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Motivational and psycho-pedagogical elements in digital educational materials for self-learning in the virtual modality

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ABSTRACT

The study focuses on the motivational and psycho-pedagogical elements of digital educational materials for self-learning in virtual mode, the research was conducted in the Department of Educational Technology of UNAN-Managua (DTE UNAN-Managua), taking as a scenario undergraduate and graduate courses. In order to carry out the research, a theoretical framework was constructed where aspects such as: teaching and learning theories, teaching and learning strategies in virtual environments, self-regulation, motivation and virtual platforms, designs of digital educational resources, culminating with the ARCS model (Attention, Relevance, Confidence and Satisfaction) were addressed. The methodological design has a qualitative approach of phenomenological type, since it was necessary to analyze the opinion of the key informants, because of this, instruments were used as interviews to directors, open questionnaires to teachers and students and the direct observation of virtual courses, specifically in the digital educational materials. From the process of analysis and discussion of results, it was obtained that teachers are specialists in the different disciplines, but there is no

distinction between the role of teacher and virtual tutor. Regarding digital educational materials, it was identified that the design does not include some motivational and psych pedagogical aspects, since teachers are not clear about these aspects. It was evidenced that there are some strengths that should be maintained in practice, and a proposal was made for actions for the weaknesses found, based on the ARCS model. The study ends with the presentation of new lines of research, which strengthen the work carried out.

INTRODUCTION

Distance learning arose from social needs, the difficulty in terms of access to education from the geographical point of view, among others, however, with the technological advance and the mass use of the Internet, it gave rise to distance education in line. It is worth mentioning that online education has developed largely in European countries, however, in Latin America it has been taking place gradually, since there is a very traditional culture in education.

There are some aspects that have been obstacles for Latin America, for example: teacher's role, methodological design for the creation of digital educational materials, virtual learning environments, motivational and psycho-pedagogical aspects that promote autonomous learning and that promote the development of skills for self-learning.

Precisely, the National Autonomous University of Nicaragua, Managua (UNAN-Managua) specifically the Department of Educational Technology has worked in the area of online education since 2005. However, until 2015 it began to work formally when the modality of online education was integrated to the Statutes and University Policy.

The above, led to the creation of educational policies for this modality, however, the teaching staff has been trained in different specialties such as: virtual tutoring, creation of learning environments, among others. It is at this point that the research takes validity since, the motivational and psycho-pedagogical aspects to promote self-learning in students in the online mode, have not been studied in depth and must be analyzed, with the aim of presenting appropriate strategies for its implementation.

Keeping in mind that in the online education modality the students manage their time, this allows to regulate their learning and develop their spaces for study, but how to motivate the student to self-learning? To what extent do digital educational materials have the psycho-pedagogical motivational elements for self-learning?

On the other hand, the research is qualitative, under a phenomenological approach. The general objective of the research is to assess the motivational and psycho-pedagogical elements for self-learning present in the digital educational materials from the ARCS model, in the virtual education modality courses, in the Educational Computer Science career and the Master in

Virtual Teaching Environments Learning from the Department of Educational Technology from the Faculty of Education and Languages, in order to achieve this general objective it is necessary, first to characterize the material resources, as well as the professional profile of the personnel that are available for the development of digital educational materials, then describe the use of the digital educational materials in the virtual modality courses also, identify the motivational and psycho-pedagogical elements present in the digital educational materials and finally analyze the theoretical arguments behind the use of the ARCS model (Attention, Relevance, Confidence and Satisfaction) in Digital educational materials.

Historical evolution

According to different authors, the history of educational or didactic materials dates back to 1658 in the 17th century, with the publication of the work "Orbis Sensualium Pictus" by J. A. Comenio, which consisted of showing the world in images. It is considered the first text that includes didactic aspects, because it combines texts and images for the transmission of knowledge. In the mid-nineteenth century, after the Education System of Europe was institutionalized, printed educational materials were an important axis in the formation and development of the teaching-learning process. However, in the twentieth century, the inclusion of technology in the academic field, opens the way to the digitalization of educational content, which have been the subject of research throughout its history and evaluation.

Digital resources

A study conducted by Gértrudix M, Álvarez, Galisteo del Valle, Gálvez de la Cuesta, and Gértrudix F. (2007) which aims to analyze strategies focused on reuse, portability, interoperability and open educational software are, for example, characteristics with which the educational materials used must comply.

