Article

Analysis of Emergency Remote Education in COVID-19 Crisis Focused on the Perception of the Teachers

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Abstract: This descriptive study intends to identify the satisfaction perception among the teachers of the Universidad del Valle de México (UVM) concerning the use of the Microsoft Teams platform in the transition from traditional model (face-to-face) to 100% online education [Emergency Remote Teaching (ERT)]. The proposal aims to determine the perspectives of teachers regarding the use of the Microsoft Teams platform during the crisis caused by COVID-19. UVM has 6938 full-time teachers and part-time teachers who collaborated in educational programs during January-June 2020 in the 33 campuses of UVM. And an instrument was developed and applied using finite population sampling, UVM perspective of teachers, which was distributed via Google Forms. The feasibility of the data collection instrument was determined by the Cronbach's Alpha coefficient, with a result of 0.926. The data collection period was aligned with the first isolation period: 23 March to 20 April. The results in the perception of teacher satisfaction in the different sections of the instrument established an agreement in the answers (very satisfied or satisfied) regarding values that were higher than 60% in terms of satisfaction using the equipment. The analysis of the data collected was performed to verify the proposed hypothesis with the R version 4.0 software. A G-test was performed with the Logverosimilitude coefficient to test whether the categorical variables were independent (qualitative variables that are not defined continuously). The Krammer coefficient of association was then calculated to measure the correlation.

Keywords: COVID-19; ecosystem learning; quality education; 21st-century skills; perception of the professors

1. Introduction

This research addresses virtual learning platforms (VLP) during the COVID- 19 crisis, where there was a transition in the teaching-learning process. For the primary characteristic, a process for the virtualization of education at all educational levels was developed. Universidad del Valle de Mexico decided to use Microsoft Teams platform for this transition, and based on this change the perception of the teachers was analyzed [1]. Notably, this virtualization process should not be considered 100% online education. The appropriate concept is known as emergency remote teaching (ERT). According to UNESCO monitoring, during the first stage of the COVID-19 crisis from 23 March to 1 June 2020, more than 100 countries implemented closures nationwide, impacting more than half of the student

population around the world. More than 850 million children and youth—roughly half of the world's student population—stayed away from schools and universities, with national closures effective in 102 countries and local closures in others [2,3]. The scale and speed of school and university closures represented an unprecedented challenge for the education sector. Governments worldwide rushed to fill the gap with distance education solutions that ranged from high-tech alternatives, such as real-time video classes conducted remotely, to lower-technology options, such as educational programming on TV channels, television, or radio [1,4–6].

COVID-19 caused an unprecedented crisis across the board. This emergency led to the massive closure of educational institutions in face-to-face activities. For its part, UNESCO identified significant gaps in educational outcomes, which are related to an unequal distribution of teachers in general, and of the best-qualified teachers, in particular; countries and regions with lower incomes and rural areas, those that also tend to concentrate the indigenous and migrant population [7,8]. These specific needs of particular institutions were solving these gaps in different ways. In the educational field, a large part of the measures that countries have adopted in the face of the crisis was related to the suspension of face-to-face classes at all levels, which gave rise to three main fields of action: the deployment of distance learning modalities through the use of a variety of formats and platforms (with or without the use of technology); the support and mobilization of the educational staff and communities, and the attention to the health and integral well-being of the students [9,10]. Different institutions made its own mix according to the organizational objectives and contexts from the said fields of actions. The pandemic transformed the context of implementing of the curriculum, not only due to the use of platforms and the need to consider different conditions from those for which the curriculum was designed, but also because competencies became a relevant context. Decisions and resources need to be made that challenge the school system, schools, and teachers [3,11]. This is the case of the curricular adjustments in priorities and its necessary contextualization to ensure the relevance of the contents. The decided adjustments should be based on the consensus among all the relevant actors. It is equally vital that adjustments in the competencies and values from the fields of action have different priorities for each situation, in the current times are solidarity, autonomous learning, self-care and care of others, socio-emotional competencies, health, and resilience, among others. A controversial and complex aspect refers to the criteria and approaches for making decisions regarding priorities of learning and ways to make adjustments [11]. Each alternative requires certain logic for selecting the most relevant content, which is preferred over others. Another perspective is integrating the contents and learning objectives in interdisciplinary thematic nuclei that make it possible to tackle different subjects simultaneously through topics that are especially pertinent and relevant for students in the current context. As an example, project-based methodologies allow an integrated approach to learning [12]. This approach requires valuing teaching autonomy and developing sophisticated competencies among teachers. Certain countries have designed curricular prioritization proposals that include a reduced set of essential knowledge in the different disciplines, moving from the curricular prioritization to modular content by level, from the crucial to the new learning associated with integrated or significant objectives can be articulated between subjects [10,11]. In adaptation, flexibility, and curricular contextualization, elements such as prioritization of learning objectives and content should be considered as allowing a better understanding of the crisis and responding to it in a better way, incorporating aspects related to care and health, critical and reflective thinking around information and news, understanding social and economic dynamics, and strengthening behaviors of empathy, tolerance, and non-discrimination, among others [3]. On the other hand, a balance must be done between identifying core competencies, which will be necessary to continue learning, and deepening education's integral and humanistic nature, without yielding to the pressure to strengthen only instrumental learning [7]. An important aspect to consider in future work on the topic of virtualization of education derived from the COVID-19 crisis and paradigmatic change

in the teaching-learning process, is satisfaction of parents, the impact of the pandemic on the education system and which is analyzed by many researchers [7–9,11–13].

