Artículos científicos

Herramientas learning como medio de apoyo en la disminución de la reprobación en la Universidad Autónoma del Carmen para la modalidad a distancia

Learning tools as a means of support in the reduction of failure at the universitaria autonoma del carmen for the distance modality

Ferramentas de aprendizagem como meio de apoio na redução de reprovação na Universidade Autônoma de Carmen para a modalidade a distância

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Resumen

De acuerdo con datos estadísticos, en la Facultad de Ciencias de la Información 40 % de los estudiantes abandona por casos de deserción y 30 % por rezago escolar, lo cual ocurre durante el primer año escolar debido a reprobación de materias. El modelo Acalán de educación a distancia basado en el constructivismo plantea estrategias de apoyo contra la reprobación, pero estas no son suficientes. Por eso, esta investigación tiene como objetivo evaluar el impacto de un repositorio de herramientas de aprendizaje *e-learning* y las estrategias didácticas aplicadas para disminuir la reprobación en la licenciatura en Tecnologías de la Información de la Universidad Autónoma del Carmen. En concreto, se utilizaron tres instrumentos con los cuales se validó la viabilidad de la propuesta, que incluyó los objetos de aprendizaje necesarios para integrarlos en el repositorio, para lo cual se midieron las

necesidades de estudiantes y profesores. La metodología usada se apoyó en una muestra de 17 alumnos regulares, 10 irregulares y tres profesores que trabajaron en un curso de programación con apoyo del repositorio. Como resultado se obtuvo que de los alumnos inscritos en el curso solo 29 % reprobara la asignatura. Asimismo, la aplicación del modelo de regresión lineal y Anova mostró que las variables *falta de interés* y *mayor calidad en los contenidos* son factores que impactan en la reprobación. En síntesis, se recomienda un entrecruzamiento con la carrera de Ingeniería en Diseño Multimedia para la elaboración de materiales de alta calidad que permitan evaluar las herramientas de trabajo *e-learning* idóneas para un mejor desempeño por parte de los docentes en las unidades didácticas.

Palabras clave: reprobación, repositorio, objetos de aprendizaje, educación a distancia, herramientas de aprendizaje.

Abstract

According to statistical data in the Faculty of Information Sciences, 40% of students drop out due to dropouts and 30% due to school backwardness, this occurs during the first school year, due to the failure of subjects, the model Acalan of distance education based on constructivism proposes support strategies against failure, but these are not enough, this research aims to evaluate the impact of a repositories of e_learning learning tools and the didactic strategies applied to reduce failure in the degree in information technology from the Autonomous University of Carmen, three instruments were used with which the viability of the proposal was validated with which the learning objects necessary to integrate them into the repository were included, with this the needs were measured of students and teachers, the methodology to be used, was carried out with a sample of 17 students regular, 10 irregular and three teachers who worked in a programming course one with the support of the repository, it was obtained as a result that of the total number of students enrolled in the course only 29% failed the subject, the application of the linear regression model and Anova showed that the variables lack of interest and higher quality content are factors that impact repronation, the need for a crossover with the Multimedia Design Engineering career for the development of high quality materials, which allows evaluating the tools of suitable e_learning work for a better performance on the part of the teachers in the didactic units.

Keywords: Reprobation, repository, learning objects, distance education, learning tools.