Teaching strategies

According to Díaz and Hernández (2002), the objective of the pre-instructional strategy is to make it clear to the student what they will learn and how they will do it, such is the case with the learning objectives. With the coinstructional strategies which are used in the development of the class, motivation has a very important role here, because it is necessary to keep the student's attention. Finally, post-instructional strategies consist in the student being able to reflect on their learning. Which means that teaching strategies are not linear processes and it cannot be assumed that each stage has an alpha and an omega. In this sense, Anijovich and Mora (2009) affirms that *"to accompany the learning process, it is necessary, from teaching, to create a constant cycle of reflection-action-revision or modification about the use of teaching strategies"* (p. 5).

Learning strategies and resources

Learning involves the use of strategies and resources, which are more focused on the student, that is, we cannot talk about teaching, not including metacognition, which is the modification of previous mental schemas and the relationship of knowledge with new ones, or add new knowledge, similar to the development of psychomotor skills for activities of daily living. Talking about learning leads to infer, in factors such as the strategies and resources that students use to acquire these new knowledge and become meaningful learning.

> *"The key to meaningful learning lies in relating the new material to the ideas already existing in the cognitive structure of the student. Therefore, the effectiveness of such learning is a function of its significant character, and not in the memorial techniques"* (Pimienta, 2012, P.3).

Connectivism

Less than fifteen years ago there was talk of three learning theories that although they are true they are effective and valid for their contributions to the evolution in education, it is also true that they arose when technology was not an incident factor in the teaching and learning processes. And the aforementioned is supported by Siemens (2004) when it states that:

"[..] *behaviorism, cognitivism and constructivism are the three great learning theories often used in the creation of instructional environments. These theories, however, were developed at a time when learning had not been impacted by technology"* (p. 1). Connectivism can be considered as an emerging theory, which focuses on the integration of ICT in the teaching-learning process.

According to this paradigm, the world is not a collection of particular forms, but a complex network of interrelated information (Pastor and León, 2007). In addition, Connectivism argues that learning is not within a single entity, call it a learner subject, but rather, it is in binary format traveling at high speeds in a data network. This data is stored temporarily and can be accessed depending on what is needed, in turn the new information is shared on this network and in this way a cycle is generated.

Self-regulation of learning

Self-regulation of learning, seen as the strategies used by students to acquire knowledge, "learn to learn", a phrase well known and used in the educational field, but which has been gaining great relevance in recent times and this is supported by Zimmerman (2000) when he argues that the self-regulation of learning, allows the student to be an agent that controls the processes to reach a goal, also self-monitors and self-evaluates the progress of their learning. For his part Shunk (2012) mentions that self-regulation can take different forms, such is the case of self-regulation seen as the ability to be focused on a goal to be achieved or as the processes and strategies that can be used to define what they want to learn.

Self-regulation of learning is closely related to motivation, González and Tourón (1992) mention *"the use that students make of various self-regulated learning strategies are intimately connected with their motivational characteristics, [...]"* (p. 386). So motivation becomes a variable that influences the quality of self-regulated learning.

Motivation

Different authors have presented their views regarding the definition of motivation. González and Tourón (1992) define it as,

> *"The process that explains the beginning. The direction, intensity and perseverance of the behavior towards the achievement of a goal is, to a large extent, mediated by the perceptions that the subjects have of themselves and the tasks they face"* (p. 285).

On the other hand, the goals and strategies are motivating elements for the student to carry out a task with greater commitment and a high degree of responsibility, which generates self-efficacy in the face of a task that demands greater challenge (Montalvo and Torres, 2004). Likewise, Lamas (2008) postulates that motivation is the belief of control over learning, affirms that when a student considers that the results of their learning processes are dependent on their effort.

Online education

Anderson and Dron (2011) ensure that distance education seen as technological evolution contains three generations that relate to each other, the first is given by correspondence, the use of postal mail, the second generation, the use of mass access means , such is the case of, radio, television and the third generation focused on the development of interactive technologies, audio, text, video through the Internet.

In summary, online education although it has a great boom and that the implementation of this modality has been increasing, and this due to the advancement of technology and dizzying changes in society, also has some weaknesses that must be overcome , and that are objects of research for a better implementation of it. However, many of the disadvantages are not of the modality itself but rather of external agents that are focused on the interpersonal and attitudinal part where online education has very little or almost no impact.

Virtual learning environment

According to Rodolfo (2001), the virtual classroom is in itself an environment for the development of learning, in other words, applications, communication systems converge within the virtual classroom, integrating multimedia as a motivating and interactive medium and the attractive resources of synchronous and asynchronous communication.

