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Teachers' Perception in Selecting Virtual Learning Platforms: A Case of Mexican Higher Education during the COVID-19 Crisis

Marco Antonio Zamora-Antuñano ^{1,†} , Juvenal Rodríguez-Reséndiz ^{2,*,†} , Miguel Angel Cruz-Pérez ^{1,†} , Hugo Rodríguez Reséndiz ^{2,†} , Wilfrido J. Paredes-García ^{2,†}  and José Alfredo Gaytán Díaz ^{3,†} 

¹ Posgrado y Centro de Investigación e Innovación Tecnológica (CIIDETEC-UVM), Universidad del Valle de Mexico, Naranjos Punta Juriquilla 1000, Santa Rosa Jáuregui, Santiago de Queretaro 76230, Mexico; marco.zamora@uvmnet.edu (M.A.Z.-A.); miguel_cruzp@my.uvm.edu.mx (M.A.C.-P.)

² Facultad de Ingeniería, Universidad Autónoma de Querétaro, Santiago de Queretaro 76010, Mexico; hugorore@uaq.edu.mx (H.R.R.); wparedes17@alumnos.uaq.mx (W.J.P.-G.)

³ Ingeniería Automotriz, Universidad Politécnica de Santa Rosa Jáuregui (UPSRJ), Carretera Federal 57, km 31 + 150, S/N, Santa Rosa Jáuregui, Santiago de Queretaro 76220, Mexico; agaytan@upsrj.edu.mx

* Correspondence: juvenal@uaq.edu.mx; Tel.: +52-442-1921200

† All authors contributed equally to this work.



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Abstract: In this project, an analysis is made of the perception of teachers of Higher Education Institutions (HEI) regarding the use of Virtual Learning Platforms (VLP) in the transition from the Traditional Educational Model (face-to-face) to Emergency Remote Teaching (ERT). A statistical analysis of teachers' views on the academic environment caused by the COVID-19 crisis is carried out for the change of educational scenarios from school to home through VLP, the support for teaching–learning knowledge of VLPs and the received training, and the main problems during the transition period. Through convenience sampling, data was collected for a statistical study using a developed instrument (Data collection was designed through the Google Forms application and distributed to public and private HEI teachers). The results of the study showed that more than 60% of respondents had experience using Moodle, Google Classroom, and Blackboard; 80% of teachers had training from their institution for the use of virtual platforms; and in 60% of cases, higher education institutions allowed them to choose the VLP. In addition, the main issues they faced were connectivity, student attitude, and student attendance at class sessions. Fisher's test was conducted to determine the relationship in the variables analyzed by identifying that there are differences of teachers in perception depending on age.

Keywords: virtual learning platforms; emergency remote teaching; teachers of higher education institutions; COVID-19 crisis

1. Introduction

The educational models in Mexico are based on a compilation of theories and pedagogical scopes related to the infrastructure of the educational environment. As fundamentals, it guides the elaboration of the subject contents and the systematization of the teaching–learning process. The curricular contents of the educational models have changed responding to the needs of the reality by incorporating technology [1].

Distance education and distance learning are possible in our days and many institutions are willing to offer this additional service which allows access to training to multiple users. Communication and information technologies bring different advantages when potentiating its scope and covering different educational interests in the population [1].

Teacher's perception is a process that looks to the understanding of the situation of a phenomenon related to the educational environment or the teaching–learning process. Derived from the COVID-19 crisis, teachers rapidly changed their courses from traditional

presentations to Emergency Remote Learning (ERT), with confidence in the virtual learning platforms (VLP) [2,3].

In this study, it is intended to know the opinion of the teachers about the use of VLP. Derived from the COVID-19 crisis, the use of technology and the virtualization of the process was the only possibility to continue with the teaching–learning process and led to a confusion between online education and ERT. Hodges et al. [4] was one of the first differentiating the differences among both of them. Today, there are multiple works reporting the use of technology to transmit contents and contributed to positive results [5].

The number of students who stopped attending higher education institutions (HEIs) worldwide increased exponentially to contain the global pandemic [6]; over 850 million young students and children stopped attending schools, half of the population of students of the world. In over 102 countries, learning institutions were closed [6]. Mexico was not an exception to this rule; over 2M students across 11 higher education systems were affected, as well as the Ministry of Education in Mexico (SEP) [7]. The rapid virtualization of learning environments arose as a consequence of the COVID-19 crisis.

With the pandemic scenario, teachers were asked to continue in virtual teaching environments. The idea that a course could be continued in a virtual environment was easily conceived. Many thought that simply “uploading the course on the internet” would be sufficient to adapt. Consequently, in the media and social networks, teachers expressed their concerns and opinions regarding this matter. Two positions were observed. The first group perceived virtual teaching as an excellent opportunity to apply information and communication technology (ICT). The second group resisted this change in using new technologies in the classroom. Their arguments focused on the lack of efficiency in this teaching method and its approachability and availability for all students.

The haste of this rapid change to a virtual learning platform (VLP) due to the pandemic crisis implied a confused belief that virtual learning does not provide different benefits compared to traditional education. This also suggested that no additional expertise is required in a mixed learning environment (virtual and face-to-face environments) or a 100% virtual environment. Although the learning activities continued, and the outcomes appeared to be satisfactory regarding the adjustment to the virtual education diversity and complexity, there was no analysis of the differentiated teaching and learning outcomes during virtualization. Such analysis is important and necessary [8]. In virtual learning, the teacher is able to respond to queries on technological, andragogical, and pedagogical issues, and as progress is made, teacher self-evaluation and reflection will generate new approaches to the virtualization of academic processes [9].

The development of critical thinking and the capacity for actions congruent with this thinking is not necessarily offered with traditional teaching models, despite opportunities offered with the technological developments for education. Education often requires change, and a change in perspective must be an alliance between those who lead the student body, the teachers, families, communities, and administrations [10].

Technology can be a great ally but only if it is properly positioned as a tool. Virtualization must consist of online educational strategies in which the teacher accompanies the students in their training for the use of VLP with the support of the institution. This training includes tools and resources provided by the web that can be creatively adapted to university training. The present study involves examining the flipped classroom as a student-centered approach that complements the virtual learning process. The initiation of VLP and the emergency events that required learning from home will be referred to as emergency remote teaching (ERT).