Resumo

De acordo com dados estatísticos, na Faculdade de Ciências da Informação, 40% dos alunos abandonam por deserção e 30% por atraso escolar, que ocorre durante o primeiro ano letivo por reprovação nas disciplinas. O modelo Acalán de educação a distância baseado no construtivismo propõe estratégias de apoio ao fracasso, mas não são suficientes. Por esta razão, esta pesquisa tem como objetivo avaliar o impacto de um repositório de ferramentas de aprendizagem e-learning e as estratégias didáticas aplicadas para reduzir a reprovação no curso de Tecnologia da Informação na Universidade Autônoma de Carmen. Especificamente, foram utilizados três instrumentos para validar a viabilidade da proposta, que incluiu os objetos de aprendizagem necessários para integrá-los ao repositório, para os quais foram medidas as necessidades de alunos e professores. A metodologia utilizada foi baseada em uma amostra de 17 alunos regulares, 10 alunos irregulares e três professores que trabalhavam em um curso de programação com o apoio do repositório. Como resultado, obteve-se que dos alunos matriculados no curso, apenas 29% reprovaram na disciplina. Da mesma forma, a aplicação do modelo de regressão linear e Anova mostrou que as variáveis falta de interesse e conteúdo de maior qualidade são fatores que impactam o fracasso. Em suma, recomenda-se um cruzamento com a carreira de Engenharia de Design Multimédia para o desenvolvimento de materiais de alta qualidade que permitam avaliar as ferramentas de trabalho de e-learning ideais para um melhor desempenho dos docentes nas unidades didáticas.

Palavras-chave: reprovação, repositório, objetos de aprendizagem, educação a distância, ferramentas de aprendizagem.

Introduction

The Bachelor of Information Technology (LTI) is a career offered by the Faculty of Information Sciences (FCI) in the distance modality since 2012. Its objective is to provide high quality higher education and make it reach the most distant communities in the world. state of Campeche and the country, as well as train information technology administrators competent enough to meet the needs of the labor market. This career began with an enrollment of 20 students from various regions of the state, who are served through the Moodle platform. The degree is made up of 48 subjects divided into eight semesters and is

administered by the Department of Distance Education. In addition, it has a manager who is in charge of assigning courses, enrollment, tutoring and monitoring of students.

The acceptance of the program in the community has been very favourable, but from 2014 to date various problems have arisen, such as the failure of subjects, abandonment due to economic problems, lack of interest on the part of the teachers in teaching the modules, scarce training for new teachers, which has increased failure rates. This has caused the race to go into the suppression process, hence the importance of this study.

Since the degree is taught online, it is important that students have access to sources of information that support them. In the case of face-to-face courses, students generally have the support of services such as the library, but this is not the case when the program is taught in this modality. For this reason, a repository of learning objects focused on evaluating the impact of e-learning tools must be implemented, as well as the didactic strategies applied to reduce failure. In this sense, the following hypothesis has been formulated: if the learning repository based on e-learning technology is applied, the failure rates of the degree in Information Technology will decrease.

Literary review

According to statistical data reported by the management of the degree in its internal control in the first year of career, 40% of students abandon their studies due to desertion and 30% due to school backwardness, which occurs during the first school year due to failure of subjects. One of the most frequent causes is poor school performance (that is, falling behind or failing subjects), which does not coincide with the indicators of the Organization for Economic Cooperation and Development (OECD), since between 2008 and 2013 there was a average of 7% in the failure rates in the upper secondary school (Ruiz Ramírez et al., 2014).

In fact, the National Association of Universities and Institutions of Higher Education (ANUIES) offers the figure of 39% as the national average of terminal efficiency, and highlights that it corresponds to the same percentage of graduation (Ruiz Ramírez et al., 2014). In this sense, the OECD points out that failing a student one or more school years is a costly practice, since it keeps them longer in school, postpones their entry into the labor market and reduces commitment to the educational institution and learning. Therefore, providing early support to those who show signs of lagging should be considered as an alternative to accredit their subjects. (Montilva y Montilva, 2018).

University projects in the reduction of failure and desertion

The Acalan educational model of distance education is a guide for students. With this they develop interests and personal capacities in order to serve their society. The teachers train them in the field of research in the design of improvement projects for various workshops in which knowledge is built based on disciplinary and social problems that transcend the classroom, which are systematized, discussed and resolved from an educational point of view. critical, with various postulates of a scientific nature, of the construction and reconstruction of knowledge.

The constructivism of learning says that the purpose of education is the promotion of the student's personal growth processes, both in the cognitive field and in their sociocultural context (Emiro, 2005). These do not occur automatically and alone, but are the result of the student's participation in intentional, planned and systematic activities. In other words, the student is responsible for their learning and the teacher guides and generates the ideal scenarios. Furthermore, he must explicitly and deliberately guide such activity. Reasoning and questioning skills are cultivated, the creation of skills to select, organize and process various documentary and information systems, as well as efficient beings in solving real problems of society, attending to training in the values that characterize the university.