> The current situation has posed immense challenges for countries to provide uninterrupted learning for all children and young people on an equitable basis. We are stepping up our global response by creating a coalition to ensure a rapid and coordinated response. Beyond meeting immediate needs, this effort is an opportunity to rethink education, expand distance learning, and make education systems more resilient, open, and innovative [2].

This work's main objective is to analyze UVM teachers' perceptions of the use of Microsoft Teams. An implicit issue in the educational phenomena caused by COVID-19 is identifying the main issues within the educational process itself, such as training for teachers and the university community; the experience of teachers in the use and management of VLP; the ease of adapting to changes in educational processes in forced virtualization or the difficulties in carrying out the teaching-learning process; motivations of the teachers'; the activities to be developed by the students; and the perception of the professors as the main actors. These issues must be resolved to answer the following question:

Was the virtualization of the teaching-learning process through the Microsoft Teams platform by UVM adequate?

The main limitation in carrying out the work was the time needed to collect the data, so we decided to apply a convenience sampling method for finite populations that will be explained in the methodology—both qualitative and quantitative—for the entire process [14].

1.1. From a Traditional Educational Model to ERT

The traditional university education model based on masterclasses and linear didactic materials required adapting to the knowledge-based requirements of postmodernity, making it imperative to carry out this research [15]. Due to the threat of COVID-19, schools and universities faced the trade-off of continuing to deliver their courses while keeping their community safe from a fast-moving, poorly understood public health emergency. Many institutions chose to cancel all face-to-face classes, including labs and other learning activities, and required teachers to teach their courses instead online to help prevent the spread of the COVID-19 virus:

Moving to an online instruction model provides flexibility to teach and learn anywhere, anytime. Still, the astonishing speed with which this shift to online teaching is expected to occur is unprecedented [16–18]. While support teams generally exist to help faculty members learn and implement online learning, they typically support only a small group of teachers interested in teaching online. In the current situation, with so little preparation time, these teams were not able to offer to all the teachers the usual level of support given to small groups [4,18–21]. Further, the temptation to compare online learning with classroom instruction in these circumstances is strong. First of all, the politics of any such debate must be recognized: "online learning" will become a politicized term that can have any meaning depending on the argument. The idea of blended learning was thus developed. In this paper, the characteristics of the current context are analyzed to identify some elements requiring in-depth analysis for teaching and the necessary reflective practice. This should be done under the mandatory and forced transition from traditional education to online education generated by the crisis of COVID-19 among university communities (ERT) along with the repercussions of the change itself on learning and the achievement of the required competencies [1]. New ways of learning are being promoted that include information and communication technologies (ICT). This change has allowed teachers incorporating unit contents into management systems with a web 2.0 connection through educational platforms known as teaching-learning management systems (LMS). These learning management systems can adopt different formats, as there is a wide range of programs designed for this purpose; this is the case for mexican universities, such as UVM, Anáhuac University, the Monterrey Institute of Technology for Higher Education,

and the National Autonomous University of Mexico, among others [22,23]. Among the teachers, Bower identified three main concerns related to this technology: (a) changes in interpersonal relationships, (b) the adequacy of institutional support, and (c) the quality of teaching [24]. The quality of education is an issue both, defenders and opponents of online educational environments have expressed. Phipps and Merisotis identified 24 benchmarks considered essential for ensuring excellence in internet-based distance learning, as used by the following six institutions that are leaders in distance education: Brevard Community College (Florida), Regents College (New York), the University of Illinois at Urbana-Champaign, University of Maryland University College, Utah State University, and Weber State University (Utah) [25]. These benchmarks are divided into seven categories: (1) institutional support, (2) course development, (3) teaching/learning, (4) course structure, (5) student support, (6) teacher support, and (7) evaluation and assessment. Yassien and Masa'deh [26] wrote a literature review of the concept of satisfaction. Initially, this concept was a way to measure how well the user processed data. Afterwards, satisfaction was the attitude of the users towards the provided system and continued with other authors, as the user's entire experience. Summarizing, satisfaction was part of the idea of usability, a sub-factor, but changed to a mediator between usability and the system that can be well used to relationship improvements among users. In this paper, the satisfaction of the teachers, is the holistic experience they might have, and that could improve the teaching-learning process.

1.2. Microsoft Teams

Microsoft Teams is a communication platform accessed through an institutional account with Office 365 designed to improve communication and collaboration among work teams while reinforcing the platform's cloud collaborative functions. Microsoft Teams makes it easy to create dedicated spaces for project teams, business units, task forces, and other groups to communicate and collaborate. By creating a "team" and assigning users, organizations can establish private group chat rooms (called "channels") to plan, manage, and deliver work.

2. The Case of UVM Laureate México

On 16 March 2020, the guidelines established by the Federal and sub-national Governments of the States were that schools at all levels would close their facilities to minimize the spread of COVID-19 [7]. Laureate México, made up of UVM with 33 Campuses, and UNITEC, with 9 Campuses, encompassing 210,000 students from upper secondary and higher education levels of education in different modalities, joined the national guidelines to continue all their face-to-face courses using an ERT Modality [1]. Since 2008, VLP platforms have been incorporated into the teaching-learning process at UVM. The most widely used VLP are Blackboard, Moodle, and Schoology. UVM students at degree level use these services in 10 subjects under a 100% online mode throughout their academic training [23]. The use of Microsoft Teams is an institutional strategy for transitioning from a classroom scheme to a 100% online scheme standardizing the academic process (for example, activities that each student will develop in all subjects). Microsoft Co. and UVM have an agreement for the virtual platform, which included the assignment of institutional mail, accounts for the entire community, training in the use of the equipment for 100% of the teachers and students, and the configuration of topics and calendar sessions [27]. A key aspect to consider selecting Microsoft Teams was group communication: Microsoft Teams allowed many users in each session and without a time limit (see Table 1). As of 21 March 2020, the deployment of human, material, and technological resources done at UVM, were to guarantee the continuity educational program fulfillment within the planned calendar.

