Perception of professors regarding the transition to emergency remote teaching in a large public university in Mexico during the pandemic[1]

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Abstract

This paper presents the most relevant results from a follow-up questionnaire applied to a sample of professors from the largest public university in Mexico – the National Autonomous University of Mexico (UNAM). It further investigates the issues identified by a questionnaire applied at the start of the pandemic (whose results were also published), sending a follow-up questionnaire to the university faculty months later. The research sought to identify and describe the opinions, experiences, characteristics, and conditions in which these professors had to switch to remote teaching using technological tools during the pandemic. Data were collected by an exploratory online survey with Likert-type multiple choice and open questions applied to a non-random sample of 513 professors at UNAM. Results show that 43% of the participants considered the quality of remote teaching to be equal to classroom teaching, 23% reported an improvement, and 34% stated that it was worse. Most respondents said they spent an average of 1 to 10 hours per week on teaching activities, with assessing and providing feedback on student assignments being the most time-consuming. Clearly, the experiences and teaching activities of university professors are changing as the pandemic continues. Post-pandemic times will require a more compelling answer from higher education institutions regarding the social inequalities generated by the pandemic.

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As percepções dos professores sobre a transição para o ensino remoto de emergência em uma grande universidade pública no México durante a pandemia

Resumo

Apresentamos os resultados mais relevantes da aplicação de um questionário de acompanhamento a uma amostra de professores da maior universidade pública do México, a Universidade Nacional Autônoma do México (UNAM). O objetivo deste estudo foi aprofundar as questões identificadas em um questionário aplicado no início da pandemia (cujos resultados também foram publicados), enviando um questionário de acompanhamento ao corpo docente da universidade meses depois. A intenção era identificar e descrever as opiniões, experiências, características e condições dos professores de ensino superior que tiveram que mudar para o ensino remoto usando ferramentas tecnológicas durante a pandemia. O método empregado foi uma pesquisa exploratória on-line com perguntas abertas e fechadas do tipo Likert que foi aplicada a uma amostra não aleatória de 513 professores da UNAM. De acordo com nossos resultados, em relação à qualidade do ensino, 43% dos participantes afirmaram que era igual ao ensino em sala de aula, 23% disseram que tinha melhorado, e 34% compartilharam que era pior; a maioria disse que gastava em média de 1 a 10 horas por semana em atividades de ensino; o que envolvia mais tempo eram avaliação e fornecimento de feedback sobre as tarefas dos alunos. É evidente que as experiências e atividades de ensino do corpo docente nas instituições de ensino superior estão mudando à medida que a pandemia continua. Os tempos pós-pandêmicos exigirão uma resposta mais convincente das instituições de ensino superior em relação às questões de desigualdade social que a pandemia deixará por um longo período.

Introduction[3]

To ensure continuity in teaching and learning processes during the COVID-19 pandemic, many professors and teachers in Mexico and around the world (TRUST; WHALEN, 2020) rose to the challenge and swiftly started using the technological resources available at home and adapting their teaching abilities to the 'stay at home' strategy mandated by the Mexican government.

The results of this study[4] (CUAIEED, 2020) may present useful information for stakeholders and higher education authorities during decision-making in terms of designing strategies that would allow, during and after the pandemic, to transition towards a university model in which technologies are an integral part of the professors' teaching process, whether in a school-based, distance or open modality. Consequently, the efforts and work of higher education institutions will necessarily include the idea of an intermodal education.

Conceptual framework

Studies exploring the response of university faculty to the emergency remote teaching in Mexico and Latin America are beginning to emerge. A literature review reveals diverse conceptions regarding the teaching-learning experiences of schools and universities during the 15-month school lock-down in Mexico, and still today after 18 continuous months of distance and online education at the National Autonomous University of Mexico (UNAM). Technology is part of the solution, surely, but it is also a factor that can further widen Mexico's educational gap (MATEO DIAZ; LEE, 2020) and economic inequality (ILO, 2020; RUIZ, 2020; SANZ; SÁINZ; CAPILLA, 2020). The implicit risk in the distribution of private or self-employed work in Mexico is highlighted by a survey conducted by UNAM scholars, who mapped socioeconomic vulnerabilities in the face of the COVID-19 health crisis, exploring the spatial distribution of various aspects that explain the social, economic and health vulnerability of the population (SIQUEIROS; SANTOS, 2020).

UNAM's Institute of Social Research conducted an opinion survey directed at university members about the coronavirus epidemic and its social effects. A questionnaire was applied to a sample of 13,073 students, professors, and university employees about their views on the pandemic. Of the total sample, 27% considered the situation very serious, 57% serious, and 17% regular[5], little, or not serious (INFANTE CASTAÑEDA; PELÁEZ BALLESTAS; MURILO LÓPEZ, 2020).

