Artículos Científicos

Más allá de los procesos de enseñanza-aprendizaje tradicionales: construcción de un recurso didáctico digital

Beyond Traditional Teaching-Learning Process: The Development of a Digital Didactic Resource

Além dos processos tradicionais de ensino-aprendizagem: construção de um recurso digital de ensino

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Resumen

En las últimas décadas, las tecnologías de la información y la comunicación (TIC) se han desarrollado de manera vertiginosa. Su utilización ha tenido un fuerte impacto en todos los ámbitos de la vida humana. Concretamente en el ámbito educativo han tenido una fuerte incidencia al transformar las formas de enseñar y de aprender, lo que implica nuevas y variadas exigencias, desafíos y posibilidades que permitan facilitar, enriquecer y fortalecer los procesos de enseñanza-aprendizaje. Una de dichas posibilidades se centra en el desarrollo de materiales y recursos didácticos digitales (RDD). Teniendo en cuenta lo anterior, el objetivo de este trabajo fue la construcción de un RDD como apoyo a los procesos educativos de la unidad de aprendizaje Administración de Proyectos que se imparte en la Escuela Superior de Cómputo (ESCOM) del Instituto Politécnico Nacional (IPN). Con fundamento en una investigación aplicada, se siguieron dos etapas: en la primera se llevó a cabo un análisis documental y, en la segunda, se construyó el RDD. Dicha construcción se realizó con base en el programa sintético de la unidad de aprendizaje en cuestión y en los aspectos pedagógicos, editoriales, gráficos y técnicos exigidos y evaluados por la Unidad Politécnica para la Educación Virtual (UPEV) del IPN, así como en las características y funciones de los RDD. Así, el RDD desarrollado está apegado a los objetivos y necesidades curriculares, considerando su adecuación al contexto y una apropiada organización y pertinencia del contenido, y está reforzado con imágenes diseñadas en función de cada uno de los temas. Adicionalmente, cuenta con lecturas complementarias, ligas de videos y artículos de Internet, actividades de aprendizaje a desarrollar con un enfoque por competencias, presentaciones en PowerPoint y un test (con reactivos aleatorios) que el estudiante podrá contestar al término de cada unidad temática, con lo que se pretende que reflexione sobre su progreso o detención en relación con los aprendizajes esperados.

Palabras clave: aprendizaje significativo, competencias, procesos de enseñanza-aprendizaje, recurso didáctico digital, TIC.

Abstract

In the last decades, information and communication technologies (ICT) have developed rapidly. Their use has had a great impact in every aspect of human life; specifically, in education they have evolved teaching and learning processes. Therefore, new demands, challenges and possibilities arise that allow to enrich, facilitate and strengthen the teaching-learning process. One of such possibilities is in the development of new teaching materials and digital didactic resources (DDR). So, the objective of this was the construction of a DDR as an aid in the teaching-learning process for Project Administration class, that is part of the program at the Escuela Superior de Cómputo (ESCOM) at the Instituto Politécnico Nacional (IPN). An applied research methodology was used in two steps: first, the documental analysis; second, the building of the DDR. The DDR was designed according to the class plan in the following aspects: pedagogic, editorial, graphic and technical, that are required and evaluated by the Unidad Politécnica para la Educación Virtual (UPEV) of the IPN, as well as the characteristics and functions of DDR. The developed DDR fulfills the Project Administration class program, its objectives and curricular needs, as it also adequate with the context and the content, which is reinforced with images designed specifically for each subject. Additionally, it uses complementary readings, links to audiovisual materials and internet articles and learning activities with a competency development approach. Also, PowerPoint presentations and tests (with aleatory questions) in which the student can discover his or her personal progress in relation with the expected progress.

Keywords: significative learning, competencies, teaching-learning process, digital didactic resource, ICT.