In the development of competencies, the teacher has the role of observer-interventor to create learning situations with which the acquisition of knowledge becomes simple and enriching. He proposes various activities that guide and redirect the tasks that promote reflection on the knowledge acquired, defining conclusions to rethink the process. The teacher, together with the other members of the academy, must identify the problem situations of the environment, discipline or profession, as well as of the people as an object of study and include them as learning experiences in the planning of courses, workshops and other activities that allow students to live cognitive conflicts, facing real problems and needs.

Thinking about the requirements of this educational model, several tools are considered, such as the design of didactic sequences, which are the main strategy of educational intervention. They involve planning how to teach, determining times, selecting content, media, resources, designing learning environments and developing skills.

UNACAR recognizes the ability to learn, self-direct and organize their learning of the human being, promoting analytical, critical and creative thinking. In addition, practice is prioritized because the student mobilizes what they have learned in the face of the problems, needs and innovations they face and, above all, the logic of lifelong learning.

The virtual classroom is now conceived at UNACAR as the place where application projects are designed for real environments, which contribute to individual, community and social improvement. These are teaching spaces in which students, academics and communities interact to build and reconstruct knowledge under the postulates of scientific work and professional practice, in a permanent continuum of learning. In an educational model of these characteristics, the classroom is not the only place where knowledge is promoted, since learning requires the use and management of other symbols and objects of social origin.

The problem of failure, abandonment and desertion in UNACAR

The desertion and disapproval of UNACAR university students has become a great concern, as in all educational institutions in Mexico, especially in the Faculty of Information Science. In what corresponds to distance education, the problem is still alarming. The academic offer for a degree in Information Technology began in 2012, with a demand of 30 students who enrolled in the propaedeutic course. Of these, only 66% managed to pass the course and start the first semester of the degree. At the end of the first semester period, 50% of the population dropped out for the following reasons:

1. Lack of interest: 30%.
2. Failure in subjects: 70%.

Based on the sample taken, the withdrawn students mention that the teacher's absence affected them and that the resources were not enough to understand each of the topics well, since they did not provide enough elements to solve the activities in some of the subjects.

The subjects that presented the highest rate of failure were those of mathematical skills and programming principles, in which 100% of the withdrawals did not accredit these subjects. Advanced semester students are waiting for the authorization of modules with which they can conclude their degree.

Currently, only 9 students are enrolled in the various semesters, of which no graduate has been reported since the beginning of the degree. The students who still continue mention that they have not accredited the subjects because the resources of the platform are very limited and that some of the teachers and tutors do not give the correct follow-up.

No higher education institution (HEI) is exempt from the high failure and dropout rates that are recorded in the first years in the different careers. During the common core, the mathematical and technological bases are taught, precisely the subjects that have the highest

failure rate. Due to this, a series of actions have been carried out aimed at reducing student failure and desertion, among which propaedeutic courses, advice given by teachers, tutorials and work by academies to reinforce strategies stand out.

Constructivist theory: meaningful learning and development of academic skills

Constructivism actually covers a wide spectrum of theories about cognition that are based on knowledge existing in the mind as an internal representation of an external reality (Matas, 2018).

Learning in constructivism is dimensioned in such a way that an individual can create with his mind the knowledge necessary to solve problems, a process of internal individual construction of said knowledge (Quintero Guerrero and Jaramillo Mujica, 2012). Given this, students generate new ideas based on knowledge acquired during their school career, with which they build and demonstrate hypotheses in a cognitive structure.

In the learning orientation process it is of vital importance to know the cognitive structure of the student; It is not only about knowing the amount of information that he has, but what are the concepts and propositions that he handles, as well as his degree of stability.

Significant learning occurs when new information connects with a relevant pre-existing concept in the cognitive structure. This implies that new ideas, concepts and propositions can be meaningfully learned to the extent that other relevant ideas, concepts or propositions are adequately clear and available in the cognitive structure of the individual and that they function as an anchor point to the first (Covarrubias y Martínez, 2007).