According to Sánchez Mendiola et al. (2020), educational institutions at all levels have faced an abrupt transition to online and distance education due to the disruptive effects of COVID-19 (UNESCO; IESALC, 2020), and the main response so far has been the implementation of emergency remote teaching (ERT), which is characterized by offering a quick and temporary response to support the continuation of schooling before

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3- The authors of this paper would like to thank the careful reading and always pertinent comments from the reviewers.

4- In this paper we address some of the most relevant findings of the study. To view the full research report, consult CUAIEED (2020).

5- The sum of percentages exceeds 100% due to rounding of decimal places.

a crisis situation, without a pre-designed plan for the use of resources or infrastructure (EACHEMPATI; RAMNARAYAN, 2020; HODGES *et al.*, 2020; WHITTLE *et al.*, 2020).

We identified several exploratory educational studies carried out by means of surveys and questionnaires directed at primary, secondary, and tertiary education teachers (PERROTTA; BOHAN, 2020; GUDMUNDSDOTTIR; HATHAWAY, 2020; FARDOUN *et al.*, 2020; GUILLÉN SÁNCHEZ *et al.*, 2020; MARTÍNEZ-GARCÉS; GARCÉS-FUENMAYOR, 2020; MALDONADO GÓMEZ *et al.*, 2020; SGRECCIA; CIRELLI, 2020; THIBAUT, 2020; TRUST; WHALEN, 2020). These studies sought to identify, describe, and explore teachers' perceptions, experiences, problems, difficulties, or abilities to assess their readiness for online or virtual teaching practice, and for the shift from face-to-face to remote teaching. The present study focuses on higher education professors.

Face-to-face teaching is defined as that in which there is a face-to-face teaching-learning interaction, whereas remote or distance teaching occurs when teaching activities are carried out using videoconferences and synchronous and/or asynchronous online interaction, a hybrid or blended teaching modality, in turn, is one in which the two previous modalities coexist (GARCÍA-PEÑALVO *et al.*, 2020 *apud* FARDOUN *et al.*, 2020). Remote activities should be carried out flexibly, at different times (asynchronously), or given the option to do them synchronously. Hence, e-learning has also been directed towards the mobile and ubiquitous world according to the paradigm of ubiquitous learning (COPE; KALANTZIS, 2009; PEÑA-AYALA; CÁRDENAS, 2016) and social and situated learning.

Given the unprecedented nature of the pandemic, which precludes any forecast as to the economic crisis and the learning losses that will impact the right to education of an entire generation of children and youth (DI PIETRO et al., 2020; KUHFELD; TARASAWA, 2020; ILO, 2020; RUIZ, 2020; SANZ; SÁINZ; CAPILLA, 2020), we must begin to reflect and think about what other effects the pandemic will have on higher education in the medium and long term. When reporting on evidence of impact, Hattie (2021) states that, regarding the achievement effects analyzed by 7 European studies based on approximately 5 million students, "the average effects were: primary school -.17, high school -.10, mathematics -.17, native language -.11. These are small but important effects showing that distance learning is not optimal; so, any claims that schools should stay in COVID mode teaching would be hard to defend" (HATTIE, 2021, p. 3).

Despite the significantly small average learning loss during the pandemic, which could be explained by socioemotional distress or anxiety, this is generally attributed to teaching or school systems. Knowing the impact rate of learning loss is certainly crucial, as it could provide strong evidence via randomized studies and help clarify whether this is a reversible situation once teachers are experienced and familiar with the development of open or remote and distance education, or work with better circumstances towards better teaching. This we do not know yet.

The impact cannot be anticipated, but we must take advantage of the situation and shift into a new way of conceiving and developing the traditional face-to-face teaching model, upon which university education has rested until now (BROWN *et al.*, 2020; EIU, 2020; HALL et al., 2020). Conversely, pandemic education brings a great opportunity to reflect on what, where, and how universities want to return to classes and what comes next. This in-depth analysis needs to involve both students and professors.

While adapting to new changes, faculty and student readiness needs to be assessed and supported accordingly. Learners with a fixed mindset have difficulty adapting and adjusting, whereas those with a growth mindset adapt quickly to a new learning environment. There is no one size-fits-all pedagogy for online learning, but rather a variety of individuals with varying needs. Different publics and age groups require different approaches to online learning (DOUCET *et al.*, 2020 *apud* POKHREL AND CHHETRI, 2021).

Moving towards a multimodal education (KRESS; BEZEMER, 2009) and a Pedagogy of Multiliteracies (THE NEW LONDON GROUP, 1996) in a world that writes and reads in a multimodal manner implies promoting, in professors and students, the appropriation of a true multimodal and digital culture (CODE; RALPH; FORDE, 2020) where the online educational experience does not imply adapting what happens in the classroom, but rather conceiving of these modalities as ways in which students and teachers experience education.

A study from Spain highlighted lack of knowledge of pedagogical models (27.5%), student assessment (22.5%), lack of technological platforms (19.6%)—compounded by lack of technological resources (18.63%)—, and lack of adequate materials (0.98%) as the main issues facing higher education. Added together, the technology-related issues reach almost 40%, with 8.82% of teachers unable to perform monitoring and assessment (FARDOUN *et al.*, 2020).

