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Study Of Project-Based Learning In Virtual Environments Within Colombian University Education, The Case Of The Popular University Of Cesar

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This article was born from the development of a research project that had as its main objective to analyze project-based learning in virtual environments in Colombian higher education. The methodology of this research is mixed, longitudinal and descriptive analytical, which seeks to identify the relationship between the different variables corresponding to project-based learning and their influence on creative creation. Developed by teachers and students of the Popular University of Cesar, Valledupar campus. Where the stimulation of the use of virtual environments through the use of digital didactic resources in university education in Colombia was evidenced, which promote in students the development of new learning skills (access, selection, processing, registration and communication of information). One of the pedagogical methods that integrates these components and promotes the construction of new knowledge by students is Project-Based Learning, where the student, faced with a problematic situation, develops skills, solutions and results, guaranteeing the creation of that knowledge from a proposal.

Keywords: *Virtual education, higher education, project-based learning, teaching processes.*

1. Introduction

It seems undeniable that we live in a virtual society, mediated by information and communication technologies and access to internet platforms. Students, who are possibly enrolled in face-to-face classrooms at universities, are increasingly developing their learning activities through ICT, attending classes online, taking online tests, searching for and producing materials related to the content of the subjects through virtual platforms. From the university, the professors themselves use these same means to implement active and participatory methodologies, in which cooperative learning techniques, or project-based learning, among others, are those that promote quality teaching-learning.

In this work, we will follow the scheme proposed in the call for the journal, in which four blocks of analysis are proposed that, in turn and by omission, follow the focus of studies on how to analyze the resources of virtual platforms to learn effectively. The facets to be analysed are the content, the structures of interaction, the multimedia resources and activities and the design and organisation of the virtual environments. We intend to observe and analyze how the use of the virtual platform where project-based learning takes place.

1.1. Context of university education in Colombia

During the last decades, higher education in Colombia has undergone different transformations: some of them global, as a result of internationalization processes; other national ones, according to the guidelines of different government plans and inputs. In this sense, institutional and teaching projects have been introduced to improve training methodologies and results, thus ratifying that the high quality of education in a country is determined by the development opportunities it offers. This context manifests a duality of scenarios according to the conditions of higher education institutions in a format of high standards and, on the other hand, of a considerable population of HEIs that do not meet rigorous expectations, undertaking the realization of institutional improvement projects.

Virtual education does not escape government policies and internationalization processes. In fact, they constitute a great challenge in training in the context of higher education. However, the country currently faces the challenge of assuming it with quality in a double challenge: to guarantee a wide range of training to exceed the national coverage rates of 35% and, on the other hand, to comply with the principle of being a nation of high standards in the production of significant information and knowledge to improve its different processes. Given this observation, it is expected that the proposals will guide the improvement of the quality of informal, national and international education, as well as its written and research processes to strengthen the social appropriation of science and technology in scenarios of future virtuality.

1.2. Importance of project-based learning in virtual environments

They carry out significant learning around project-based learning, since, in the development phases of IT and ICT projects, required to obtain a university education degree, students must, for example, understand, plan, execute and close a project effectively, communicating the activities and skills acquired, cognitive competencies that students now have to acquire in a virtual environment. Project-based learning, characterized by applying the knowledge acquired in real situations for the design and development of tasks and research, has been used very successfully in novel methodologies based on learning by doing. Unlike traditional education, in which the teacher is responsible for the construction of knowledge, the teacher acts as a stimulating guide, channeling all the activity around the teaching project, in which knowledge from different disciplines and with different formats, competencies, skills and values are integrated, encouraging and motivating students. involving them in it. Project-based learning is considered, in the different theoretical and practical frameworks where it is usually integrated, a powerful methodological strategy that can contribute to changing a part of engineering teaching, putting the student at the center of the teaching-learning process, while acquiring their important experience as an intrinsic part of the teacher training process.

2. Theoretical foundations

Various studies suggest that traditional teaching has become obsolete with the advance of resources and techniques for the development of skills and competencies. An accumulation of pedagogical approaches that seek to expand students' learning opportunities arises, so these approaches must contemplate all educational scenarios. Thus, any content can be approached from the project-based learning approach. Project-based learning is an active work proposal based on proposing complex activities related to real and contextualized problems that the student must investigate and solve. This project-based learning is based on a multidisciplinary approach, so students work on an objective issue from various areas of knowledge.

