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Proposal for an instrument to evaluate virtual platforms applied by HEIs in pandemic time.

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Keywords

Instrument,
evaluation,
virtual platforms.

Abstract

The purpose of the instrument proposal is to evaluate the use of virtual platforms in times of pandemic where face-to-face academic processes are interrupted and, without prior planning, technologies are used as the only means to continue teaching-learning activities. The instrument allows to know in a general way what the student is perceiving regarding the use of virtual platforms, thus identifying the areas of opportunity, as a training institution. The instrument was validated using the criteria of experts and by the Cronbach's alpha statistical method in SPSS with satisfactory results, demonstrating that the instrument allows identifying the perception of students from the disposition of equipment, connection, aspects related to the educational experience, with the teacher, course content, teacher-student communication in a virtual environment and in relation to working times on the platform, using a Likert scale.

Introduction

Since 2019, world health has been affected by the virus called Covid-19 that appeared in Wuhan, China, which has been evolving rapidly since its origin, forcing all affected countries to generate monitoring strategies and surveillance of identified cases (1) as well as the generation of public policies to create healthy community environments (2). Currently, the outlook is still uncertain because patients can be symptomatic or asymptomatic, which means that measures to diagnose and prevent infection should continue for some extra time (3). Among these measures, those that occurred in the field of education stand out since the traditional model of higher education had to be adapted to a completely virtual or digital model that required, and may continue to require, the collaborative effort of the teacher and the student focusing on the use of virtual pedagogical

resources (4). Therefore, it is vital that Higher Education Institutions (HEIs) generate flexible and resistant education models that adapt to the needs that are generated day by day (5).

When talking about this type of virtual resources, we cannot generalize or focus on the basic ones that already exist. Today, the use of social networks is becoming more typical, which means that virtual education methods must be transformed (6). For some time now, HEIs have tried to generate flexibility for students and have adapted the so-called Information and Communication Technologies (ICT), however, it is necessary to take into account the institutional model, didactic planning and instructional design of each one of the Educational Experiences (EE) and begin to analyze if distance education is really effective (7). On the other hand, it is known that both students who are in urban areas and those in rural areas, faced almost equally challenges such as lack of electricity, internet access problems and more complex problems such as lack of motivation consequent to not having physical interaction with the teacher and classmates as well as lack of self-confidence and other emotional problems (8).

Some time ago, the Federal Institute of Telecommunications (IFT) conducted a study on the use of ICT and Internet activities in Mexico. They analyzed the influence of the main socio-demographic characteristics of the population such as gender, educational level, economic income, occupation, age and place of residence, on the probability of using ICTs and carrying out certain activities online. According to the survey, it was estimated that 124.7 million people live in Mexico and 113 million were 6 years old or older. 31% of the population aged 6 or over study or have primary school as the highest level of studies. The rest attended secondary school (26%), 19% high school, 16% undergraduate and 1% postgraduate. When analyzing the population by zones, it was found that 19% of the population aged six or more living in urban areas have a bachelor's degree and, in rural areas, only 4% do. In relation to primary education, they found that, of the population aged 6 years or older, the educational level is higher in rural areas (43%) than in urban areas (27%) (9). For all of the above, given the growing need for the use of technology-supported education and the evolution of teaching-learning processes, in the year 2000 the Universidad Veracruzana (UV), as a HEI committed to professional training, took the opportunity to start the operation of a flexible learning environment through a distributed education system called Eminus, a synchronous and asynchronous multimedia communication and collaboration tool aimed at adapting to the modalities of the academic offer of the UV and representing a great challenge for the university community (10)

It should be noted that, in most cases, a virtual modality was operated with didactic plans prepared for a face-to-face modality, a situation encountered in the rush to continue classes in times of pandemic but that, through the institutional virtual platforms available, the academics who had the skills made the necessary adaptations and those who did not, faced critical moments of adaptation to the systems.

Materials and Methods

First, the indicators of interest were identified to construct the items measured through a Likert scale. The instrument is integrated into two sections where, in the first section, data are collected to characterize the population through four questions with short and closed answers for the collection of the following data:

– Age

– Sex

– The student has a computer or some device that allows him to carry out virtual activities from the home where the contingency happens.

– The student has an internet connection at the address where the contingency happens.