Resumen

Nas últimas décadas, as tecnologias da informação e comunicação (TIC) se desenvolveram vertiginosamente. Seu uso teve um forte impacto em todas as áreas da vida humana. Especificamente no campo educacional, tiveram um forte impacto na transformação das formas de ensino e aprendizagem, o que implica novas e variadas demandas, desafios e possibilidades que facilitam, enriquecem e fortalecem os processos de ensino-aprendizagem. Uma dessas possibilidades se concentra no desenvolvimento de materiais e recursos digitais de ensino (DDR). Considerando o exposto, o objetivo deste trabalho foi a construção de um

RDD para apoiar os processos educacionais da unidade de aprendizagem de Gerenciamento de Projetos ministrada na Escola de Computação (ESCOM) do Instituto Politécnico Nacional (IPN) . A partir de uma pesquisa aplicada, foram seguidas duas etapas: na primeira, foi realizada uma análise documental e, na segunda, foi construído o RDD. Essa construção foi realizada com base no programa sintético da unidade de aprendizagem em questão e nos aspectos pedagógicos, editoriais, gráficos e técnicos exigidos e avaliados pela Unidade Politécnica de Educação Virtual (UPEV) do IPN, além das características e funções dos RDDs. Assim, o RDD desenvolvido está vinculado aos objetivos e às necessidades curriculares, considerando sua adaptação ao contexto e uma organização e relevância apropriadas do conteúdo, e é reforçado com imagens desenhadas de acordo com cada um dos temas. Além disso, possui leituras complementares, links de vídeos e artigos da Internet, atividades de aprendizado a serem desenvolvidas com foco em competências, apresentações em PowerPoint e um teste (com reagentes aleatórios) que o aluno pode responder ao final de cada unidade temática, com que se destina a refletir sobre seu progresso ou detenção em relação ao aprendizado esperado.

Palavras-chave: aprendizagem significativa, competências, processos de ensino-aprendizagem, recurso digital de ensino, TIC.

Introduction

In recent decades we have witnessed how in all areas of human activity the ways of doing, thinking, communicating and relating have been transformed due to the rapid growth and development of information and communication technologies (ICT). These cover much more than computers, since this term denotes the broad spectrum of technologies linked to information processing and the sending and receiving of messages (United Nations Educational, Scientific and Cultural Organization [Unesco], 2005). It is a reality that technology is increasingly present in our lives and that should be reflected in schools and classrooms. The use of ICT in students' projects or works is considered one of the most active pedagogical practices that promotes the construction of knowledge required by students for their academic and work future (Organization for Economic Cooperation and Development

[OECD] , 2015). This body emphasizes that ICTs have great pedagogical potential in teaching-learning processes because they can expand and enrich learning; contribute to the development of higher order cognitive skills, including analysis and synthesis; promote the development of the ability to think independently; the creativity; problem solving, and manage their own learning, among others (OECD, 2003). In this sense, there is clear evidence that ICTs have had a great influence on the changes that have been experienced in the ways of teaching and learning. According to Unesco (2005):

> ICTs also play a fundamental role in the transformation of the current learning environment, mainly focused on the teacher, to a student-centered environment, where the teacher ceases to be the main source of information and the main transmitter of knowledge to become a learning facilitator, and where the student is no longer a passive receiver of information, but actively participates in their own learning (p. 12).

Given this scenario, teachers and students must acquire new skills and assume different roles to those they have performed by tradition. The teacher should become a guide, counselor, advisor and facilitator of resources and learning tools; Additionally, it must be: evaluator, organizer of mediated learning situations, media and materials designer adapted to the characteristics of their students and the potential of the technology available to support their educational practice, and also share it with their students to make them autonomous in the management of information and in the construction of knowledge (Navales, Omaña and Perazzo, 2003, cited in Angulo, 2015). So that the center of the educational phenomenon is the student and his learning.

Under this context, the National Polytechnic Institute [IPN] (2003), in its Institutional Educational Model, points out that the educational process should be focused on learning, with teachers who create spaces for the construction of knowledge and facilitate the process. That is, academics who learn by teaching, that adequately incorporate the use of ICT and non-conventional teaching modalities, among other aspects (IPN, 2003). In accordance with this pronouncement and taking advantage of the potential of ICT, the following research questions were raised in this work: how to generate innovative learning environments that foster autonomous learning? How to favor meaningful learning? and how to create spaces, in the classroom, dedicated to collaborative work, argumentation and discussion, among

others? To answer these questions, it was based on the following premise: if the student has, and has access at all times, all the contents of the synthetic program of the learning unit, PowerPoint presentations, complementary readings, videos and articles Internet related topics, if you have all this, then you can develop autonomous learning, and in this way, it will be possible to change the dynamics of work in the classroom: by moving from an exhibition class to an interactive class.

