Proyecto de intervención para la capacitación virtual de profesores de educación superior en diseño instruccional y recursos educativos digitales

Intervention project for virtual training of higher education teachers in instructional design and digital educational resources

Projeto de intervenção para a formação virtual de professores do ensino superior em design instrucional e recursos educacionais digitais

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Resumen

La pandemia generada por la covid-19 ha tenido un impacto negativo en los ámbitos económicos, sociales y educativos. La contingencia ha obligado a que más personas, sin importar su profesión o actividad, recurran a plataformas digitales para prepararse en el aspecto profesional y académico. Este artículo, por tanto, tiene como objetivo presentar los resultados de un trabajo de investigación evaluativa llevado a cabo para medir la implementación del proyecto de intervención sobre la capacitación de profesores de educación superior en el diseño instruccional y en la producción de recursos educativos digitales. Para evaluar el proyecto, se elaboró un instrumento, el cual se aplicó en línea luego de la capacitación para identificar los resultados descriptivos e inferenciales. Para la obtención de los datos y su análisis respectivo, se aplicó una metodología de corte mixto que consideró diferentes momentos, actores e instrumentos. En concreto, se aplicó un enfoque cuantitativo. La investigación se llevó a cabo en la Universidad Veracruzana, específicamente con la participación de profesores del área académica técnica. Los resultados señalan que el proyecto de intervención tuvo resultados favorables en cuanto al diseño de cursos en línea bajo una metodología de diseño instruccional con el uso de recursos

educativos digitales, pues se incrementó la acreditación en las materias de la modalidad mixta; sin embargo, es necesario realizar otro estudio que contraponga las percepciones de los profesores y de los estudiantes sobre la mejora en los procesos de enseñanza-aprendizaje.

Palabras clave: capacitación, diseño instruccional, evaluación, proyecto de intervención, recursos educativos digitales.

Abstract

The COVID-19 pandemic has had a negative impact on the economic, social and educational spheres, the contingency has led more people, regardless of their profession or activity, to turn to digital platforms to prepare in the professional and academic sphere. The present research aims to show the results of an evaluative research work, carried out to measure the implementation of the intervention project on the training of higher education teachers in instructional design and in the production of digital educational resources. To evaluate the project, an instrument was developed that was applied online, after the training, to clearly identify the descriptive and inferential results. To recover the data and its corresponding analysis, a mixed cut methodology was used that considered different moments, actors and instruments. This document presents the work carried out using the quantitative approach, highlighting the results obtained in the intervention groups. The research was carried out at the Universidad Veracruzana, specifically with the participation of professors from the technical academic area. The results indicate that the intervention project had favorable results, in terms of the design of online courses under an instructional design methodology with the use of digital educational resources, increasing the accreditation of the subjects under the mixed modality, however, it is It is necessary to carry out another study that contrasts the perceptions of teachers and students about the improvement in the teaching-learning processes.

Keywords: capacitation, instructional design, evaluation, intervention project, digital educational resources.

Resumo

A pandemia gerada por covid-19 teve um impacto negativo nas esferas econômica, social e educacional. A contingência tem forçado mais pessoas, independentemente de sua profissão ou atividade, a recorrer às plataformas digitais para se preparar profissional e academicamente. Este artigo, portanto, tem como objetivo apresentar os resultados de uma pesquisa avaliativa realizada para medir a implementação do projeto de intervenção na formação de professores do ensino superior em design instrucional e na produção de recursos educacionais digitais. Para avaliação do projeto, foi desenvolvido um instrumento, o qual foi aplicado online após o treinamento para identificar os resultados descritivos e inferenciais. Para a obtenção dos dados e respetiva análise, foi aplicada uma metodologia de recortes mistos que considerou diferentes momentos, atores e instrumentos. Especificamente, uma abordagem quantitativa foi aplicada. A pesquisa foi desenvolvida na Universidade Veracruzana, especificamente com a participação de docentes da área acadêmica técnica. Os resultados indicam que o projeto de intervenção teve resultados favoráveis ao nível da concepção de cursos online sob uma metodologia de design instrucional com a utilização de recursos educacionais digitais, uma vez que foi aumentada a acreditação nas disciplinas da modalidade mista; No entanto, é necessário realizar outro estudo que compare as percepções de professores e alunos sobre a melhoria dos processos de ensino-aprendizagem.

Palavras-chave: treinamento, design instrucional, avaliação, projeto de intervenção, recursos educacionais digitais.

Introduction

The pandemic that we are currently experiencing due to covid-19 has brought significant changes in all areas, including education. For this reason, there was a need to abruptly switch from face-to-face to online education, which caused the teaching and learning processes to be affected not only because many institutions did not have the necessary technological infrastructure, but mainly because the majority of teachers lacked digital skills to face the new educational scenario.

Indeed, according to a study carried out at the Universidad Veracruzana (UV), it was found that only 43% of students consider that teachers have the necessary skills to teach classes under the virtual modality, although these figures contrast with the data collected by

Gazca (2020), who points out that 79% of teachers believe that they have the necessary skills to effectively develop teaching and learning processes in the virtual modality. These results are the basis for carrying out a training intervention project in instructional design and in the production of digital educational resources based on the UV technology platform.

Conceptual framework

Instructional design

Training teachers in cooperation with ICT is vital for continuous improvement; However, what is complicated is that to work in virtual media, didactic planning must be improved, which is based on a methodology called instructional design, which is responsible for the appropriate selection of techniques for teaching-learning, technological resources, as well as the identification of educational means and measurement of management (Branch and Kopcha 2014; Domínguez et al., 2018; Moreno et al., 2014).