Methodology

Of the total enrollment that enters the bachelor's degree, 70% of those enrolled are active in the labor market; of these, 60% stopped studying for at least three years. In addition, of all the students who enter the first semester, only 20% remain and the rest are temporarily or permanently withdrawn, while 40% leave their studies for subjects that do not accredit.

The implementation of the Acalán model at a distance with its tool (the didactic script) has not shown the expected results. One of the most serious points is the failure of subjects, so in the present work a repository was implemented to serve as a complementary tool so

that students had access to quality learning objects and could obtain favorable results in their performance.

In this investigation, the type of descriptive study was used because the purpose was to know the causes that lead to the failure of subjects. Likewise, it is cross-sectional and field, and it is presented without the deliberate manipulation of the variables, since only the factors that act are studied.

The research approach is of a mixed nature, since statistical methods were used for the analysis of the instruments (table 1) and the behavior of the sample was observed during the use of the repository during the course. The research was carried out with 17 active students, 10 dropouts and 3 teachers. The instruments were validated using Cronbach's alpha (Oviedo and Campo, 2005), and were applied via email. The reagents were designed using the Likert scale (Chávez Maciel et al., 2007) and were applied according to the following phases.

Table 1. Application phases

Objeto	Objetivo	Instrumentos	Variables
Instrumento uno	Obtener la información preliminar por los alumnos regulares para determinar las causas de la reprobación.	Cuestionario	Reprobación, rendimiento escolar, tiempo dedicado al estudio
Instrumento dos	Obtener las causas de la reprobación de asignaturas por parte de los alumnos irregulares.	Cuestionario	Reprobación, deserción, tiempo dedicado al estudio
Instrumento tres	Obtener las causas detectadas por los		

	docentes que han generado la reprobación de asignaturas.	Cuestionario	Desempeño escolar, reprobación

Source: self made

In the case of instrument 1, the reliability of regular students was as follows:

$$\propto = \frac{17}{17-1}\left[\frac{14.162}{58.090}\right] = 0.7968$$

According to the consistency analysis, the result is in a state of reliability of irregular students (instrument 2).

$$\propto = \frac{10}{10-1}\left[\frac{9.278}{33.433}\right] = 0.8019$$

According to the consistency analysis, the result is in a state of reliability applied to teachers (instrument 3).

$$\propto = \frac{4}{4-1}\left[\frac{21.167}{55.333}\right] = 0.8212$$

The application of instrument 1 (table 2) aims to collect information on the problem of failure from the students' point of view.

The variables used in the applied instrument are:

Table 2. Instrument variables 1

Variable	Objetivo
Reprobación	Obtener la información sobre los factores de reprobación por curso de los estudiantes.
Rendimiento escolar	Obtener la información del rendimiento escolar de los alumnos, dentro de cada una de las asignaturas de la licenciatura.
Trabajo en plataforma	Obtener información sobre la adaptación a la plataforma y el manejo de los recursos.
Trabajo con facilitadores	Obtener información sobre disponibilidad, atención y resolución de dudas por parte de los facilitadores.

Source: self made

In accordance with this, the following was obtained from the first test with the sample of regular students (figure 1): from the questions on school performance, they were asked about difficulties in the subjects, resolution of activities, contents and objectives of the course.

Figure 1. School performance

Opciones de respuesta	Respuestas	
siempre	29,41%	5
casi siempre	35,29%	6
a veces	17,65%	3
casi nunca	17,65%	3
nunca	0,00%	0
Total		17

Source: self made

It is shown that 29.41% of the students show difficulties in their subjects (figure 2).

Regarding platform work, they were questioned about the difficulties in handling it, activities, work environment, objectives, materials, complementary resources. The results were the following.

Figure 2. platform work

Opciones de respuesta	Respuestas	
siempre	29,41%	5
casi siempre	35,29%	6
a veces	17,65%	3
casi nunca	17,65%	3
nunca	0,00%	0
Total		17

Source: self made

As can be seen in the figure above, 29.41% of the students have difficulties in handling the modality, which includes the use of the platform and content. Therefore, it is observed that the variable with the greatest weight corresponds to the difficulties in the subjects, which include resolution of activities, contents and objectives of the course. This is shown in Figure 3 below.

