Volume 22, January-December 2024, ISSN: on request

ORIGINAL ARTICLE

CIENCIAS UNIVERSITARIAS

Journal site: https://revistas.unah.edu.cu/index.php/cu Cu-ID: https://cu-id.com/cu/v22e11

THE APPLICATION OF THE EXELEARNING PLATFORM TO THE TEACHING OF TOPOGRAPHY IN AGRICULTURAL ENGINEERING

LA APLICACIÓN DE LA PLATAFORMA EXELEARNING A LA ENSEÑANZA DE LA TOPOGRAFÍA EN LA INGENIERÍA AGRÓNOMA

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Summary

The COVID -19 pandemic contexts promoted the exponential use of virtual learning platforms. This incorporation allowed teachers and directors to realize the need for its use based on the development of the programs of the different subjects that comprise the curriculum of the different careers. The objective of this work is to present the results of the application of eXelearning to the teaching-learning process of Topography in third-year students of Agricultural Engineering, belonging to the University of Artemisa. An evaluative research was carried out during the blended period under pandemic conditions, where a group checklist was applied to 46 students who were part of the study for evaluation. The application of the eXelearning platform during the learning of Topography contents allowed the development of the contents provided in the program from virtuality, proving to be a tool that offers various uses for the teacher and students; in addition to contributing significantly to the teaching-learning process of the subject Topography for Agronomists.

Keywords: Virtual Education, eXelearning, Teaching Learning Process, Topography, Higher education

Resumen

El contexto pandémico de COVID -19, promovió el uso exponencial del uso de las plataformas virtuales de aprendizaje. Esta incorporación permitió a los docentes y directivos darse cuenta de la necesidad de su utilización en función del desarrollo de los programas de las diferentes asignaturas que comprenden el currículo de las distintas carreras. El presente trabajo tiene como objetivo presentar los resultados de la aplicación de eXelearning al proceso de enseñanza aprendizaje de la Topografía en los estudiantes de tercer año de la Ingeniería Agrónoma, pertenecientes a la Universidad de Artemisa. Se llevó a cabo una investigación de corte evaluativo durante el período semipresencial en condiciones de pandemia, donde se aplicó para su evaluación una la lista de cotejo grupal a 46 estudiantes que formaron parte del estudio. La aplicación de la plataforma eXelearning durante el aprendizaje de los contenidos de Topografía, permitió desarrollar los contenidos previstos en el programa desde la virtualidad, demostrando ser una herramienta que ofrece diversas utilidades para el docente y los estudiantes; además de contribuir significati-vamente en el proceso de enseñanza-aprendizaje de la asignatura Topografía para Agrónomos.

Palabras clave: Educación Virtual, eXelearning, Proceso de Enseñanza Aprendizaje, Topografía, Educación Superior

Introduction

The development of information and communication technologies today has undoubtedly opened new individual and institutional possibilities for an unprecedented expansion of learning in various spaces and forms, since the student with their support can receive the content part-time or at a distance, or can do so at the educational institution or at home. Thus, terms such as distance education (DE), virtual teaching (VT), virtual environments (VLE) and personal learning environments (PLE) and others arise that have a common goal: to achieve self-directed and meaningful learning based on the construction of knowledge that is exposed in the possibilities and resources of the Internet.

Received: November 19, 2024
Accepted: November 25, 2024
Conflict of interests: The authors of this work declare no conflict of interest.
AUTHORS CONTRIBUTION: The authors participated in the design and writing of the work, in addition to the analysis of the documents.

All of these virtual processes mentioned above expand access for many students who would otherwise not be able to attend classes in person (due to the availability or lack of availability of courses, geographical distance, family circumstances or personal difficulties). In addition, it encourages education professionals to rethink more effectively the way they direct the teaching-learning process of their specialties or subjects, selecting the appropriate methodologies and structuring the content in a clear, meaningful and developing way.