Instructional design, therefore, is a systematic, grounded, planned and structured process that allows the student to appropriate the knowledge of a certain subject through exact instructions distributed in four environments: preliminary occupations, exercises, integrative activity and a integrating case, so it becomes a mediator of learning with self-taught properties (Brambila et al., 2006). Specifically, the stages of the instructional model are the following: analysis, design, development, implementation and evaluation (ADDIE), which are related to each other (Luna, Ayala and Rosas, 2021).

Therefore, according to Belloch (2013), the instructional model is also multiple because it adjusts to the needs of the teacher, which allows its adaptation to achieve the objectives set. Likewise, another of its relevant aspects is the way in which the indications are developed, since they provide specific guidelines to carry out didactic sequences, which results in a teaching-learning approach in a synchronous (in real time) and asynchronous way. However, once the instruction is designed, it must be tested, evaluated and revised so that it effectively meets the particular needs of the course developed. (Candia, 2016).

Digital resources

Based on various studies, it can be assured that technological resources by themselves cannot solve all the inconveniences that educational institutions present (López et al., 2013). In fact, if they are not well used, they can create apathy in students and, in the long term,

school dropout. For this reason, it can be affirmed that the mastery of ICT by teachers is a variable that is very useful to promote student learning.

In this regard, the United Nations Educational, Scientific and Cultural Organization indicates some basic principles that must be taken into account in all educational centers:

- Technology should be integrated into the entire teacher training program.
- Future teachers need to train and experiment in educational settings that make innovative use of technology (López *et al*., 2013; Unesco, 2004).

Now, it should be noted that the technological elements must be evaluated once implemented to detect areas that can be improved (Aguaded and Muñoz, 2012; Margalef and García, 2016). Therefore, for this type of technological tools to be classified as educational, they must promote the learning of conceptual and procedural content, as well as contribute to the integral education of the individual (Zapata, 2012).

Logically, there are various applications on the market that allow you to create digital educational resources without having to be an expert in the field. For example, to design video tutorials you can use Open Broadcaster Software (OBS), which allows you to record videos and make live broadcasts. Another application is Videopad, a video editing tool developed by NCH Software (available for Windows, Mac, Iphone, Ipad and Android). With VideoPad you can get a professional looking product in minutes. Likewise, Audacity is a free, open source audio editor and recorder software, compatible with Windows, macOS, GNU / Linux, among others. You can export recordings in many formats.

Virtual educational platforms

Virtual educational platforms provide the possibility not only of publishing digital educational resources, but also of promoting interaction among all participants (Andrade and Velázquez, 2014). In addition, they serve for teachers to evaluate and monitor the progress of students thanks to indicators that the tools themselves provide (Raichman and Mirasso, A. 2018).

These educational platforms must be formed in a computing environment that have tools grouped and optimized for teaching objectives. Its functionality is to allow the construction and administration of entire courses over the internet without requiring deep programming knowledge. In other words, they should be the easiest to use for both teachers and students.

Referential framework

The objective of this intervention project consists of three parts: the first, to formalize the mixed model of online education; the second, to offer clarity regarding the training processes that are currently in place and are currently being carried out, and, finally, to detail in an extensive way all the possible parameters regarding the precision and clarity that one has to carry out the training. online education. At the end of the entire process, you will have enough information to know exactly what aspects can be modified through feedback from those involved.

Likewise, based on the document issued by the Academic Secretariat of the Veracruzana University on the General Provisions for Academic Work (2020) (proposed in the school period September 2020-February 2021), it was established -thanks to emergency distance work that was carried out by the teachers with the students during the health contingency in the face of the covid-19 pandemic during the February 2020-July 2020 school period - the existence of the following three scenarios:

- The necessary conditions were had to advance in the contents of the subjects according to what was programmed during the confinement period.
- There were favorable conditions for reinforcing content and advancing a certain percentage of the study program.
- There were no conditions for remote academic work, which implied difficulties for progress in the knowledge of the subjects.

Based on the foregoing, it was determined that the school period September 2020-February 2021, regardless of the risk traffic light conditions, represented a possibility for teachers to strengthen the strategies that proved the effectiveness of their online work. Therefore, the document on General Provisions for Academic Work (2020) established the activities under the mixed modality, which is a form of pedagogical work that considers the teaching of subjects with combined activities, generally face-to-face and non-face-to-face, on a basis of favorable interaction between academics and students.

For this, the teaching-learning process, logically, requires an active use of technology to set virtual academic meetings (synchronous and / or asynchronous) that allow the orientation and delivery of activities. Consequently, we will have a guided learning environment, while at the same time fostering autonomy.

Likewise, the aforementioned document indicates that teachers must use educational platforms (preferably the Eminus institutional platform), which, of course, requires knowledge about strategies in virtual learning environments. However, it is clear that not all teachers have these requirements to teach classes in the mixed mode. Therefore, in coordination with the Directorate of the Technical Academic Area of the UV, the decision was made to train a certain number of teachers from the five regions where the UV has a presence in the state of Veracruz to successfully fulfill the aforementioned purpose.

Research objective

The objective of the research was to evaluate, based on the intervention project, if the academics who had participated in the training developed competencies based on the knowledge of learning theories, mastery of the stages of instructional design and the use of resources technologies that would allow them to be trained in the use of educational platforms (Eminus), technologically enabled in the technological knowledge of teaching, applying strategies in the instructional design for the development of virtual learning environments of educational experiences under the mixed modality, and if there was an improvement in the students' teaching processes.