Table 1. Comparison of characteristics of different web-based platforms for virtual learning.

Web-Based Platform	Number of Participants	Time Limits	Chat Feature	Recording	Cost	Breakout Groups	Conference Phone
Google Meet	150	None	Yes	No	Free until July 2020	No	Yes
Zoom	100	40 min	Yes	Yes	Free	No	Yes
Zoom paid	100	24 h	No	Yes	$15 per month	$49.99 per room per month	Yes
Facetime (Apple devices only)	32	None	No	No	Free	No	No
Facebooklive	No limit	4–8 h (depending on device)	In the comments	No	Free	No	No
Facebook Video Chat Messenger	50	No	No	No	Free	No	No
Teams	10,000	No	Yes	Yes	8–35/month	Yes	Yes
Google Hangouts	10	None	Yes	No	Free	No	No
Freeconference-call.com (video and/or phone)	1000	6 h	Yes	Yes	Free	No	Yes
Skype	50	24 h	Yes	Yes	Free	No	Yes
Slack	15	No	Yes	No	Free	No	No
Moodle	20	None	Yes	No	Free	Yes	No
Blackboard Collaborate	300	No	Yes	Yes	10–90/month	Yes	No

3. Methodological Development

The present work addresses the phenomenon of the transition from a traditional teaching model to an ERT Model and the perception of the teachers of the learning achieved, the evaluation results, and their willingness to use the resources of the Microsoft Teams platform as part of their teaching and day-to-day lives at UVM.

3.1. Design of the Data Collection Instrument

An instrument with Likert-type scale items was designed to collect the necessary data [28].

3.2. Instrument Perspectives of Teachers

This instrument consists of five sections: I. General Data, featuring fourteen questions: three (3) with an open response item, ten questions with 31 closed response items, and one (1) problem with a Likert scale response item. This section considers the following aspects: email, campus, gender, age-range, type of contract, years of experience, educational level, secondment, number of subjects taught, experience in managing platforms, experience as an online tutor in UVM and outside UVM, and satisfaction with the training received at UVM for the management of the Microsoft Teams platform. II. Satisfaction using Microsoft Teams platform: four (4) questions with response items on a Likert scale. III. Teaching perspectives on the Microsoft Teams platform: 12 questions with response items on a Likert scale. IV. The use of the Microsoft Teams platform: During the educational process, six (6) questions were used with response items on a Likert scale V. Activities developed using the Microsoft Teams platform during the COVID-19 crisis see Appendix A.

3.3. Sample

Convenience sampling method used among the accessible population. Considering time limitations for data collection, it was combied with simple random sampling [29–31]. The 33 campuses of UVM and students enrolled in traditional programs during January-June 2020 were considered. The university included 6938 full-time and part-time teachers during January-June 2020 in the 33 campuses of UVM. The following formula was used to calculate the sample size:

$$n = \frac{Z^2(p)(1-p)}{c^2} \qquad (1)$$

where:

- Z = Confidence level (95%)
- p = Estimation of the proportion to be measured = 0.5
- c = Margin of error $(0.04 = \pm 4)$

The data were substituted into the formula, and a sample size of 368 teachers was obtained. At the end of the information collection period, there were responses from 1655 teachers. This highlighted the reliability of the results and decreased the margin of error [32,33].

4. Results

To measure the reliability of the instrument, the Cronbach's alpha coefficient was calculated [30,31]. Sections of the data collection instrument are included in Section 2; Sections of the data collection instrument are included in Section 2; satisfaction with Microsoft Teams' use in Section 3; teaching perspectives on the platform, in Section 4. These sections were used to consider the fundamental questions that were defined to integrate each instrument. Table 2 shows the results of the Cronbach's alpha coefficient.

Table 2. Cronbach's alpha coefficient.

Section	Cronbach's Alpha
Satisfaction with the use of Teams	0.95
Teaching Point of View on the Platform	0.945
Using the Teams Platform during the Teaching-Learning Teacher-to-Student Process	0.888
Total	0.926

A questionnaire is considered reliable when the Cronbach's alpha coefficient result exceeds 0.8. Therefore, it can be concluded that the information collection instruments are reliable. The surveys were sent electronically to collect the data. The application period spanned from 30 March to 20 April 2020 (the first period established by the SEP for the closure of Educational Institutions). UVM community voluntarily answered the survey within monitoring and process control policies. The instrument was distributed from the national academic vice presidency to the 33 UVM campuses. The results of the relevant Q2–Q13 products that the data collection instrument yielded show that among the teachers who answered the questionnaire, 52% were male, and 48% were female. Furthermore, 94% were teachers on a temporary contract, 64.9% of the teachers were aged 31 to 50 years, and 44.8% had between 10 and 20 years of experience teaching classes; 55% of the teachers who responded to the questionnaire taught courses in semester-based degree educational programs, where almost 50% taught on average, 1 to 3 subjects. More than 30% of the teachers had experience as online tutors at UVM or other higher education institutions (HEI). Table 3 shows the results regarding teachers' knowledge and expertise level in virtual learning platforms management.

Table 3. The experience of teachers when managing VLP.

