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A proposal of strategies to promote study habits in virtual learning objects

Propuesta de estrategias para fomentar hábitos de estudio en objetos de aprendizaje virtuales

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Abstract

The recent events produced by the global pandemic COVID-19 have conclusively demonstrated the need to strengthen various learning mechanisms, including e-learning and self-learning, and the adaptation of the use of technology as a fundamental tool in the teaching process. -learning. The objective of this article is to propose strategies to promote study habits in the development of virtual learning objects (VLO), by including a catalog of suggested techniques for strengthening time distribution, reading optimization and exam preparation, encapsulated and standardized with SCORM and reusable in various e-learning platforms. Our contribution is to collect and adapt study habits techniques in a methodology for the development of virtual learning objects

Learning objects, Study habits, SCORM

Resumen

Los recientes acontecimientos producidos por la pandemia global COVID-19, han demostrado fehacientemente la necesidad de fortalecer diversos mecanismos de aprendizaje, entre ellas el e-learning y el autoaprendizaje, y la adaptación del uso de la tecnología como una herramienta fundamental en el proceso enseñanza -aprendizaje. El objetivo de este artículo es proponer estrategias para fomentar hábitos de estudio en el desarrollo de objetos de aprendizaje virtual (OVA), mediante la inclusión de un catálogo de técnicas sugeridas para el fortalecimiento de la distribución de tiempo, optimización de lectura y preparación de exámenes, encapsulados de manera estandarizada con SCORM y reutilizables en varias plataformas e-learning. Nuestra contribución es recopilar y adaptar técnicas de hábitos de estudio en una metodología para el desarrollo de objetos de aprendizaje virtuales.

Objetos de aprendizaje, Hábitos de estudio, SCORM

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Introduction

The pandemic situation that is still ongoing in the world has had a direct and important impact on the field of education, because it has forced educational institutions to seek, propose and implement teaching strategies that encourage the use of technologies in the teaching-learning process and as a consequence provide mechanisms to promote study habits; These are fundamental in the learning process of students, since through them they acquire customs that facilitate the acquisition of knowledge.

(Padilla et al., 2022) they point out that social isolation, anxiety and depression, are the main difficulties or concerns experienced by students during the COVID-19 pandemic, for which they showed difficulty in adapting to the use of technological resources. Hence the proposal of this article is to provide the facility for students to foster study habits and make use of technological resources to facilitate their learning.

In this respect (Quesada-Jure, 2018) they affirm that educational processes are increasingly versatile in the face of the evolution of societies, so that every day it is necessary to see the school as a place of personal and community development. The course towards a school of education more contextualized to the social reality depends on the focus directed towards research as the engine of apprehension of the student's interest in learning. The research carried out by the authors mentioned in this paragraph had the purpose of strengthening the habit through the improvement of literacy based on Information and Communication Technologies as a strategic tool.

Improving the teaching-learning process in university students involve, not only the preparation of the teacher, also today it is necessary to quantify and better understand the student in each context. Knowing the university student in the areas of time distribution, preparation, class activity, management of social networks and cyber tools, can facilitate the implementation and quantification of the effectiveness of introducing cyberspace tools as a form of contact and approach to the student.

That is why (Antonia Mireles Medina *et al*., 2020) in this study that is the background of this research article, they previously carried out a study where they have identified the study habits of a group of students corresponding to the area of Computational Sciences.

Problem Statement

The recent events produced by the global pandemic COVID-19 have reliably confirmed the need to strengthen various learning mechanisms, including e-learning, self-learning and the adaptation of the use of technology as a fundamental tool in the teaching process. -learning, the authors of this study have never been oblivious to this situation that continues to lacerate one of the most important that exists in society: education. Where now the teacher is no longer the center of the teaching-learning process, consequently and moreover rather the facilitator or instructor who has the duty to provide the elements, techniques, strategies and tools so that their students can acquire knowledge in a more accessible and easier, especially in these times where the conditions of the context have changed and there is a need to adapt teaching strategies that are within the reach of students.

General objectives

Generate a proposal of didactic strategies to promote study habits in the development of virtual learning objects (VLO), through the inclusion of a catalog of suggested techniques for strengthening the distribution of time, optimization of reading and preparation of exams.

Specific objectives

Design and develop a proposal of didactic strategies to promote study habits in the development of virtual learning objects (VLO), through the inclusion of a catalog of suggested techniques for strengthening the distribution of time in higher level students.

Design and develop a proposal for didactic strategies to improve reading optimization, through reading comprehension strengthening techniques applied in the development of virtual learning objects (VLO).

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Strengthen applied knowledge evaluations in presential and online courses for higher level students, through exam preparation techniques applied in the development of virtual learning objects (VLO).

