household, 2) the resources, tools or strategies used to carry out distance education; 3) the media or platforms used to communicate in distance education; and 4) the difficulties that students face when having to participate in distance education. The analyzed population was composed of 296 teachers. The survey was applied to every teacher and the response rate was of 225 teachers, which represents 76.01% out of the total professors. The teachers were part of 12 higher education institutions in the Public Teacher Training School subsystem in the municipalities of: Mulegé (7.6%), Loreto (7.1%), Comondú (20.9%), La Paz (45.3%) and Los Cabos (19.1%) in the state of Baja California Sur. They were part of 20 Bachelor's Degree education programs. The survey was designed with the help of Google Form. It was applied online and the analysis technique was descriptive. Frequencies and percentages were obtained and the information pertains to the year 2021. The instrumentation of the questionnaire with its reagents was established by a national policy in Mexico, through the Secretary of Public Education in collaboration with the states to know the impact and evolution of the use of technology and platforms in relation to learning and number of students who actually dropped out.

5. Results

Descriptive results are presented regarding the analysis of technological and connectivity resources in distance education in the Public Teacher Training School subsystem in Baja California Sur during the preventive period due to COVID-19, and correspond to the surveys applied to 225 teachers. The data was obtained through the application of a structured survey that was designed with the Google Forms tool, and its application was carried out online from February 24 to March 3, 2021, with the support of the Higher Education for Professional subsystem in Baja California Sur. Total data results are shown in percentages orga-

nized in graphics. Most of the teachers were female, 65.78%, and 34.22% were male. We are presenting the results of the technological and connectivity resources available in households, the resources, tools or strategies used to carry out distance education, the media or platforms used to communicate with the students in distance education, and the difficulties that students face to participate in distance education. All data pertains to the year 2021.

Technological and Connectivity Resources Available in Teacher Households: Results show that most teachers had connectivity at home, 94.67% of them have Internet, and the main technological resource that they use is their cell-phone, 88% use it for their classes, followed by 85.78% who have computer equipment at home. Also, 70.22% have a television, 61.33% uses mobile data; 27.11% have a tablet (see Graphic 1).