2. Theoretical Framework

2.1. Flipped Classroom (FC)

In recent years, the FC has gained importance in the traditional learning system. This model was adapted to the current needs of student-centered learning. The role of the teacher is as a “guide on a side” [11]. The FC model, as part of hybrid learning, is innovative in that it reverses what is typically done in traditional education. Students

prepare their lessons outside of class, and they construct knowledge by accessing the contents of their subjects at home. This is a section that is related to what is known as explicit knowledge [12,13]. In the classroom, they do their homework and interact to carry out activities that require more peer participation. This is linked to what is tacit knowledge. Student activities are primarily based on new technologies and with a teacher acting as a guide [14]. It is important to emphasize that peer participation or tacit knowledge is not an academic skill but that it integrates life situations with meaningful content in a place other than school. The mentioned skill is important and will be carried out in this paper as approaches to learning.

From the end of 2019 to June 2020, the literature reported that course coordinators and students had different views regarding the use of technology [15]. Trust in peers and in the work of the coordinator, motivation, and commitment (social characteristics) proved to be very important for a better learning environment. However, during class time, the wrong use of social media in smartphones was considered to be a problem (PSU) for a deep approach to learning (which facilitates critical thinking skills) that can be solved by interacting and seeking learning with sympathy in activities where social media could be supporting the class [16].

In 2019, Cheng, Ritzhaupt, and Antonenko examined the overall effect of the flipped classroom instruction strategy on student learning outcomes with a set of moderator variables that included the student level, post types, duration study, and subject area [17]. They obtained what was considered significant learning with their instrument's support. However, regarding this strategy and also in 2019, Tomas, Doyle, and Skamp explored how a flipped classroom supported student participation and learning [18]. Still, participation requires the teacher to act in a certain way when approaching and participating just when it is needed [19]. This interaction with the student must be discussed, transformed, and agreed upon by teachers and by leadership teams in education but also by the families, where the inquiry cycle should be part of the family activities for students. This means that social skills are essential to the flipped classroom [18].

2.2. Virtual Learning Platform (VLP)

Many studies were performed regarding the use of virtual platforms, particularly the Moodle platform. The developing learning activities in Moodle have increased the motivation and the interest in learning of the students. Other authors have determined that students, when using the resources and practices of digital technologies, felt comfortable [20,21].

Even when there were positive effects on learning outcomes, student satisfaction with the learning environment was heterogeneous among studies [22]: The variety of results obtained means that satisfaction should be measured considering more than one variable to understand the different ways in which it could be improved. Moderator analyses showed that students in flipped classrooms achieved better learning outcomes when face-to-face class time was not reduced compared to non-flipped classrooms or when questionnaires were added in flipped classrooms [23]. The authors concluded that an adequately designed FC is a promising pedagogical approach. The matter now involves understanding what is required to design this approach successfully and the role of VLPs.

Technological platforms are a technologically supported way to organize learning that can help teachers, school administrators, and other stakeholders make pedagogically or andragogically based decisions when choosing which VLP is better to support student learning. According to Daniela and Rüdolf, learning through VLPs is a way to organize learning supported by technology [24]. Additionally, teacher-training with VLP support solves some limitations regarding the material attached to the platform, the time to prepare the class, administration time, etc. [25].

Another point to consider is that at an international level, a series of innovative pedagogical/andragogical communication proposals have emerged, including "Minecraft Education", "NFB Education", "Educ'Arte", "Scratch", and "7 de Cinema", which are called com-educational platforms. These proposals can help in the way learning process could be organized: based on an education-communication idea. Some studies

implemented a multimodal discourse analysis (MDA) to investigate the characteristics beyond individual idiosyncrasies [10]. This research revealed a common central feature: community creativity as the central phenomenon of VLP-supported learning. With this education–communication approach, more should be discussed regarding the way learning activities are organized and how the principles of education should be supported with deeper theoretical support. In 2019, López found some problems in the use of the virtual platform, such as connectivity problems (Internet speed, access, coverage, collapse of the net during a high demand time); electronic device access (one device for several users in a family, having no devices, or obsolete equipment); limited knowledge of the platform (lack of training in the use of the platform, unawareness of the platform); and energy problems (energy cuts); however, 94% of students were satisfied [26]. In 2020, Hedges et al. gave an explanation of the differences between virtual education and remote teaching which is part of what should be discussed and clarified [4].

2.3. Emergency Remote Teaching (ERT)

In emergency remote teaching (ERT), there is a sudden change from traditional face-to-face instruction to remote learning in the context of an unplanned emergency. This situation is different compared to e-learning in normal circumstances [21], where all learning activities and the needed training for the use of the platform was part of the content and where the way interaction between students and teachers was planned to reinforce learning process. During the start of the pandemic in 2020, Hodges, Moore, Lockee, Trust, and Bond were the first to address the differences between online education and ERT [4]. Affouneh, Salha, and Khalaif affirmed that ERT is not planned [27].

A way to understand part of the change from face-to-face education and ERT could be understood by identifying the differences between academic and non-academic skills mentioned by Palardy [28]. Students and teachers are now required to use non-academic social skills in an academic setting that also is difficult to be familiar with, when physical human contact is not possible [29]. COVID-19 is a global crisis occurring in the era of digital knowledge where socialization is difficult and only accepted when done by virtual conference software. Human contact is being weighted as a support for academic knowledge. The consequences of the socialization change will be reflected in the sociocultural, economic, and political spheres. Amaya-López highlighted the difficulty in the transition from face-to-face education to virtual and remote education within the framework of the health emergency caused by COVID-19 [30]. She stated that it has been a great challenge for teachers, parents, students, and the entire educational system in a scenario that forced the move from school to home. With this change, the pedagogical links (real-life situations) of the family were retaken in the pedagogical processes of the students. Family involvement contributes to the formation of the students and this shows, once again, the importance of social interaction in education as a way to improve the learning process. According to López, ERT was generated as a response to the COVID-19 situation where academic spaces and their contents lacked preparation time for the required development of a virtual environment required by online courses [26].

Whittle, Tiwari, Yan, and Williams provided an educational framework not only for the emerging COVID-19 crisis but also for future ERT sets [31]. During the COVID-19 outbreak, many educators worldwide were quick to switch their practice from classroom teaching to ERT in a matter of days [32]. Still, this global pandemic exposed a significant gap in teacher training for a remote environment. The teacher point of view during this crisis, when using VLP, raised the question of how to distinguish between demographic variables that impact the satisfaction of the teachers from those that has no impact or are not strong. It was important not only to differentiate subjects but also to train the students and teachers involved.

