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Project-based learning: a pedagogical adaptation for socio-organizational innovation and development

Aprendizaje basado en proyectos: una adaptación pedagógica para la innovación y el desarrollo socio-organizacional

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ABSTRACT

This text reviews the theoretical and contextual background that influenced the inclusion of a sequential proposal in subject 04056 of the Bachelor's Degree in Management Sciences at UNED-Costa Rica as a simulator mechanism of an indispensable reality to be approached investigatively by the students. The aim is to develop epistemological skills following the Pedagogical Model established by this educational institution. In this way, it is clear the existence of a theoretical background that reaffirms the value of Project Based Learning. However, its practicality and impact lie in the fact that it needs to be delineated (technically and instrumentally) from the contour of Management Sciences and not only replicating what has been achieved from other social sciences. This is insofar as the aim is to effectively train researching and innovative people capable of understanding and having a positive impact on the organizational, national, or international environment in which they are inserted.

Keywords: education, teaching and training, educational planning, educational project.

JEL classification: O32; L29

RESUMEN

El presente texto revisa los antecedentes teóricos y contextuales que incidieron en la inclusión de una propuesta secuencial en la asignatura 04056 del Bachillerato en Ciencias de la Administración en la UNED-Costa Rica, como mecanismo simulador de una realidad indispensable de ser abordada investigativamente por el estudiantado. Se propende en este el desarrollo de habilidades epistemológicas acordes con el Modelo Pedagógico establecido por dicha casa de enseñanza. De esta forma, queda clara la existencia de un acervo teórico que reafirma la valía del Aprendizaje Basado en Proyectos, aunque la practicidad e impacto del mismo radica en que sea delineado (técnica e instrumentalmente) desde el contorno de las Ciencias de la Administración y no solo replicando lo logrado desde otras ciencias sociales. Esto, en el tanto se pretenda formar, efectivamente, personas investigadoras e innovadoras, capaces no solo de comprender, sino también de impactar positivamente en el ámbito organizacional, nacional o internacional en el que están insertas.

Palabras clave: educación, enseñanza y formación, planificación de la educación, proyecto de educación.

Clasificación JEL: O32; L29

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INTRODUCTION

As of the third quarter of 2014, the subject 04056 Qualitative Research Methods - part of the Bachelor's Degree in Business Administration - was incorporated into the School of Management Sciences of the UNED (ECA/UNED) curriculum of Costa Rica. It is part of a triad to strengthen students' knowledge and theoretical-methodological skills for research in Administrative Sciences. Its original design was in 2013, so in 2020, it was redesigned before the Program for Curricular Support and Assessment of Learning (PCE)[1], aimed at the construction in stages of a four-monthly research project. For this purpose, the summative assessment was maintained and understood as a support for measuring and evaluating learning processes (El-Awaisi et al., 2022; Guo & Yan, 2019; Ismail et al., 2022). In this way, each student would

present a proposal specific to the emphasis followed in the ECA/UNED "in order to generate scientifically sound information that contributes to innovation, continuous improvement, new business development and, in general, to the solution of problems in the corresponding area, whether nationally or internationally." (PACE, 2020, p.3)

The purpose of including this evaluation was to take advantage of the benefits of the Project Based Learning (PBL) methodology. The purpose was to bring students closer to a situation as similar as possible to their current or future work performance. The logic followed pointed to identifying a problematic situation, which would be approached analytically by establishing its feasibility, methodological framework, theoretical framework, and a brief analysis of the results. Thus, Barquero's (2020) precept is fulfilled by pointing to the context and society as sources for a given curricular design approach. In short, through a simulation of the real sector, the program seeks to bring students closer to possible contexts of their professional lives, thus seeking a better preparation for the challenges of the productive sector.

METHODS

The study presented here was conducted under a qualitative epistemology, as its interest was to understand the pedagogical uniqueness of project-based learning in the framework of a specific subject. The inductive approach adopted allowed for a holistic study of the phenomenon in question (Taylor et al., 2016). The main direction was understanding the meanings and implications of collaborative learning under a project-based pedagogical design. For this purpose, two studies were conducted with a sequential approach.

The first was based on analyzing the author's documents (lesson plans, personal notes, e-mail). This type of study presents a vast tradition in qualitative research and allows the discernment of personal narratives as an essential source of knowledge (Taylor et al., 2016).