Therefore, the objective of this work was the construction of a digital didactic resource (RDD) as an aid in the teaching-learning processes of the Project Management learning unit that is taught at the Higher School of Computing (ESCOM) of the IPN . Its use is intended to promote the autonomous learning of students, that the strategies within the classroom are modified and are directed to the development of contextualized learning activities that privilege the development of other competences, namely: the argumentative, purposeful, problem solving , entrepreneurship and collaborative work, among others, all of which will enable students to become the center of the teaching-learning processes.

Theoretical-contextual references

In order to establish the theoretical-contextual bases necessary for the development of an RDD, learning and skills and the means, materials and RDD will be succinctly addressed.

Meaningful learning and skills development

To date, there have been two educational models that have been implemented in higher education institutions: the so-called traditional model focused on teaching, and the educational model focused on learning. Learning is a personal process of building knowledge of reality (Oliver, 2007); It is understood not as an end in itself, but as an instrument at the service of the competencies required in the contemporary world (Caballero, Rodríguez and Moreira, 2011). These authors emphasize that, from recent cognitive perspectives, the relevance of meaningful learning and its potential in the development of skills in student training is insisted. To clarify the above, it is essential to address the terms significant learning and competence. According to Moreira (2017), meaningful learning is the

acquisition of new knowledge with meaning, understanding, criticality and possibilities of using that knowledge in explanations, arguments and solution of problem situations. While a competition, according to the OECD project (cited in Pérez, 2007) called Definition and Selection of Competencies (DeSeCo), is defined as:

> The ability to respond to complex demands and carry out various tasks in an appropriate manner. It involves a combination of practical skills, knowledge, motivation, ethical values, attitudes, emotions and other social components and behaviors that are mobilized together to achieve effective action (p. 10).

Taking into account the above, the essence of meaningful learning lies in its functionality, that is, in the application that students can make of what they have learned to build new learning and solve contextualized problems. Thus, what has been learned can be mobilized, integrated and applied to other contexts to solve different situations, so that the student is increasingly competent in resolving them (Caballero et al., 2011).

In this understanding, to achieve meaningful learning and develop competencies it is essential to make transcendental changes in the traditional roles with which we have worked (teachers and students) and in the way in which the teaching-learning processes have been carried out.

The teaching-learning processes

In the educational field it has always been intended to achieve student learning, which is closely related to teaching. Learning and teaching have different conceptions depending on the educational approach in question. Ruíz (2012) argues that learning must be understood as a process of building knowledge of the reality that develops in the mind of each person; construction process that can be favored with didactic interventions, which must always be presided over by well-defined pedagogical positions. While the teaching, according to Díaz Barriga and Hernández (2010), from the constructivist framework, should be conceived as an adjusted and necessary aid to the construction processes carried out by students on the programmed contents. Likewise, Ruíz (2012) proposes a teaching in terms of competence from the pedagogical and the didactic, answering questions such as the following:

a) What should the student know to establish theoretical knowledge?

b) What should the student know to obtain practical knowledge? and

c) How does the student have to know, be and act to specify the attitudes and behaviors required? (p. 2).

Thus, teaching in terms of competencies implies the conscious design of intentional actions to promote the development of autonomy, with a view to achieving competent performance by the student.

In short, talking about teaching requires talking about learning and its processes. In this sense, Pla (2010, cited in Abreu, Barrera, Breijo and Bonilla, 2018) defines the teaching-learning process as follows:

> That institutional educational process that more systematically organizes and structures teaching in relation to the way in which learning should occur, based on the essential relationship that exists between the aims of education (objectives) and the accuracy of the contents and of these with the dynamics (teacher, student, methods, means, forms, evaluation) through which it is possible to achieve education directly linked to a specific content of the specific sciences, expressed in curricula and curricula (p. 612).

More recently, Ruíz (2012) emphasizes that the pillars of education require focusing the processes on the individual's abilities, responsibility and autonomy. What, in the words of the same author, justifies assuming competency-based learning as a process focused on the student's own ability, the stimulation of their responsibility and the development of their autonomy.