Therefore, virtual learning environments are a complex scheme that needs the essential integrity of science and technology such as pedagogues, Web designers, graphic designers, content experts, among others, all working in a coordinated way for creation of learning environments in the search for, as Rodolfo (2001) rightly states *"[…] design new teaching strategies and methodologies specifically oriented towards virtual classrooms and new emerging technologies […]"* (p. 136), thus creating virtual learning environments.

Platforms

Virtual learning platforms can be classified around their purpose, for Belloch (2010, p.1) catalogs them as follows:

- Content distribution portals.
- Group work or collaboration environment.
- Content Management Systems (CMS).
- Knowledge Management System (LMS) also called VLE or Virtual Learning Environments.
- Content management systems for knowledge or learning.

Finally, a virtual platform, regardless of the type of software, must allow the integration of basic elements such as access to teaching resources, learning activities and communication modules for consultations, feedback, etc.

ARCS model

This model was created by Keller (1987) and states that *"The model is a method to improve the motivational aspect of digital educational materials"* (p. 2). As a result, the model has a close relationship with the design of digital educational materials, to encourage learning in each of the categories that comprise it (Galicia-Alarcón and Edel-Navarro, 2014). The ARCS model is made up of four categories which are Attention, Relevance, Confidence and Satisfaction, these components focus on motivation to encourage student learning. The central idea is to keep the student motivated from the very beginning of the course. Attention, is the category or conditioning requirement, in other words, learning can not occur if attention is not first. The relevance is another category, at this point the student must be able to know clearly the applicability and usefulness of what he or she learns. Another category is trust, it is related to success and perseverance, the sum of these two factors leads to the achievement of a goal. Finally, satisfaction, in agreement, is focused on the use of strategies that help the student feel good about the results obtained in equity with the work done.

METHOD

One of the central axes of the research is to identify those psychopedagogical elements that encourage self-learning in online education students, which implies that descriptive research should be done, in this sense Sabino (1992) and Tamayo (1999) agree on that the descriptive scientific research consists in describing elements and characteristics that can then be taken as guidelines to compare with phenomena that may be related. As for the delimitation of time and space. In this particular, UNAN-Managua has virtual platforms for each of its faculties and among them is the Faculty of Education and Languages, specifically the courses offered in the undergraduate and postgraduate area of the programs which are of interest for this research, Master's degree offered in the Department of Educational Technology. As regards time, it will be carried out with the master's courses that began in 2015 and end in the second half of 2017 and in undergraduate with the first year of the career that began in the first half of 2017. In short it is a descriptive scientific investigation of a non-experimental cross-section, focused on the phenomenological paradigm, as noted by Husserl (1978) who points out that the phenomena-objects under study are intuitive knowledge, that is, they are perceived equally or with scattered assessments that have universal validity in social settings. The analysis consists on the interpretation of the information obtained based on the previously proposed objectives, the process of inferring the information obtained in a pure way, (Puig, Alcaraz and Lafon, 2004).

RESULTS

First, a matrix of the categorical system was made, which includes categories, subcategories, coding and a correspondence between items resulting in the following categories of analysis:

- Professional profile
- Material resources
- Use of digital educational materials
- Motivational and psycho-pedagogical elements

Main findings of the discussion

From the analysis and discussion of the results the main findings are presented:

- Teachers have an academic level of masters, specialties or doctorates.
- Their specialties are focused on the subjects they teach.
- There are few specialists in online education.
- They have received training in the management of the virtual platform.

- They have not received training in the management of programs for graphic design.
- There is an area of graphic design and layout within the Department of Educational Technology.
- The design area supports teachers in the development of digital educational materials.
- Teachers develop their own digital educational materials.
- They have more than ten years of experience in the use of teaching platforms.
- The resources they use the most are; Word, PDF, videos, presentations and Web 2.0 tools.
- They do not have a single structure to develop digital educational materials.
- Focus on the aesthetics of the material, as a motivational aspect.
- To generate learning, they include questions, use questionnaires.
- The content of the materials focuses on procedures or techniques to solve some activities.
- Reflection and criticism are not encouraged.
- The concept of interactivity focuses on navigation within the document, does not allow the student to control their learning.
- Digital educational materials are well structured, but it is not clear how it can serve in their real life, in their work environment.
- Digital educational materials can be reused in other courses, but not used for other disciplines.
- The evaluation of digital educational materials is done by the teachers themselves.
- The virtual tutor's ability focuses on monitoring, evaluation and feedback.
- Insulation problems and lack of motivation are not detected in time.
- Students do not read documents completely.
- Teachers encourage self-learning, using forums and questionnaires.
- Students prefer a video for self-learning.