Method

For the execution of this intervention project, a non-experimental, exploratory, descriptive and quantitative research was carried out. For this, an evaluation of the impact of teacher training and the perception they had on student learning was carried out. Likewise, it was based on the principles of descriptive research, by reviewing concepts in the main international journals on the elements of instructional design, as well as the development of digital educational resources and the management of virtual technology platforms.

Population and sampling

The study subjects were those professors belonging to the superior level of the Directorate of the Technical Academic Area (DGAAT) of the UV. According to the numerology of the DGAAT, the teaching staff in the five regions that the state of Veracruz covers is formed as indicated in table 1.

Tabla 1. Profesores adscritos a programas educativos de la DGAAT

Grado académico	Hombres	Mujeres	Total
Doctorado	249	179	428
Maestría	99	89	188
Especialización	14	6	20
Licenciatura	57	35	92
Total	419	309	728

Fuente: Dirección General Académica del Área Técnica UV (2021)

To determine the size of the sample, the formula for the calculation of the finite population was used at convenience with the following formula:

$$n = \frac{N * Z^2 * p * q}{e^2 * (N-1) + Z^2 * p * q}$$

As:

Z = Confidence level 93%, table value (1.81)

p = Probability of the event occurring 50% = .5

q = (1-p) Probability that the event will not occur 50% = .5

N = Population of 728 teacher (s)

e = Maximum accepted estimation error is 7 %.

Substituting the previous values, we obtain a sample of 136 teachers who had to take the course. According to the sampling and its convenience, they were full-time, part-time or subject, in addition to the technical academic area and belonging to one of the five regions covered by the UV in the state of Veracruz.

Table 2 shows the distribution of teachers in the courses and the result of terminal efficiency in terms of the passing rate of the course-workshop.

Tabla 2. Profesores adscritos a programas educativos de la DGAAT

Grupo	Inscritos	Aprobados	No aprobados
1	34	30	1
2	32	30	2
3	35	31	7
4	35	25	10
Total	136	116	20
Eficiencia terminal		85%	15%

Fuente: Elaboración propia

Training course design

For the training of teachers, a course called Instructional Design and Digital Educational Resources was developed, which was conceived as a course-workshop in an innovative modality of the teaching processes of the academic offer. It is part of the UV Academic Training Program (ProFA), with a duration of 45 hours (15 theoretical and 30 practical) and a value of 3 credits. The orientation of the course was focused on the design and production of educational resources with the support of applications for the editing of audios and videos that improve the teaching-learning processes and the development of skills through digital environments.

The evidence of performance that those enrolled in the course-workshop had to meet focused on the planning of the instructional design, in addition to using the technological resources that complement the instructional design for the application of virtual learning scenarios.

The course-workshop had digital educational resources to consolidate the mixed educational modality, a form of pedagogical work that is characterized by the development of educational experiences (subjects), with combined face-to-face and non-face-to-face interaction to harmonize the teaching-learning processes with the use of technology. This was developed in a guided learning environment and at the same time autonomous for the participants to be trained in the learning theories that underpin virtual education. Likewise, work was carried out on the planning of the instructional design to detect the different processes involved in the development of online educational programs and in those software applications that complement the processes described.

The course-workshop was divided into theoretical, heuristic and axiological knowledge. Table 3 shows the theoretical knowledge with which the course of the intervention project was formed.

Tabla 3. Saberes teóricos del curso-taller diseño instruccional y recursos educativos digitales

1.-Fundamentos de las teóricas de aprendizaje	2.- Modelo de diseño instruccional de la UV	3.- Aplicaciones de uso libre para el diseño de recursos educativos digitales
1.- Conductismo 1.2.- Cognitivismo 1.3.- Constructivismo 1.4.- Conectivismo 1.5.- Relación entre las teorías de aprendizaje y el diseño instruccional	2.1.- Planeación 2.2.- Análisis 2.3 Diseño instruccional 2.3.1.- Datos generales 2.3.2.- Actividades de aprendizaje 2.3.3.- Recursos multimedia 2.3.4.- Evaluaciones de las actividades 2.4.- Desarrollo 2.5.- Implementación 2.6.- Evaluación	3.1.- OBS Studio para el diseño de videos tutoriales 3.2.- Audacity para la edición de audios 3.3.- VideoPad para la edición de vídeos

Fuente: Elaboración propia

In the theoretical knowledge of the topic of instructional design model of the UV, the didactic planning of the virtual course was carried out by means of the explanation of the filling of the instructional design instrument, adapted from the model proposed by the digital communities for learning in higher education (Digital Communities for Learning in Higher Education [CODAES], 2015) and the ADDIE model.

This instrument —as can be seen in figure 1— was made up of five sections: 1) version of the course developed; 2) general data of the course; 3) collaborators in the design of the course; 4) instructional design, and 5) evaluation of activities. Undoubtedly, the correct didactic planning through this instrument favored both the teaching and learning process of the students.