3. Objective

The objective of this research is as follows: Identify the demographic aspects of the teachers that has an impact on the use of VLPs; to know the perception of teaching staff on

the HEIs over the use of VLP during the COVID-19 crisis; and identify the main problems that teachers faced in the process of virtualization of teaching–learning and how this contributes to strategies in preparing the Educational Institutions for this change.

3.1. Research Questions

- Question 1: To what extent demographics of HEI teachers have an impact when using a VLP?
- Question 2: Are there differences in the perception among professors about VLPs established by the HEIs, whether public or private, to be used during the COVID-19 crisis (March–June 2020)?
- Question 3: Is the technological infrastructure of the HEIs sufficient to address the virtualization of the teaching–learning process as a change factor?
- Question 4: What are the main problems faced by teachers trying to generate a significant contribution to the IES strategies?

3.2. Hypothesis

Null hypothesis (H_0): Teachers' perception of the VLP is the same independently of the chosen virtual platform.

$$H_0 : \sigma_1^2 = \sigma_2^2$$

Alternative hypothesis (H_1): There are significant differences in teachers' perceptions due to the choice of the use of VLP.

$$H_1 : \sigma_1^2 \neq \sigma_2^2$$

4. Problem Statement

Due to the COVID-19 crisis, questions arose regarding institutional guidelines for the use of VLPs and the training teachers received to effectively navigate virtual environments. Educational needs should determine the choice of VLP in the change of “face-to-face” to ERT learning and not just the cost of the platform. This decision should respond to the continuity and improvement of the academic activity and the corresponding process management, providing new learning opportunities for the whole organization. In addition, due to the problems of teaching in ERT, universities offered different choices that promote the use of technology even though uncertainty regarding the use of virtual learning scenarios can generate doubts about how education performance is achieved. Thus, the research question guiding this study involved understanding the teacher perceptions of virtual learning platforms (VLPs) during the COVID-19 crisis.

As a clarification about the differences between LMS and VLP, the content of the subject is distributed through the LMS but it is done in the particularity of the selected platform. So, the perception of the teachers is of how efficient the platform was for delivering the contents. In answering questions in this study, it was sought to (a) identify the demographic characteristics of teachers that impact use of VLPs; (b) investigate if the perceptions of teachers regarding the appropriateness of the VLP selected by the HEI could have an impact on the learning process during the COVID-19 crisis; and (c) to identify the main problems that teachers faced in the process of the virtualization of teaching and learning and how this contributes to strategies in preparing educational institutions for this change. One hypothesis was tested statistically, namely, that there are significant differences in teacher perceptions regarding the usability of the VLP chosen by the HEI.

5. Methodology

The steps followed to develop this work are shown in Figure 1 and are explained in detail in this section.

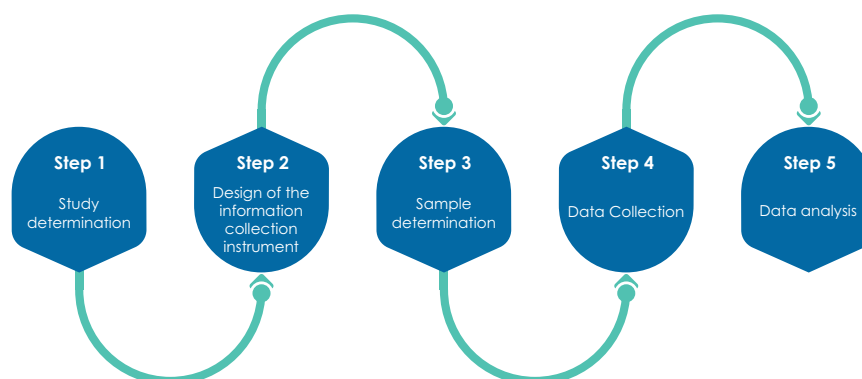


Figure 1. Methodology of the research.

Step 1. Study determination. Research is conducted to know the situation of the HEIs regarding the use of VLP with the ERT.

Step 2. Design of the data collection instrument (Appendix A). Surveys were used in the data collection. This structured technique was intended to obtain answers regarding the perception of the use of virtual platforms by teachers. In this regard, De Groot and Spiekerman indicated that the systematic approach with a series of questions is the most efficient technique to obtain data [33]. Validation of the instrument was carried out using the expert panel technique, where 15 teachers responded to the instrument. The results were analyzed and proved to be reliable. The reliability test of dichotomous-answered questions (Q4, Q5, Q13, Q15, Q17, Q18) was performed using the Kuder–Richardson coefficient, obtaining a KR (20) result of 0.81. In questions Q11, Q12, and Q14, being Likert scale type answers, Cronbach’s Alpha coefficient was used, with a result of 0.82. Kuder–Richardson, and the Cronbach’s Alpha coefficients are considered reliable with results greater than 0.80 [34,35]. After the reliability and validity analysis, the instrument was sent to the Federation Research Commission of Private Mexican Institutions of Higher Education (FIMPES) for them to send it to the schools conforming to the Commission to collect the data presented and analyzed in this study.

Step 3. Sample determination. This instrument was administered in several different private and public higher education institutions from the center of Mexico, supported by FIMPES but the sample was not under the researcher’s control: Those institutions answering were doing it willingly with the intention to understand the situation. The instrument was used to collect data on variables that operate without the researcher interfering with them. A descriptive analysis was conducted using the frequency and percentage analysis of Fisher’s tests, applied to determine the association of the sociodemographic variables with social and cultural dimensions (tacit and explicit knowledge, respectively). FIMPES is an Organization that brings together more than 100 of the main Private Universities in Mexico, serving more than 1M students in their different educational levels. Some public institutions were included in being able to know that it was the phenomenon of virtualization of educational processes from the point of view of teachers in terms of the use of Virtual Platforms and to have knowledge of the situation in general in Public and Private Institutions. Some public institutions were included to look for possible differences in the perception of teachers in those schools.

Step 4. Data collection. The survey was distributed in the period from 23 March to 30 June 2020, using Google Forms, considering the participants.

Step 5. Data analysis. Once the data collection was completed, the dependent variables were organized into two dimensions: social (tacit knowledge) and cultural (explicit knowledge). The social dimension relationships address the teacher relationship established with the students at both the academic and the non-academic level and the experience he has to deliver the content in a specific context. The professional links that the teacher can establish will increase and extend in the social and professional life, which also gives a particular way to understand the subject. There is also a cultural dimension where the education and knowledge are relevant in the profile of the teacher that is centered on the required contents

for professional development. Fisher's test was applied to the dichotomous associated variables to make the statistical analysis. Fisher's test is the most appropriate because of the type of data collected. So, Fisher's test able to us accept or reject the hypotheses stated in this paper.

