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Dossier

Gnoseological Fundamentals for the Development of Professional Competency Mini-Company Project Management

Fundamentos gnoseológicos del desarrollo de la competencia profesional gestionar proyectos microempresariales

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ABSTRACT

Aim: To provide a cognitive rationale for mini-company project management processes.
Methods and techniques: The research methods used were, in essence, analysis and synthesis and induction-deduction.
Main results: The outcome was associated with the arrangement of contributions to processes pertaining to professional competency and its assessment,0. depending on the components of the system studied.

Conclusions: The rationale for scientific argumentation of a didactic strategy to develop the competence was established.
Key words: project-based learning, project managing, mini-company.

RESUMEN

Objetivo: Se ofrecen los fundamentos gnoseológicos de los procesos inherentes a la gestión de proyectos microempresariales.

Métodos y técnicas: Los métodos de investigación utilizados fueron esencialmente los de análisis-síntesis e inducción-deducción.

Principales resultados: Se llega a conclusiones referidas a la estructuración de los aportes sobre los procesos inherentes a la competencia; así como la valoración de estos desde los componentes que conforman el sistema objeto de atención.

Conclusiones: Se crearon las bases para argumentar científicamente una estrategia didáctica para el desarrollo de la competencia. Palabras clave: aprendizaje por proyectos, gestionar proyectos, microempresa.
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INTRODUCTION

Looking at the demands of the twenty-first century, known as the century of knowledge, universities are confronted with challenges, so that these institutions have an ever increasing direct and determining influence on society and its processes. One of these challenges is directly related to the possibility on increasing the number of mini-companies, due to the value added they can provide to the economy of the Republic of Ecuador. However, because many of them have not been conceived and based on a scientific, humanistic, and ecologically sustainable perspective, they fail to go through

productive and economic systematization that produces a quantitative and qualitative leap. In many other cases, they are not trustworthy enough to receive the benefit of loans that cause direct development.

Accordingly, a theoretical rationale that reveal processes enabling viable didactic proposals conveniently, which can be assimilated by the teaching-learning process in universities, is presented in this paper. Thus, students receiving education in the economic and related studies can become competent in providing counseling, and managing their own projects, or projects from other small entrepreneurs –or others interested in being entrepreneurs–, once inserted in the business sector, considering each particular case.

Another factor, humanistic management of mini-company development, can be added. It is highly transcendental in this area, since, so far, projects designed to achieve that end have essentially heeded economic factors, rather than focusing on their social, environmental, and technological relevance. Consequently, this rationale shows, explicitly or implicitly, the need to offer such a relevant quality to the process.

The essential research methods used to meet that goal were analysis-synthesis, and induction-deduction, which permitted to draft conclusions related to further structuring, as a didactic product, of the contributions of this paper.

DEVELOPMENT

An aspect to consider, as a preamble, lies in the theoretical rationale and the grounds, based on a gnoseological perspective that contributes in such a magnitude that it becomes evident due to the implications it has on possible further studies.

In that sense, this article stems from research done by Marina and Válgoma (2000), who said that humans are beings “that project themselves”; that is, they are capable of directing their behavior toward a thought future idea. It also refers to the grounds presented by Machado and Montes de Oca (2020 a, b), in terms of reconsidering and reconceptualizing what is now known as *competency* within the university, based on a definition that contextualizes the true demands of a global society.

Besides, special attention is given to the ideas of Elvira and Dávila (2009), with a humanist sense of the theory of entrepreneurial and mini-company development. These conceptions rely on the contributions made by Vygotsky (1979), which pave the way, to the effects of this study, to be used in developing competency mini-company project management, on the basis of the zone of proximal development, all of which leads to a dynamic of performance that calls for innovation, creation, and research.

Certainly, because such procedures deal with the manner in which processes must be implemented for project management, but also because they contribute to operational and didactic management that offers ways and modes to organize cognitive activities between university students as regulators of interactive activities between them and educators, in order to accomplish training objectives.

Regarding didactic management, there is also a multiplicity of contributions that permit the materialization of processes which ensure its optimization in that environment. Research done by Montes de Oca, Machado, and Obediente (2019) demonstrate the above; they refer to that type of management within the current context of higher education. A group of authors, like Hernández (2016), Molina-Mora (2015), and Tobón (2014; 2015) has also made multiple contributions to the method known as project-based or project-based learning (PBL) from a didactic perspective.