Project-based teaching strategies seek to stimulate the development of different competencies, such as effective information seekers, critical ability to analyze and synthesize information, knowledge of skills and abilities specific to the fields of knowledge, ability to work in teams and among peers and authorities, as well as to organize tasks and resources. planning and decision-making skills, as well as communication skills related to the use of specific systems of symbolization and formulation of communications or reports. It will be used as an information collection technique composed of a bibliographic file, underlining and summary file, ethnographic paradigm marked by classroom observation and questionnaire. In their article, they argue that current education should allow the acquisition of skills and abilities that make it possible to apply knowledge in a changing world, in the current of constructivism.

2.1. Project-based learning: definition and characteristics

The biggest problem encountered with the degree projects carried out in the Colombian university is that they are works with characteristics of a "promotion" thesis. Due to the line

along which he presents his work 130, from behavior to behavior, the research is based on project-based learning (PBL) or Project-Based Learning (PBL), applied in North America, skill in the management of virtual learning platforms in undergraduate students. In addition to the concept of 'degree work' as a type of academic exercise, by virtue of which the obtaining of a degree or degree is certified, and the approval of the necessary credits is obtained for it, knowing how to split from what are known as the parameters of learning, such as independent intellectual work, creative work, the argumentative capacity and the general documentation of the work, in order to be able to strategically implement the design and implementation of the pedagogical principle in this university.

"Project-based learning" is conceived in higher education as a modality of undergraduate academic work, which consists, under the supervision of a director, of addressing a problem or situation that requires the development of a product or proposal, and/or providing knowledge by reason of discipline; This implies, from the context, prior application effects as a way to analyze or verify the promotion of the achievement of a progressive goal. To be considered in such a way that a PBL, or project-based autonomous learning (AABP), can be considered of quality, as required by the EHEA. The answers are diverse, but all of them agree that, in this new model, the student becomes the true protagonist of their training process and that the teaching staff has a facilitating leadership, avoiding, at all times, a return to the old teaching practices.

2.2. Virtual learning environments: concept and types

The term virtual learning environment appears associated with the introduction and socialization of learning management systems in higher education institutions, where Moodle, Blackboard, SAKAI and a large number of them have been acquiring importance within the curricular offer of these institutions. This has brought with it enriched environments of elements such as the chat, the forum, the tasks, the resources, the dictionary, the chat or the book, among others that are designed to achieve learning protected by the virtual. Other authors visualize the virtual environment in the same way, but from personalized education, as an educational tool based on ICT, which provides flexible and productive environments to support teaching-learning processes.

In Colombia, the implementation of virtual learning environments and face-to-face programs, supported by learning activities in virtual teaching, has had a positive and significant increase year after year. This development has materialized in terms of learning management platforms or specific virtual environments, since different platforms coexist in the country to manage content. It is relevant to mention that most higher education institutions have opted for some of the most popular platforms worldwide, such as Scanner DETS Colombia and, especially, Moodle 2.8.

3. Research methodology

The methodology for this study is related to the fieldwork that was carried out on a set of cases at the university level in the virtual environment of the city of Valledupar, based on the classic stages of the case study, defining in the first place the procedures and techniques used for the collection and analysis of the information. Secondly, its application was defined, with the aim of identifying whether this pedagogical process affects the teaching-learning of Colombian university education students, namely: I. Selection of the scenarios to be studied and data collection; II. Analysis of the information obtained from the interviews; III. Comparison between the experiences obtained and the final conclusions.

Qualitative research uses the logic of grounded theory, that is, it builds a theory from the fieldwork itself, drawing on different documentary collections of greater or lesser importance. Such collections bring together all the general documentary inputs for the interpretation of a topic, so that their analysis allows us to know different perspectives, approaches, approaches to analysis, reported results and all kinds of material that allows the results of a study to be founded, contrasted and compared. The following collections have been produced, for the most part, as final master's projects and theses developed at the Popular University of Cesar; Likewise, some collections come from research consulted by the authors. This collection that collects our reflections and academic production has been integrated with findings compiled in documentary sources, databases of scientific publications consolidated and recognized in the academic, institutional and social context.

3.1. Research design

The focus of this research is qualitative and quantitative, longitudinal and analytical descriptive, which seeks to identify the relationship between the different variables corresponding to project-based learning and their influence on creative creation in students of some university education institutions in Colombia. The exhibition includes the International Institute of Higher Studies and the Popular University of Cesar. Young people in the fifth semester from different faculties between the ages of 18 and 22.