Resources, Courses, Tools or Strategies Used by Teachers to Carry Out Distance Education. Most of the teachers surveyed, 90.67%, used mainly the Google Classroom platform as a tool to conduct their online classes. The main resources used to support online distance teaching were the website used to share videos: Youtube (38.22%), own resources (35.56%) and 30.67% used the Google of Google Form formats (see Graphic 2).
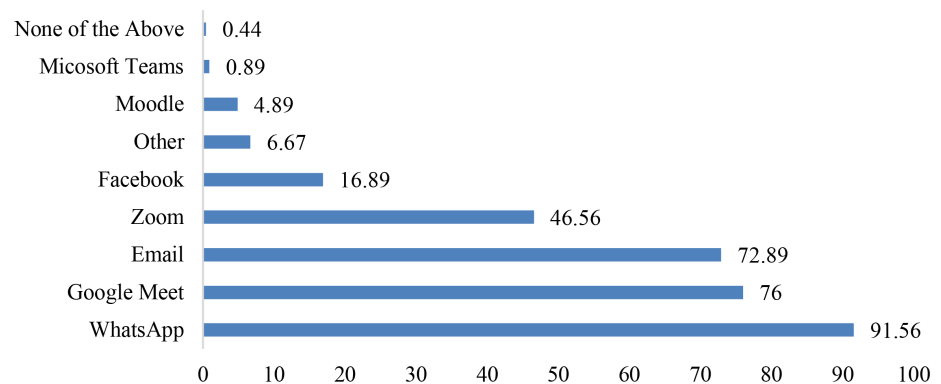
Media or Platforms Used by Teachers to Communicate in Distance Education with Their Students. Results show that the most widely used media by teachers to communicate with students in distance education were the following: 91.56% used WhatsApp, 76% of them used the videoconference service from Google Meet, 72.89% used email, 46.56% used the Zoom video chat software, and 16.89% used Facebook. A smaller percentage also used Moodle, 4.89% used the communication and collaboration tool Microsoft Team; and 6.67% used other media to teach their classes, them being Messenger, the NEO learning platform, the Discord messaging service, Google Drive, software to present and record classes, the Duo cell phone app, Google Hangouts, the EDU 2.0 learning management system, and the videoconference and messaging software Jitsy (see Graphic 3).
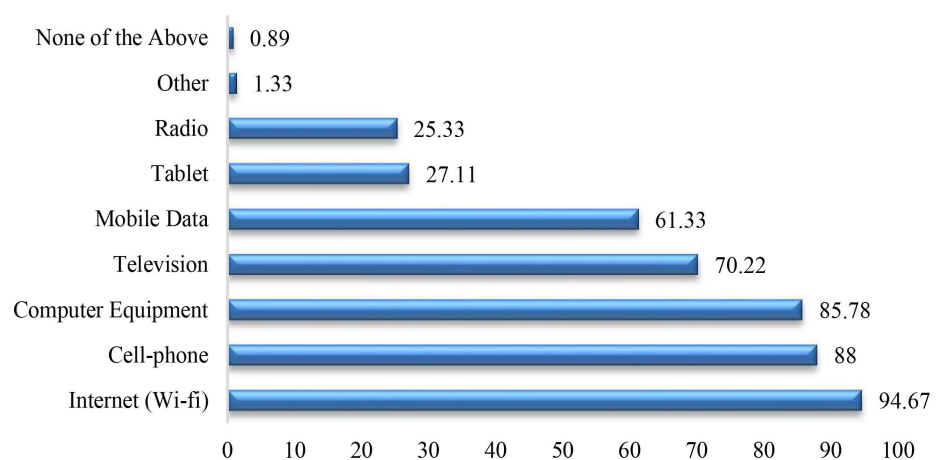
Graphic 1. Resources, techonological and connectivity courses that teachers have at home (percentages).
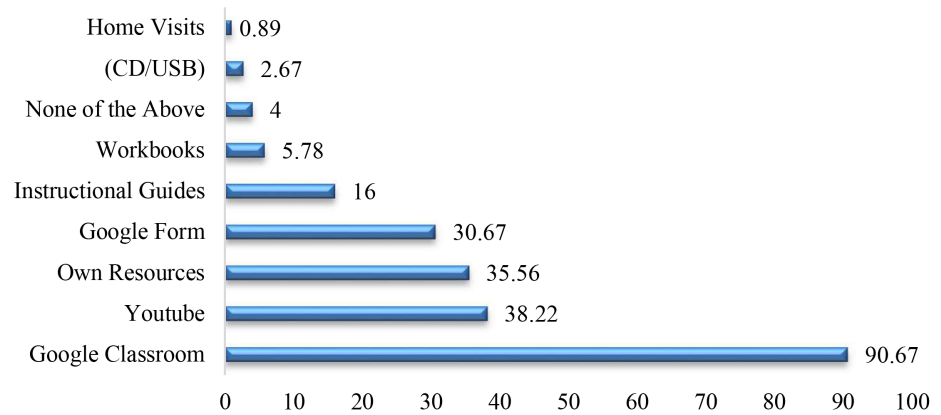
Graphic 2. Resources, tools, or strategies used by the teacher to develop distance education among the students (percentages).

Graphic 3. Media or platforms used by teachers to communicate in distance education with their students (percentages).

Difficulties Detected by Teachers That Students Face to Carry out Distance Education. Results show that the difficulties detected by teachers as far as what students have to face in distance education related to ITCs are the following: 90.67% have connectivity issues, and 74.67% had a lack of technological equipment; other relevant aspects were that 75.11% of students were working, 45.78% stated that they disliked distance education, 44% felt a lack of motivation, 40.44% reported health issues in their families, 36.44% stated uncertainty to the pandemic, 24.89% had health problems, 24% required individual guidance; and 2.22% had other difficulties, such as thinking that they would not fail the course and performed other activities, did not pay the proper attention to their education, autonomy in their own academic performance processes, financial issues, even though they had the technological equipment(cell-phone, tablet, or computer) they were not necessarily willing or trained to use them as a tool for systematic distance learning (see **Graphic 4**).