In the face of the presence of the Covid-19 pandemic across the planet, virtual teaching was presented as an alternative to continue many curricular programs in several universities, since one of its main advantages is that students do not need to be physically present at the university. Through virtual teaching, the university student receives the study material, allowing the use of various educational resources and information and communication technology tools in this electronic teaching-learning process to stimulate student self-management, self-directed, personalized and collaborative learning.

One of these technological tools that allows the management of virtual courses and online educational resources for university students is eXelearning; open source computer software that is free to use and that allows teachers to create and manage interactive web content for students during their training process from any operating system, without having to have knowledge of HTML. It is a multiplatform enriched with multimedia elements, interactive self-assessment activities, and others that make it possible for students to integrate known knowledge with other existing knowledge, and thus make their learning autonomous and meaningful.

Authors such as: Won, 2003; Valladolid & Neyra, 2015; Vazquez, Trujillo, & Perez, 2015; Rigo & Avila, 2016, Ulloque, 2016; Flores et al., 2017; Garay, 2017; Rojas & Cuellar, 2017; Yanez & Nevarez, 2018; Benitez, 2019; Castrillon, 2019; Montalvan, & Nardin, 2020; Ramos, 2020; De La Cruz, 2021; Lopez & Novoa, 2021; Peláez & Urcia Vega, 2022 have highlighted the didactic potential of this virtual platform for education and have captured very positive experiences in different contexts and subjects. However, it is necessary to reflect on its implementation in the face of Covid-19, which showed us the inadequacy in the preparation of our higher education teachers to develop these virtual platforms or virtual learning environments that were required at that time.

In the words of (Arriaga, Bautista, & Montenegro, 2021):

> Since this pandemic has made us open our eyes to the fact that many institutions, especially the state ones in our Latin American countries, still suffer from an adequate implementation to be up to the task of virtual training as required by this emergency context and later for any other type of context where our students have to return to the classrooms and in fact the mandatory use of ICT will be marked. (p.202)

In Cuba, in order to solve the situation of the teaching-learning process in pandemic conditions, the Ministry of Higher Education has recommended virtual education. To this end, educational programs and resources have been organized using the technological tools that make up open source virtual platforms. These platforms for online learning (also known as e-learning platforms or learning management systems) are technological tools that work by offering support for distance learning. According to (Hidalgo, Bonilla, & Rivera, 2021), they currently constitute a technological reality that supports academic training, transforming traditional spaces into virtual spaces.

The Moodle platform is the most widely used by our teachers, and this is due to the advantages it has in supporting group interaction, personal discussion and the control exercised over assessment activities. However, it requires an internet connection at all times and this means that many students cannot interact with it. eXelearning, on the other hand, is a simple platform that allows the development of educational resources on a website without connection and the student can work from any electronic device.

According to (Pérez Gómez, 2017) cited by De La Cruz Perero, LM (2021). These technological advances have produced a radical alteration from the extension and universalization of telematic networks, digital communications, social networks and virtual platforms.

The open source eXelearning platform facilitates academic teaching activities. It allows students to demonstrate their learning with interactive activities in a face-to-face, virtual or distance learning session. It is a simple and intuitive tool with a friendly work environment that guarantees a simple production process and is compatible with most web browsers, learning management systems (LMS) and learning management systems. (Merayo P, 2020)

For these reasons, this platform was chosen to develop the contents of Topography, because it is easy to use and does not require a permanent internet connection to be used, that is, it is an offline tool. This property makes its inclusion easier in the Agricultural Engineering degree, since the navigation system at the University of Artemisa is not very efficient, which sometimes makes it difficult to search for topographical content.

The present work aims to present the results of the application of eXelearning to the teaching-learning process of Topography in third-year students of Agricultural Engineering.