Platform	Percentage
Moodle	30%
Google Classroom	23%
Blackboard	19%
Schoology	12%
Edmodo	6%
Algebraix	2%
Google Drive	2%
Zoom	2%
SIUP	2%
Brightspace	1%
Meet	1%
Nothing	2%

Table 3 corresponds to the answers to Q11. In total, 98% of the teachers had experience and knowledge in the management of virtual learning platforms, with the Blackboard and Google Classroom platforms being the most commonly used before the pandemic. Moreover, 61% responded that they were satisfied or very satisfied with the received training in Microsoft Teams. The results of Sections 2–4 of the instrument are presented below. These sections consider questions 15 to 36 and show the relevant products. The results regarding satisfaction with Microsoft Teams (Q15); 75% of the teachers were satisfied or very satisfied with the service. For Q16, related to the first contact with Microsoft Teams, 76% of the teachers were pleased and happy. For Q17, 68% of the teachers were satisfied or very satisfied with the help available for Microsoft Teams. For Q18, in terms of motivation to use Microsoft Teams, 65% of teachers were satisfied with the use of the platform. See Table A2 in Appendix A.

The results of Section 4 the substantive aspects Section 3 of the teaching-learning process where, on average, 78.58% of the teachers agreed that Microsoft Teams allowed them to plan their activities, manage information, work as a team, increase their motivation, and achieve their goals. See Table A3 in Appendix A.

The results of Section 4 teaching-learning process from teacher to student. The main results observed for the answers to questions Q31–Q36 about the perception of teachers in the development of the teaching-learning process and the different relevant areas, such as the interest shown by the students, the dedication of the students to self-preparation and learning time, student participation in the activities developed through Microsoft Teams, and the satisfaction shown by the students in the development of the course in Microsoft Teams, as well as with the activities that were created. Combining the agreeing responses, these results give an average of over 70% in terms of the teachers' perception regarding the student's process and execution on the Microsoft Teams platform as adequate. Regarding the activities carried out (Q36), more than 50% of the results showed that the teachers used presentations, tasks, or projects, and 3% responded that they had used simulators in their classes. Stratification of the results was carried out to analyze the group results where the highest percentage of responses was concentrated. 675 teachers aged between 31 and 50 years, teaching experience of 10 to 30 years, and 1–4 classes were semester-based. Among the teachers, 100% responded that they had experience using virtual learning platforms, with 56% being female and 44% male. These results are called the maximum stratum (MS) in each of the sections of the instrument. See Table A4 in Appendix A.

4.1. Statistical Analysis

Using the *R* software version 4.0, data analysis was performed to verify the proposed hypothesis, a G-test of the log-likelihood rate was applied to test whether the categorical variables were independently analyzed (the qualitative variables that are not defined in a continuum). The Krammer association coefficient was calculated to measure the correlation.

4.2. Relationship between Demographic Elements and Critical Questions

The socio-demographic factors obtained through the survey included male/female, age range, teaching experience in years, and previous experience in handling digital platforms. The critical questions sought to determine whether the teachers believed that they had improved their curricular planning with the use of digital media, if these media promoted the self-learning capacity of the students, if these media enhanced the organization of the sessions, if the students were satisfied with the platform (based on the perception of the teachers), and if the teachers believed that the activities carried out were adequate. See Tables 4 and 5.

Table 4. Proof of log-likelihood rate (G-Test) of independence. The statistic and its *p*-value are displayed.

	Q19	**Q24**	**Q28**	**Q34**	**Q35**
Gender	13.519 0.0089	2.166 0.7053	6.8931 0.1416	3.157 0.5319	6.2756 0.1795
Age	12.581 0.4002	16.706 0.161	14.893 0.2474	12.569 0.4011	11.251 0.5076
Teaching experience	29.821 0.8801	35.61 0.6681	11.529 0.7757	7.9251 0.9511	11.381 0.7854
Digital experience	6.6233 0.5778	6.0342 0.6434	10.039 0.2623	11.851 0.158	16.081 0.0412

Table 5. Krammer association coefficient for categorical variables.

	Q19	**Q24**	**Q28**	**Q34**	**Q35**
Gender	0.1151	0.04635	0.08233	0.05592	0.07810
Age	0.0648	0.07458	0.06976	0.06730	0.06189
Teaching experience	0.0834	0.09113	0.08384	0.02154	0.31573
Digital experience	0.0568	0.05247	0.07206	0.07017	0.09522

The responses presented in the tables show that the demographic factors collected are independent, except for the relationship between gender and planning and organization capacity (Q19). Figure 1 provides a mosaic plot for the rest of the relationships.