Access to the connectivity service (Internet), use of electronic devices such as cell phones and electronic applications such as WhatsApp and Messenger, which were the most widely used by teachers to communicate with their students in their classes, were paid for with the teachers' own resources. Therefore, it did not
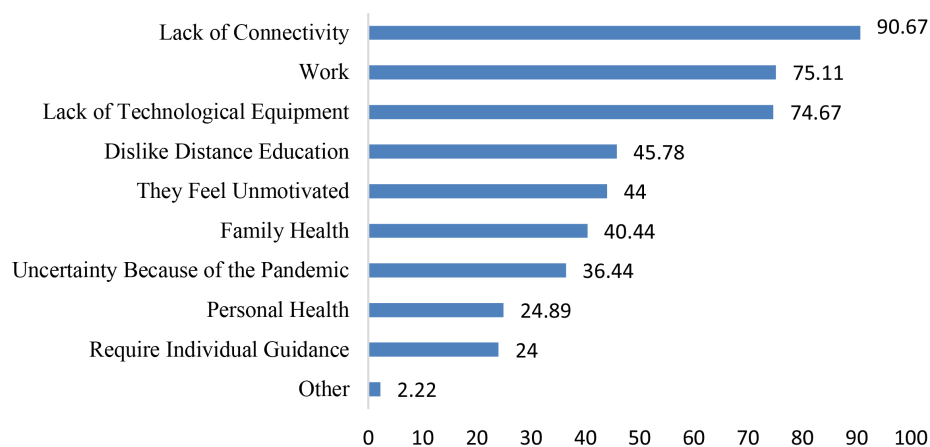
Graphic 4. Difficulties detected by teacher, that students face to carry out distance education (percentages).

imply a strategy on the part of your workplace to support distance education.

Although, the platforms or means that they used the most to communicate in distance education with their students were free, such as Google Meet, Google Drive, email, with the management support of the Educational Institution.

The situation of the students was more complex, since the teachers identified that most of the students presented difficulties for an optimal performance in their classes, due to the lack of connectivity and technological equipment.

Therefore, it is evident that the situation caused by the pandemic found an educational system which was not prepared to face distance education in contingency cases. Such was the case due to COVID-19, and the Connectivity and Technologies (ICT) resources available for teachers and students, therefore reducing the negative impact it produces in the teaching-learning process in teachers and students of the Public Teacher Training Schools in Baja California Sur.

6. Conclusion

From the standpoint of access to technological and connectivity resources in their households, most teachers had connectivity (Internet) and computer equipment in their households. Teachers stated that some students did not have access to computers, connectivity network, or a cell-phone to access the digital platform to take their classes or open networks that are free of charge since some of their parents lost their jobs during the pandemic or because they live in rural areas.

Regarding the teachers' experience with distance education, we discovered that they were not trained and that they do not have the resources, tools, or teaching strategies to develop and teach this type of classes; particularly as far as access to open networks free of charge to teachers. It is important to highlight that sometimes they did not have access in distant areas, and they suggested developing audiovisual material to teach their classes. The main technological resource used was their own cell-phone.

Teachers came to the conclusion that the most widely used media or platform

was mainly Google Classroom, as well as those hired by the students at home and that is open to the public and for the community to use to communicate and have access to distance education. However, the academic performance of the students was in some cases that they dropped out of school since they did not have the financial conditions in their families to continue paying for the service and to take the subjects and curricular contents to obtain their academic credits.

The difficulties faced by students to carry out distance education got complicated because of the lack of connectivity, access to equipment, and the low access to platforms and social media since they lived in isolated areas. Also, for not having the technological means, or because their father or mother lost their job, and in particular when the students' tasks were not followed up by the teacher since many times the parents do not have the basic or didactical training to accompany their children to be able to continue with distance education.

On the other hand, the challenge that the higher education subsystem of teacher training schools, state and public universities, is the maintenance and access to technologies in suburban places in the different regions in Mexico, including the state of Baja California Sur.

Acknowledgements

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

References

Aguilera, H. A. P. (2020). College Students' Use and Acceptance of Emergency Online Learning Due to COVID-19. *International Journal of Educational Research Open, 1,* Article ID: 100011. https://doi.org/10.1016/j.ijedro.2020.100011

Aliyyah, R. R., Rachmadtullah, R., Samsudin, A., Syaodih, E., Nurtanto, M., & Tambunan, A. R. S. (2020). The Perceptions of Primary School Teachers of Online Learning during the COVID-19 Pandemic Period: A Case Study in Indonesia. *Journal of Ethnic and Cultural Studies, 7,* 90-109. https://doi.org/10.29333/ejecs/388

Bacher, H. A., Goodman, J., & Mulhern, C. (2021). Inequality in Household Adaptation to Schooling Shocks: COVID-Induced Online Learning Engagement in Real Time. *Journal of Public Economics, 193,* Article ID: 104345. https://doi.org/10.1016/j.jpubeco.2020.104345

Baptista, L. P., Loeza, A. C. A., Almazán, Z. A., López A. V. A., & Cárdenas, D. J. L. (2020). Encuesta nacional a docentes ante el COVID-19. Retos para la educación a distancia. *Nueva Época, 50,* 41-88. https://rlee.ibero.mx/index.php/rlee/article/view/96/369

Benemérita Universidad Autónoma de Puebla (BUAP) (2020). *Desarrollo del modelo de integración de la información resultante de las evaluaciones y las acciones realizadas*

por cada profesor en plataformas digitales de la Benemérita Universidad Autónoma de Puebla. Reporte Final.