Figura 1. Formato de instrumento del diseño instruccional

Universidad Veracruzana			
Universidad Veracruzana Proceso de Producción de Recursos Educativos Dirección General del Área Económico-Administrativa		Código:	
		Versión:	
		Páginas:	

Nombre de la Facultad:		Región:	
Título de la Experiencia Educativa:		Fecha:	
Nombre de la Experiencia Educativa:		Periodo:	
Correo electrónico:		Teléfono:	

1. Control de versiones del Curso

Versiones anteriores	
Elementos usados	
Cambios realizados	

2. Datos generales del Curso

Nombre o título del Curso:					
Objetivo / Unidad de Competencia:					
Área del conocimiento:					
Idioma:		Horas/ Semana		Semanas	Total Horas

3. Colaboradores

No.	Nombre	Correo electrónico	Rol

4. Diseño instruccional

4.1 Datos generales

Nombre de la Unidad temática/ módulo/ lección:	
Descripción de la unidad temática/ módulo/ lección:	
Objetivo:	
Contenido:	

4.2 Actividades de aprendizaje

No.	Título de la actividad	Descripción	Tipo	Nombre del Archivo y Tipo	Duración/Horas /Días/Semana

4.3 Recursos multimedia
(Identificar los recursos de texto, audio, video, imágenes y simuladores que serán utilizados en el curso)

No.	Nombre del recurso	Descripción	Nombre del Archivo y Tipo	Responsable	Duración aproximada

5. Evaluación de la Actividad

| Actividad	Evidencia	Ponderación

Fuente: Elaboración propia

The training was carried out online using the UV's virtual educational platform, called Eminus (Distributed Education System of the Universidad Veracruzana). It is a flexible learning environment management system that helps to present online courses for distribution on the internet. This system enables communication in a synchronous and asynchronous way, and generates a complete environment for learning, which serves to improve educational levels without parameters of time or distance. Thus, each user takes control of her learning (Colunga, 2005).

To accredit the course, the teachers had to design a subject in virtual mixed mode. Figure 2 shows the course interface on the Eminus platform. Initially, a welcome message is given accompanied by a video that explains the operation of the course. All digital

educational resources were designed with the OBS studio, Videopad and Audacity applications in their free versions, so it did not represent additional costs.

Figura 2. Interfaz del curso en la plataforma Eminus
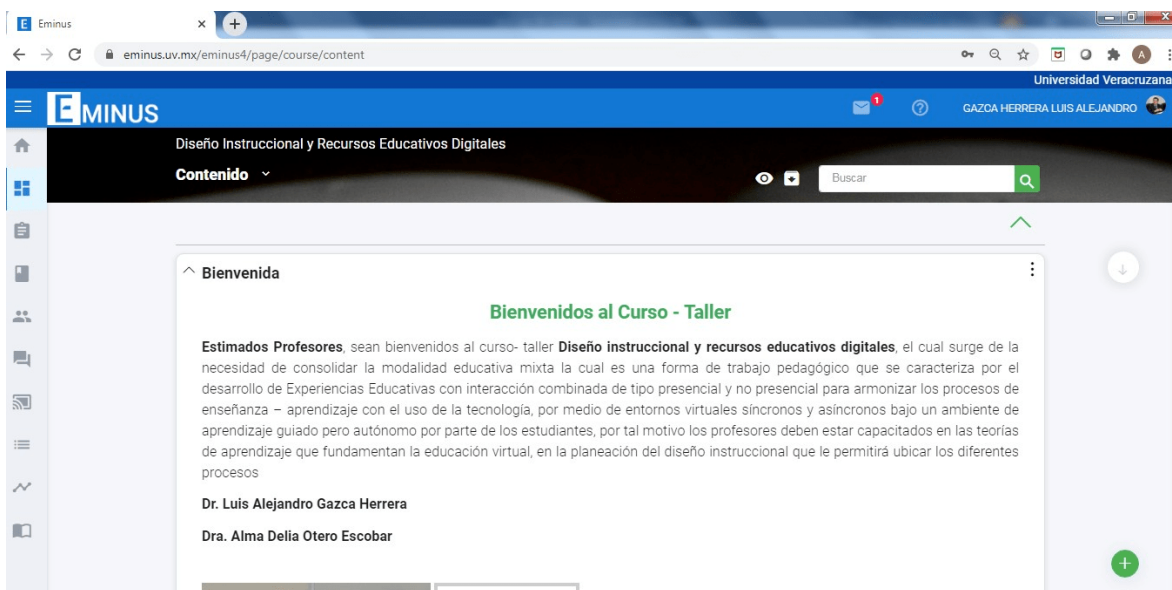
Fuente: Elaboración propia

A primary part of the course was related to instructional design, so it was clearly explained (with practical examples) how it should be filled out. Four videos were produced that complemented the theoretical aspects so that the teachers could develop their own instructional design for one of the subjects they teach. Figure 3 shows the interface of this theme.

Figura 3. Interfaz del tema sobre diseño instruccional
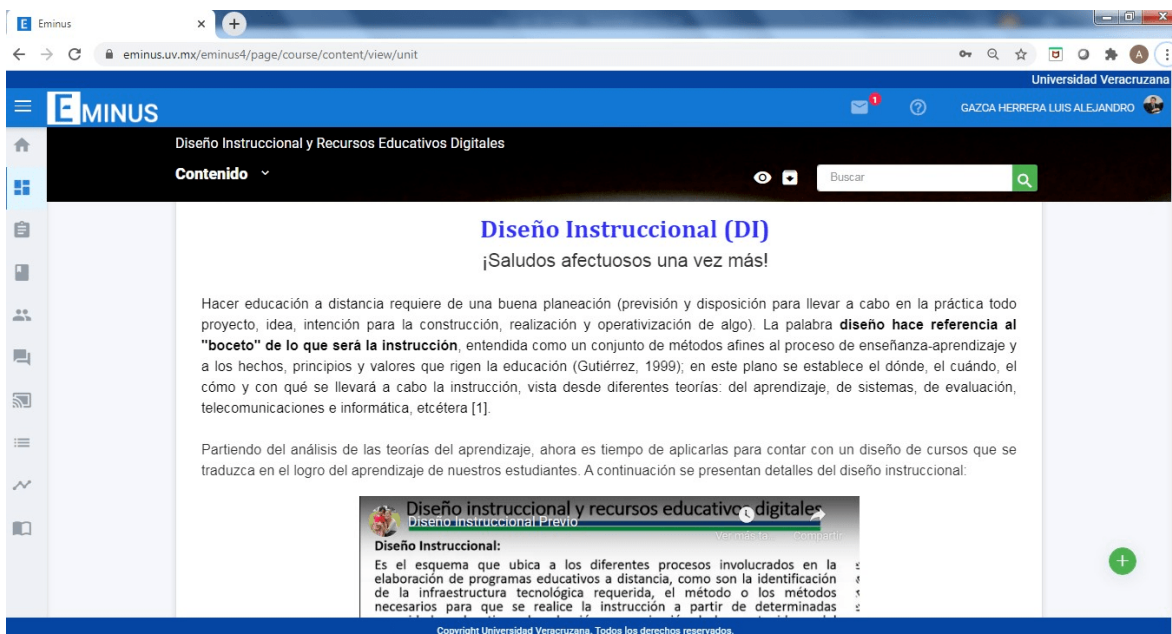
Fuente: Elaboración propia