Materials and methods

An evaluative research was carried out during the semi-presential period given under Covid-19 conditions in 2021, where eXelearning was applied to the teaching-learning process of Topography in Agricultural Engineering students. The study was carried out at the Faculty of Agricultural, Technical and Economic Sciences of the University of Artemisa, in the second semester of Agricultural Engineering.

46 students from the aforementioned course took part in the study, which constitutes a 100% sample. According to the diagnostic evaluation applied to them, they showed adequate appropriation of skills for the use of information and communication technologies, essential for the use of email and navigation on the platform.

The group checklist was used to evaluate the proposal. This instrument allowed for monitoring, controlling and regulating the knowledge, skills and abilities developed by each student during the synchronous virtual session with eXelearning. Likewise, it contains previously established evaluation criteria, in which only the presence or absence of these is qualified using a dichotomous scale (Achieved / Not achieved).

Assessment criteria for students:

1. Follow the instructions of the proposed activities.
2. Start the activity punctually in sync with the teacher.
3. Participate actively with the teacher.
4. Their participation is in line with the proposed theme.
5. Interact with others in the group.
6. He is respectful in his interventions.
7. Use relevant vocabulary.
8. They act independently
9. Make decisions and adjust them
10. Apply what you have learned to new situations
11. Relates the previous contents with what you learn
12. They show clarity and precision in the presentation of their ideas
13. Use the multimedia resources in the content tree
14. The activity concludes.

Once the development of the Topography course program was completed, the 21 students in the sample were asked to evaluate the eXelearning platform according to the following criteria: Usefulness, Breadth of content, Quality and precision in interactive activities and Navigability. These criteria will assume a descriptive evaluation of excellent, good, average and bad, with a nominal value of four to one in descending order.

Results and discussion

For the application of the experience, three phases were taken into account: The first called familiarization with the software, the second referred to the creation of the contents of the Topography subject and the third to the application and evaluation of the platform designed in the students of Agricultural Engineering.

First stage: Familiarization with the platform

As its name indicates, this stage was characterized by familiarizing the work environment with eXelearning once the exe2.0.1 version was downloaded. A study of its support materials was carried out, such as its tutorials in manuals and YouTube channels with the intention of keeping in mind all the countless educational tools that this platform offers (Fig. 1).

Second stage: Creation of the contents or educational resources for the subject Topography for Agronomists

Once we were familiar with the learning environment and its tools, we moved on to the development of the content that would be mounted on the eXelearning platform. To do so, we took into account a unique didactic structure, with a logical order of the topics that would allow the development of the content, and in turn, the navigation of the students with greater fluidity, in such a way that the teaching-learning process of the subject would not be difficult for the student to understand (Fig. 2).

This teaching structure assumed the following criteria or aspects:

- **Introduction**: Introduces the student to the topic, its importance and the objectives to be achieved. Some previous knowledge is presented that is very useful for understanding the content and developing interactive tasks.
- **Presentation of the content**: It allows us to develop educational resources on the platform that we are going to interact with the students in the subject.
- **Orientation of teaching and study tasks**: Answers the questions; What tasks should students do? And; How to perform the exercises? A description is given of the steps to follow to carry out the Activities and Interactions
- **Assessment:** Where an explanation is given of how the subject will be evaluated. To do this, the teacher, after prior coordination with the technicians from the computerization department, will establish the tasks, the control of the results, the orientation of the exercises and tasks for independent work that will be answered online.
- **Literature:** The complementary and basic one for consultation and work with students.