The second was directed to analyzing specialized and intentionally selected bibliography and official documents and records (subject design, section used in the Moodle platform, enrollments, evaluations). According to Taylor et al. (2016), the main contribution of this type of study lies in presenting approximations of the concerns, constructions, and activities of the subjects involved in a process or phenomenon under study.

RESULTS

Project Based Learning (PBL)

The need to discover new teaching-learning methods has been present in the social relations of transfer since the primitive community (Ikromova, 2020) to potentiate the cognitive and manual skills of the human person, insofar as these allow to understand the environment better or to model it according to their ambitions, requirements, and possibilities. Although from the scientific perspective that is currently defended, human collaboration and learning in these processes have a phylogenetic character, it is in these processes that the notion of PBL emerges. The evolution of PBL can be traced back to the 16th century, as shown in Table 1, although its name is not used today. Even so, it is clear that it has historical roots that demonstrate its durability - and implicitly its importance - despite the time that has elapsed.

For their part, Zorrilla-Pacheco et al. (2022) highlight the merit of PBL as a teaching-learning strategy through which students are the protagonists of their study. This approach allows them to develop a project to apply the knowledge acquired on a particular product or process (Almulla, 2020; Amaral et al., 2021; Barbosa et al., 2022). At the same time, they put into practice the conceptual system provided and can thus solve real problems determined by the context in which they are located (Barquero, 2020). It is precisely this technique that authors such as Guitert et al. (2020), Ávalos et al. (2021), and Senra et al. (2023) qualify as an enabler of skills such as, for example, collaboration for learning, affective communication, logical and creative thinking, metacognition and innovative approach, adaptive-resolution thinking and technological literacy.

Given their transversal essence, the skills above go beyond the old focus on the logical-mathematical and are obtained from a broader concept of intelligence. According to Pereira (2021), it points not only to a process based on skills of understanding and application of knowledge but also conceived as the potential, creative, innovative, and supportive that allows preserving and improving life on the planet, with an ethical sense, not only cognitive. Some essential elements that must be fulfilled by the projects proposed to the student group, according to Rojas (2016, pp. 186-187), are the following:

- Focus on the students, who will be the protagonists, as well as those responsible for planning and directing them.
- Be clearly planned, with a starting point, development and conclusion.
- Correspond to contents related to daily life, so that it is meaningful for the student to solve them.
- Have the definition of objectives, contents, behaviors or skills taken from the official curriculum.
- Establish relationships and interdependencies with academics, daily life and work competencies.
- Include delimitation of time and resources, as well as a specific presentation format.
- The teaching staff should act as mediator and guide during the process.

Table 1.
Historical evolution of the ABP

Country	Period	Application
Italy	Century XVI	Use of projects as a form of teaching in the field of architecture and engineering.
Italy and France	Centurys XVII and XVIII	The competition scheme is adopted for the training of architects and engineers. competition is adopted for the training of architects and engineers.
United States	1870	Stillman H. Robinson of Illinois Industrial Industrial University of Illinois, adopts the didactic technique.
United States	1879	Calvin M. Woodward of the University of Washington founded the first Manual Training School, where at the end of each teaching unit and at the end of the school year, students developed "projects" independently at the end of each teaching unit and at the end of the school year, students developed "projects" independently.
United States	1918	William Heard Kilpatrick of Columbia University publishes an essay entitled. "The Project Method.
United States	Century XIX and XX	John Dewey gives support to PBL with the pragmatist movement and progressive pedagogy progressive pedagogy.
Denmark	1974	Aalborg University adopts PBA as an educational model. Other European universities adopt the model.
Latin America	End of the century XX and beginning of the century XXI.	Two movements serve as a framework for the use of PBL: critical-theoretical education and competency-based education competency-based education.

Source: own elaboration.

It is necessary to highlight a first approach between PBL and developing skills of great transcendence for human beings, which can be exercised in their academic, work, personal, and community environments. This is because, as an individual, he/she is part of a particular socio-geographical section, coexisting with non-governmental or charitable organizations to which he/she could also offer his/her intellectual effort. In that tuning, the concept of PBL applicable in the ECA/UNED environment is conceived as a process that facilitates students to investigate within the framework of theory-praxis integration and, therefore, to employ in the context of their learning the necessary resources to solve a previously identified professional problem (Toledo & Sanchez, 2018).