The second section is presented with a questionnaire structure of 33 quantitative reagents distributed in six dimensions: general aspects of the educational experience, aspects related to the teacher, course content, teacher-student communication, virtual learning environment and aspects related to time of work. Among the aspects that were considered are, for example, the same schedules that respond to the academic-administrative organization, based on the provision of available physical spaces, the type of hiring of the academic staff and based on the academic programming, which represent a determining factor in the development of the training process in addition to being a purpose in optimizing economic resources, human capital and infrastructure (11). The characteristics of the subject or educational experience define the modality that can be a course, workshop, seminar, laboratory, clinic, field practice, among others; these delimit the characteristics of the learning and teaching process and are consistent with the methodological strategy and the roles of the student and teacher (12). The teaching profile plays a preponderant role in the training process since it establishes the characteristics of the teacher who will be able to execute the subject program based on their training and professional and pedagogical experience (13).The structure of the program of the subject obeys the characteristics of the institutional educational model and the social needs identified in the elaboration of the foundation of the educational program. This must contain at least the objective, the competencies as well as the list of knowledge that will be addressed, whether theoretical, skills, attitudes and values, which are promoted through the approach and development of the activities and products and evaluation instruments that are considered by the academies to evidence the competencies declared in the program as well as the teaching and learning strategies, resources and teaching materials and primary bibliographic sources (14).

Communication with the teacher is no longer seen only as a means of transmitting knowledge in the subject they are assigned. It has been shown that communication plays an important role in learning since it has been described that one learns better where there are activities rich in communication and interaction with pedagogically selected materials andin everyday activities, in their context above all. The student-teacher relationship has an impact on learning so it must be of quality. Immediacy and closeness can be improved through eye contact and language as well as through the enthusiasm that the teacher conveys in their communication. On the other hand, the student recognizes and values the teacher's openness by instilling confidence and accessibility to resolve their doubts or misunderstood concepts (15).

Similarly, virtual learning environments have become a means of academic communication where face-to-face activities can be complemented or done exclusively online or mixed; synchronously or asynchronously in which groups interact. They offer not only spaces to consult content or activities, but also have spaces for interaction between groups through forums or virtual classrooms. Each platform has characteristics suited to the needs of its users (16), who, to a large extent, depend on the time dedicated to study, varying according to socio-demographic characteristics and family finances, distinguishing those who dedicate full-time to study, those who study and work part-time and those who work sporadically.The relationship between income and occupation, employment and academic status of the parents has been reported. However, it should be noted that some students work in order to gain experience in relation to their training discipline and their academic performance is not affected, some of them even manage to combine their work hours with academic work with what they come to identify the workplace as an immediate learning space. For others who work full time and study, they do report a negative impact on their academic performance but manage to sustain their studies that way (17). Therefore, these aspects were considered in a general way in order to generate, at the time of the application of the survey, an overview of the school situation of the students.

Five response categories were used according to the following degree: 1=totally agree, 2=somewhat agree, 3=neither agree nor disagree, 4=somewhat disagree, and 5=totally disagree. To certify the validity and reliability of the instrument, two actions were carried out, highlighting that, in the first, which cannot be expressed quantitatively and is more subjective or intersubjective, the so-called expert judgment (18) was used to assess the configuration of the instrument. Thus, the questionnaire was applied in the original proposed to 162 students from 8 different Educational Experiences in the period January-July 2019, after this, with the results, a database was created in the statistical software IBM Statistical Package for Social Sciences (SPSS) version 26 in which a statistical analysis was performed using Cronbach's alpha with a reliability of 0.959 as shown in table 1.

Table 1. Reliability statistics

Cronbach's alpha	Number of elements
.959	33

Results and Discussion

There are various platforms, each with available tools and particular characteristics, which the teacher could choose according to their convenience. This instrument seeks to evaluate platforms with the purpose of generating information related to indicators corresponding to their operation. Once the areas of opportunity have been identified, attention to them will correspond to the collegiate work.

Regarding the evolution of the use of ICTs in Mexico, in the population studied from 2015 to 2018, the use of the conventional telephone decreased from 25% to 11.9%; as the use of the internet increased from 57.4% to 65.8%; and the use of smartphones increased from 47.4% to 62.2% (9). The socio-demographic characteristics are an important element to consider in the surveys, since for this research topic they delimit the probability of using ICTs and carrying out activities on the Internet. The use of the internet, in some way, implies being able to make use of educational platforms, so the survey, as mentioned, is aimed at students who use these educational tools in times of pandemic.