Justification

In a study conducted by (Lezama & Galdámez, 2017) the results of their research demonstrate the existence of a statistically significant relationship between the levels of study habits and the levels of academic performance of students taking algebra, Sic. the authors in mention based on (Villegas, Muñoz, & Villegas, 2016) mention that the interest in the study habits of university students has become a topical issue both nationally and internationally due to the high percentage of failure. Also returning to (Peña, 2014) Lezama and Galdámez say in their article that one of the biggest challenges currently facing the national education system is the low academic performance that students present in areas of knowledge such as Spanish and mathematics.

Referential framework

Virtual Learning Object (VLO)

One of the decisive factors in the incorporation of ICT for the generation of new learning scenarios in the educational field is the figure of the teacher, and in this sense, their adequate digital competence is decisive (Lorenzo-Lledó et al., 2018). For this reason, the authors of this article intend to provide a proposal that allows promoting study habits using Information and Communication Technologies. That, although according to (José Luis Díaz Vega, 2006) in his work he considers the following study habits: Distribution of time, motivation in the study, distractions in the study, notes in class, reading optimization, exam preparation and attitude towards the study.

The authors of this research aim to propose strategies to encourage study habits in the development of virtual learning objects (VLO), by including a catalog of suggested techniques for strengthening the distribution of time, optimization of reading and preparation.

Of exams, in the design and implementation of learning objects encapsulated in a standardized way with SCORM and reusable in various e-learning platforms. While the contribution is to collect and adapt study habits techniques in a methodology for the development of virtual learning objects.

(Morales & Gutiérrez, 2016) consider that a VLO (Virtual Learning Object) refers specifically to learning objects that correspond to digital materials and that allow students to learn at their own pace and autonomously. (Hernández Suarez et al., 2020) carried out research in basic education that aims to develop a virtual learning object (VLO), to develop numerical skills through basic mathematical operations, where they considered the ADDIE model for the construction of the VLO. The technique and instrument were a Likert-type questionnaire.

The evaluation of the quality of the VLO was through an evaluation team, which issued its opinion on the didactic and technological nature of the VLO. The authors of this study consider that not all students have numerical skills, the foregoing is based on the high failure rates that occur in the subject of Differential Calculus derived from this, this proposal is focused on developing a series of Virtual Learning Objects in relation to this subject that all the students of the Tecnológico Nacional de México Campus Zacatecas Norte, in the first semester, the proposal is especially focused on the students of Computer Systems Engineering.

Differential Calculus is a subject that contains five learning units (Tecnológico Nacional de México, 2016):

1. Unit 1. Real numbers
2. Unit 2. Functions
3. Unit 3. Limits and continuity
4. Unit 4. Derivatives
5. Unit 5. Applications of the derivative

For the proposal of the development of the VLO, the content of unit two is considered, specifically the topics: 2.1 Definition of variable, function, domain and range; 2.2 Real function of real variable and its graphical representation.

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Information technologies and study habits

The technological means of information and communication are useful tools for accompanying educational processes; however, their excessive use generates effects that deserve a review. The mass media make up a socialization system: they influence our ideas, habits and customs (Rodríguez, Nathalia Concepción & Mag. Rosanna Ester Dávalos Krivorotoff, 2017); Sic., they mention that addressing the problem represented by the lack of reading habits in youth society is highly relevant, since through said analysis, it will be possible to reach possible improvement actions. And the authors of this document consider that not only of improvement but of a constant impulse on the habit of reading through attractive and easy-to-use didactic strategies for students.

(Paredes, 2015) mentions that educational institutions have reading teaching as one of their activities. This they carry out quite efficiently and gradually better because they know the scientific principles that guide the methodology of this teaching. However, the great challenge that the school has been facing is to train readers, that is, to create or foster the habit of reading. It is not an easy task because there are no magic recipes. As it is not an easy task due to such a situation, it is proposed that through VLO the reading habit be promoted or as I would say (José Luis Díaz Vega, 2006) the optimization of reading.

(Mondragón Albarrán et al., 2017) they carried out a study where they have considered as an objective "to determine the incidence of study habits and their academic performance in students of the degree in Administration of the Unidad Académica Profesional Tejupilco dependent on the Universidad Autónoma del Estado de México. The population was 173 students of both sexes from the 2016 B period. The Study Habits Inventory instrument was used, with a qualitative approach, to calculate the frequency of use. The results show that in the scales of environmental conditions of study, study planning, use of materials, assimilation of contents and sincerity, the students present a level of use from normal low to normal high.