Allied to the above, Rojas (2016) points out a core point within the PBL scheme that is considered essential to rescue since the development of the 04056 subject is entirely virtual through the exploitation of the Moodle platform. Thus, the author points out that the development of projects within the learning process, if any of the tools provided by the Information and Communication Technologies (ICT) are used, should lead learners towards the achievement of enriching learning experiences. In this sense, those related to experimentation, discovery, and analysis of errors and their subsequent correction stand out to solve the fortuitous situations inherent to the execution of any collaborative work (Awuor et al., 2022).

Regarding this last term, it is worth clarifying its connotation according to the limits included within the

subject 04056. The aim is to construct a research proposal of a broad scope (national or international) while reaching a manageable level of complexity since it involves a certain level of financing and human and technical resources of significant volume. Their timeline could cover the pre-feasibility stages, feasibility, approval, execution, and evaluation. An example of this type is the economic and social development project, whose content includes technical, social impact, financial, and market studies. All this is structured in a detailed schedule of the actions to be carried out and the administrative instance assigned as responsible.

The characteristics above refer to the research's details and financial resource requirements and the programmed disposition of the actions to be achieved in this respect (chronogram). However, as regards the elaboration of the project as part of the teaching-learning process, they point to the definition and approach of what is outlined in subject 04056, as detailed below:

- The research topic.
- The research problem.
- The objectives and research questions.
- The research design.
- Research techniques.
- The (tentative) bibliography to be used.

The modeling of research projects in the Management Sciences

Management Sciences refer to the best disposition of a public or private organization's human, technical, and financial resources, which is part of an economic system. This, in turn, is a consubstantial part of a political system determined to follow a particular economic line. However, the latter system is also part of a more extensive social system in which all the different human groups that make up a nation-state converge. This implies that they share, to a greater or lesser extent, historical, physical, cultural, educational, and commercial features, among others, which are sensitive to the understanding of the past, present, and future of the different social groups.

This improved availability of resources has made it necessary to diversify the approach to be taken according to generally universal principles (Planning, Management, Organization, Control, and Evaluation) to meet organizational goals according to criteria of efficiency and effectiveness. The latter criteria can be extended to public institutions, for example, economy, publicity, probity, security, and transparency. In this way, university faculties generate curricular proposals that support the preparation of students in the administration of institutional or national resources.

To the above, it should be added that socio-commercial relations will always be subject to evolution since human activity of an economic nature aims to take advantage of and transform those given contextual conditions, whether natural, technological, or otherwise. Therefore, the student in Administrative Sciences should possess mutatis mutandis skills to identify such opportunities as an implicit contribution to the evolution of the organization to which he belongs. In order to achieve this mission, it is vital to have academic training focused on such socio-professional problems.

Again, within an adequate strategy of higher education, the student must be prepared to face and solve future situations of an administrative nature. This is based on a theoretical and methodological arsenal in their professional development, indispensable foundations if a later purpose were to continue their university career at the postgraduate level, whether Masters or Doctorate. This view of lifelong education favors a better response to these processes of professional improvement, which stands out for their high demand for knowledge and application of designs, techniques, and instruments for scientific research.

As indicated by Bolaños (2020), incorporating a summative evaluation aimed at building a short-range administrative research project was based on modeling the UNED's pedagogical process. This pursues the favoring of the necessary skills for the critical assessment of reality but still awaits a scientific study based on the epistemic aspects defended in the model:

- The learning subject must be understood in its active and transforming character, who interprets and restructures its reality based on the relationship between its cognitive structures and affective processes.
- The learning subject is self-regulating and shows a tendency towards self-realization.
- The learning subject is a social being, lives in society and tends towards freedom and awareness of his project and meaning of life.

Similarly, the generation of such project also took into account several of the descriptive principles of scientific realism formulated by Bunge (2017), such as the following:

- G13. None or inquiry starts from total ignorance: it is necessary to know something before being able to formulate a problem and investigate it.
- No scientific, technical or humanistic advance emerges from a vacuum: it always originates in some previous body of knowledge.
- G45. Every research discipline is composed of an accepted body of theory, an object or problem of study, a category and methods that are largely its own, and a scientific community.

Thus, the four-monthly research that, according to the PBL proposal, the students of the ECA/UNED should satisfy when taking the 04056 course is structured as shown in table 2.