Cabello, P., Arriagada, S., & Felmer, P. (2021). Actividades de resolución de problemas matemáticos con apoyo de la serie animada Renata y Los Problemas en el contexto de la emergencia sanitaria SARS-CoV-2. *Calidad en la Educación, 55,* 120-155.

Camilleri, M. A. (2021). Shifting from Traditional and Blended Learning Approaches to a Fully Virtual and Remote Course Delivery: Implications from COVID-19. *Academia Letters*, 481. https://doi.org/10.20935/AL481

Darling, H. L., & Hyler, M. E. (2020). Preparing Educators for the Time of COVID … and Beyond. *European Journal of Teacher Education, 43,* 457-465. https://doi.org/10.1080/02619768.2020.1816961

Day, T., Chang, I. C. C., Chung, C. K. L., Doolittle, W. E., Housel, J., & McDaniel, P. N. (2021). The Immediate Impact of COVID-19 on Postsecondary Teaching and Learning. *The Professional Geographer, 73,* 1-13. https://doi.org/10.1080/00330124.2020.1823864

Diario Oficial (2021). *Ley General de Educación Superior, 20 abril 2021.* http://www.diputados.gob.mx/LeyesBiblio/abro/lces/LCES_abro_20abr21.pdf

Eklund, K., Kilpatrick, K. D., Kilgus, S. P., & Haider, A. (2018). A Systematic Review of State-Level Social-Emotional Learning Standards: Implications for Practice and Research. *School Psychology Review, 47,* 316-326. https://doi.org/10.17105/SPR-2017.0116.V47-3

Erosa, R. E., Guzmán, J. C., & Villaseñor, P. M. (2021). *Efectos de la pandemia del COVID-19 en el aprendizaje y situación emocional de estudiantes universitarios mex-icanos.* Ponencia. XVI Congreso Nacional de Investigación Educativa.

EUA (European University Association) (2020). *COVID-19 and Universities*. European University Association https://www.eua.eu/issues/27:COVID-19-and-universities-in-europe.html

Fernández, M. K., & Vallejo, C. A. (2014). La educación en línea: Una perspectiva basada en la experiencia de los países. *Revista de educación y desarrollo, 29,* 29-39. https://www.cucs.udg.mx/revistas/edu_desarrollo/anteriores/29/029_Fernandez.pdf?fbclid=IwAR27DLgzyvUIG-hKW79NpyC5RYv4nZUb6S9WM0WY2eM9sNCkLzTSZIUV6ag

Gobierno de México (2022). *Información General*. COVID-19 México. https://datos.COVID-19.conacyt.mx/

Harris, A. (2020). COVID-19-School Leadership in Crisis? *Journal of Professional Capital and Community, 5,* 321-326. https://doi.org/10.1108/JPCC-06-2020-0045

Hernández, S. R., Fernández, C. C., & Baptista, L. P. (2014). *Metodología de la investigación* (6ta. Ed.). McGraw Hill/Interamericana Editores, S.A. de C.V.

IESALC-UNESCO (2020). *COVID-19 y educación superior: De los efectos inmediatos al día después. Análisis de impactos, respuestas políticas y recomendaciones*. https://www.iesalc.unesco.org/wp-content/uploads/2020/05/COVID-19-ES-130520.pdf

Instituto Nacional de Desarrollo Social (INDS) (20 mayo del 2020). El sistema de educación a distancia, la pandemia y las desigualdades de género. *Comunicado de Prensa*. Gobierno de México. https://www.gob.mx/indesol/prensa/el-sistema-de-educacion-a-distancia-la-pandemia-y-las-desigualdades-de-genero-272674?idiom=es#:~:text=Debido%20al%20confinamiento%20todo%20el,l%C3%ADnea%2C%20%E2%80%9Centonces%20de%20un%20aprendizaje