Here, it can be observed that the residuals assuming no relationship between the variables in the model are small. Thus, the model definitively shows no relationship between variables based on the data. The only statistically significant relationship is the relationship between gender and question 19. However, as shown in Table 4 and Figure 2 (the corresponding mosaic plot), this relationship is weak.
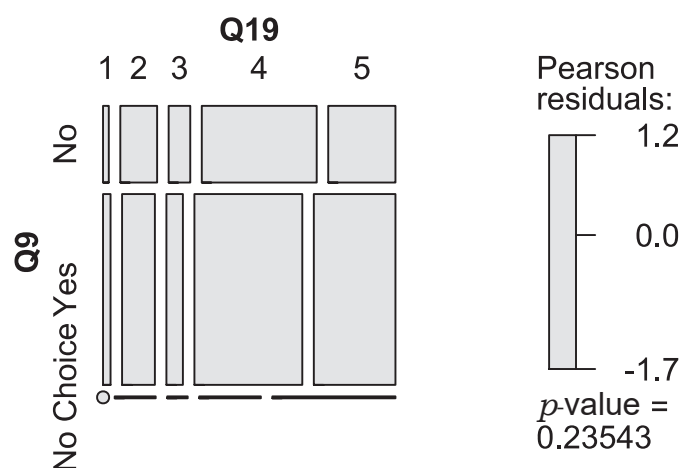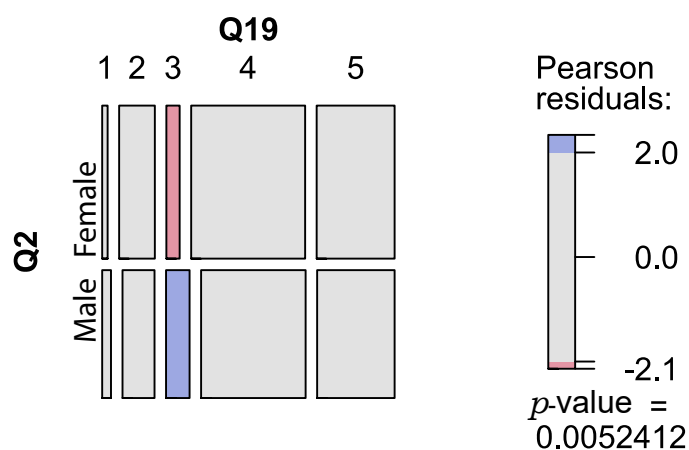
Figure 1. Mosaic plot for Q9–Q19.

Figure 2. Mosaic plot for Q2–Q19.

4.3. Relationships between Key Questions

Due to the institutional nature and importance given by UVM the questions Q19, Q24, Q28, Q34, and Q35 were defined as critical. Tables 6 and 7 show the relationships between the essential questions defined by UVM for this study.

**Table 6.** Proof of log-likelihood rate (G-Test) of independence. The statistic and its *p*-value are displayed.

	Q19	Q24	Q28	Q34	Q35
Q19		346.33 $<2.2 \times 10^{16}$	459.32 $<2.2 \times 10^{16}$	236.42 $<2.2 \times 10^{16}$	267.48 $<2.2 \times 10^{16}$
Q24			528.51 $<2.2 \times 10^{16}$	330.68 $<2.2 \times 10^{16}$	276.99 $<2.2 \times 10^{16}$
Q28				262.42 $<2.2 \times 10^{16}$	352.5 $<2.2 \times 10^{16}$
Q34					542.94 $<2.2 \times 10^{16}$

In Table 6 is clear that only the top diagonal is shown by symmetry and because the diagonal is 1.

Table 7. Krammer association coefficient for categorical variables.

	Q19	Q24	Q28	Q34	Q35
Q19		0.32167	0.41654	0.26936	0.31628
Q24			0.39854	0.33815	0.33240
Q28				0.30407	0.39509
Q34					0.40857

Table 7 shows that only the top diagonal is shown by symmetry. The diagonal in 1. While in this case, all the questions were related in pairs, the mosaic plot shows similar behavior among all relations see Figure 3.
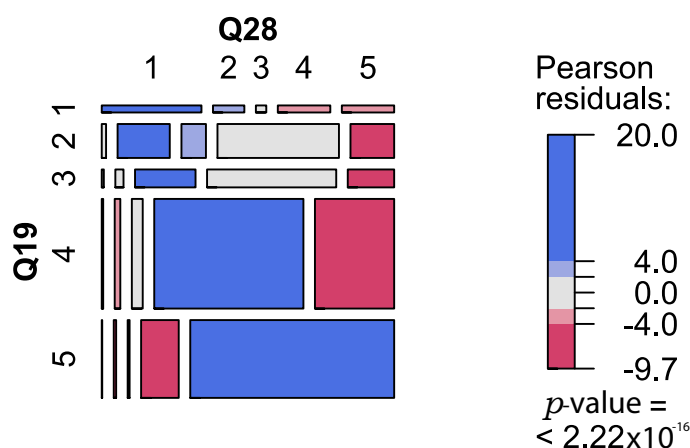
Figure 3. Mosaic plot for Q9–Q28 relationship.

Here, it can be seen, that when responding with consistency one question, the other will be responded in the same way. Therefore, the hypothesis of the perception of VLP among teachers is verified. This perception is not affected by factors such as gender, teaching experience, age, or approach to virtual platforms.

5. Discussion

Redefining academic roles and responsibilities facing a complex scenario when teaching became necessary, thus, educational institutions' current challenges are to provide the appropriate tools to increase efficiency. In this crisis environment, UVM applied the ERT paradigm of Hodges et al. [1], Tran et al. [34], and Grivokostopoulou et al. [35]. Numerous studies have measured user satisfaction in virtual learning environments with a usability approach, or with holistic experience [36]. Some of these studies are focused mainly on student satisfaction identified four types of educational uses associated with virtualization [36,37]. Túñez-López developed an approximation of the teaching environment within social networks for students. Gonzalez [38] and Namoun et al. [39], through different evaluations, measured the satisfaction of using Blackboard [40]. However, much information reported in the literature deals with other studies related to VLP, such as Moodle. Microsoft Teams, however, is a new application. The virtualization strategy used by UVM was successful, based on results obtained, since its use during the COVID-19 contingency. This strategy presented a series of advantages, such as accessibility and an extensive range of available applications. Moreover, the support provided was diverse and the system is robust, highlighting the ease with which the user can explore and determine the fundamental aspects of the VLP.