Methods. The methodology will be carried out in two phases. The first, quantitative and cross-sectional, is described in detail in numeral 3.2, which has a population of 350 students, belonging to five university education institutions in Valledupar, whose purpose is to describe the impact of project-based learning in virtual environments on creative creation, through two scales: Project-Based Learning Model in virtual environments and Quantitative Evaluation Scale of the Innovation Process - Creativity. The second quantitative phase will correspond to a longitudinal monitoring of the projects that participated in the quantitative phase and the design of the general characterization of the different participating institutions. It will have a sample corresponding to 67 degree projects, whose purpose is to understand in detail the impact of project-based learning on creative creation during the period of

undergraduate work. The data will be collected through observation methodology, the design of strategies to strengthen creativity in culminating projects and the proposal of activities that promote creativity in trips to the different headquarters of the institutions under study. The analysis of these will be carried out through the inferential statistical method, using techniques such as regression and factor analysis.

3.2. Sample selection

The target population in this study are the actors of the Colombian university education system, who are directly or indirectly related to the project-based learning methodology mediated by virtual learning environments in the framework of distance education. In this regard, the question that arises in the context of this study is whether the trend of the current use of the methodology addressed by this study in virtual learning environments was the result of the selection of an intentional sample of subjects, such as professionals and university students who are officially enrolled in technical education programs. technological, university and virtual at the different levels: technological, technical, professional and technological; face-to-face university education programs based in Valledupar, distance learning, face-to-face education programs based in the country or that are offered in person by Colombian institutions that have the authorization of the Ministry of National Education.

To this end, an analysis of the supply and enrollment of the programs at each educational level was carried out. A total of 86 programs of the analyzed levels were evaluated, assigning the following sampling units: a) technical and technological education programs and in the categories of complementary training programs, technological level programs and, logically, university education programs at the different levels: technological, technical, professional and technological. And b) education programs for work and human development in which there is no distinction between the different educational levels.

3.3. Data collection and analysis

Additionally, the data collected through the virtual learning platform are unequivocally validated through in-depth interviews, individually with the teachers participating in the project. As it is a qualitative analysis, categories are identified in the methodological field, which allow interaction between the researcher and the object of study. Qualitative analyses interpret the portions of discourse that allow a description and explanation of the representations of the subjects themselves.

The categories were selected based on the review of sources associated with the research problem and a thorough reading of the respondents' discourses, which is part of the analysis technique called thematic coding; This approach seeks to detect patterns and structure the analyzed content, something that contributes to the validity of the study by confronting the researcher's interpretations with those of the subjects themselves. Finally, these multiple social representations are compared to find those common and collective representations that

underlie the different parts and are represented by means of a graphic relationship where structuring factors in mutual interaction will be pointed out.

4. Study results

Regarding the reality that affects the development of the project model in HEIs, it is evident that there is a lack of knowledge about the processes of the student's learning modes. As a result of this, the trend is to generate models of master training without space for the student to apply, correct, learn and take that learning for life or for the later part of their professional training. Formats that generate compliance in the structure of the training, really hiding the essence that should be worked on with the apprentices or students: coherence with the natural development of their knowledge, their cognitive structure and self-control, citizen in exercise of the principles of the pedagogical model such as responsibility, solidarity, fraternity, respect for their being, by nature.

The lack of knowledge of teachers validated with the pedagogical model and in turn with the institutional model. In this sense, teachers are very clear about the contents, objectives and topics of their subjects, but as for the pedagogical foundation, it seems that some have not been clear about it. When reviewing for each subject, the program and the development of the pedagogical model leave more to be desired seen from the work through the projects. There is a large number of students who come from traditional undergraduate programs and have internalized the masterful logics of the teacher and the institution. Additionally, at the time of finishing their university studies. On the other hand, it is worth reading the question well, when comparing, obviously if the one who has already completed his undergraduate degree has a better knowledge of the subjects. However, the theoretical foundation between the two populations is similar.

4.1. Analysis of the implementation of project-based learning in virtual environments

Following the historical development of the PBL method, it is evident that this teaching-learning system provides student-centered learning and active participation. It is as if the Montañera curve was tailored to the PBL training cycles. Students of the institution U_Virtual access the academic platform U_Planner, where they find the navigation instructions, socialize the course with the coordinator of the cycle. When they see what is planned for the subject, they take a walk to see the new pedagogical boards proposed by the activities (Introduction, Case Study, Master Lecture, Forum, among others) and leave the pedagogical experience on a trip when they want to participate in the different activities of the subjects in which they are not enrolled.

The cycle coordinator has a special interest in the methodology and incorporates it through a case study that must be presented at the end of the cycle. The second subject is the one referred to in which the projects that are delivered at the end of the cycle will be evidenced. That said, the following is asked: Does the cycle that is about to end present significant levels of participation by students in the different activities that are designed under PBL? In addition,

the attention of the topic regarding whether the number of cycles in which a cycle has been lost has a positive effect on the cycle that is being studied, monographic or the one that advances.