Educational platforms, also known as Learning Management System (LMS), are virtual learning spaces that facilitate the distance training experience as they allow virtual interactions between teachers-students and student-student and are used not only by educational institutions but also by companies to develop work-at-home activities. Some platforms have spaces to deposit the necessary materials to address the theoretical knowledge to be reviewed in the sessions, which can be synchronous or asynchronous. In addition, they have spaces that promote active participation, such as forums and chats, and tools that are controlled or managed by teachers or learning facilitators. Some platforms have spaces to make evaluations, among many other tools, which can be managed and controlled with established time and space (19).

The platforms have basic characteristics in their virtual learning environment, standing out for being: *interactive*, where students are self-managers of their knowledge and regulation is key in this training modality since the teacher guides, but the student must assume responsibility for their learning. Likewise, they are a *centralized* and automated means of learning management, as well as *standardized*, since this attribute allows the use of other materials made by third parties and allows them to adjust the contents, optimize the knowledge and management times of learning activities. Also, they are identified as *flexible*, since they allow activities to be planned based on the study plans and educational models of each

HEI; *functional*, since each platform has its own characteristics that make it functional to the needs and requirements of users; *scalable*, since the number of users can vary according to the needs of the HEI or the user organization; and *comprehensive*, because they can be used with other business applications to manage impact, effectiveness, costs, or other issues of interest to business users. Finally, they are qualified as *reliable* and *easy*, since everything the user needs, the platform must guarantee that he will find it in the virtual environment and all activity carried out within the platform must be easy to carry out.

Each platform has been designed with an intention that characterizes it, such as its management model, its pedagogical base, technological possibilities of the proposals or user profiles. Similarly, these platforms can be licensed or as an open educational resource, so choosing the ideal one is not so easy since variables such as costs, content, infrastructure, intent and functionality come into play. The most used platforms under license are: Blackboard, Eminus and Microsoft Teams; and as an open educational resource they are: Dokeos, Sakai, Moodle (19,20). Platforms are more present in some sectors than in others, relating to the beginning of the digital economy, which plays a key role in everyday life, so to understand their use in today's economy it is important to understand the mechanisms that govern its dynamics (20).

In face-to-face modality, didactic planning is another important tool because it is a plan that contemplates the elements that intervene in the teaching-learning process that, based on its organization, allows the development of cognitive structures for the promotion of skills and attitudes in students within an established period of time, according to the educational model of each institution, as well as the modality of the study plan. Its starting point should be the competencies to promote, as well as the teaching strategy, that responds to the characteristics of the group, modality of the program of the subject or educational experience, objectives, resources and teaching materials, products or evidence of learning with their evaluation instruments, which must contain the expected elements of learning; and in virtual mode, the instructional design implies an analysis of what is to be taught, to whom it is addressed and what resources should be used; the design of how to reach the instructional goals where the development involves the elaboration of the lesson plan and the materials to be used; its implementation is disclosed on the platform of choice and, finally, the evaluation of its effectiveness and efficiency of instruction.Similarly, the times and spaces established follow a chronological order based on the level of complexity of the task or activity that promotes the construction of knowledge, where the organization can go from simple to complex in terms of approaching content (21).

Conclusion

As we can see, the choice of a platform, as well as the conjunction of variables of the administrative academic process, is not easy and is due to variables that are decisive for the use of the platforms and the training and education time. Not all the actors in the process showed interest, prior to this pandemic, in mastering the use of technologies as a training environment in such a way that, since the massive closure of all face-to-face educational activities due to the pandemic in March 2020, being the only option available, the university community is forced to make use of them under the conditions already set forth above and with all the variables that interact in the virtual teaching-learning process. Hence the importance of evaluating the perception of the students so that, based on the situational diagnosis, the academies can implement strategies that address the areas of opportunity identified through this proposed instrument to assess whether the program of the subject or educational experience considers in its design its operation in virtual and face-to-face mode, if its operation is functional to the university community, if the limitations for its operation are of a material nature, identify the provision of trained human resources and financial resources, and assess the benefits of its use and the security and consistency for the system.

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