Summarizing, Microsoft Teams was a sufficient tool to quickly implement educational applications while observing the UVM community's needs of knowledge generation and information management. Here, it is essential to use the concept of satisfaction as the

teachers' entire experience with the system. The system is used to deliver content, so the experience should include the differentiated knowledge to improve the satisfaction measurement, which is also related to the fields of action mentioned previously. The background should also make it easy for the whole organization feedback and to implement features that increase the positive attitudes from the teachers toward the platform and as found in this paper, such as constant training and ways to involve or engage students in the process through the platform while considering the well-being of the students and teachers.

Regarding of face-to-face teaching and the dimensions of the teachers and students' role, specific approaches are applied to teaching and learning [41]. In face-to-face classes, a stratified learning approach predominates. Teachers are perceived as guides and facilitators in students' knowledge construction, alligned with the conceptions of skill development outlined by [8,42,43]. This perspective is consistent with the ideas of [44]. Concerning the online teaching and learning process, the teachers believed that the implementation of Microsoft Teams facilitated the teaching-learning process, the cognitive development of the students, and active participation, in addition to allowing students to engage in personal and professional development, being these factors of the satisfaction obtained with the experience of the users. This factor is essential when searching for didactic tools for the development of classes [45] although, different approaches measuring satisfaction from various theoretical perspectives could be further made. Microsoft Teams' primary function is to centralize contents in one tool for managing the subjects and resources needed to support teachers and students: The teachers showed great adaptability in incorporating new elements for developing their teaching-learning processes [46]. Therefore, Microsoft Teams is a flexible tool that facilitates the tasks and the management of subjects and provides the possibility to elaborate upon educational materials; it also serves as a tool to record student data. As an element capable of increasing the attractiveness of teaching, it also favors communicative relationships. It spreads information and knowledge, without disassociating it from the teaching-learning experience's satisfaction. Undoubtedly, Microsoft Teams provides a plethora of communication and innovation possibilities, becoming a motivational tool for the student when used to increase the attractiveness of the content in the syllabus [37]. On the other hand, teachers are a critical element in the incorporation of virtual teaching models. The use of Microsoft Teams and different related tools have definitely reconfigured teacher-student relationships according to the three main concerns mentioned by Bower: (a) changes in interpersonal relationships, (b) the adequacy of institutional support, and (c) the quality of teaching [24]. These communication tools represent a powerful didactic resource, which allows teachers to share their experience and their knowledge, but such tools also limit the topics covered and the interaction with content based on an immovable syllabus that is reflected by the platform, meaning that the academic contents do not adhere entirely to real life situations while being changed with the interaction through interfaces that print a particular perspective to how communication, and hence, comprehension will be during class, but being aware of the limitations and possibilities of the specific platform. Fariña-Vargas et al. [47] in their satisfaction study used an observation matrix to determine the resources most commonly used by teachers, the typology of activities requested by teachers, the communication resources that were incorporated into each virtual classroom, and the use of such resources, such as the structure of the virtual classroom (temporary, social, or thematic), the communication resources used, and the design of such resources: Each virtual classrooms' pedagogical model was also determined [47]. Torres et al. developed a Moodle platform study, where the instructors considered that the non-face-to-face phase was beneficial for extending the face-to-face stage [48]. A good question that institutions should work with is the awareness of students about the limitations and the bias generated by the platform and the VLP and LMS itself. Ramírez et al. used regression analysis with successive steps to study the factors of course flexibility, teaching attitude towards e-Learning, student self-efficacy using internet and perception of interactions, showing that 47.2% of the student community was satisfied with the LMS service [49]. Based on these results, guidance was provided for administrators of

virtual higher education courses. Still, according to the authors, the platform's limitations awareness should be discussed in class. Microsoft Teams' potential in education as an alternative to continuing with the traditional teaching and learning process, both virtual and face-to-face, has been descriptively explored. Moreover, the situations that yield such educational changes affect the students' emotional state and, therefore, student's willingness to work, as their routines are broken despite looking for specific elements to maintain continuity. At UVM, the class schedules were maintained. This directly affected the realization of other activities related to the same course and those related to other courses. The re-deployment of face-to-face activities in virtual space was feasible since the teachers managed to transform class activities into virtual activities, adopt a series of best practices, and allow students to participate in those activities [50]. Learning was self-assessed by the teachers and evaluated by the students during the academic process developed during the COVID-19 crisis. However, many of these activities were transformed and transferred to spaces where they were not entirely native. This process led to a reconceptualization of the advantages and disadvantages of each media. Each of these media has its own benefits and its particular communication ways. No thorough trans-disciplinary work has yet studied the activities and contents relevant to each presentation method that impacts the selection of a VLP. In short, digital resources have their logic, and in-person training may not be perceived the same as if they were created for an online format. The impact of virtualization on student learning will facilitate the more effective implementation of innovative activities. The effect of adopting such activities will be part of the new concept of a comprehensive traditional teacher with virtual teaching skills as a critical element to invigorate academic offers if the contents and objectives of education are correctly determined in this new environment. One possibility for the topics to be discussed, is having the content on the platform while considering each participant's reflection moments, which is why such moments should be explored. As long as the reflective and evaluative spaces to present proposals are not encouraged, changes may always be faced with "emergencies" and lack opportunities to rethink education's reality. School-based education has a limited time-frame and features its own specific spaces that are not present in distance education. During the COVID-19 crisis, students have had to improvise their academic areas. They may study on a table, in the living room, in the bedroom corner, or in the dining room. These are all spaces with other functions, and other family members may be present and carry out activities unrelated to school. How often was that done during face-to-face? Conventionally, a student spends school time in a space made for that purpose and school buildings are currently abandoned. Of course, a virtual student can demand that his or her "room" be vacated if someone occupies that space for another task while the student has class hours. This study area exists in a time and space that does entirely exist or is delimited in the conventional way (i.e., a paradoxical truth). That is to say, and virtual education exists in the context of virtual reality, an area that the student does not share with others while studying and with whom, simultaneously, shares physical reality, producing the need to rethink the concept of "face-to-face" classes. This study indicates favorable results for the administrative and academic staff of Laureate Mexico regarding the implementation of the curriculum under combined traditional and virtual education approaches. UVM is part of the mexican federation of private higher education institutions (FIMPES), which is an essential factor in improving the dynamics generated by the current crisis and seeking a scheme of academic satisfaction that includes the satisfaction of teachers. The University of Havana determined through different surveys that teachers under 35 years of age were very satisfied with the use of virtual classrooms. This previous study presents essential similarities with the present work because, in our results, the best satisfaction in using Microsoft Teams was observed in the stratum of teachers between 30 and 50 years of age, where females had greater pleasure in the use of the LMS [51].