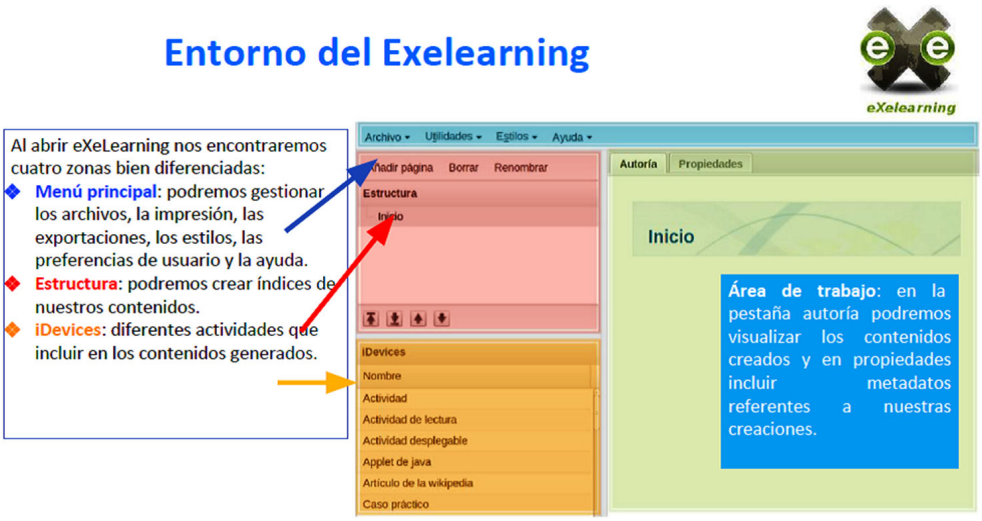

Figure 1. Exe learning environment Source: Internet

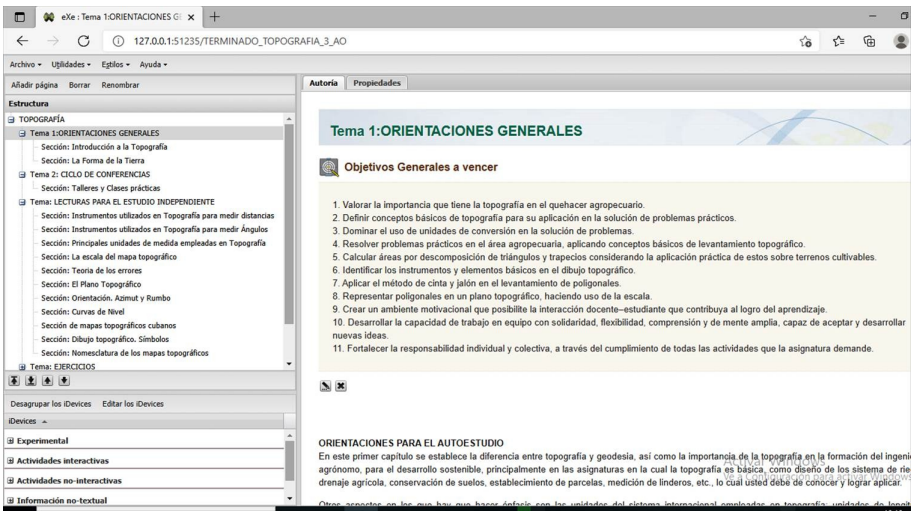

Figure 2. Content tree structure of the eXelearning platform

After having selected the proposed teaching sequence, it was necessary to have on hand the resources and means with which the students will receive the content, therefore, to successfully achieve what was proposed we had to:

- Have the lectures, study guides and practices of the subject previously prepared in Word
- Conduct a prior search on the Internet and in digitalized documents of educational resources such as: YouTube videos, scientific articles, book chapters, electronic presentations, websites, maps, texts and images, links, among others, for the interactivity of the platform topics with the students.
- Create a basic bibliography containing the textbooks for the subject and a complementary bibliography on the topic. Both in PDF format so they can be downloaded.
- Define the type of evaluation, control and monitoring that will be given to students in the development of activities and thus achieve the objective of the topic studied.
- In this regard, it was necessary to remember that the student is not physically present, so the alternatives provided by applications such as WhatsApp, Email, Instagram, among others, were required.
- Use the activities designed on iDevices, taking into account that they are the tools or blocks that we can insert into our pages that will allow us to generate interactive pages such as (true or false questions, multiple choice questions, SCORM exam, etc.)
- Introduce the subject teachers to the program and the dosage of the topics.