Research on digital skills carried out in Colombia (MARTÍNEZ-GARCÉS; GARCÉS-FUENMAYOR, 2020) reported the following noteworthy findings: the ease of sorting digital information (78.85%), sharing information through virtual media (50.00%), editing digital content (40.38%), protecting personal data (40.38%), and developing conceptual skills (42.31%). It concludes that computer and information literacy, communication and collaboration, and problem solving are the most developed skills.

A qualitative grounded theory study with 35 public universities in México about their website and their response to the national school lock-down, as well as the mechanisms implemented during the pandemic, found 22 conceptual categories grouped into four domains: a) measures for early transition and alerting members of the university community about what is to come, b) supportive and responsive measures for the implementation of online education, c) measures for comprehensive care and well-being of students, and d) permanent communication channels on the university website (NIÑO CARRASCO; CASTELLANOS-RAMÍREZ; BERMÚDEZ VIVAS, 2021). Results showed that both UNAM and two other State Universities (Autonomous University of Baja California and Veracruzana) offered a broad level of response, implementing a diversity of actions, strategies, and programs in response to the crisis on their website and achieving a 90% compliance in at least three of the four domains (NIÑO CARRASCO; CASTELLANOS-RAMÍREZ; BERMÚDEZ VIVAS, 2021).

University professors and students learn remotely while becoming familiar with the tools and creating strategies for distance learning (TRUST; WHALEN, 2020; SÁNCHEZ MENDIOLA et al., 2020). Both studies concur that difficulties related to connection and communication, lack of technological resources, and pedagogical and didactic challenges in designing digital learning strategies and activities are the main issues underlying professors' perceived unpreparedness for online education, leading them to feel overwhelmed.

These findings are similar to the problems, experiences, and difficulties of professors in other parts of the world (GUDMUNDSDOTTIR; HATHAWAY, 2020). A broad descriptive research (SILAS CASILLAS; VÁZQUEZ RODRÍGUEZ, 2020) analysing a convenience sample of 1,310 responses from Latin-American university professors, mainly from Mexico, obtained through a digital questionnaire opened from March 27 to April 30, 2020, shows different perceptions about difficulties with a) student's technology skills, b) lack of connectivity (45.3%) and slow or poor internet connection (39%); c) personal circumstances at home, such as housework (48.2%), various distractions with family members, private and quiet space, among others (34.9%); and d) educational resources, such as library books (25.8%).

The vast information that has been produced since the beginning of the pandemic asserts that the most viable proposal to not only overcome the crisis but transform education, is to reconsider the momentum that the incorporation of digital technologies had in education early in the century to transform the conditions under which teaching is conducted, giving new verve to the "pending innovation" (COBO; NARODOWSKI, 2020; COBO, 2016, ITOW, 2020; FUJITA, 2020). This demand requires that professors reflect on their continuous practice, with participation of students and support from institutional structures, and a collective reflection for educational actions that allows them to build a flexible and inclusive model on how to change beyond what the shift to REE implies (CODE; RALPH; FORDE, 2020).

UNAM, like many other higher education institutions, faces a huge challenge in developing the pedagogical skills of its faculty to participate in digital cultures, and supporting new modalities and forms of teaching and learning. In this regard, educational institutions should foster flexible practices and interactions for learning, as well as for teacher education and professionalization, and promote intermodal student-centered education with a humanistic and universal approach based on social justice, minority rights, gender equality, anti-racism, sustainable development, and cultural development and its conservation.

Method, techniques and ways of inquiry

This research sought to identify and describe the opinions, experiences, characteristics, and conditions in which higher education professors had to switch to remote teaching using technological tools during the pandemic.

The instrument we designed for this study differs from other research, which has emphasized aspects such as the emotional health of the school community or the socio-economic issues faced by university students. Rather, the instrument designed by the Coordination of Open University, Educational Innovation and Distance Education (CUAIEED) is interested in exploring the pedagogical conditions, didactic and assessment experiences faced by professors when shifting to ERT. Consequently, the questionnaire and its results focused on the following dimensions:

- Professors' conditions and experiences regarding their pedagogical work in ERT.
- Technological, pedagogical and logistical issues of teaching during ERT.

- Professors' interests and education needs within ERT.
- Didactic practices and interactions in ERT.
- Forms of assessment in ERT.

With an 'online survey' design, this exploratory study used the platform Survey Monkey to send e-mail invitations to professors attending continuing education and faculty development courses offered by CUAIEED[6] at UNAM in Mexico City. We developed a four-part questionnaire comprising close-ended Likert-type questions to collect quantitative data, and open-ended questions to recover the professor's teaching experience with the digital media available and those provided by the institution. As it was an exploratory study, all participants signed an informed consent form before answering the questionnaire. At UNAM, we followed all university academic ethical concerns about confidentiality, data safeguarding, retention, anonymization, and sharing.