Figure 3. Instrument 1 Prediction
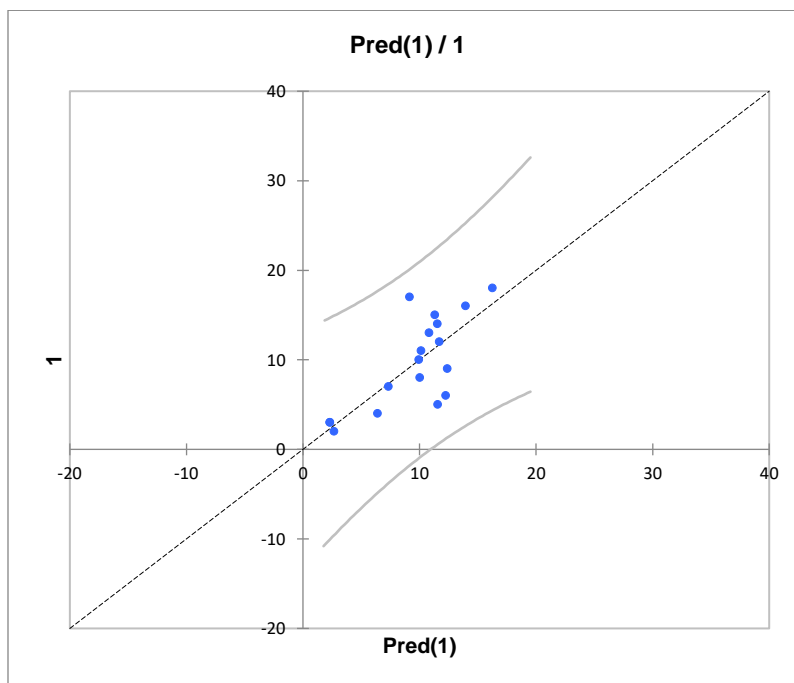
Source: self made

From the above, it is concluded that the difficulty of the subjects influences 63 % in failure, that the contents and objectives of the course have very little influence on it. Finally, the lack of materials, resources and expectations on the part of the student affect, but not in a considerable way.

The application of instrument 2 (table 3), aims to obtain information on the causes of failure of non-regular students. The variables used in the applied instrument are:

Table 3. Instrument variables 2

Variable	Objetivo
Reprobación	Obtener la información sobre los factores de reprobación por curso de los estudiantes.
Rendimiento escolar	Obtener la información del rendimiento escolar de los alumnos, dentro de cada una de las asignaturas de la licenciatura
Trabajo en plataforma	Obtener información sobre la adaptación a la plataforma y el manejo de los recursos.
Trabajo con facilitadores	Obtener información sobre disponibilidad, atención y resolución de dudas por parte de los facilitadores.

Source: self made

According to the application of the instrument to the students who did not pass the semester, the following was obtained: regarding the questions of school performance, they were questioned about the difficulties in the subjects, resolution of activities, contents and objectives (figure 4).

Figure 4. School performance

Opciones de respuesta	Respuestas	
Siempre	10,00%	1
Casi siempre	80,00%	8
A veces	10,00%	1
Casi nunca	0,00%	0
nunca	0,00%	0
Total		10

Source: self made

Therefore, 90% of the population left temporarily or permanently for having experienced difficulties in their subjects, course content and activities. The results obtained from the management of the modality say that 20% always presented difficulties, so it can be affirmed that the management of the modality is not considered a main factor in the abandonment of the study by the students.

Based on the linear regression model applied to non-regular students, from the results of instrument B, the coefficient of determination (R2) gives us 0.554 as a result, which gives a midpoint of confidence to the model (table 4). This gives us an idea of 55% variability of the failure variable, explained by the explanatory variables, attributed to a greater extent to the difficulty in the subjects.