Table 2.
Synopsis of the research project in the subject 04056

Stage	Topic	Objective
Task 1	Presentation and justification of the research topic.	Present the research topic (according to criteria of social justification, convenience, practical implications, theoretical value, or methodological usefulness). Theoreticalvalueormethodologicalusefulness).
Task 2	Presentation of the Methodological Framework.	Establish the research's objectives, questions, and Methodological Framework (research design, choice of data collection techniques). data collection techniques) of the research.
Task 3	Presentation of the Theoretical Framework.	To present the outline for the Theoretical Framework of your research according to the search of scientific bibliographic sources accessible to any student of UNED. Accessible to all UNED students.
Final Work	Finalization of the research project. the research project.	Finalize the final work of the research according to the structure and instructions provided for that purpose, considering the purification of previous tasks and the inclusion of the analysis of results. The analysis of the results.

Source: Prepared by the authors based on PACE-UNED (2020).

For each of the above sections, the respective evaluation rubrics are available, independent of each other, which stand out for their uniqueness without losing the common thread that unites them. This relationship was designed so that each acts as a link in the same research project theme in a sequential, logical, and inductive sense. This will allow students to recognize strengths to be strengthened quickly and weaknesses to be solved, contributing to developing their professional aspirations and goals (Beier et al., 2019).

Within this teaching-learning scheme, the tutor should go beyond the mere transmission of knowledge, projecting that the students analyze their motivations for their professional training, making their learning more meaningful. This role transcends the superficial, marginal, and limited handling of theoretical and methodological contents and, on the contrary, seeks more complex levels that allow students to be within reach of the demands of today's society (companies, government, non-governmental associations, international organizations, among others), all this through constant teacher/student feedback throughout the teaching period.

At this point, a core concept is taken up again since it is one of the essential skills to enhance and apply transversally in each project stage established for subject 04056: critical thinking. This organizes and regulates the aptitudinal and attitudinal elements involved in the creative planning and responsible execution of a project (Caratozzolo et al., 2022; Chen et al., 2022; Kwangmuang et al., 2021). Other considerations related to informational skills and skills for data collection, analysis, and evaluation in the transportation to new situations and communication of the same effectively and dynamically, from virtual environments to professional performance, should be added to this

meaning (Beneroso & Robinson, 2022). The development of critical and creative thinking favors the formation of a self-corrective and context-sensitive subject oriented to global socioeconomic development, the harmonization of micro and macro skills, and the generator of metacognition (Ismail et al., 2022; Mueller et al., 2020; Senra et al., 2023; Yildiz & Yildiz, 2021).

It is evident then that subject 04056 in itself, as well as the incorporation of an administrative research project, become an integral strategy to reinforce the cognitive skills of students, among which is the exhortation to build a narrative traceability that is worthwhile that justifies itself (Galván & Galván, 2017). This does not occur in isolation, as it becomes an inherent skill in the student person, feasible to be applied throughout his or her academic and work trajectory.

Qualitative Epistemology for a Developing World

The concept of globalization has been introduced previously. Casinader (2014) argues that the term began to be used in the early 1970s at the time of the first global fuel crisis. These facts can be traced back to the Club of Rome during the previous decade, but it was in the 1990s that authors such as Giddens (1999) popularized its use. However, it is now a familiar term to most university-educated people and even less so to those studying Administrative Sciences, given the nature of the discipline. This is due to the understanding, improvement, adaptation, and modernization of social institutions at the national and global levels, influenced by a given social, legal, political, commercial, technological, and financial context, which is the subject of a research approach.

However, an obstacle that generally arises when outlining an administrativist qualitative research is the need for more documentary sources (physical or electronic) dedicated to guiding the interested person in this regard. Most of these sources include designs, techniques, and instruments (quantitative and qualitative) for disciplines such as Sociology, Psychology, Political Science, or Anthropology.

Although several of them have contributed to the identification of ideas for organizational improvement (Bolam & Deal, 2021), the truth is that many of them are inspired by methodological falsificationism and are dedicated to experimentation. In order to find falsehoods or anomalies that show the need to rethink a particular theoretical scheme or research program (Lakatos, 2007), this perspective responds to demarcation criteria that limit the understanding of processes and their categorization as scientific or not since they respond to Popper's epistemological theory (1980), in which singularity is practically banished.