Participants

Convenience sampling was used to recruit 133 teachers from 93 public and private educational institutions in Mexico who voluntarily agreed to respond to the instrument in the established period. The sample is not representative, but all the subjects (teachers) of the population have the same probability to be selected in the sample. The data that was delivered by FIMPES was used and the researchers had no control over the way the survey was delivered and quantity of respondents.

The instrument was used to collect the following information: email; name of the institution; geographic location; type of institution; years of teaching experience; educational level; gender; age; experience with and level of knowledge of virtual learning platforms; technological development (skills developed in the use of technology); other platforms known; and the training received in the management of virtual platforms from the education institution, including the organization and problematic elements. The instrument had 19 questions, including 4 open-response questions and 15 closed-response questions.

6. Results

6.1. Answered Research Question

Question 1: To what extent demographics of HEI teachers have an impact when using a VLP? The hypothesis was tested statistically, and there are significant differences in teacher perceptions of private and public schools regarding the usability of the VLP chosen by the HEI.

Question 2: Are there differences in the perception among professors about VLPs established by the HEIs, whether public or private, to be used during the COVID-19 crisis (March–June 2020)? The perception did not change between teachers of the public sector and private schools.

Question 3: Is the technological infrastructure sufficient to address the virtualization of the teaching–learning process? Technological and computer infrastructure was not sufficient in all HEIs cases. The HEIs did not have the sufficient or adequate technological and computer infrastructure to carry out the teaching–learning process in the most appropriate way at the beginning and during the COVID-19 crisis [36]. A series of related problems were identified regarding this issue. Question 4: What are the main problems faced by teachers trying to generate a significant contribution to the HEIs strategies?

Table 1 shows the principal problem teachers had: first, internet connection, and second, the students' attitudes to virtual learning (Are they really working or distracted now that they are unsupervised? Do they participate in class discussions? Are they responsible of their own learning? Do they organize their time and are they accountable of their self organization? Do they trust in their teacher and his professional and didactic skills?). In Q19, the teachers identified one or more responses from the given options considering the main problems: Internet connection, students' attitudes, and student attendance.

Table 1. Main problems identified by the teachers.

Internet connection and equipment	63.50%
Student attitude	46.20%
Student attendance	46.20%
Material development	30.80%
Class delivery	28.80%
Communication with the institution	9.60%

Sociodemographic Results

Figure 2 shows the main sociodemographic results. The teachers who responded to the survey were 70% from private institutions and 30% from public institutions. It was found that 43% were men and 57% were women. Considering the educational level of the teachers, the result was that 70% of them had a master's degree and 20% had a bachelor's degree; 47% of the teachers taught at a bachelor's level. Regarding the question (Q10), most teachers taught subjects in a range of two to four hours from January–June 2020. A total of 31% of the teachers considered their technological management level as high. A total of 50% considered their level to be medium, and 19% considered it low. Regarding the platform management experience (Q13), 92% responded that they had experience. In (Q14), 56% of the teachers responded that their institution allowed them to choose which virtual platform to use. With regard to questions Q15–Q9, the training results were (Q15) 86% of the teachers responded that they received training for VLP management; (Q16) 67% of the teachers answered that the training received was between 1 to 5 h; (Q17) 55% of the HEIs organized the contents of the subjects; and (Q18) 93% of the teachers considered that communication with their institutions was adequate.