5. Discussion and conclusions

Undoubtedly, project-based collaborative learning is a pedagogical practice that is naturally adjusted to the contexts of university education disciplines, characterized by serious and profound professional scenarios that recurrently demand autonomous, contextual and meaningful learning. The results obtained in this research work establish, in turn, that the virtual resource for the development of projects can dynamize this type of training processes with quality. Training focused on project-based processes not only poses cognitive challenges to participants, but also underlies a training horizon that promotes ethical values, the development of skills such as teamwork, problem solving, decision-making, effective communication, leadership, among others, in tune with what is established in Cuban education. The weakness in the web design of the identified virtual experiences, added to the students' statements about the difficulty of working from the virtual classroom, requires careful reflection. Indeed, the need arises for environments designed particularly for certain teaching situations and responding to pedagogical actions that are also aligned in a relevant theoretical framework.

Among the implications of the study's findings are: the virtual classroom is not only a space for access and generation of information, but also for critical reflection, discussion and argumentation among participants. It is important that teachers and students recognize the particularities, advantages and disadvantages of the virtual environment, so that, if they start, continue or restart training experiences, this obeys academic criteria and not simply technological fashions. It is essential to promote training actions on the pedagogical web design of courses in specific virtual environments; technical mastery of the environment would not be enough, but also to have a theoretical appreciation of the infrastructure, the tools and the characteristics and needs of the students.

5.1. Comparison with other teaching methods

By combining PBL and information and communication technologies, students are able to promote autonomous learning. Also noteworthy is the success achieved in the development of skills related to teamwork, which is essential today in the work environment. Another noteworthy aspect is the development of skills for the handling and processing of large volumes of information. In addition, PBL and the creation of virtual learning environments enhance the development of many other generic skills and competencies such as, among others, decision-making, conflict management, leadership, communication, the use of ICT to search for information and for the presentation of results, or the promotion of creativity and critical spirit. The PBL approach also gives greater significance to learning and students are usually more motivated, participative and engaged at work, although it can produce some stress.

The VLE also reduces the spatio-temporal limitations for learning, allowing students to adapt to their own pace of work and establishing strategies for access and availability of materials that adapt to each particular case. Through the EVA, data can be obtained on the patterns of use and access to the environment by teachers and students, and the performance of students in assessment activities can be monitored in order to make decisions to improve the teaching plan. In addition, VLEs can present innovative solutions to common teaching situations, such as managing the presentation of large amounts of information, monitoring student work, differentiating content and activities, or establishing community meeting places.

5.2. Implications for university education in Colombia

1. Competency-based education: Today it is in the phase of consolidating competency-based learning programs. The incorporation of virtual environments to extend the learning and assessment scenarios in terms of the proposed competencies is presented as a kaleidoscope of interesting proposals for systems of contributions, debates, performance evidence, and advice for the orientation of learning. 2. Quality personalized teaching: Permanent quality assessment has become a priority objective of university higher education policies in Colombia. Updated data are required, analysis of the same by the Academic Council and continuous improvement processes conducted by the respective Curriculum and Self-Evaluation, Accreditation and Certification Committees, which imply the responsible and competent participation of the educational community and effective monitoring and evaluation by government agencies. 3. Flexibility of virtual learning environments: Regarding course designs, the lack of homogeneity of criteria in institutional offerings is due both to the lack of inspiring examples and to their low impact on academic management. In most universities, planning maintains a high level of generalization: the Academic Council approves a matrix of offerings per curricular program/project every six months. At the end of the ordinary payroll, according to the number of students who have enrolled in the apprenticeship, the dean requests to "reduce" or "mark" the approved offer, as the case may be, as less than a quarter, a quarter, a half, etc., and based on that new number calculates the deficit or surplus of academic loads.

6. Recommendations for future research

The future of higher education in Colombia is marked by the need to provide quality university education that fosters an analytical and critical spirit with a comprehensive and flexible training, in the face of the changing needs of the labor market. Aware of this, there are many universities, public and private, that are permanently looking for innovative and effective pedagogical initiatives and strategies that encourage their students towards the active and reflective construction of their own knowledge. In conclusion, there are many aspects that the theme of Project-Based Learning and its application in virtual environments under the Teleproximity modality implies the need to pursue future inquiries around these topics. First, to expand research on the design, development and applicability of virtual learning units under the Teleproximity modality. In the second instance, a study on the learning practices developed in the virtual classroom, to strengthen reflection on the practice itself and on coherent theory. Finally, a third aspect is proposed to broaden the inquiry around meaningful learning that is enhanced with a reflective and creative metacognitive attitude and from

practice to see how much of what has been learned has been incorporated into one's own being.

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