Table 4. Determination coefficient

Observaciones	18.000
Suma de los pesos	18.000
GL	10.000
R²	0.554
R² ajustado	0.242
MEC	21.607
RMSE	4.648

Revista Iberoamericana para la
Investigación y el Desarrollo Educativo
ISSN 2007 - 7467

MAPE	48.124
DW	1.047
Cp	8.000
AIC	60.734
SBC	67.857
PC	1.160

Source: self made

The variable with the greatest weight is presented in the difficulty in the subjects, followed by teaching attention, lack of resources and expectations on the part of the student of the career (figure 5).

Figure 5. prediction coefficient
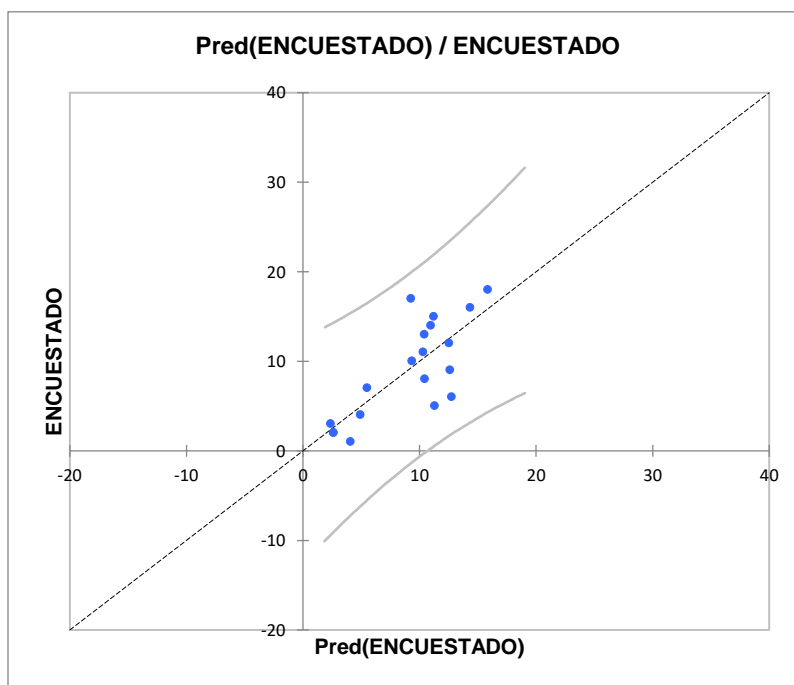
Source: self made

It is concluded that the difficulty of the subjects influences 50% in the failure. Behind this, the attention of facilitators, the lack of materials, resources and expectations on the part of the student affect, but not in a considerable way. Finally, the contents and objectives of the course have very little influence on failure. The application of instrument 3 provides

information on the causes that the facilitators have detected for the failure of the students. The variables used in the instrument are shown in Table 5.

Table 5. Teaching instrument variables

Variable	Objetivo
Desempeño del estudiante	Obtener la información del desempeño mostrado en las asignaturas por cada uno de los estudiantes.
Responsabilidad	Obtener información del cumplimiento en las actividades de cada estudiante, fechas de entrega, calidad en sus trabajos.

Source: self made

Regarding the work of the facilitators, the students were questioned about their performance in their courses, as well as feedback, tutoring, additional resources, programming of videoconferences and flexibility (figure 6).

Figure 6. Facilitators work

Opciones de respuesta	Respuestas	
siempre	0,00%	0
casi siempre	30,00%	3
a veces	40,00%	4
casi nunca	10,00%	1
nunca	20,00%	2
Total		10

Source: self made

30% rate the performance of the facilitators as very good, so it is shown that they influenced the results of the students who left temporarily or permanently. Therefore, it was obtained as a result that the performance of the students is considered an important factor in the desertion.

Regarding the variance analysis of the explanatory variables (performance, perseverance, interest, responsibility and resources), they give rise to a significant amount of information, taking into account that the percentage of risk is high (table 6).