However, protocols on the use of virtual reality are not understood, which leads to confusion. This confusion extends to contexts such as education and commerce. Virtual education is positioned worldwide as a valuable alternative to traditional education due to

the population's accelerated mobility. Still, it lacks agreement between the managers and users of such tools, obfuscating such tools' true meaning. This pertains to content itself and what that content means, and how it can support analysis of the situation and promote the generation of proposals [52].

There are also concerns about the boundaries of virtuality and the components, characteristics, and assumptions regarding the virtual education modality. We must also clarify the ERT concept. Unlike educational experiences completely designed and planned to be online, ERT responds to a sudden change from instructional models to alternative ones due to a crisis. In such circumstances, the education that would usually be delivered using face-to-face or blended methods requires immediate, fully remote solutions. However, when the problem subsides, students and teachers will revert to the initial format. In these circumstances, the primary goal is to provide temporary access to teaching and instructional support in a quick and easy-to-implement way, not to recreate a robust educational ecosystem. In this way, ERT can be disassociated from online learning. Due to their political agendas and decision-making processes, institutions may make different options and invest differently, resulting in various solutions from one institution to another. This experience highlights some distinctions that can guide ERT evaluations during and at the end of the crisis. Despite research showing otherwise, it is a common cliché that online learning is of lower quality than face-to-face learning. In a state of emergency, it is not difficult for this idea to be reinforced since the urgency to migrate to online learning will make, in many cases, proposals unable to maximize their potentials and possibilities supported with an urgent decision-making process.

6. Conclusions

Microsoft Teams is an alternative tool implemented by UVM to respond to the educational paradigm shift during the COVID-19 crisis. The use of Microsoft Teams for educational purposes is an invitation to research and reflect. One way to explain the possibilities of Microsoft Teams, regarding a communication point of view, is to conceptualize the platform as a set of "tools" and "spaces" in which communities with common interests interact exchanging information. Microsoft Teams is that space for synchronous and asynchronous communication (individual–individual or individual–group) where that interaction and social activity occurs and provides a means to search for information, to distribute and to retrieve that information in digital format; Microsoft Teams is thus a support tool used to execute the teaching–learning process in an educational environment in ERT.

In designing the information collection instrument for UVM teachers, validation of the questions and answers using the Cronbach's alpha coefficient gave a result of 0.926, indicatinga high reliability and correlation among the problems.

Of the teachers who answered the Instrument, 45% were female, and 55% were male. More than 60% of teachers were 30 to 50 years of age. Teachers had 6 to 20 years of teaching experience. Moreover, 76% of the professors taught one to three subjects, 30% had experience as virtual tutors, and 71% were experienced in the management of VLP, mainly Blackboard and Schoology, which were used as support tools in the teaching–learning process before the pandemic. Likewise, UVM, as an avant-garde institution, has access to the internet in all its fields and facilities nationwide. Consequently, the use of Microsoft Teams was facilitated by the following favorable aspects: the digital literacy of the UVM community and the use of ICT in daily life along with the institutional organization of groups and subjects, which was a relevant factor in the success of the changes caused by the COVID-19 crisis. The teachers also expressed satisfaction with the training received and their ability to quickly assimilate to the Microsoft Teams environment.

There are several relevant aspects to mention, such as improving the planning and organization of information in Microsoft Teams and the related elements of teamwork. From the perception of the teachers, the use of Microsoft Teams facilitated the experiences of students, such as their involvement, interest in their preparation, and self-evaluation. In

just six days, UVM trained more than 15 thousand teachers and more than 100 thousand students. The phenomenon of the virtualization of management processes and academic processes and ERT caused 100% of UVM teachers to be transformed into teachers with virtual tutoring skills. UVM professors accepted the challenge of preparing for emergency remote teaching and training in the use of a novel technological platform. Teachers took control of their classes, and now, for educational researchers, new lines of research have opened, which will help establish better parameters in ERT. All these analyses allowed us to answer the following question: Was the teaching–learning virtualization strategy at UVM while using the Microsoft Teams platform appropriate? Considering the results of this work, there are several conclusions, but the primary result is that Microsoft Teams offers the necessary tools to facilitate autonomy in learning.

Therefore, we conclude by answering the central question: Has the virtualization strategy for the teaching–learning process through the Microsoft Teams platform used by UVM been adequate? The virtualization strategy used by the Universidad del Valle de México was ultimately shown to be acceptable when using Microsoft Teams (a relevant aspect of the work), and the use of a single VLP lead to a positive perception, among teachers, of the virtualization of the teaching–learning process caused by the COVID-19 crisis.

Appendix A

Table A1. Data collection instrument.