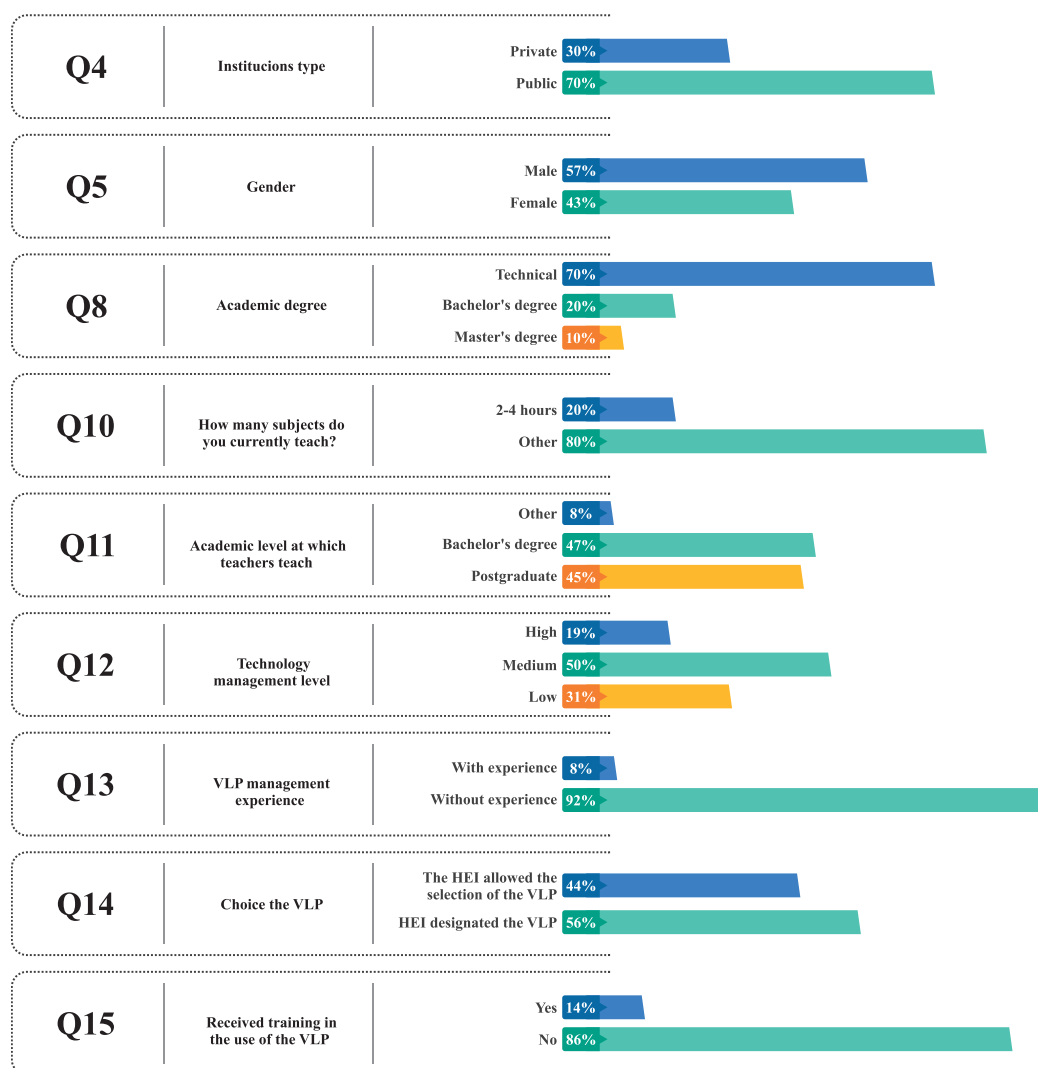


Figure 2. Sociodemographic results.

6.2. Statistical Analysis

A multiple correspondence analysis (MCA) was performed, and it was found that there is a contrasting result in the use of Google Classroom between teachers with a PhD and those with a master's degree. Moodle is commonly used in public schools, while

Google Classroom has more presence in both public and private schools. In addition, teachers with bachelor's and master's degrees tend to be much younger than those with PhD. Furthermore, teachers with PhDs do not have a common platform, while teachers with a master's degree tend to use Google Classroom and teachers with bachelor's degrees are more likely to use Moodle, see Figure 3.

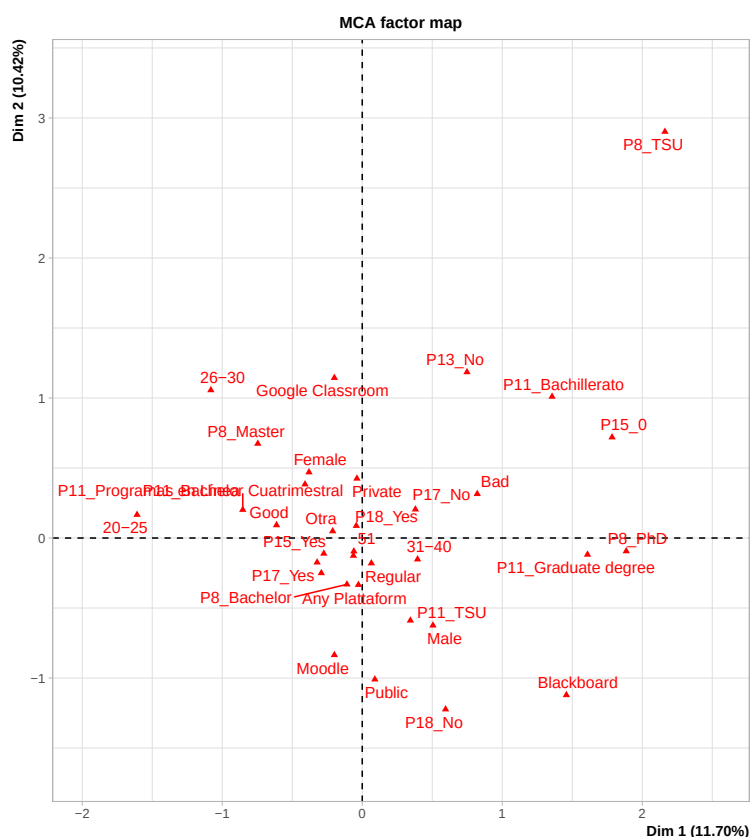


Figure 3. MCA Factor Map.

When Fisher's test was applied to test two dichotomous associated variables, the resulting value was compared with the corresponding value in the critical values table. If $F_{calculated} > F_{tables}$, the null hypothesis is rejected. These calculations were conducted using the R program, version 4.0. Questions Q4, Q7, Q12, and Q13 were taken as a reference to determine what was happening with teachers with the virtualization of the teaching-learning process. Question Q12 focused on the perception of the respondent regarding their use of digital tools. In this sense, the perception did not change between teachers of the public sector and private schools. In the sample, it was observed that the majority of the teachers perceived that they had average knowledge of technological management. A total of 52.68% work in the private sector and 45.00% in the public sector. The hypothesis where the perception among teachers was different according to the sector in which they worked resulted as false, verified by Fisher's exact test for contingency tables. After the test was applied, the p -value was 0.6755. This makes it impossible to reject the hypothesis of independence between the labor sector and the teachers' perception. This same test was applied to gender, age, educational level, and teaching experience. The results in the teachers' perceptions were independent of gender, education, and teaching experience with p -values of 0.9187, 0.08823, and 0.7509, respectively. However, the perceptions changed depending on the age of the teacher. It was found that 100% of teachers under 26 years of age claimed to have more significant technological management, and 100% of teachers under the age of 31 considered that they had average technological management. As the age of the teacher increased, the perception was more reserved. Another critical issue is the approach to digital platforms from teachers. In this sense, none of the teachers of the

public sector were unaware of the platforms, while 10 of the 93 private sector teachers were unaware of all of the VLPs. A significant statistical difference of the p -value, 0.03217, in the Fisher's test was obtained. The respondents also said the same about gender; in this sense, gender was significant in the VLPs knowledge. Other factors, such as age, experience, or educational level, were not significant.

7. Discussion

In this paper, the main results have a lot in common with what was stated by López and Huges et al. (2020) regarding the main identified problems and the fast transition to ERT [4,26]. Some sources that were cited in this work and that are related to the virtualization process are Escamilla, García, Moreno, Osoria, Peña, González, and Briz (2020), who analyzed the educational virtualization process from a socioaffective dimension [37]. They described the stages that a student could follow during the change. These authors focused their attention on the activities that teachers and students could make and found that 50% of answers corresponded to unsatisfied responses regarding the teachers training proposed that the institutional intervention should be focused on settling and managing technical support, in order to bear the cost of instrumental deficiencies with the absence of pedagogical analysis and articulating control measures. The result of this is the weakening of the teachers and a lack of training to a negative quality of mixed-teaching for the future.

According to Alam et al. [3], online education is a concept that is misunderstood and misused when trying to gain popularity and leverage in the market. COVID-19 has contributed to this situation. Online learning using technology could work as an incomplete substitute for face-to-face education. To examine if online education is an active agent for change, we compared both the academic knowledge and the competencies preparing for work in the students before and during COVID-19 lockdown. The greater the response to work competencies, there is a positive correlation for active learning in the HEIs.