It should be noted that different elements come into play in the teaching-learning processes. And one of them is the use of teaching resources. In this regard, Moreno (2004) states that "in almost all teaching situations, the use of teaching materials of all kinds and on any medium appears" (p. 6). This is how the teaching materials as a whole constitute essential tools for the development and strengthening of the teaching-learning processes, which is why it is essential to choose, design, build and use them accordingly.

Means, materials and teaching resources

Over time, the systematic use of teaching aids, materials and resources in the educational field has been a valuable aid in facilitating and strengthening the teaching-learning processes. Didactic means and resources are the active components in any process aimed at the development of learning (Bravo, 2004). Likewise, Marquès (2011) states that any material can be used as a resource to facilitate the aforementioned processes and clarifies that there are differences between an educational medium and an educational resource. In this regard, he explains that a didactic medium is any material developed with the intention of facilitating the teaching-learning duality, while an educational resource is any material that is used for didactic purposes or to facilitate the development of training activities. The author emphasizes that the educational resources used in a teaching and learning situation may or may not be didactic means.

Similarly, Parcerisa (2007) states that the materials constitute a basic resource for learning, fulfilling a mediating function between the educational intent and the learning process, between the educator and the student. This function is broken down into various specific functions that materials may have in the formative path.

Functions of materials and teaching resources

Teaching materials and resources are elements that facilitate the construction of learning. In this sense:

> Each learning requires specific conditions and different from another. Conditions to be determined through planning and evaluation processes. These learning conditions are determined by two elements: educational resources and teaching strategies, and by the interaction of both (Zapata, 2016, p. 3).

This is how they perform various functions that impact the teaching-learning processes. In this regard, Marquès (2011) states that depending on how the didactic means and educational resources in general can be used, they can perform various functions, among which the following stand out:

- Guide and facilitate learning by helping students organize information, relate knowledge, create new knowledge and apply it in specific contexts. Therefore, it is necessary that the use of teaching resources and resources be combined with methodological strategies.

- Develop skills in directing the implementation of knowledge.

- Motivate, wake up and maintain the interest of the student. That is, to offer a different experience to the student, so it is essential that aspects such as shapes, colors, structure, sensations, among others, be considered in the design and selection of media and teaching materials.

- Provide simulators that allow observation, exploration and experimentation.

- Provide tools that facilitate expression and creation, such as word processors or computer graphic editors.

- Evaluate the knowledge and skills that are being developed, as well as provide feedback to the student. The correction of errors is sometimes made explicitly (such is the case of some multimedia materials that immediately feed the user) and in other cases it is implicit, since it is the student himself who identifies his mistakes (as it happens, for example, when interacting with a simulator)

Likewise, Moreno (2004) points out that, from the point of view of their didactic use, the media and curricular materials must meet some functionality criteria, such as being a support tool or learning aid, they should never replace teachers in their task of teaching or students in their task of learning, their use and selection must respond to the principle of rationality, so selection criteria must be established, and finally, from a critical perspective, they must be built between all people involved in the learning process.

ICT and digital teaching materials and resources

The term ICT denotes the broad spectrum of technologies linked to information processing and the sending and receiving of messages (Unesco, 2005). In the educational field, the topic of ICT is broad. When they are used in teaching, they favor the curricular development of different learning areas (Cacheiro, 2011; Fandos, Jiménez and González, 2002; Pantoja and Huertas, 2010). ICTs play a fundamental role in the teaching-learning processes by serving as support in the interaction with didactic activities that integrate the

visual, innovative and interactive; enable the use of applications, platforms and social networks; they promote new forms of teaching by facilitating communication and the search for information (García, Reyes and Godínez, 2017).

The use of ICTs has enabled the creation and use of media, materials and teaching resources very different from those that had been used traditionally. Alba (2012) affirms that "in the face of the traditional vision, the content no longer has to be considered something static inserted in a physical support, but that through its digitalization it becomes dynamic and transformable" (p. 7). Today, thanks to the benefits of technology, it is also possible to talk about materials and RDD.

A digital teaching material is a resource in digital format used in the teaching-learning processes (Fernández, Domínguez y de Armas, 2013). These materials "articulate new forms of interaction of learners with knowledge" (Area, 2015, cited in Cepeda, Gallardo, and Rodríguez, 2017, p. 82).