I. General Data		
Items of the instrument		
Q1. Email		
Q2. Gender	Male	Female
Q3. Age Range	25–30 years 31–40 years 41–50 years 51–60 years	
Q4. Type of Contract	Professor of the subject Full-Time Teacher Academic Officer	
Q5. Years of Teaching Experience	0 to 1 year 1 year 1 month to 5 years 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	

Table A1. *Cont.*

Q6. Career / Educational Program where he/she teaches classes					
	Baccalaureate				
	TSU				
Q7. The educational level where he/she teaches the class	Quarterly Degree				
	Semester Degree				
	Executive Bachelor				
	Postgraduate				
	Online Programs				
Q8. How many subjects do you currently teach?					
Q9.Before the contingency, did you have experience in managing Virtual Learning Platforms?	Yes	No			
	Blackboard				
	Schoology				
Q10. Indicate in which Virtual Learning Platforms did you have experience?	Google Classroom				
	Moodle				
	Other				
Q11. Have you participated as an Online Tutor at UVM?	Yes	No			
Q12. Have you participated as an Online Tutor in another Institution?	Yes	No			
Questionnaire items: 1 = Very dissatisfied; 2 = Dissatisfied; 3 = Moderately satisfied; 4 = Satisfied; 5 = Very satisfied;	1	2	3	4	5
Q13. Are you satisfied with the Training received at UVM for the use of the Teams Platform?					
II. Satisfaction with the use of the Teams Platform					
Questionnaire items: 1 = Very dissatisfied; 2 = Dissatisfied; 3 = Moderately satisfied; 4 = Satisfied; 5 = Very satisfied;	1	2	3	4	5
Q14. Using Teams has been easy for me					
Q15. I have been able to use Teams without significant difficulties					
Q16. Overall, I can say that this first contact with Teams has been satisfactory for me					
Q17. Using Teams helped me reflect on the concepts taught on the subject matter					
III. Teaching point of view on the Teams Platform					
Questionnaire items: 1 = Strongly disagree; 2 = Disagree; 3 = I don't know; 4 = Agree; 5 = Completely agree;	1	2	3	4	5
Q18. With Teams, my organizational skills have improved					
Q19. My ability to organize and plan has improved					
Q20. Through Teams, my information management skills have improved					
Q21. My communication skills have improved					
Q22. My information management skills have improved					
Q23. My ability to work in a team has improved					
Q24.Teams allow me to reinforce the academic content of my subjects					
Q25. My motivation towards meeting academic goals					
Q26. Using the Teams Platform allows me to reinforce content					
Q27. The Teams Platform allows the student to self-evaluate					
Q28. The Teams Platform increases the student's ability to learn autonomously					

Table A1. *Cont.*

IV. Teaching-Learning Process Teacher to Student					
Questionnaire items: 1 = Strongly disagree; 2 = Disagree; 3 = I don't know; 4 = Agree; 5 = Completely agree;	1		2	3	4 5
Q29. The student has been involved with interest in the course through the Teams Platform					
Q30. The student dedicates sufficient time to self-preparation					
Q31. The student participates actively in the activities developed in the Teams Platform					
Q32. The technical skills of the students to use the different Teams resources are sufficient					
Q.33 There is student satisfaction with the development of the course in the Teams Platform					
Q.34 The activities carried out in the Teams Platform during the contingency are adequate					
Q35.In the Teaching-Learning Process, innovative activities have been carried out by the students					
Q36. Activities that the students have done					
Exhibitions					
Exams					
Chores					
Discussions					
Projects					
Practices					
Other					

Table A2 corresponds to the answer to the questions Q15–Q18 of the data collection instrument.

Table A2. Q15–Q18 question results.

Question	Very Satisfied	Moderately Satisfied	Does Not Know	Dissatisfied	Totally Dissatisfied
Q15	32%	43%	11%	2%	12%
Q16	33%	43%	9%	2%	12%
Q17	25%	43%	16%	6%	11%
Q18	27%	38%	17%	6%	12%

Table A3 answers to Q19–Q30 questions, show the results of Section 4 the substantive aspects (Section 3) of the teaching–learning process where, on average, 78.58% of the teachers agreed that the use of Microsoft Teams allowed them to plan their activities, manage information, work as a team, increase their motivation, and achieve their goals.

Table A3. Q19–Q30 question results.

Question	Very Satisfied	Moderately Satisfied	Does Not Know	Dissatisfied	Totally Dissatisfied
Q19	29%	48%	7%	13%	3%
Q20	32%	45%	8%	12%	3%
Q21	32%	46%	9%	12%	1%
Q22	29%	49%	8%	13%	1%
Q23	33%	42%	10%	13%	2%
Q24	37%	42%	9%	11%	1%
Q25	36%	37%	14%	11%	2%
Q26	36%	41%	9%	13%	1%
Q27	31%	41%	16%	10%	2%
Q28	43%	44%	6%	6%	1%
Q29	45%	43%	6%	5%	1%
Q30	41%	41%	11%	6%	1%

Table A4 corresponds to Q31–Q36, showing the results of the Section 4 teaching–learning process from teacher to student.

Table A4. Q31–Q36 question results.

Question	Very Satisfied	Moderately Satisfied	Does Not Know	Dissatisfied	Totally Dissatisfied
Q31	32%	50%	8%	9%	1%
Q32	18%	45%	18%	16%	3%
Q33	31%	47%	9%	12%	1%
Q34	38%	49%	4%	7%	2%
Q35	25%	44%	17%	11%	3%
Q36	41%	47%	6%	4%	2%

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