Some opportunity areas are identified as part of the challenges regarding higher education that is given through online technology in an emergent society. First, the technological infrastructure in online education was not at its best at the beginning of the COVID-19 crisis in HEIs, presenting several opportunity areas. Internet access and speed in the developing countries have not been standardized for students in urban and rural areas, and there are diverse socioeconomic backgrounds that prevent a fair educational advantage. Moreover, a great part of students did not have access to an adequate device, which is fundamental. Second, online education is a new culture in the United Nations. The contents of the new courses are not prepared to reflect online delivering needs of the developing countries, which constrains the achievements compared with their counterparts in developed countries [2,3].

The interactive learning culture is greatly missing in the universities in developing nations. The online technology delivery mode is not ideally helpful to minimize the gap, rather, it may exacerbate it. Having said that, none can ignore the role of campus life in fostering both the physical and psychological maturity of students [5].

Although, Fuentes-Pérez found good practices, some others were not as satisfying [38]. He studied the improvement points and the educational environment as one of the firsts describing the position of the students and teachers in front of the training in the use of virtual platforms during the crisis. For this matter, Delgado proposed training strategies for the teachers in order to confront the COVID-19 crisis [39]. In a study by Fernandez-Alvarez on the perception of the students, the main results demonstrated that they perceive that distance learning will remain [40]. This is why students adapt and are satisfied with this in a percentage of more than 75%; students also said that they should acquire for-class-purpose technological devices and that the bibliography should also be digitalized. Following from these results, online higher education could be a change factor to improve the access to education for more students, and previous infrastructure investment could increase the formative and instructional capabilities of the country. The conclusions in this study are that students perceive that the change to distance learning will remain worldwide and that they should have an Internet connection at home, a for-purpose device, and that the

bibliography should be digitalized. Another finding in this study is that students trust in their teacher and admire them because of his patience, didactics, and a motivational dialog that establishes a strong communication with them (as the most cited features). The teacher is also important as an example and as a trusted guide. More details in the profile of the teacher should be considered and developed to improve the online education, promoting certain interactions.

The said proposal is similar to the present research, although there is a difference. The present work uses as a starting point the perception of the higher education teachers regarding the use of virtual platforms, just as Paidá, Herrera, Salazar, and Álvarez (2020) did, but they analyze implications at the technological knowledge level, while Fernández-Alvarez focuses on the perception of students [41]. There are common elements between Paidá et al. [42] and the present work because of the approach to the knowledge level of the teachers in order to face the COVID-19 crisis. Other works such as the one of Del Prete and Almenara (2020) points out the difference between the students' and teachers' perceptions [43].

Rosales Torres established the differences in the process satisfaction (physical evidence) by the process in the perception of teachers and students in two different educational institutions [44]. In addition, Martínez and Jiménez conducted an in-depth analysis of the activities that should be developed by the teacher during virtualization and determined a key aspect was training in the use of platforms, which is exactly what was found in the present work [45]. Moreover, Ramos-Huenteo, García-Vásquez, Olea-González, Lobos-Peña, and Sáez-Delgado (2020) found the requirements of the teachers and their challenges facing the pandemics: It is vital to provide teachers with the needed support [46]. Even though in this work the sample considered was too small, it was found that the teacher is more focused on the control of the emotional needs over the academic ones. This emotional need is one problem that teachers faced and should be considered while preparing HEI's strategies. It also could lead to the importance of distinguishing between what is a requirement for tacit and the explicit knowledge to improve the teaching–learning process.

Online higher education should become an agent for development because of the paradigmatic changes caused by COVID-19 and the transition from face-to-face to online education and its performing risks and the ways to withstand it. It could be managed as a way to increase the educational inclusion for those with time, distance, and access difficulties if the infrastructure is improved, which, by the way, will have a substantial return on the investment if it is accompanied with the required training for its responsible use. Alam & Parvin, (2021) [36] mentioned some aspects of the misuse and abuse of technological devices affecting the higher educational process. This led to a wider digital gap worldwide during COVID-19. One example of this is that in Mexico, before the COVID-19 crisis, only 50–60% of middle schools and high schools had Internet connection [7]. It has become a priority to have a policy framework to manage higher education during an emergency as a real change agent [36] but should be guided by data and results for best results.

Regarding the use of VLPs during the pandemics, the work of Macchiarola, Pizzolitto, Solivellas, and Muñoz could be mentioned [47]. They determined that both students and teachers were satisfied with the VLPs used, and moreover, López-Gutiérrez, Sánchez-Salmerón, Espejo-Garcés, and Stuart-Rivero analyzed the satisfaction in the VLPs using the teacher performance assessment as an instrument [26].

Teachers must develop new competencies that were not previously necessary to develop critical thinking and become continuous learners and educators with knowledge of advanced technological tools [24]. VLPs provide a set of tools where the content can be delivered: the learning management system (LMS). The LMS can be used to evaluate ways of knowing such as emotion, imagination, as well as reason and language, but most LMS are focused on the students, not considering the teachers but having an impact in the perceived value that Institutions has about teachers. If planned correctly according to the needs and mission of the school, this complex scenario, where the platform, the LMS, the teachers, the students, and the university are considered necessary to redefine roles

and responsibilities in the teaching–learning process and to provide stakeholders with the appropriate tools to face the current education challenges efficiently, the approaches to learning (ATL) should be considered while designing the course but also when deciding the platform that best suits these approaches and the ways of knowing that the subjects are developing. In various works that are taking place, approaches to teachers and students' roles are focused on VLP education, where teachers perceive themselves as guides and facilitators in constructing students' knowledge, but not much is said about the ways of knowing and how this isolation circumstance is affecting that, so that the approaches to learning could reinforce the social skills required to give a meaningful sense to the content. These skills are consistent with the development conceptions [46] and the understanding of the proposals of Bozal, Márquez, Navas, and Vázquez but also to find out how to plan content based on the differences between tacit and explicit knowledge and the way to deliver content using this differentiation [48] and also considering the point of view of the teachers.