An essential part of the course was to provide the necessary skills so that teachers could create their own digital educational resources. For this reason, three sections were considered where video tutorials were created to explain from the installation of the OBS Studio, VideoPad and Audacity applications to how to design and edit audios and videos.

Figure 4 shows the interface of the section on the management of applications for the design of digital educational resources. This knowledge would serve so that they could create a channel on YouTube, that is, materials other than traditional text files.

Figura 4. Interfaz del tema sobre el diseño de recursos educativos digitales

Fuente: Elaboración propia

Results

Evaluation is a key aspect in the implementation of any educational project because it allows identifying variables that can be improved in the teaching and learning processes. Therefore, as an evaluation requirement, the participants had to use the instructional design methodology to develop and use digital resources in at least one subject during the August 2020-January 2021 school period. Therefore, an instrument was designed (made up of a Likert scale) to measure the dimensions of training, technology and impact on student learning.

The instrument was made up of 15 items (Annex 1). Reliability and validity were analyzed with Cronbach's alpha coefficient, using the SPSS software. Tables 4 and 5 represent the reliability of the instrument scale obtained in a pilot survey (15 items) in which 20 teachers participated. A Cronbach's alpha of .810 was obtained, which represents a good value, according to George and Mallery (2003).

Tabla 4. Resumen del procesamiento de los casos de las variables para profesores

Resumen del procesamiento de los casos			
		N	%
Casos	Válidos	20	100.0
	Excluidos[a]	0	.0
	Total	20	100.0
a. Eliminación por lista basada en todas las variables del procedimiento.			

Fuente: Elaboración propia

Tabla 5. Alfa de Cronbach para instrumento de profesores

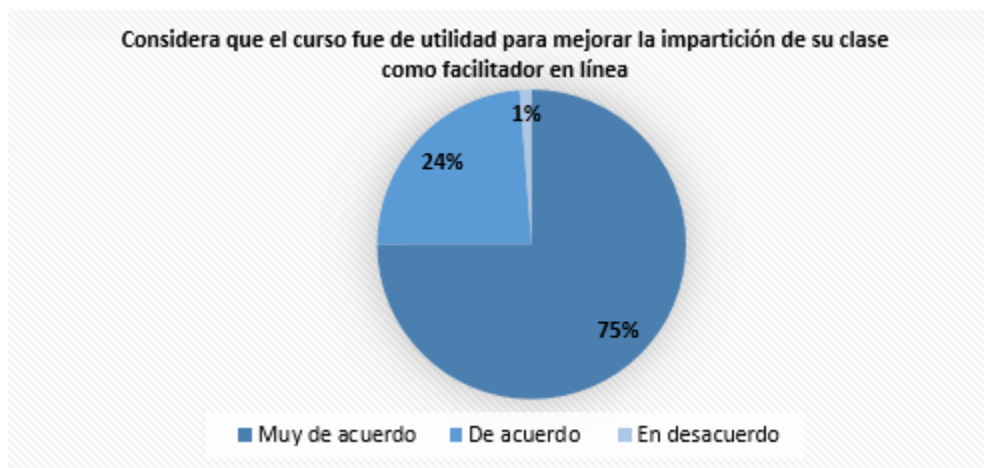| Estadísticos de fiabilidad		
Alfa de Cronbach	Alfa de Cronbach basada en elementos estandarizados	N de elementos
.810	.814	15

Fuente: Elaboración propia

After analyzing the results, it can be said that an instrument with good consistency was obtained; in addition, it is valid and reliable. Finally, it was applied digitally (through Google Forms) to all teachers who took and passed the course (116).

Regarding the generalities of the results, 60% of the respondents were men and 40% women; the minimum age was 25 years and the maximum age 65 (average age = 45 years). On average, respondents have been teaching classes for almost 15 years. Likewise, 59% have a doctorate, 30% a master's degree, 1% a specialization and 8% a bachelor's degree.

The results obtained in terms of the training dimension reflect that 99% strongly agree and agree that the course was useful to improve the delivery of their classes online. This shows the importance of proper training (figure 5).

Figura 5. Utilidad del curso-taller para mejorar de la impartición de clases

Considera que el curso fue de utilidad para mejorar la impartición de su clase como facilitador en línea

- 1%
- 24%
- 75%

■ Muy de acuerdo ■ De acuerdo ■ En desacuerdo

Fuente: Elaboración propia

Likewise, 97% of the respondents answered that they strongly agree and agree with the instructional design methodology, as they improved their didactic planning for the benefit of the teaching-learning processes (figure 6).