The IPN (2010), in its Teaching Promotion Regulations, expresses the following:

> Those resources created with the support of software, whose purpose is to promote the learning of facts, concepts, theories, processes, procedures or principles, are considered as digital teaching material, considering objectives or goals of a specific study program or learning unit; teacher training program and professional update (pp. 15-16).

Materials of this type, with the support of ICTs, constitute one of the main areas of quality of learning and teaching (UNIQUe, 2012, citado en Fernández *et al.*, 2013).

Alba and Zubillaga (2012) four features of digital media stand out:

1) *Versatility,* refers to the ability to adapt easily and quickly to various functions. Digital media allows presenting and displaying the content in different formats (text, still image, moving image, sound, combination of text and image, multimedia, etc.).

2) *Transformation capacity,* refers to the possibility that the same content can be passed from one format to another. Such transformation can be within the medium itself, for example, adjustments in the size of the text, transform the written text into sound or the spoken language into text, to name a few.

3) *Marking,* supposes the possibility of making marks in the content. This option is derived from the characteristics of the language and code in which they are designed

and that allow labeling the contents so that they can be reorganized or reconstructed in versions based on selections determined by the user.

4) *Connectivity,* if there is something that characterizes digital media, it is precisely the possibility of connecting or making connections through links, thereby providing resources that support learning and opening the content beyond the limits of the text itself, which allows digital materials to respond to the complexity of the processes and the differences in the patterns and ways of learning of the students.

Because of their impact on the teaching-learning processes, authors such as Dick and Carey (cited in García, 2001) identify some essential elements for the design and selection of digital teaching materials: objectives, content and profile of the students, to name a few. In this sense, Mishra and Koehler (cited in Posada, May 8, 2013) developed the model called Technological PedAgogical Content Knowledge (TPACK), very useful for the construction and technopedagogical evaluation of RDD. This model results from the complex intersection of three types of knowledge: content knowledge, pedagogical knowledge and technological knowledge. The first refers to what is the expected learning; the second refers to how to facilitate learning, and the third seeks to answer the question of what is the technological resource that best responds to educational needs.

According to the Guide for the Evaluation of Digital Teaching Resources of the Polytechnic Unit for Virtual Education [UPEV] (nd) of the IPN, an RDD is the result of the harmonious integration of this knowledge and translates into the creation of a tool effective both for the teaching work and for the academic achievement of the student. Its main functions are the following:

- Provide students with opportunities for analysis, experimentation and understanding of a particular topic in an innovative way.
- Build learning environments that promote the development of curricular and extracurricular skills.
- Encourage students' motivation and attention on issues that are difficult to understand. To achieve the functions mentioned above, RDDs must have certain characteristics:
- They are informative materials and didactic tools that facilitate the achievement of expected learning.
- Integrate audiovisual media or interactive materials for the study of various topics.

- They do not require sophisticated equipment or programs for their use.

Following Fernández et al. (2013), the quality of teaching materials is essential. In this regard, they consider that a digital teaching material is of quality if it has didactic and technological effectiveness; that is, if it contributes to improving teaching and learning, if its use improves academic results and if it is also a computer product with the following characteristics: robust, interoperable, usable and scalable.

Methodology

The type of research that followed the development of this work was applied research. For Murillo (2008, citado en Vargas, 2009):

> Applied research is called practical or empirical research, which is characterized in that it seeks the application or use of the knowledge acquired, while others are acquired, after implementing and systematizing the research-based practice (p. 159).

And in this case it was applied in the development of an RDD, specifically in the creation of a balance for the Project Management learning unit, whose nature is predominantly practical, so it lends itself so that the theoretical contents are worked at a distance (autonomous learning) and thus facilitate the development of training activities and the construction of knowledge.

The method was the review and analysis of bibliographic documentation on the subject treated.

The development of the RDD was mainly based on the following:

1) The guidelines provided by the UPEV (nd), which states that RDDs must be constructed and subsequently evaluated considering pedagogical, editorial, technical and graphic design aspects, each of which is made up of various elements, which are described in figure 1.

2) The content of the synthetic program of the Project Management learning unit that is taught in the ESCOM of the IPN.