Educators are fundamental to the implementation of virtual teaching models (VTM). The teaching–centered perspective is in line with the educational instruction perspective of Rivas-Rebaque, Gértrudix-Barrio, De Cisneros, and De Britto [49]. According to the online teaching–learning process, teachers considered that VLPs facilitated the process in the students' cognitive development and that students presented more active participation in their learning, in addition to the personal and professional development presented by in-class topics and in search of educational tools for the class [2], which also help teachers in their professional activity. Researchers observed that the use of VLPs and different tools modified the relationships with students; this represents a powerful educational resource that allows for both experience and knowledge [9]. The virtual concept is being built and has a social representation of all communications through electronic networks or specialized software but with the experience of the teacher and the peers. This concept is not new; ICTs have openly penetrated the world. New communication words and codes have also started to swell in everyday language, and it is typical for people to use them. Virtual learning environments are no longer just for specialists, emails, or cyberspace [50].

However, in the case of virtual protocols, consistent use has not been perceived. Virtual protocols generate confusion, which extends to contexts such as education or commerce. Virtual learning was positioned worldwide as a useful alternative for the population's rapid mobility and without any agreements between users about its meaning. Therefore, there are concerns regarding the conceptual limits of the virtual components, characteristics, and assumptions about the virtual education modality. A concept called ERT must be specified.

With the COVID-19 crisis, there is scant information on the policies that HEIs undertook to measure the satisfaction levels in using VLP. Other authors, such as Starkey (2020), addressed that distance education and well-planned online learning experiences were significantly different from other online courses in response to a crisis or disaster. Colleges and universities that worked to maintain their work during the COVID-19 pandemic must understand those differences when evaluating remote emergency education [4]. The ERT is an agile response based on flexible strategies that facilitate teaching thanks to information and communication technologies (ICT) remotely. The objective was to ensure that all students' learn in an unforeseen and temporary situation [8]. Unlike fully designed and planned online educational experiences, ERT responds to a sudden shift from instructional models to alternative models in a crisis. In such circumstances, generally, face-to-face and semi-face-to-face education requires immediate remote solutions. When the COVID-19 situation is over, institutions will revert from online teaching and return to their original teaching methods. The primary goal in these circumstances is not to recreate a robust educational ecosystem but rather to provide temporary access to instruction and education quickly and with easy set up.

By understanding ERT in this way, the dissociation of e-learning should start on political agendas but devote sufficient attention to allow institutions to make different decisions and invest differently, resulting in varied solutions and outcomes from one

institution to another. This experience emphasizes some significant differences that can guide ERT evaluations at the end of the crisis: integrating the teacher's perception and suggestions to improve the teaching–learning process is vital to identify standouts and improvement points.

Despite the research, the idea that online learning is of a lower quality than face-to-face learning is still widespread. In an emergency, such as the one experienced during the COVID-19 crisis, this idea could be reinforced due to the urgency of migrating to online learning, which can diminish its potential or possibilities, but learning should be the main idea of universities and researching about the ways to do it, their path.

7.1. Limitations

The present work has limitations that were identified by the authors. One limitation was not having control over the study universe: The results were processed from surveys that were answered by teachers voluntarily during the period between March and June 2020 with a non-probabilistic sampling type of self-selected sampling. The population of analysis was of teachers from public and private HEIs, with 133 answered surveys, making a total of 93 HEIs. This could lead to biased answers regarding labor stress from the respondents or the emotions they have at the time the survey was answered. This research was about perception, which works with the surveyed abstract point of view.

Another limitation, and due to sampling, the generalization of the results was carefully analyzed, as not all the subjects of the study were surveyed. Different subjects bring different difficulties, and that is not considered in this study. A representative sample of the entire universe of HEIs that exist in Mexico was not obtained, and the presented results do not consider these differences. The said limitations give a clear path for future research, such as the construct and validation of a deeper and robust instrument to know the perceived differences between working or studying online and face-to-face to replicate the research with a bigger sample of higher education teachers.

7.2. Implications for Research and Theory and/or Practice

This perception work provides a way to measure if someone fits in a group and if someone's perception has an impact on the way that person interacts. The point of view can be positive or negative about the issue and can reveal if there is dissatisfaction or satisfaction about something. Teachers can also transfer this perception to other HEIs in a situation of uncertainty. This can lead to a positive or negative impact on academic processes.

Private school teachers tend to work in more than one school. Thus, training in one workplace could be transferred to another workplace. This knowledge becomes one way to reduce training costs for institutions; however, this also has a learning cost. Training is carried on from a particular point of view, which requires a specific strategy. Teaching in several HEIs may distract the teacher or not provide full training development while working in other schools, thus reducing the training's scope. Teachers require these courses to be hired again, contributing to or increasing the precariousness of the teaching activity.

To understand and promote equity and how the training is performed, an in-depth analysis is essential to differentiate the perception by gender. In this case, this could lead to differentiated training between men and women. This could also increase the awareness of gender equality, which will contribute to the teaching–learning experience's effectiveness. In addition, according to equity, teachers become less confident with technology as they become older. Training perception also addresses age equity, as it is vital to consider the teacher's age when trained. Due to these dimensions, the social and cultural environments must be considered. The social dimension is a way of understanding a person's background. These professional and personal ties can be improved and communicated (taught) as a point of support to ensure the cultural dimension. This dimension deals with the knowledge that a person already has and links them to the social environment. If a person does not act or feel confident in what they know or does not know how to communicate with different people (social dimension), their development as a teacher will be limited. Another thing that should be considered is about the way to improve the way explicit knowledge is

delivered and the tacit knowledge that needs social contact [51,52]. This study will bring a guide to research about how this information could be used to select platforms and training for the teachers to share their own knowledge supported by the knowledge of the organization.

7.3. Recommendations

HEIs are recommended to design stratified and differentiated training programs to distinguish according to the specific needs of gender and age. This fact can reinforce the responsibility of HEIs considering these key factors. In addition, there is the need to increase the sense of support offered to teachers by the HEIs as an important issue that increases the confidence of the teachers when they are using technology, new teaching methods, and resources.