The questionnaire consisted of 40 Liker-type multiple choice items, and open questions, divided into four sections: 1) General information, 2) Technological, pedagogical and logistical issues, 3) Practices and interactions, and 4) Learning evaluation. The instrument was sent to professors from different academic levels at the University who were actively teaching and had classes assigned during the second semester of 2020. Data were collected via LymeSurvey from June 17 to July 3, 2020, returning 513 answers (32.4% response rate). We sent an invitation by e-mail to a non-randomized sample of 1,583 professors who integrated the list of academics enrolled in courses, workshops and all other continuing education activities offered by the then Coordination of Educational Development and Curricular Innovation (CODEIC)[7] of UNAM, using the SurveyMonkey platform.

This study follows up on a first survey conducted at the beginning of the pandemic in Mexico, during March 2020 (SÁNCHEZ MENDIOLA *et al.*, 2020).

Data source

Academic peers at UNAM, with graduate degrees and teaching experience during the pandemic and the transition to the remote modality, reviewed the questionnaire. The instrument consisted of 40 Likert-type multiple choice items and open questions, divided into four sections: i) sociodemographic data, with 23 items; ii) technological, pedagogical, and logistical issues with three items, one of which is a battery of items; iii) practices and

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6- At UNAM, teacher education courses are offered by three academic entities: a) the "Dirección General de Cómputo y Tecnologías de Información y Comunicación" (DGTIC) which offers different online courses, 10 specialization courses and seminars; b) the "Dirección General de Asuntos de Personal Académico" (DGAPA) and its "Programa de Actualización y Superación Docente" (PASD), which offers updating and academic improvement by courses and diplomas aimed at disciplinary, pedagogical, and transdisciplinary education. All of them must comply with the university curriculum and the program of the undergraduate subjects at UNAM; and c) the "Formación Docente y Educación Continua" at CUAIEED, which offers courses and workshops for academic improvement during the pandemic, focusing on the pedagogical use of teaching-learning platforms and technologies.

7- On June 11th, 2020, UNAM decided to merge two academic services, the CODEIC and the "Coordinación de Universidad Abierta y Educación a Distancia" (CUAED), into the new Coordinación de Universidad Abierta, Innovación Educativa y Educación a Distancia (CUAIEED) to meet teaching and learning needs during this, and future, pandemics by offering learning, information, and communication technologies that can adequately face the emerging challenges and respond fully to society's demands (UNAM, 2020).

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interactions, with seven questions divided into three batteries and two open questions; iv) learning evaluation, with seven items, two batteries and two open questions.

Study sample consisted of faculty from the different academic levels at UNAM, with active courses for the 2020 academic year. We received 513 complete responses, of which 63.8% were female professors and 36.2% male professors. Of the total sample, 56% were part-time faculty and 28% full-time professors, 16% did not answer the question. As for the educational level at which they teach, 77% are undergraduate professors, 21% work at the graduate level, and only 17% teach high school (National Preparatory School and School of Science and Humanities, both part of the UNAM educational system).

Substantive results or support for the argument

Importantly, most answers came from female professors (64%) teaching undergraduate courses (56%) in Biological and Health Sciences face-to-face classes (49%). Regarding the age range, the youngest teacher who answered the questionnaire was 24 years old, whereas the oldest was 80 years old, resulting in an average age of 49.

## Professors' conditions and experiences regarding their pedagogical work in emergency remote teaching

Regarding the professors' perception of the quality of their teaching, 43% considered it equal to their classroom teaching, 23% reported an improvement, and 34% stated that it worsened (Figure 1). We observed a high percentage of respondents with experience in distance or online education: 60% had experience as a student and 56% as a professor. Moreover, 31% had experience as course designers and 28% as a developer or content expert (Figure 2). This finding is corroborated by other studies, which showed that the professors who coped best with the transition to remote teaching were those with experience in hybrid or online education (O'KEEFE *et al.* 2020; TRUST; WHALEN, 2020).