Instituto Nacional de Estadística y Geografía (INEGI) (2021a). INEGI presenta Resultados de la Encuesta Para la Medición del Impacto COVID-19 en la educación (ECOVID-ED) 2020. Datos Nacionales. *Comunicado de prensa* Núm. 185/21. https://www.inegi.org.mx/contenidos/saladeprensa/boletines/2021/OtrTemEcon/ECOVID-ED_2021_03.pdf

Instituto Nacional de Estadística y Geografía (INEGI) (2021b). En México hay 84.1 millones de usuarios de Internet y 88.2 millones de usuarios de teléfonos celulares: ENDUTIH 20201. *Comunicado de Prensa* Núm. 352/21. https://www.inegi.org.mx/contenidos/saladeprensa/boletines/2021/OtrTemEcon/ENDUTIH_2020.pdf

Instituto Nacional de Estadística y Geografía (INEGI) (2021c). *Matrícula escolar por entidad federativa según nivel educativo, ciclos escolares seleccionados de 2000/2001 a 2020/2021.*

Kaden, U. (2020). COVID-19 School Closure-Related Changes to the Proffesional Life of a K-12 Teacher. *Education Sciences. 10,* 165; https://doi.org/10.3390/educsci10060165

Katz, D., Mahfouz, J., & Romas, S. (2020). Creating a Foundation of Well-being for Teachers and Students Starts with SEL Curriculum in Teacher Education Programs. *Northwest Journal of Teacher Education, 15,* Article No. 5. https://doi.org/10.15760/nwjte.2020.15.2.5

Medina, G. L., Chao-Rebolledo, C., Garduño-Teliz, E., Baptista-Lucio, P., González-Videgaray, M., Covarrubias-Santiago, C. A. et al. (2021). El impacto de la pandemia en la educación media superior mexicana: Un análisis desde lo pedagógico, psicológico y tecnológico. *Revista Iberoamericana de Educación, 86,* 125-146. https://doi.org/10.35362/rie8624356

Molina, A., Villegas, B., Pável, O. C., & Miranda, J. (2021). Continuidad académica durante la emergencia sanitaria global COVID-19: Educación 4.0 y el Modelo Flexible y Digital del Tecnológico de Monterrey en México como apoyo a la educación secundaria. En F. M. Reimers, & F. Marmolejo (Eds.), *La colaboración escuela-universidad durante la pandemia. Manteniendo las oportunidades educativas y reinventando la educación* (pp. 171-186). ANUIES Documentos. http://www.anuies.mx/media/docs/avisos/pdf/211001101752Colaboracion+escuela-universidad+Libre+acceso.pdf

Quintana, A. I. (2020). COVID-19 y Cierre de Universidades ¿Preparados para una Educación a Distancia de Calidad. *Revista Internacional de Educación para la Justicia Social, 9.*

Reimers, F. M., & Schleicher, A. (2020). *A Framework to Guide an Education Response to the COVID-19 Pandemic of 2020.* Organisation for Economic Co-Operation and Development

Secretaría de Educación Pública (SEP) (2020). *Principales cifras del Sistema Educativo Na-cional 2019-2020.* https://www.planeacion.sep.gob.mx/Doc/estadistica_e_indicadores/principales_cifras/principales_cifras_2019_2020_bolsillo.pdf

Secretaría de Educación Pública (SEP) (2021). *Instituciones de educación superior en México.* https://www.educacionsuperior.sep.gob.mx/instituciones.html

Secretaría de Educación Pública del estado de Baja California Sur (SEPBCS) (2021). *Resultados de encuesta estatal a docentes.*

Statista (21 abril del 2022). *Número de casos confirmados de coronavirus en el mundo.* https://es.statista.com/estadisticas/1091192/paises-afectados-por-el-coronavirus-de-wuhan-segun-los-casos-confirmados/

UNESCO (2020). *Surgen alarmantes brechas digitales en el aprendizaje a distancia.* https://es.unesco.org/news/surgen-alarmantes-brechas-digitales-aprendizaje-distancia

Yeap, C., Suhaimi, N., & Nasir, M. (2021). Issues, Challenges, and Suggestions for Empo-

wering Technical Vocational Education and Training Education during the COVID-19 Pandemic in Malaysia. *Creative Education, 12,* 1818-1839. https://doi.org/10.4236/ce.2021.128138