Finally, in Pearson's correlation, the five scales were not statistically significant ($P<0.05$).” Mondragón et al. identified equivalent results to those reported by Cabrera and Sánchez (2004) in other studies, who reached a non-significant relationship ($P<0.05$); instead, Valdés (2001) found a significant relationship in the elements of distribution of time, motivation to study and optimization of reading in academic performance.

"It is also important to mention the distribution of time in students, currently they do not make adequate use of their time, because they spend most of their time on technology, spending much of the afternoon on social networks and thus forgetting about their respective obligations that are even worse without physical activity” (Silva Ruiz, 2016). In this regard, the authors of this manuscript consider that it is possible to promote the distribution of time using VLO, since it will allow them greater flexibility of schedules, places and availability of these.

In exam preparation, it is seen how the student studies before taking his exam, if he studies the same day, waits for an exam date, studies a certain time every day, prepares a plagiarism, checks the notes on the day of the exam, exam in class, messing up the topics during the evaluation and taking the exam without having studied (Uscamaita Carrasco, 2022). This study habit is also encouraged when using OVL, regularly failure rates are given for having prepared an exam conscientiously, it is for this situation that this habit is also taken into account so that it is encouraged in students.

"Mendoza (2011), in his study, concludes that the study habits that they practice, 52% of the students of the 2nd academic year of agronomy of the Universidad Hermilio Valdizan de Huánuco (UNHEVAL) are not the most appropriate, therefore the low academic performance, it also determined that there is an influence of study habits on academic performance" (Uscamaita Carrasco, 2022). Hence the importance of generating proposals that encourage and promote study habits in students through innovative, practical, easy-to-use, easy-to-carry and access to them at any time, as is the case with the VLO.

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Shareable Content Object Reference Model (SCORM)

(Soto et al., 2015) indicates that SCORM is a set of technical standards that allow the generation, sharing and reuse of electronic didactic content in a standardized way, so that they can be included in e-learning platforms. SCORM is one of the most popular specifications used in many software tools, such as Exe-Learning, Articulate Storyline, Adobe Captivate and Reload Editor, which allow importing and exporting content and learning objects through different e-learning platforms or other compatible ones.

Methodology

The proposed research is based on the methodology published in the Guide for the design of virtual learning objects VLO (Nieves, Morales, 2016), which consists of five stages:

1. Identification and registration of the VLO
2. Analysis
3. Specific conceptual requirements.
4. VLO Design
5. Review, testing and implementation of the VLO

In the identification and registration stage, the Differential Calculus functions of the engineering program of the National Tecnológico Nacional de México (TecNM) were selected as the subject. In the analysis, the target population was identified as decentralized technological engineering students, who take the subject of Differential Calculus, both in presential and E-learning, whose needs are to improve the understanding of the concepts related to functions and foster habits of study in e-learning. Facing the difficulty in self-learning about Differential Calculus functions and promoting study habits to improve performance in learning presential subjects.

The specific conceptual requirements focus on the topic of functions, with the aim of understanding the concepts of functions, variable, domain and counter-domain, and their graphic representation of a real variable, based on the pedagogical strategy of e-learning and self-learning with readings, examples, exercises and quizzes.

There are various techniques to strengthen various aspects of the learning process, at this stage the compilation of table 1, it is proposed, referring to strategies to promote study habits for the distribution of time, optimization of reading and preparation for exams.

Study habit	Technique
Time distribution	Use of estimated time per topic. Pomodoro technique. Use of degree of difficulty. Eisenhower's box Kanban board Schematic How to do this (GTD) Seinfeld Technique 5-minute technique
Reading optimization	Underlining study technique. diagonal reading Scanning Skimming Promotion Promotion of speed reading
Exam preparation	Exam simulation. Study guide. Conceptual paintings. Mental maps. Voice notes.

Table 1 Techniques of study habits
Source: Own Elaboration.

For this virtual learning object, the technique of Estimated time and degree of difficulty were selected, providing a suggested duration of the subject and the degree of concentration required, with the aim that the student foresees his distribution of time, avoiding interruptions and planning his activities.

In the VLO design stage, the compilation, adaptation and generation of the didactic material and its learning activities are carried out, the learning object of the function's topic contains information on the main concepts, examples and exercises of the graphic representation of a function.

At the beginning of each topic, a technical sheet is presented as in Figure 1, providing information on the estimated time to allow planning the study schedule, recommending having the suggested time to maximize concentration; the degree of difficulty provides a suggestion of the degree of concentration and experience that you must have to improve the understanding of the content; the goal states the desired outcome after completing a topic.

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Additionally, the student can apply the Pomodoro technique to improve the administration of the time dedicated to an activity, through interspersed periods of concentration and rest.