Figure 1 – Self-perception of teaching quality during emergency remote teaching
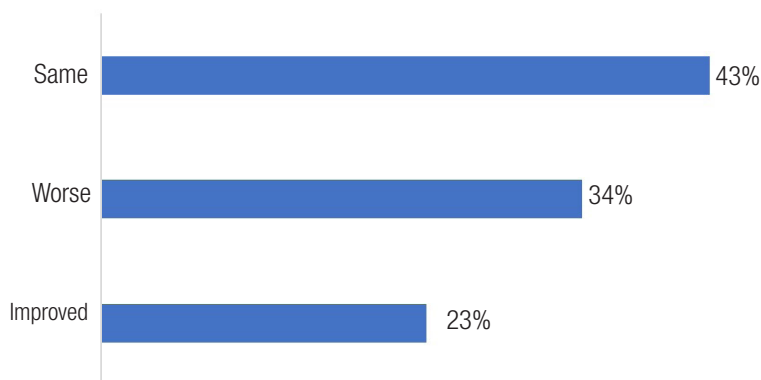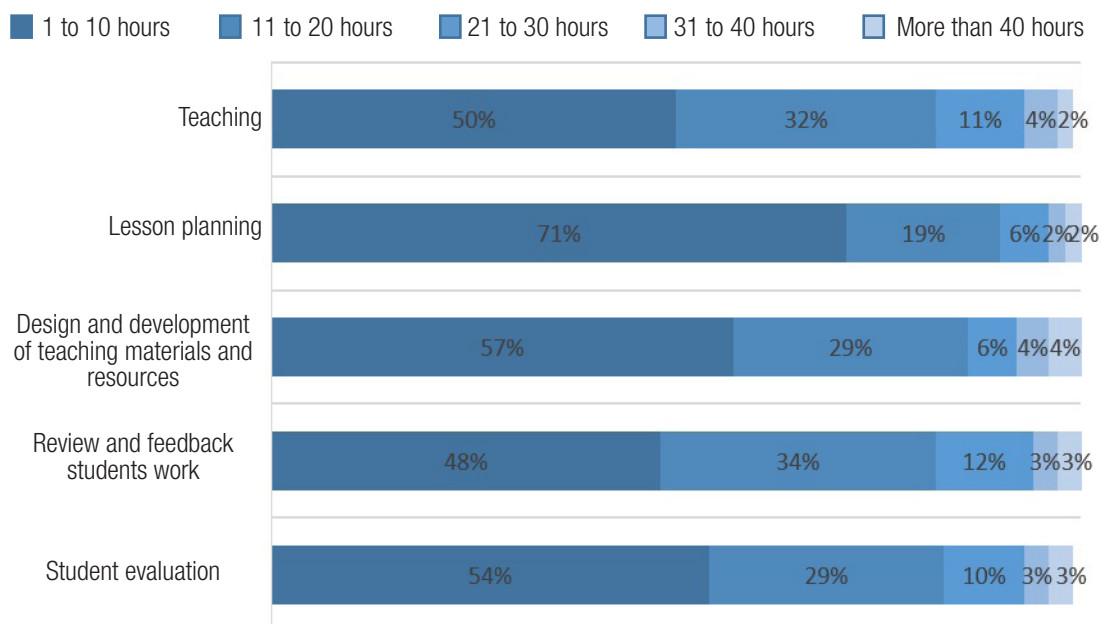

Source: Research data.

Figure 2 – Faculty previous experience with online and distance education

As a student	60%
As a teacher	56%
As a course designer	31%
As a developer or content expert	28%
As an administrator or manager	19%
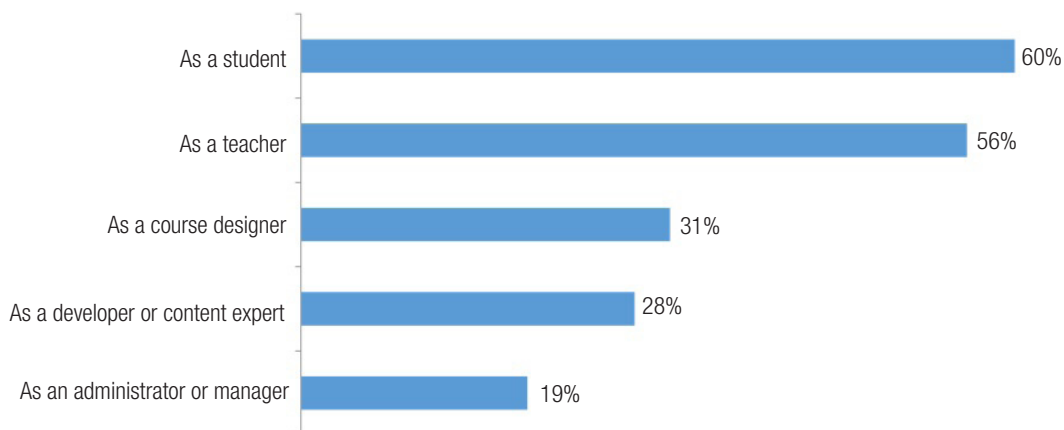
Source: Research data.

Most respondents said they spent an average of 1 to 10 hours per week on teaching activities, with assessing and providing feedback on student assignments being the most time-consuming. Of the total sample, 34% reported spending between 11 and 20 hours a week in these activities. Only 4% and 2% of the respondents said they dedicated 30 and more than 40 hours, respectively, to their teaching activities (Figure 3).

Figure 3 – Average time spent on teaching activities by faculty

Legend: ■ 1 to 10 hours ■ 11 to 20 hours ■ 21 to 30 hours ■ 31 to 40 hours ■ More than 40 hours

|	1 to 10 hours	11 to 20 hours	21 to 30 hours	31 to 40 hours	More than 40 hours
Teaching	50%	32%	11%	4%	2%
Lesson planning	71%	19%	6%	2%	2%
Design and development of teaching materials and resources	57%	29%	6%	4%	4%
Review and feedback students work	48%	34%	12%	3%	3%
Student evaluation	54%	29%	10%	3%	3%

Source: Research data.