8. Conclusions

This work allowed answering the research questions. Throughout the statistical analysis, the hypothesis was tested and proved as *teacher's perception about VLP is the same independently of the chosen virtual platform*. Perception resulted independent of gender, educational level, and teaching experience. Moreover, there were no differences in the teacher's perception when working in private or public institutions. Teachers in private schools believe they have an average performance in technology management. In contrast, teachers of public institutions perceive they had lower performance in technology management, but half of the teachers perceived their technology management as being in the middle range. The perception changed with the age of the teacher. Relevant points of the results obtained in this research are that there are no considerable differences in teachers' gender answering the instrument, but the academic level of the teachers has resulted fundamental to tackle the virtualization process of education in most of the teachers. It was found that most of the teachers had a graduate degree, and almost half of them taught with bachelor degrees. In addition, half of the teachers taught a range between two to four hours from January to June 2020. The experience of managing platforms is considered a key point because most of the teachers had experienced managing VLPs, and more than half of them were allowed to choose which VLP to be used. All teachers said that they received training, and most of the HEIs organized the content of the subjects. The communication between the HEI and the teacher was adequate for the management of the crisis. To explain the possibilities for the communication channels, the VLP was as vital considering the tools and "spaces" in which communities share common interests, interact, and exchange data. This space is asynchronous, and the individual-individual and the individual-group interaction also reduces the interaction and social activities to the limits of the environment. Although it might sound limiting, this also facilitates the search, distribution, and recovery of data in any digital format. VLP is a supporting tool for the teaching-learning process in an online environment, but considering it as the present situation, it is an emergency situation (ERT). The virtualization phenomenon for the management and academic processes in ERT caused 100 percent of the teachers to be conscious about the development of skills required as a virtual tutor. It was found that independently of the VLP used, such as Moodle, Google Classroom, and Blackboard, developing skills in its use made it possible to improve the teaching-learning process. and it is also relevant to deliver a virtual training environment. Data showed that young teachers (less than 26 years old) had high technology management skills; teachers more 31 years old perceived that they had average technology management skills. Furthermore, as teachers become older, their perception about the VLP management decreases. The main problems identified by teachers for the virtualization were Internet connectivity, absences of students, and students' attitude toward the teaching-learning process through VLP. The virtualization of the teaching-learning process could lead to a wider inclusion for those less favored in infrastructure as buildings. If more investment is used in technology, then the access to education could spread, and from there, an inquiry can be made for the requirements of the students. The education process should be more flexible and the educational process more accepted as a factor of change in different ter-

ritories if used also as digital alphabetization. Future research must be conducted in this matter as the virtual education has a lot of advantages but could be boosted if application of what was found during this research is applied. Research, education, and development should be one, and this could be a great opportunity to reduce the educational gap between developed countries and those developing, but also in developing countries where the differences of schools, resources, and contents are also considerable.

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Institutional Review Board Statement: The study was conducted according to the guidelines of the Declaration of Helsinki and submitted at UVM School of Health Sciences. The Project was approved in the Ethics and Health Committee session. Date 30 April 2020.

Informed Consent Statement: Respondents consent was waived due to its minimal risk to subjects that will not adversely affect their rights and welfare. It was obtained by voluntarily answering and informing that it was for academic and statistical purposes only.

Data Availability Statement: Data are available on request to Marco Antonio Zamora-Antuñano.

Conflicts of Interest: The population for this study is teachers from private universities belonging to FIMPES. A previously designed survey was delivered by FIMPES to its affiliates in the center of Mexico and then sent to the teachers at each university as a Google Forms link accessing a previously designed survey. Answering the survey was voluntary which made this a convenience sample method. The heading of the survey had a note informing about the use of the data to be collected and voluntary response to give answers as a consent. Data will be analyzed and will only be shared within the research team, with the identifiers destroyed. The nature of the data is electronic and does not include biological specimens, nor sensible information. The data were only accessed by the research team, and the identifiers were destroyed (anonymized data). The data were stored in a computer managed only by the research team and password protected. Data files were managed by the research team with the identifiers already destroyed and will be stored in a file with the final version of the article as evidence of the research for institutional purposes. The survey was accessed by the respondents using a link sent by FIMPES with the collected data directed to the research team. It was anonymous and voluntary responded with minimal risk to participants not exposing them to psychological, social, nor physical risk, belonging to the definition of research for generalized knowledge, which makes the survey of this study to be exempt and was reviewed and authorized by the Ethical Research Department (CEI) at UVM and FIMPES.

Appendix A

HEIs Teachers' viewpoint in the use of VLP during the Contingency by COVID-19.

Purpose: To know the point of view of the Teachers during the crisis of COVID-19 and the migration of face-to-face classes to online classes (ERT). The data collected was used to academic and statistical purposes as stated by the ethic committee at UVM.

Table A1. Data collection instrument.

I. General Data		
Items of the Instrument		
Q1. Email		
Q2. Name of the Institution		
Q3. In which city and state of the Mexican Republic is your institution?		
Q4. Your institution is	Public	Private
Q5. Gender	Male	Female
Q6. Age		
	25–30 years	
	31–40 years	
Q7. Age range	41–50 years	
	51–60 years	
Q8. What's your highest level of education?	TSU	
	Bachelor's degree	
	Master	
	Ph.D.	
	0 to 1 year	
	1 year 1 month to 5 years	
Q9. Years of teaching experience	5 years 1 month to 10 years	
	10 years 1 month to 20 years	
	20 years 1 month to 30 years	
	30 years 1 month or more	
Q10. How many subjects do you currently teach?		
	High school	
	TSU	
Q11. Educational Level where you teach	Quarterly	
	Bachelor Semester	
	Bachelor Executive Bachelor	
	Postgraduate	
	Online Programs	
Q12. ¿In your opinion, what is your degree of technological management?	Low	
	Medium	
	High	
	Medium	
Q13. Before the Contingency, you had Experience in managing Virtual Learning Platforms (Check all the answers that apply).	High	
	Google Classroom	
	Moodle	
	Others	
Q14. What platform did your institution indicate that you should use to teach Online Modality (ERT)?	Blackboard	
	Schoology	
	Google Classroom	
	Moodle, Teams	
	Gave me the freedom to choose	
Q15. Did you receive training from your institution to teach online	Yes	No
Q16. If the previous answer was Yes. Indicate the number of hours of training	1 to 5 h	
	6 to 10 h	
	11 to 20 h	
	No training	
Q17. Did your institution organize the subjects to be taught online and facilitate the teaching–learning process?	Yes	No

Table A1. Cont.

I. General Data		
Items of the Instrument		
Q18. Did your institution develop clear statements of what they expected from your teaching work during the COVID-19 Contingency?	Yes	No
Q19. Indicate some problematic elements that you faced during the Contingency for COVID-19?	Communication with the Institution	
	The attendance of the students	
	The attitude of the students to the Online classes (ERT)	
	The connection to the internet and computer equipment	
	The development of the materials	
	The teaching of the classes	
	The teaching of the classes	

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