Figura 6. Utilidad del curso-taller para mejorar de la impartición de clases

Aplicó la metodología del diseño instruccional lo que permitió mejorar su planeación didáctica

- 3%
- 1%
- 32%
- 64%

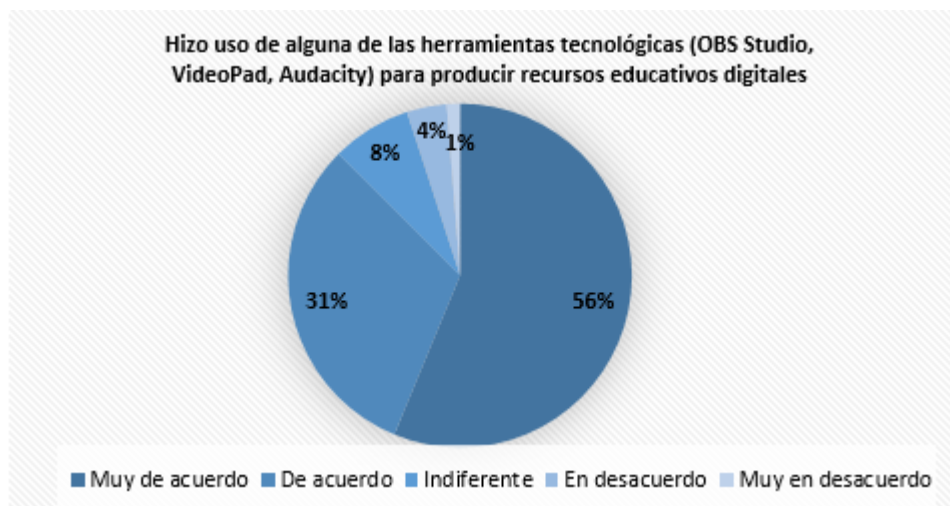■ Muy de acuerdo ■ De acuerdo ■ En desacuerdo ■ Indiferente

Fuente: Elaboración propia

Regarding the technology dimension, 87% of the teachers used at least one application to design and edit audios and videos, an elementary aspect to create digital educational resources that favor student learning (figure 7).

Figura 7. Uso de recursos tecnológicos por parte de los profesores

Hizo uso de alguna de las herramientas tecnológicas (OBS Studio, VideoPad, Audacity) para producir recursos educativos digitales

■ Muy de acuerdo ■ De acuerdo ■ Indiferente ■ En desacuerdo ■ Muy en desacuerdo
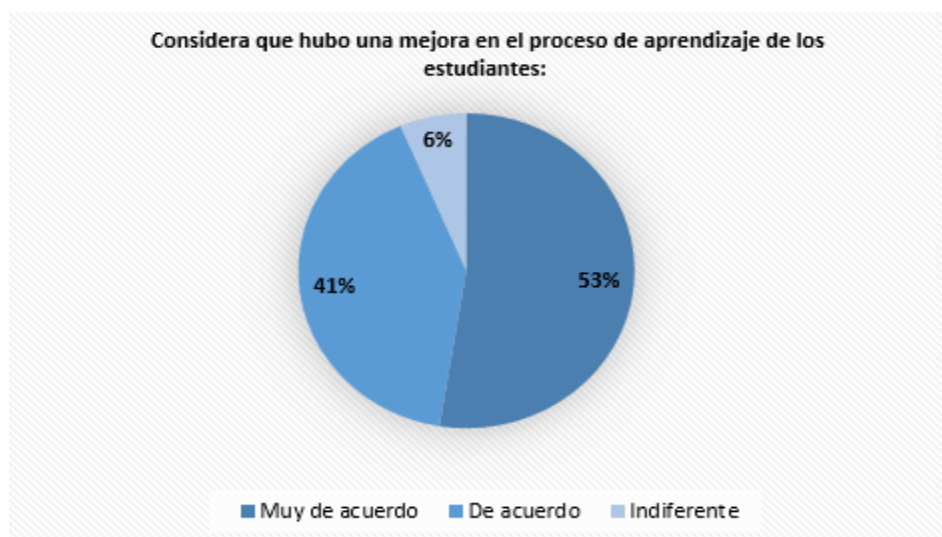
Fuente: Elaboración propia

In addition to the technological resources proposed in the course, 63% used the Eminus institutional platform (in its version 3 or 4) to upload the didactic content, design learning activities and evaluate the course. Regarding tools for synchronous activities, 56% used the Microsoft Teams platform, and 44% others such as Zoom and Google Meet.

Regarding the learning dimension, 94% considered that by applying the proposed methodology for instructional design and using digital educational resources in the mixed mode, there were improvements in student learning, which shows that this type of project results very useful (figure 8).