Although data remained constant across educational levels, with most professors dedicating 1 to 10 hours to all their teaching activities, the high school faculty (40%) are shown to spend 11 to 20 hours with assessing, reviewing and providing feedback to students, above undergraduate and graduate professors. Importantly, 10% of the high school professors said that they dedicate more than 40 hours per week to assessing, designing, and developing teaching materials and resources.

Regarding the ERT practices and interactions carried out, professors often used (always and almost always) digital books (47%), general web pages (45%), and digital libraries (41%) as digital resources. On the other hand, Wikipedia (7%) and podcasts (6%) were the least used. The relatively low frequency with which professors use the listed digital resources, which in all cases is less than 50%, is an interesting finding. Importantly, 35% of the professors have never used the Virtual Classrooms made available by the University to its entire faculty (Figure 4).

Figure 4 – Frequency of use of digital resources by faculty
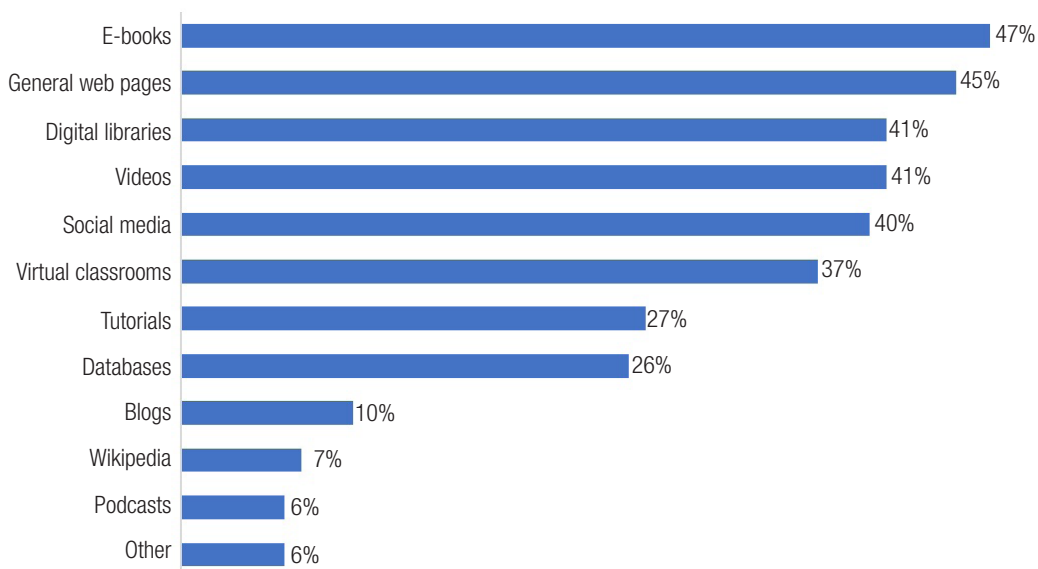
Source: Research data.

Technological, pedagogical and logistical issues of teaching during emergency remote teaching

Regarding the issues faced by professors during ERT, most situations were positively evaluated, with percentages over 60% in the "almost always" or "always" options. Situations indicating that "My daily activities at home interfere with my teaching activities" or "I have workloads that limit my teaching activities" stand out, however, with 30% of the

respondents indicating that sometimes their daily and work activities interfere with their teaching activities.

Conversely, the case of high school teachers was revealing: 32% indicated that their knowledge and skills on how to use tools and platforms are sometimes insufficient to develop their practice remotely, which is a higher percentage than that of undergraduate and graduate professors (21%, respectively).

To contribute to a better understanding of how gender affects teaching, we performed a one-factor analysis of variance to identify how this variable affected the time professors spent on teaching-related activities. Results suggests that female professors devote a higher average number of hours to teaching activities, such as designing teaching materials and resources, reviewing and providing feedback on assignments, and evaluating students.

A significant difference, however, appears in the average number of hours that female professors devote to domestic activities like cooking, washing, shopping, helping their children with schoolwork, or caring for older relatives. Thus, while men spend mostly 1 to 10 hours of work per week on household activities, women spend 10 to 20 hours of work per week on them.

Professors' interests and education needs during emergency remote teaching

Regarding the teacher training topics of interest to the respondents, most concerned the pedagogical use of technologies, coinciding with the grouping of technological and pedagogical issues identified in the previous section. Hence, 75% said they were interested in receiving training on "Design of didactic situations for remote education," 73% were interested in courses and workshops on "Assessment tools and strategies for remote education," and 69% expressed interest in "Educational use of the virtual classroom."

When asked what they considered to be the topics that a teacher training program should address, most pointed to the need to develop pedagogical skills for their practice mediated by technologies.

Didactic practices and interactions in emergency remote teaching

In their didactic practice, most participants reported maintaining the professor-student interaction via messaging applications, e-mail and cell phone messaging (81%), individual assignments (70%), and group classes via videoconference (58%) (Figure 5). Regarding frequency, e-mail is the most used tool (76%), followed by platform notifications (53%), videoconferences (51%) and WhatsApp messages (50%), consistent with the type of tools used for interaction.