CONCLUSIONS

The conclusions are classified using the specific objectives as a frame of reference.

To characterize the material resources, as well as the professional profile of the personnel available for the development of digital educational materials.

1. There is no distinction in professional profiles in terms of a teacher and a virtual tutor, in the UNAN-Managua DTE they see it interchangeably.
2. Teachers are experts in the subjects or disciplines they teach, however, they have no virtual tutoring training.
3. The virtual tutor performs the teaching role in the context of the UNAN-Managua DTE, however, they are not prepared to promote: self-learning, self-management and personal planning of time and activities to achieve the expected learning.
4. The educational materials analyzed present a series of common characteristics, such as:
    a. Different formal structure for the design of digital educational materials.
    b. Varied use of tools for the creation and design of digital educational materials without any policy or regulation.

To describe the use of digital educational materials in virtual modality courses.

1. The materials are not designed in order to be reused in multiple subjects that contribute to the consolidation of the necessary knowledge to guarantee the development of professional skills.
2. There are no requirements for the creation of digital educational materials and the procedures for their validation are unknown.
3. There are no methodologies for measuring, evaluating and satisfying the effectiveness and quality of digital educational materials.
4. Among the resources most used as a strategy to generate learning are the reading documents to solve questionnaires.
5. The DTE UNAN-Managua considers reusability as the virtual recycling of information, to be used in courses that have similar or similar content and objectives.

To identify the motivational and psycho-pedagogical elements present in the digital educational materials.

1. The content of digital educational materials is organized from the simplest to the most complex.
2. Several alternative solutions for an activity are not provided and this is because digital educational materials contain certain steps and procedures.
3. To promote self-learning, they use videos within the virtual courses of the DTE UNAN-Managua.
4. Students have developed skills in fractional reading. They are able to classify and extract specific information to solve specific activities.
5. Students prefer the use of audiovisual resources as it facilitates the semantic relationship between an image and the inferential learning of it.

To conclude and based on the theoretical arguments of the ARCS model (Attention, Relevance, Confidence and Satisfaction) in digital educational materials, we establish a horizontal comparison between the motivational elements that are included in the digital educational materials currently, and those that should be part of these according to the ARCS model, the actions that should be carried out are also detailed.

(See table on next page)

Category / Dimension	What is available?	What it should be?	Actions
Approach	Reading documents are focused on manuals, techniques or procedures.	Reflective and critical	Expose a contradictory fact. Present contradictory examples to a concept. Expose two statements that seem true, but only one of them it is.
	Most examples are not real things	Concretion	Provide real examples.
	Documents are written using formal, technical and professional language.	Humor	Use of analog humor to explain something.
	Documents with steps and solutions.	Inquire	Activities that encourage curiosity and the need to investigate.
	Most of the activities are solved individually	Participation	Assign roles and responsibilities.
Relevance	The proposed activities present what they must solve and what resources they need for this.	Experience	To set up clearly what skills they will develop when solving an activity.
	The activities indicate what resource they need to solve an activity.	Current utility	Explain how what they learn in the moment is useful.
	There is no section in the documents where usefulness in labor or personal world it is explained.	Future utility	Explain how what you learn will help them in the future.
	Guides, manuals, techniques or procedures are presented.	To opt	Give more alternatives to solve an activity.

Category / Dimension	What is available?	What it should be?	Actions
Reliability	Tutors use the videos to encourage self-learning	Self-confidence	Promote independent learning and the implementation of new skills.
Satisfaction	They use discussion forums to motivate collaborative work	Natural Consequences	What has been learned must be applied in real life situations. Foster mutual support among students.
	Tutors do not present real life situations. They use discussion forums to motivate collaborative work. The tutors focus on tutoring and evaluation.	Unexpected rewards	Make known that the student's effort was worth it.
	The tutors feedback the activities, likewise solve doubts using consultation forums	Attibutions	Communicate to the students their successes and mistakes.
	The tutors provide feedback once the activities are finished.	Positivos results	Guide the student and let them know how progress is going in the resolution of an activity.
	The tutors provide at least one week to solve an activity, there is flexibility in the delivery of the activities.	Promote self-management of time.	For the student to be able to manage their own time it is necessary: To Provide adequate time to solve a task. The time to resolve the activities must be according to the given time.

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