Figura 8. Resultado del proceso de aprendizaje de los estudiantes

Considera que hubo una mejora en el proceso de aprendizaje de los estudiantes:

■ Muy de acuerdo ■ De acuerdo ■ Indiferente

Fuente: Elaboración propia

Regarding the participation of students in online courses, 92% of the teachers responded that they strongly agree and agree that there was an improvement in the delivery of their activities (figure 9).
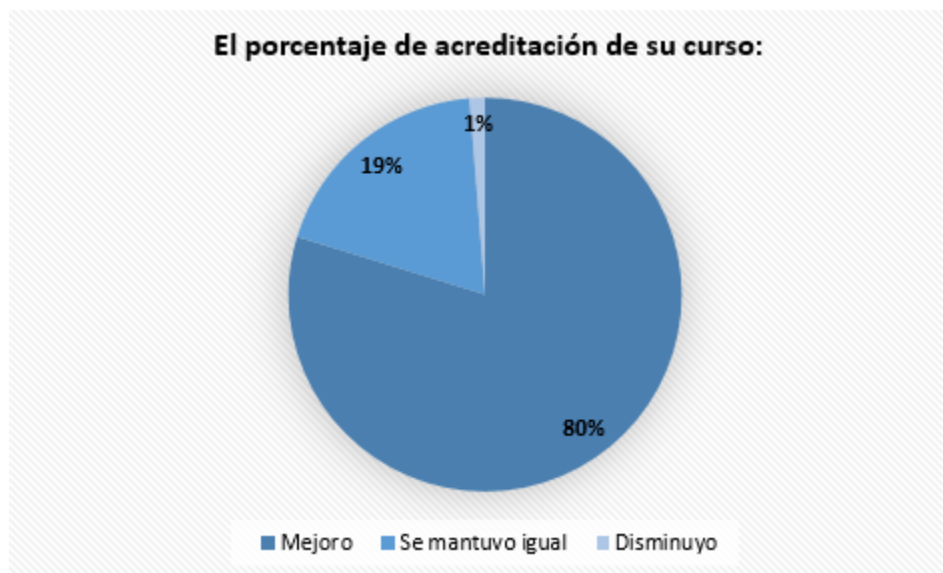
Figura 9. Uso de aplicaciones tecnológicas
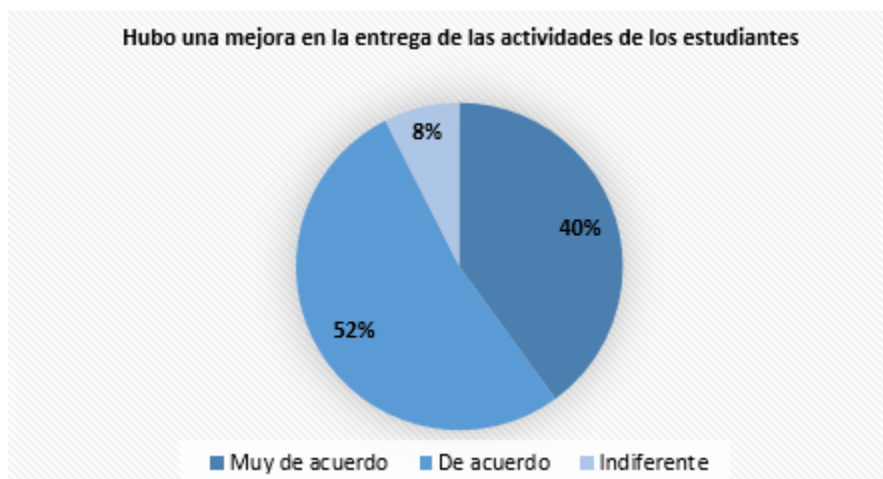
Fuente: Elaboración propia

In figure 10 it is observed that 80% of the professors responded that the course-workshop served to improve the accreditation of their students.

Figura 10. Mejora en la acreditación del curso

Fuente: Elaboración propia

Correlational analysis of data

In addition to the descriptive results of the research, a correlational data analysis was carried out by means of non-parametric inferential statistics, using Kendall's Tau-b methodology for square tables and Kendall's Tau-c for non-squared tables.

First, it was analyzed whether there was any association between the application of the methodology for the instructional design of online courses and the improvement in the learning process of the students.

The hypotheses formulated were the following:

- H_0: There is no significant relationship between the application of the methodology for instructional design and the improvement in the learning process of students.

- H_1: There is a significant relationship between the application of the methodology for instructional design and the improvement in the learning process of students.

- If the follow. p-value is <0.05 H0 is rejected; otherwise it is accepted. Kendall's Tau-b method.

Tabla 6. Correlación diseño instruccional-proceso de aprendizaje de estudiantes

			Metodología	Aprendizaje
Tau_b de Kendall	Metodología	Coeficiente de correlación	1.000	.435
		Sig. (bilateral)	.	.152
		N	116	116
	Aprendizaje	Coeficiente de correlación	.435	1.000
		Sig. (bilateral)	.000	.
		N	116	116

Fuente: Elaboración propia

As can be seen in table 6, according to the p-value "Sig. (bilateral)" = .000 <.05, which leads to reject the H0. It is concluded, therefore, that there is a highly significant association between the variables of the application of the instructional design methodology by the teachers and the improvement in the students' learning process. This is evidenced by the correlation coefficient value t = 0.435, which is interpreted as a moderate positive correlation between the variables.

Subsequently, it was analyzed whether there was any association between the design of digital educational resources by the teachers and the improvement in the accreditation of the subject by the students.

The hypotheses were the following:

- H_0: There is no significant relationship between the implementation of digital educational resources and the improvement in the accreditation of subjects by students.

- H_1: There is a significant relationship between the implementation of digital educational resources and the improvement in the accreditation of subjects by students

If the follow. p-value is <0.05 H0 is rejected; otherwise it is accepted. Kendall's Tau-c method.