Figure 5 – Type of interaction most often used by professors with their students
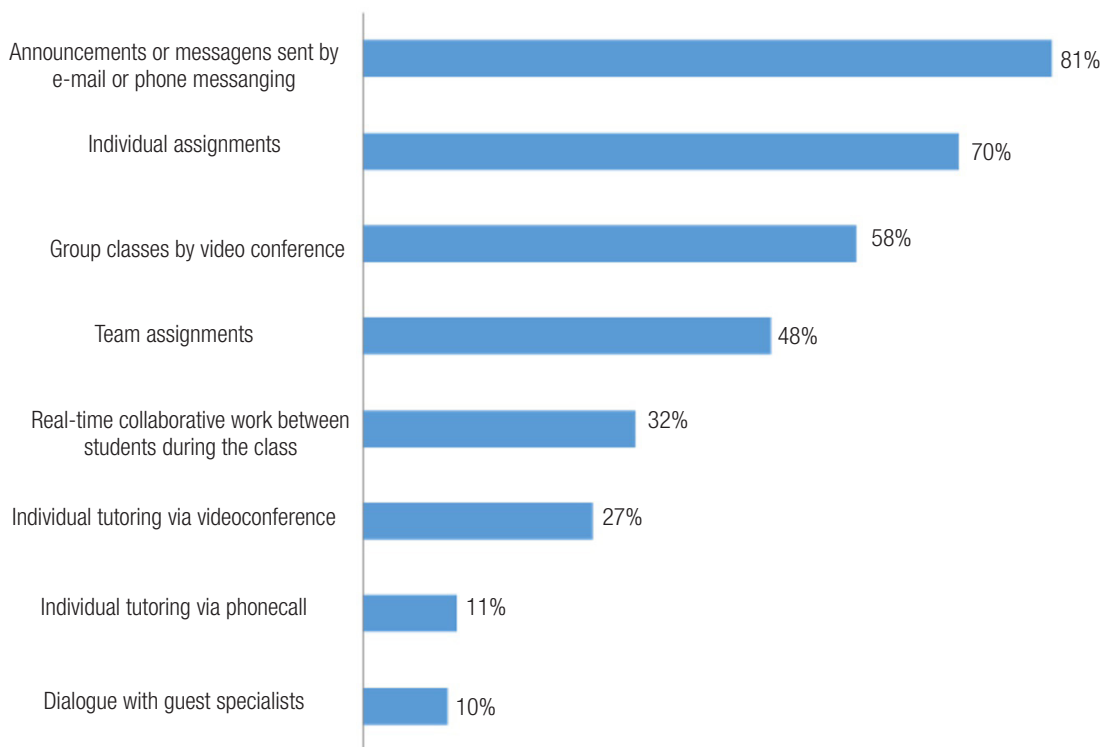
Source: Research data.

Remote education implies additional work for professors, but only a few respondents perceived their teaching work as being affected in areas such as planning, material design, feedback, and evaluation. One explanatory hypothesis for this finding is the high percentage of professors who reported having experience in online education, which allowed them to build teaching skills in distance education and digital learning.

Most teachers have maintained communication and interaction with their students by combining resources and technologies available and accessible through UNAM's Virtual Campus (https://distancia.cuaed.unam.mx/campusvirtual.html) and virtual classrooms (https://aulas-virtuales.cuaed.unam.mx/), which are available to all professors and students, as well as access to widely used communication technologies and applications.

Forms of assessment in emergency remote teaching

When exploring the assessment conducted during ERT, e-mail was the most used tool to assess students (38%), followed by the Zoom videoconferencing (26%), and Google Classroom (19%). As for the type of assessment strategies and tools used, most professors

reported the use of research (51%), followed by problem solving (46%), report (39%), and multiple choice test (37%).

As with the teaching practice dimension, we explored the evaluation dimension through open-ended questions. The results highlight the various ways in which professors provided feedback to their students, involving individual, group, or mixed participation.

Additionally, we also inquired about the main challenges regarding evaluation faced by professors during ERT. The main challenges mentioned had to do with the difficulty of building enough evidence to account for the learning achieved by students and to establish an agreed upon grade. While in these cases the difficulty concerned the type of evaluation activity that would allow copying or extracting information located on the Internet and digital spaces, other cases pointed to difficulties related to the type of knowledge to be assessed, the type of resources needed to realize a learning activity, and the use of specific digital technologies.

Academic or scientific significance

Substantiated conclusions

Undoubtedly, professors showed a great willingness to transition to ERT, but our findings indicate that while most professors were able to carry out their teaching work, the meaning of learning for their students might have been compromised.