Table 6. Variance analysis

Fuente	GL	Suma de cuadrados	Cuadrados medios	F	Pr > F
Modelo	2	0.500	0.250	0.056	0.949
Error	1	4.500	4.500		
Total corregido	3	5.000			
Calculado contra el modelo Y = Media(Y)					

Source: self made

Pilot project for the implementation of the repository of learning objects (PPIROA)

The implementation of the repository of learning objects poses the following objectives:

1. Evaluate the first impact of the use of the repository of learning objects by means of a simple percentage comparison of results between a previous school cycle and the pilot cycle.
2. Reduce the rates of failure of subjects of the degree in Information Technology.
3. Integrate suitable e-learning work tools for a better performance of the teacher facilitators.
4. Adapt tools that complement the Acalán model.
5. Integrate a variety of multimedia resources that allow students to have a better performance in their subjects.

Repository Design

For the construction of the repository of learning objects, the learning elements were classified, which lead the students to the acquisition of the necessary skills, adaptable to the new methodological strategies (table 7).

Table 7. Classification of learning objects

Objetos de instrucción	1. Lección 2. Workshops 3. Artículos 4. Casos de estudio
Objetos de colaboración	1. Ejercicios 2. Reuniones *online*
Objetos de práctica	1. Simulador de *software* 2. Laboratorios *online* 3. Simulaciones de juegos 4. Proyectos de investigación
Objetos de evaluación	1. Objetos de autoevaluación 2. Objetos de evaluación continua

Source: self made

You can see the structural view of the system, which allows you to view the layers that make it up. Specifically, the services that structure the repository are shown from the interface, services and storage level (figure 7).

Figure 7. Structural view
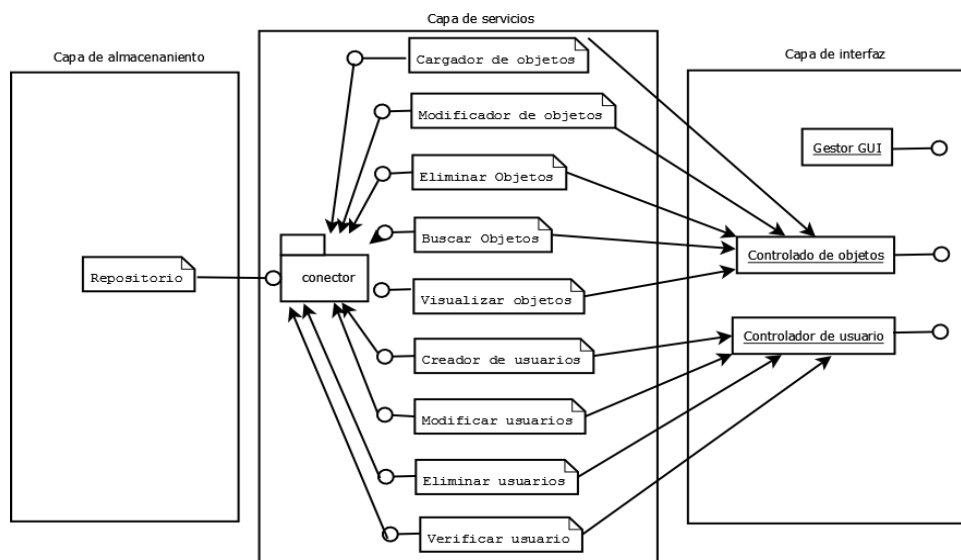
Source: self made

Psychopedagogical-communication support

The repository has considered certain peculiarities of four communication models with the aim of carrying out the teaching intervention and, above all, its purpose in the generation of knowledge. These models are:

1. Model focused on content.
2. Model focused on effects.
3. Process-centered model.
4. Model focused on technology.

The first model is centered on the teacher's ability to transmit knowledge considered valid. This concept is oriented towards behavioral education. How does it translate to the facilitator part and is it adapted so that it can achieve the expected objectives? The answer is simple: the high-level content and materials uploaded to the platform are selected by the facilitator teacher. These guide the student step by step to obtain significant knowledge, which cover:

- Issuer. Teaching facilitator expert in the topics loads the necessary content in the repository to reach the objective of the module.
- Message. The repository platform houses the materials and means so that the student can go step by step and solve their doubts and problems of the subjects.