When setting up the eXelearning platform, we exported the content in the following formats: self-deploying folder, HTML Zip and SCORM 1.2 file. The self-deploying folder format is very useful for students, as it allows them to access a folder with all the HTML, image (png, jpg and gif), sound and Java files that we have used in our subject, along with the CSS files of the style chosen in our document. To navigate through the content, the student only has to click on the main file "index.html" and the created page is displayed. The HTML Zip format contains the same content as the self-deploying folder, but within a single Zip file. The SCORM format allowed the content to be packaged to be hosted on the university server or on the Moodle platform. The student can thus consult it and complete independent tasks or exercises.

The union of all the activities of the Topography subject, created an interactive book that facilitated the interaction of the students, providing them with all the necessary elements for navigation within it, as well as the possibility of monitoring their progress (Fig. 3).

Third stage: Application and evaluation of the designed platform

For the application of the eXelearning platform in the teaching-learning process of Topography, a USB memory stick with the self-contained platform containing the contents of the Topography subject was delivered to the eleven Municipal University Centers of the province of Artemisa. Likewise, the subject was exported to the virtual Moodle platform of the University of Artemisa in a SCORM format package for its deployment and consultation by the students.

The interaction between the teacher and the students was mediated by email, WhatsApp and Instagram. Through these channels, a work schedule was established from two to three in the afternoon for cooperative work and interaction through the platform and in constant online communication with the teacher. The evaluation was systematic and in the last two meetings there were face-to-face meetings to consolidate knowledge and take the final exam of the subject.

Evaluation of the eXelearning platform based on the indicators in the checklist

As previously stated, a group checklist was applied to evaluate, according to the indicators to be observed, the application of the eXelearning platform to the teaching-learning process of Topography in third-year students of the Agricultural Engineering degree.

The results obtained from observing the indicators stated in the checklist show that, of the 14 indicators observable in the application of the platform, 96.6% were achieved, highlighting self-management of learning, independent activity, and the study of the designed materials.

As for the aspects not achieved, it should be noted that it was almost insignificant given the number of students who were evaluated with this category. Therefore, we consider that it did not affect the quality and evaluation of its use in the teaching-learning process of Topography in the 46 students of Agricultural Engineering.

Evaluation of the eXelearning platform applied by students

The eXelearning platform's Utility obtained an average of 96.3%, which indicates an excellent rating for this indicator. The students in the sample found the platform useful, as it reduced the time spent searching for information on the web and helped them understand the topics presented in the different blended learning spaces in a more effective way.

Figure 3. eXelearning platform interface for Topography

The breadth of content on the eXelearning platform, the average for this criterion was 86.7%, which places it at an excellent rating. Despite obtaining this category, some of the students perceived the content to be long, considering the virtual duration of the activities with the teacher.

The quality and accuracy of the interactive activities was rated as excellent, with a high average of 99%. This indicator was highly appreciated by the students, given that the interactivity provided by the platform and the use of various teaching tools or educational resources, such as videos, text, and images, made the content presented understandable.

The parameter of navigability through the eXelearning platform reached 89.7%, for an excellent rating. The students perceived that they could navigate the platform without difficulty and without the need for internet, however, not all of them had computing resources, tablets or mobile phones to interact with them.

Conclusions

The application of the eXelearning platform during the learning of the contents of the subject Topography in third-year students of Agricultural Engineering allowed the teacher the freedom and space to complement, enrich and improve and integrate resources created with the objectives of the study program from virtuality; and to the students, self-management, independent activity, and significant appropriation of learning from the study of the materials designed using digital resources, applications and tools.

The technological proposal is simply the technological medium, its effectiveness depends on the methodological strategies that are projected by the teachers when they put it into practice. And for the advanced student the possibilities are multiplied with their own capacity and the ability to interact with other programs.

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