Figura 1. Aspectos para el diseño y elaboración de un recurso didáctico digital

Fuente: Elaboración propia con base en UPEV (s. f.)

Development of the learning unit balance Project Management

In accordance with the above, the design and development of the balance of the Project Management unit considered pedagogical, editorial, technical and graphic aspects.

Regarding the pedagogical aspect, this RDD has a frame where you can visualize the welcome to the course, the methodology to be followed, the program of the learning unit and the bibliography (figure 2). It also has an introduction to the course and a section that contains the thematic units that make up this resource, as can be seen in Figure 3.

Figura 2. Encuadre de la unidad de aprendizaje
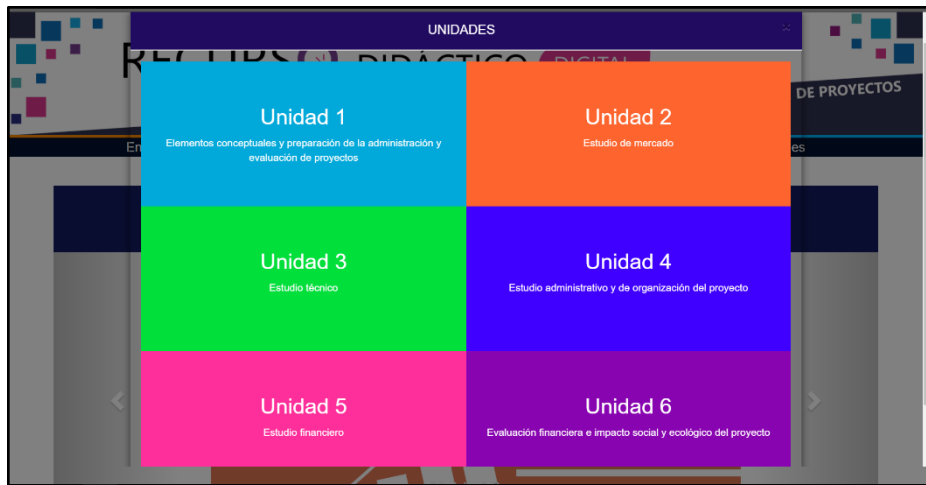

Fuente: Elaboración propia

**Figura 3**. Menú principal de navegación

Fuente: Elaboración propia

Additionally, a mosaic is displayed with the six thematic units that make up the unit in question, as can be seen in figure 4. When clicking on any of them, the title of the thematic unit, the unit of competence to be developed, is displayed and a box titled "What is this unit about?" in which an overview of the content of the unit is given (figure 5).