- Receiver. The student accesses the contents of the platform at any time and can consult the facilitator by the same means.

The adaptability of the repository to this model, which is flexible to distance education, shows that it is not only behavioral, it can also be covered by e-learning tools.

Process and product evaluation

The implementation of the repository as support in the programming subject during the school year resulted in 71% of the 21 students enrolled in the course passing, compared to the previous cycle where only 16% passed the subject.

Discussion of results

Vergaray (2021) "considers it important to take into account the students who enroll in the course and withdraw before the final exam, they call this dropout" (p. 4); however, it is an individual and independent decision that can be explained by biographical circumstances or by subjective data.

Therefore, those who abandon their studies have a lower level of social relations than those who persist. To all this, they consider that excessive integration can lead to taking too much time away from studies, causing low results and even academic failure.

Mayer and Cerezo (2018) realized that the failure factors are related to the time spent studying, the lack of correct habits and the techniques of the students, as well as the application of the strategies by the students. teachers, which allow an understanding of each content and make the teaching-learning process efficient.

The impact of learning object repositories becomes a necessity, since they allow management and other benefits such as searching, downloading, uploading, tracking of learning objects.

However, the introduction of learning object repositories in an e-learning model or in a traditional system supported by digital information systems has implications in various aspects. The institutional efforts involved in integrating the development of content as learning objects and the development of their repositories involve them with the knowledge of international implementation standards, policies and regulations.

In general, the main change will be given in the openness and intense communication of the systems that operate in an e-learning environment to share administrative information, but mainly to reuse the content available in each of these.

Conclusions

The failure in the degree in Information Technologies at a distance is worrying: 40% of students abandon their studies due to desertion and 30% due to school backwardness, which occurs during the first school year due to failure of subjects. Therefore, in this work we sought to evaluate the impact of the repository of e-learning learning tools and of the didactic strategies applied as support to reduce failure in the Information Technology degree at the Autonomous University of Carmen.

Through the research carried out, the application of the linear regression model and Anova gave as a result that the variables lack of interest and higher quality in the contents are fundamental factors in the failure of subjects. Through this study, an attempt was made to reduce failure in the degree in Information Technology at the Autonomous University of Carmen through the implementation of a repository of e-learning learning tools.

Now, although based on the results obtained, it is not guaranteed that the general objective can be reached, the repository will be able to cover most of the specific ones, especially in the adaptation and evaluation of e-learning learning tools that allow complement the Acalán model and thereby make it more robust and efficient.

Likewise, the proposed hypothesis is viable, since according to the results it could be reduced considerably, but other factors must still be analyzed to reach a conclusion about the tool. Therefore, the need for a crossover with the Multimedia Design Engineering career was determined for the development of high-quality materials that allow evaluating the ideal e-learning work tools for better performance by teachers in the didactic units.

To all this, it has been detected that part of the problem is due to the lack of experience on the part of the facilitators in online work, since they confuse face-to-face sessions with remote ones. Likewise, the need for interactive multimedia teaching resources that offer new options in the acquisition of significant knowledge is evident. In addition, the lack of experience of students in online work must be addressed, which generates problems when solving their activities.

Another important point is the lack of a consolidated academic body in the degree that can make decisions about improvements and resolution of problems that arise to offer a high quality service. This measure could combat the issue of disapproval. Likewise, work must be done on the implementation of the repository so that later on it can be combined with other alternatives that give the expected results.

Future lines of research

A crossover with the Multimedia Design Engineering career is recommended for the development of high-quality materials that allow evaluating the ideal e-learning work tools for better performance by teachers in the didactic units.

Likewise, a consolidated academic body is required in the degree, which can make important decisions about improvements and resolution of problems that arise, because in this way the problem of failure can be solidly combated.

In addition, create a pedagogical model for the design of content with which students are guided in the development of competencies aligned with the Acalán model of distance education.

In short, it can be indicated that implementing an institutional early warning academic monitoring system aimed at distance education may contribute to the adequate detection of various factors that can lead to school dropout.

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