Focusing on such findings is not the fundamental essence of Administrative Sciences, which are dedicated to observing and collecting data that demonstrate from the outset the existence or occurrence of phenomena that affect organizational performance, either internally or externally. These phenomena have a very high level of singularity. This translates into a certain distrust of the scientificity of what would have been qualitatively investigated and, therefore, into a barrier when trying to publish the findings in scientific journals. According to Reuber and Fischer (2022), this is partly due to the difficulty reviewers face evaluating the quality of this type of work, so much so that several authors who opted for qualitative research were compelled to justify having done so.

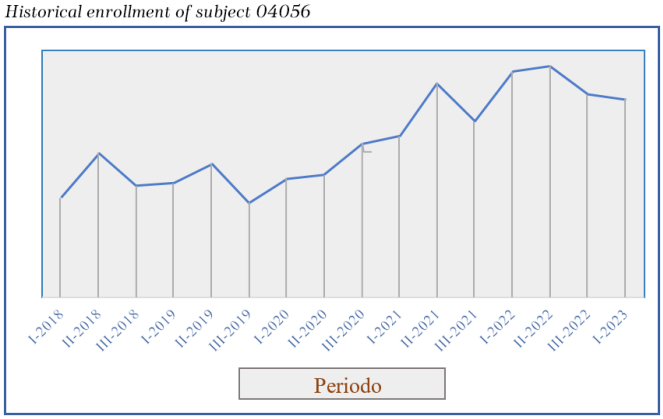
Having said this, it could be assumed that a proper qualitative-administrative epistemology is in doubt. This assumption has been introduced previously. Maslow (1979) criticized "classical" or "orthodox" science for focusing on generalization, the search for similarities, and the study of interchangeable things or objects. Following positivist postulates implicitly implies obviating an underlying reality that is not so feasible to quantify, let alone explain (Johnson & Christensen, 2019). Under this posture, the notion that it is necessary to emphasize the rigor of the research process on supposedly universal laws within the social sciences makes more sense. While the latter tends towards generalization and predictability, it is necessary to clarify how the aspects of reality that have been subjected to examination are configured.

In the same sense, Hayek (1952) pronounced himself concerned about an apparent tyranny on the part of physics and the biological sciences when they pretended to dominate explanatorily everything that surrounded or was of interest to human beings. He even reproached economic statistics for being incapable of understanding human and social phenomena independently. In consideration of the above, we arrive at the fact that the administrative professional, who develops in an increasingly globalized and ever-developing world, must make use of not only quantitative research tools if he seeks to profile himself as an innovative person within the context that surrounds him, his training must be comprehensive.

The teacher's role dedicated to schematizing and operationalizing a curriculum that promotes critical thinking

toward innovation is particularly relevant. This issue is addressed by Soto et al. (2023), who highlight the role of formal education in innovation collectively and collaboratively so that students are trained to be competitive in the context of the 2.0 economy. In this line, it is necessary to consider the level of enrollment that the 04056 subject has presented in previous periods, as shown in figure 1:

Figure 1.
Historical enrollment of subject 04056



Source: Prepared by the authors based on data provided by the Research Chair, ECA/UNED (2023).

Those amounts clarify that per four-month period, the number of students has been at least 150; it can be appreciated the amount of research proposals that from the Administration Sciences have contributed to the economic, social, and commercial development of the country. Each one, according to its range of action and possibilities (resources, access to information, among others), has contributed to a better understanding of the administrative reality faced by public and private organizations, many of them determinants in the domestic economic dynamics. In this regard, studies on the so-called Small and Medium Enterprises (SMEs) stand out, but all of them, finally, are inserted in an increasingly globalized environment. Indeed, the research proposal developed within the 04056 subject has the character of a simulator of the reality that students will face. This allows them to test and strengthen the qualitative research tools to become innovators in their work and professional context.

CONCLUSIONS

In response to the imperative need to modernize the curriculum of the Bachelor's Degree in Business Administration of the School of Management Sciences of the UNED, the subject 04056 Qualitative Research Methods was introduced. This subject is distinguished by the integration of a research project that requires students to actively relate their learning to the work context in which they find themselves. For those students who are dedicated exclusively to study or who are currently unemployed, they are encouraged to adapt their project based on the accessibility of the information required for each phase of the research process.

The essence of this research proposal lies in its pedagogical foundation: Project Based Learning. This methodology provides a solid academic formation and promotes transversal skills in students. These skills allow them to contribute and impact their communities and social contexts beyond mere application in the workplace. It is crucial that future managers are equipped to discern and analyze the complexities of their contextual environment scientifically.

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[1]The acronyms are in the original language.