Figura 4. Unidades temáticas
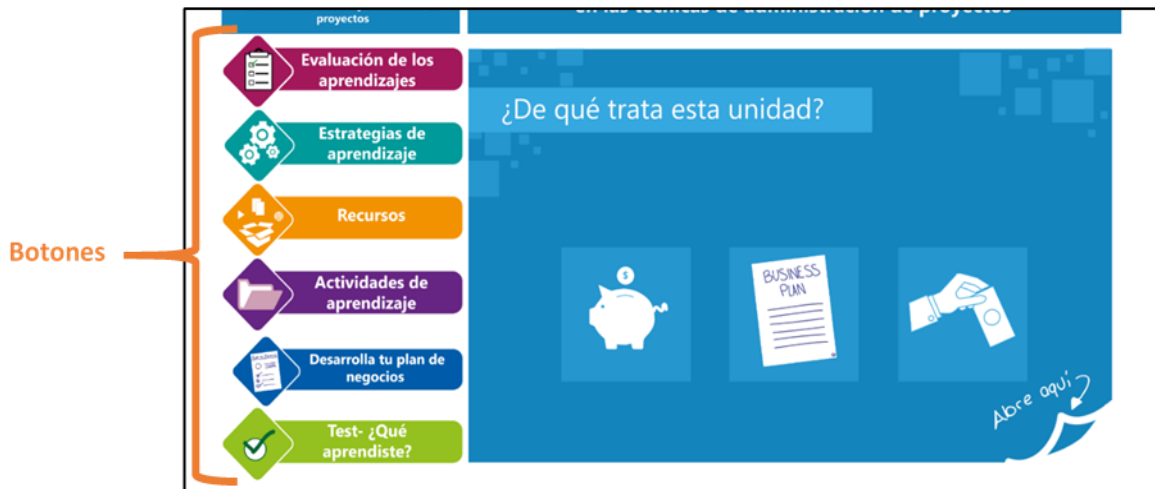

Fuente: Elaboración propia

Figura 5. Contenidos por unidad temática
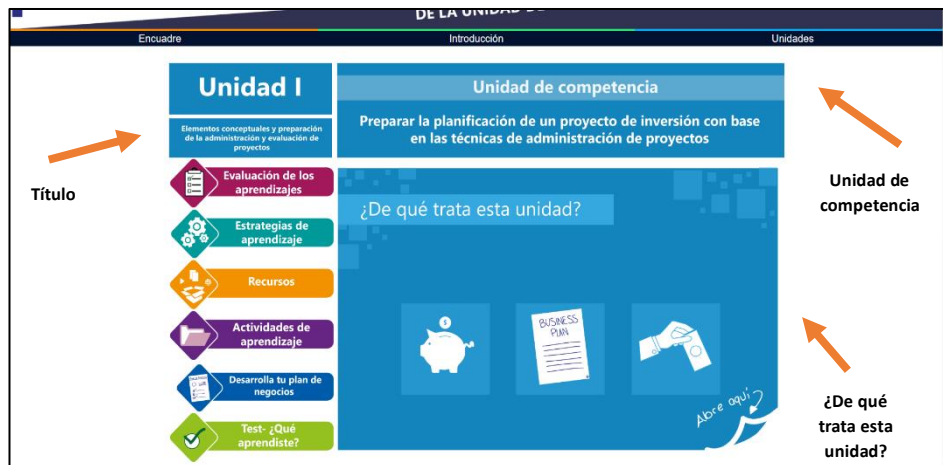
Fuente: Elaboración propia

On the left side of this RDD, the student will find, for each of the thematic units, the following buttons: Learning assessment, Learning strategies, Resources, Learning activities, Develop your business plan, Test What did you learn? (figure 6).

Figura 6. Aspectos pedagógicos por unidad temática

Fuente: Elaboración propia

The content of each of the buttons is described below:

- Learning evaluation: this section describes the evaluation mechanisms, and specifies the learning activities that will be developed by thematic unit, as well as the percentage value that each one has to integrate the evaluation. In this same section, the student will be able to check the dates on which the learning activities will be delivered to the teacher for their respective review, evaluation and feedback.

- Learning strategies: This section describes the learning strategies by thematic unit, which are basically approached based on the strategy of project-based learning and the heuristic method, as specified in the synthetic program of the unit of learning.

- Resources: in this section the student, to deepen and reinforce the learning of some subjects, has access to complementary readings, videos and Internet articles, as well as presentations of the course topics in PowerPoint.

- Learning activities: by clicking here, the learning activities that the student will develop in each of the thematic units can be downloaded and downloaded in PDF format. Each activity has a title, objective, work modality (team or individual), instructions, as well as its percentage value in the evaluation. The activities designed focus on the development of skills related to analytical, critical, reflective and practical thinking, among others.

- Develop your business plan: in this section students will be able to view and download the index of the business plan that they will develop as a project throughout the course. This plan is divided into three deliverables, one per evaluation period. The first deliverable is the description of the project and the market study, the second is composed of technical and administrative studies and finally the third deliverable covers the economic-financial study.

- Test What did you learn ?: At the end of each thematic unit, a series of multiple choice and false or true type reagents are included, which will appear randomly each time the student takes the test. Additionally, upon completion, the student will be able to visualize the result obtained in terms of successes and answers that will have to be reviewed, of which, by way of feedback, the correct answer is shown.

- Contents: the RDD fully adheres to the synthetic program of the Project Management learning unit that is taught in the IPOM ESCOM. The texts were written clearly and simply, with a language like the one commonly used when teaching a conventional class (addressing students). Each thematic unit has a brief introduction, development of themes, sub-themes and conclusions, with the latter closing and giving rise to the next unit. In order to add impact to the written word, and as visual support for the development of the contents, adequate images were designed for each of the themes. Finally, in some contents there are some links so that students can access the Internet to expand and complement the information.