Tabla 7. Correlación recursos educativos digitales-aprobación de materias

Medidas simétricas		Valor	Error estándar asintótico[a]	T aproximada[b]	Significación aproximada
Ordinal por ordinal	Tau-c de Kendall	.155	.070	2.213	.027
N.º de casos válidos		116			

Fuente: Elaboración propia

According to the p-value "Sig. (approximation) "= .027 <.05, which leads to reject the H0. It is concluded, therefore, that there is a significant association between the implementation of digital educational resources and the improvement in the accreditation of subjects by students. This is evidenced by the value of the correlation coefficient t = .155, which is interpreted as a minimal positive correlation between the variables - see values in table 7-.

With the previous data we can point out that there is an association between the variables; however, one of the correlations is negligible, so we cannot be conclusive in the statement of the existing correlation. Note that Kendall's correlations are hypothesis tests and a measure of correlation across the indices.

Discussion

From what is stated in the previous sections, the result that we can identify with the greatest relevance is that related to the evaluation of the intervention project, which was favorable according to the descriptive results. Another contribution of the research was the proposal on the course-workshop based on three main theoretical knowledge: learning theories, instructional design methodology and design of digital educational resources. Last but not least, it was the application of inferential statistics to identify the possible relationship of variables to give greater support to the descriptive results, a situation that determines, under an evaluation methodology, the impact of the intervention project.

Finally, one of the limitations of this project was not having the students' perception of their learning processes, which should be addressed in future research.

Conclusions

Studies carried out on the impact that the pandemic generated by covid-19 has had in the educational field demonstrate the latent deficiencies in the didactic planning of online classes. For this reason, this intervention project is essential to equip teachers with skills in instructional design and in the use of technological resources.

In this sense, the results of this research show that eight out of ten teachers who participated in the project consider that there was an increase in the accreditation of the subject by students, an important fact that allows reducing the percentages of failure and dropout. . The descriptive results are aligned with the inferential ones, since they demonstrated that there is a relationship between the implementation of digital educational resources and the improvement in the accreditation of the subjects by the students.

For this reason, we can conclude that this initiative fulfilled the objective of training teachers in the use of digital tools, essential knowledge to function successfully in virtual teaching and learning environments. Therefore, this type of training must be extended to other academic areas. In short, this research is of fundamental importance, as it is related to new learning models.

Future lines of research

The continuity of this research in future lines should focus on two essential aspects: first, continue with teacher training, since the results reflect that 98% of teachers consider that the instructional design and the development of digital educational resources serve to improve their skills. didactic practices. Second, it is necessary to investigate the students 'perception regarding the improvement of the teachers' competencies for the teaching of virtual classes, since it is useless to evaluate the teaching process if there is no knowledge of its impact on the teaching process. learning. For this reason, an instrument is being designed to collect quantitative and qualitative data on student learning, which must be applied to a control group to identify areas of opportunity in improving the project.

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ANEXO 1

Figura 10. Instrumento de evaluación del proyecto de intervención para la capacitación virtual de profesores de educación superior en diseño instruccional y recursos educativos digitales.

Estimado profesor:

El presente instrumento tiene como objetivo recabar información que nos permita identificar la percepción actual de los académicos que tomaron el curso sobre **Diseño instruccional y recursos educativos digitales** referente al impacto que tuvo en la impartición de sus clases en línea en el periodo agosto 2020-febrero 2021, por lo que solicitamos su valioso apoyo para contestar todos los ítems de manera objetiva y siguiendo las instrucciones. Le agradecemos de antemano su interés y decidido apoyo al responder este cuestionario.

GENERALIDADES

Marque con una X su sexo	M	F		Escriba su edad	
Marque con una X su último grado de estudios	Licenciatura		Especialidad	Maestría	Doctorado
Marque con una X su tipo de contratación	Profesor de tiempo completo		Profesor investigador de tiempo completo		Profesor de asignatura
Especifique el número de años impartiendo clases					

INSTRUCCIONES

Marque con una X la casilla que considere correspondiente al grado de identificación en cada ítem tomando en cuenta las siguientes categorías:

1	2	3	4	5				
Totalmente en desacuerdo	En desacuerdo	Indiferente	De acuerdo	Totalmente de acuerdo				
Ítems				(-)1	2	3	4	5(+)
Dimensión capacitación								
1. Previo al curso, había tomado alguna capacitación en el ámbito de la tecnología educativa								
2. Considera que el curso fue de utilidad para mejorar la impartición de su clase como facilitador en línea								
3. Pudo aplicar la metodología del diseño instruccional, lo que permitió mejorar su planeación didáctica								
4. Considera adecuada la metodología de diseño instruccional propuesta en el curso								
Dimensión tecnología								
5. Considera adecuadas los recursos tecnológicos propuestos en el curso								
6. Hizo uso del recurso tecnológico OBS Studio para el diseño de videos								
7. Hizo uso del recurso tecnológico VideoPad para la edición de videos								
8. Hizo uso del recurso tecnológico Audacity para el diseño de audios								
9. Considera que hubo una mejora en el proceso de aprendizaje de los estudiantes								
10. Además de los recursos tecnológicos que aprendió en el curso, mencione algunos otros que utilizó en la impartición de su clase (puede elegir más de una opción): Eminus Teams Zoom Alguna otra:								
Dimensión aprendizaje								
11. Hubo una mejora en la entrega de las actividades de los estudiantes								
12. Mejoró la calidad de los trabajos o proyectos entregados por los estudiantes								
13. Hubo comentarios favorables de parte de los estudiantes sobre la forma en que impartió el curso								
14. El porcentaje de acreditación de su curso: Mejoró Se mantuvo igual Disminuyó								
15. Considera que se debe dar continuidad a este tipo de capacitación para mejorar el uso de metodologías con el uso de recursos tecnológicos educativos								

Fuente: Elaboración propia