Figure 1 Example topic sheet
Source: Own Elaboration

The reading resources are based on an underlining technique with the purpose of optimizing reading, where the color code allows the elements of the reading to quickly identified, making it easier to increase the speed of comprehension of the written material. For this learning object, the main ideas will be highlighted in green, secondary ideas in yellow and examples in blue, see Figure 2. This technique can be adopted by the student and use their own color code.

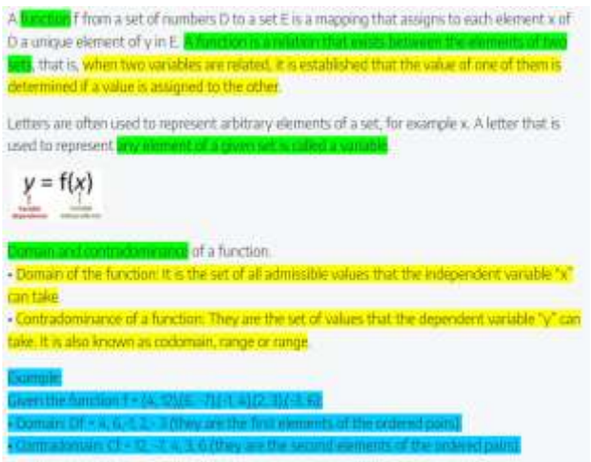

Figure 2 Underline Color Code Example
Source: Own Elaboration

At the end of each topic, a reinforcement of the preparation for exams is conducted through quiz simulation activities that allow the student to conduct a self-diagnosis of their understanding of the main ideas, allowing the review of the material and improving their repair for quizzes to be applied in an appropriate way presential, see figure 3.

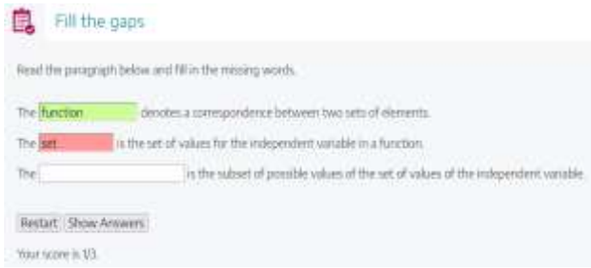

Figure 3 Self-diagnosis example
Source: Own Elaboration

In the review, testing and implementation stage, eXeLearning was used, which is an open-source software to create educational content that can be exported to the Shareable Content Object Reference Model (SCORM) set of specifications, see Figure 4.

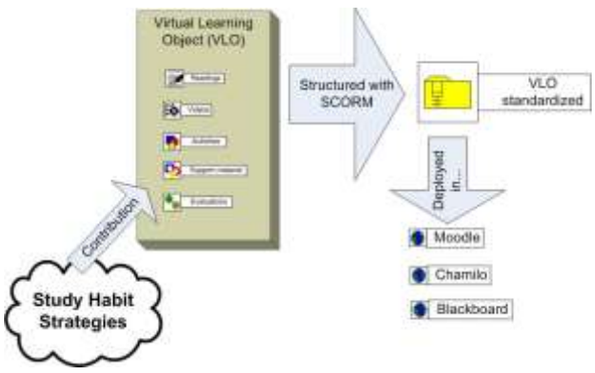

Figure 4 VLO Implementation
Source: Own Elaboration

The benefits of using eXeLearning and SCORM are to generate educational resources in an open and standardized way that can be implemented on different platforms such as Moodle, Chamilo, SCORM Cloud, among others. The foregoing facilitates the incorporation of learning objects to most e-learning platforms and promotes the exchange of learning objects with other authors, see figure 5.

Figure 5 VLO preview
Source: Own Elaboration

Results

The results of this proposal are made up of enriching a methodology to generate learning objects by adding a collection of strategies to promote study habits of time distribution, reading optimization and preparation for exams and demonstrating its implementation in a learning object. virtual learning about functions in the subject of Differential Calculus.

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Conclusions

The use of information technologies offers great advantages in academic development and expands the scope of the teaching-learning process, in this context, learning objects are an appropriate tool in e-learning platforms. It is recommended that virtual learning objects have the characteristics of being self-contained, modular, standardized (SCORM), reusable, with reasoning, reading and comprehension activities, with estimation of time and effort and indicated with a rate of progress.

Derived from the proposal of this article, we conclude that the development of learning objects, which include the promotion of study habits, is possible through the incorporation of strategies focused on the distribution of time, optimization of reading and preparation for exams, however, the accompaniment of the teacher is recommended to support study planning and monitoring of student performance. These learning objects, due to their modular and portable nature, can be used both in self-learning modalities as well as in support of presential or virtual classes.

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