Finally, the development of the contents of each of the thematic units of the synthetic Project Management program is deployed (figure 7).

Figura 7. Contenidos temáticos

Fuente: Elaboración propia

Regarding the editorial aspect, the sources consulted (bibliography and Internet references) were included following the guidelines of the American Psychological Association (APA); All textual quotes that were made are clearly identified and grant the corresponding credit; There was total adherence to the policies of inclusion that states that the texts should not include discriminatory ideas or that denote marked ideological, political and religious biases. The text is clearly structured, fluid and has relevant information, well organized and respects the rules of syntax and spelling. In addition, this RDD has free rights for publication and circulation through a Creative Commons license.

Finally, regarding the technical aspect, this RDD has a section where the student can consult the different learning activities to be carried out, as well as the delivery dates. Two emails are provided as a means of communication in order to answer questions or, if the student wishes, to comment on their experience using the RDD. It should be noted that the resource can be accessed very easily and quickly; The interface design is intuitive and self-explanatory, allowing simple and pleasant navigation; the execution of the resource is constant and reliable in not presenting errors of operation; the menu and links enabled to other resources and sources of consultation work properly; It is structured and organized in a way that facilitates movement and it is very fast to locate what you want to consult; Additionally, the resource is compatible with the most common browsers: Internet Explorer, Microsoft Edge, Firefox, Google Chrome, Opera and Safari.

Discussion

As Unesco (2005) and the OECD (2003) emphasizes, as a result of recent pedagogical approaches and the use of ICTs, education has undergone significant changes in the teaching-learning processes, which require new ways of doing , of thinking and learning totally different from those they had some years ago. In this sense, the use of RDD articulates other forms of interaction between students and knowledge (Area, 2015, cited in Cepeda et al., 2017). Likewise, its development and use represent opportunities and challenges for teachers and students.

The RDD of Project Management developed will allow, on the one hand, the student to have at his disposal in advance and at all times the contents of said unit, which can work at his own pace: this is intended to achieve, as affirms Ruíz (2012), promoting his responsibility and his autonomy for the management of his learning. And on the other hand, teachers will have the possibility to rethink the dynamics within the classroom because they can combine the use of RDD, taking advantage of its great pedagogical potential (OECD, 2003), with different teaching strategies and thus creating innovative learning environments . That is, the use of the RDD will allow the change of roles of teachers and students because the teacher will not be focused on the traditional discursive class, but on being a facilitator and guide, and the student should not be considered a receiver of information, but an individual who will be mobilizing his knowledge and building his own learning.

Therefore, it can be pointed out that one of the strengths of this RDD is that it will allow the class to focus on contextualized activities aimed at developing higher-order cognitive skills such as collaborative work, argumentation, deliberation, discussion, creativity in the problem solving favoring meaningful learning (Caballero et al., 2011), which will give students the opportunity to become the center of the teaching-learning processes.

Regarding the limitations, the fact that the design is based on the technical-pedagogical aspects for the development and evaluation of digital teaching resources of the UPEV of the IPN is highlighted, and probably does not meet the criteria established by other educational institutions of Upper level. However, this resource can be consulted and used as support by students or professors who have an interest in issues related to investment projects.

Conclusions

The design and development of this RDD required effort and months of work of the multidisciplinary team that collaborated for this purpose. The construction of this type of materials is not an easy task, especially due to the lack of resources and sufficient computer knowledge by teachers, who may be experts in the learning units they impart, however, may lack digital skills aimed at the creation of teaching materials, so it is very important that educational institutions provide support in graphic and web design, among others, for the successful development of RDDs.

Additionally, for the development of digital resources, teachers are also required to develop other competencies related to feedback, collaborative work, selection and discrimination oriented to the relevance of the contents presented, the design of contextualized learning activities mediated by ICT , as well as the design of a learning evaluation system to guide and influence student learning.

RDDs are effective tools that positively impact the teaching-learning processes, taking into account that they serve as didactic support without intending to replace the teacher; that is to say, beyond the fact that students have access to the contents, what is really intended to be achieved is that they reflect on their processes and progress or stops learning with the help of the teacher.

Finally, it is considered that it is essential to carry out more research, to increase the critical mass, on the development of other types of digital teaching resources that respond to new educational demands with quality standards.

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