The sample size is reasonable for statistical assumptions, according to recommendations of no less than 50 responses, and 100 are accepted for a confirmatory factor analysis of the instrument (HERNÁNDEZ SAMPIERI; FERNÁNDEZ COLLADO; BAPTISTA LUCIO, 1992; SPIEGEL; STEPHENS, 2020). When using a convenience or quota sample, the diversity of academic disciplines is compromised, as in the present study. Studies show that the response rate for questionnaires in digital research is about 25%, reaching higher percentages when it involves students and professors with higher education, and specially for self-administered digital instruments (GUINALÍU; DÍAS DE RADA, 2021). Regarding non-response, we suggest that sample adjustments be made for future representative digital studies with individual and cohort weights to consider random multiple sample packages to include faculty from all university study programs. Our exploration of the type of digital resources used, the didactic interaction maintained, and the type of evaluation performed, highlights the existing limitations for proposing didactic strategies that engage students and place them in a dynamic of increased activity, as well as for establishing smoother, more formative feedback-based communication. Our results may be explained by the sample constraints of the study and the professors' prior experience with digital education or distance and open teaching and learning. Moreover, we should understand whether this perception is shared by professors who have not attended CUAIEED' teacher education courses or workshops. What beliefs and perceptions do professors have about their ERT, especially those who had no previous experience in online education? We are unable to answer that question here.

Results suggest that despite the professors' efforts, there is a need to promote pedagogical emphasis, support and advisement in remote teaching, as well as multimodal and situated teaching practices. But the accessibility, affordability and equity of the technological infrastructure to be ensured by UNAM, and Mexican higher education, for all teachers of different rural or marginalized urban economic status remains unanswered. The big pending task in the coming months is learning evaluation, feedback, and assessment.

According to Kuklinski and Cobo (2020), an education for the new era implies a shift in discourse, where the educational narrative incorporates synchronous and asynchronous, face-to-face and virtual moments, where professors are more than just passive consumers and content producers, where transplanting face-to-face teaching to online education is insufficient.

Reading these results to identify faculty training needs, we observe a gap that seems to be sustained between traditional teaching practices and the pandemic educational reality. Besides reinforcing the extended model technology-focused training, this situation shows that what matters to professors is to include the use of technology in the pedagogical aspect as a support for their teaching tasks, as well as to take advantage of the resources made available by the University, such as virtual classrooms. As Pokhrel and Chhetri (2021) argue, the pedagogical challenge concerns online continuing education, the demoralization of faculty, public and student criticism about the loss of learning due to distance and online education, and policies that exclude professors. For them, the worst case scenario would be hybrid or blended education for 2023 (ESTEVES et al., 2021).

Asking ourselves how much and how 'more of the same' was done, and how professors managed to 'save the day' with the available resources, is key information for university authorities, who need to design policies, programs, and strategies that will enable shifting to a new university education.

Resumption of face-to-face or post-pandemic measures for Higher Education was met with some reservations, the main one concerning the continuation of technology knowledge with LMS and learning platforms and the new advantages that education has when teachers have ready and quick availability of educational resources through the internet or their own institutions (MURGATROYD, 2021). There is a pressing need to innovate and implement alternative strategies for education and evaluation. Clearly, the COVID-19 pandemic has given us the opportunity to pave the way for the introduction of digital learning (DHAWAN, 2020 *apud* POKHREL; CHHETRI, 2021).

Academic significance of the study

Our results highlight the need to strengthen professors' training, professionalization, and practice, especially for mastering and developing pedagogical skills linked to technology, since, as occurred during the closing of schools and the move to remote emergency education, professors demonstrated the willingness, attitudes, and ethics necessary to continue their work.

In broadening attention to the implications of a long-term or definitive transition into intermodal education with educational models that more vigorously incorporate

the digitalization of academic life, however, we will have to assess whether faculty collaboration was pushed as something temporary, since physical distancing was thought of as temporary and the post-COVID-19 time would imply a return to 'normality,' as if it were a wrinkle in time.

When the time comes to return to campuses, we will all have experienced new ways of learning, educational practices and interactions with new epistemologies, and a different appreciation for how education is carried out in classrooms, workshops, and university laboratories, along with new conceptions about education. In other words, students and professors today interact in very different ways than before March 2020. Intended to radically transform the way educational processes will be carried out when the physical spaces of the University are reoccupied, the training and professionalization strategies need diversity in the types and modalities of education, flexibility, technological and pedagogical soundness, and impact and viability programs.

What was initially a collaborative attitude can become a source of frustration, fatigue, and resistance. Against this scenario, a question emerges: what could Universities do to make the transition to digital learning as organic and sustained as possible?

Research studies on the future of attitudinal and ethical issues for online teaching and learning processes are scarce in Mexico and worldwide. It is imperative to explore the impact on teaching skills, competencies, and professionalization of remote and emergency education in today's settings. Further studies focusing on this diversity of challenges, decisions and actions facing higher education should be conducted, so that professors develop pedagogical skills in the active use of technologies, and support new modes and forms of teaching and learning. More research is needed on the processes of education, mentoring, and building teaching-practice communities, incorporating evidence-based practices and the principles of multimodal education.

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