In that sense, PBL is an important way to develop professional competencies successfully, which is also embodied in the active conceptions of the teaching-learning process (Manzueta, Machado, and Blanco, 2018, 2019). Today, this form is used in different processes to motivate students to consciously immerse in their own learning, so this aspiration is possible. It is also characterized by the collaboration created through process interchanges, which stimulates teamwork (Guerra, Machado, Espíndola, and Farit, 2020), making competency-based work the perfect setting to train future professionals.

The development of competency mini-company project management is expected to offer humanistic education of students in the economic and related studies, as the center of teaching, research, and off campus activities in the community they engage. Accordingly, upon graduation, the action itself must be aligned to responsible practice of

their labor in favor of project management. All of it is expressed in a system made of knowledge, processes, and ethical and environmental performances.

Hence, synthesizing the above stated rationale, the teaching-learning process directed to the development of this competency in particular results in various processes that state, in essence, a logical structure, and enable the materialization of educational purposes in that sense (Fig. 1).

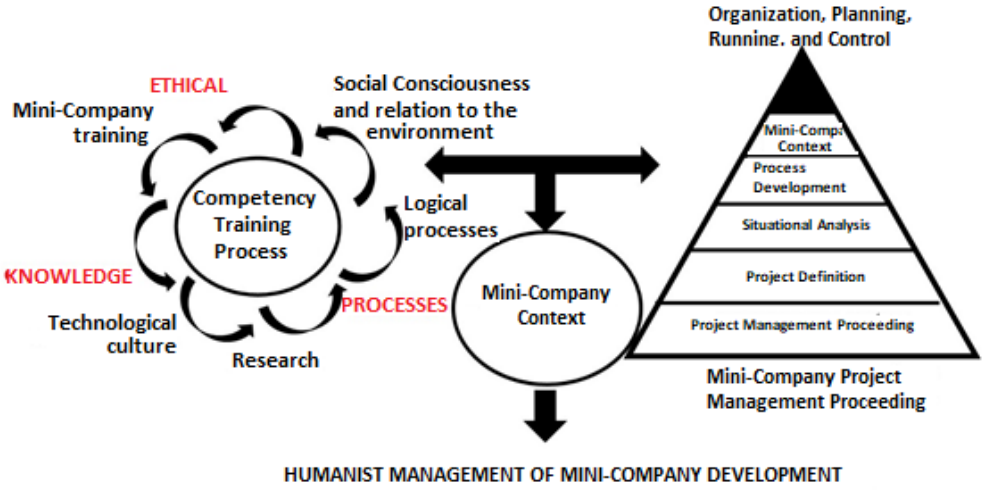

Fig. 1. Processes inherent to the development of competency mini-company project management.

The graphic shows the structure of competency mini-company project management, of which no sufficient scientific evidence exists in relation to its explanation in the literature. Accordingly, two processes were considered, whose relationships and contradictions will permit a prompt design of a strategy to achieve these goals:

The dimension formative process in the competency (Fig. 1) shows, depending on its coordination and synergy with the proccedings of project management, mediated by the mini-company context, the existence of five devices under which the system of knowledge, skills, and own values lie. These can be deployed through the teaching-learning process to develop the competency successfully, such as social consciousness and relationship to the environment, logical thinking processes or logical skill, research skills, and technological culture with emphasis on entrepreneurial culture. Below, some of them are explained.

- The relationship between social consciousness and the environment has the humanist background stated in this paper, which can be materialized through conscious academic and human education, one that is custom-made, and supported by transcendent and ethical values. The intention is to educate virtuous, scientifically competent, enterprising, and honest human beings for the professional world, who are committed to the future of their country, in favor of peace and social justice, the strengthening of national identity in the national Ecuadoran multicultural context, the reassertion of democracy, human rights, and the defense and protection of the environment (Fig. 1).

  In that sense, the intention is to train professionals by placing ethical, and particularly humanist criteria. Through their performance, these professionals can improve the life quality of people who are interested in this type of enterprise, either by manufacturing goods or providing services; professionals who can help spread the dignity of their profession over humans, and the respect for life, and the search for shared good.

  To that effect, undergraduate students must thoroughly acquire their own experience that sub-add mini-company project management, going through the ethical issues of the profession didactically introduced by their teachers. They must rely on the characteristics of the society and community where this takes place, an aspect that must be acquired from interdisciplinary and transdisciplinary didactic management of several subjects and disciplines that make up the syllabus.

  For instance, the introduction of such issues may be given by the guidance of educators, using PBL, in terms of organizing mini-company projects so that students analyze the implications and responsibilities assumed with their engagement, and to society. These must justify the importance of economic reproduction in keeping the variability of social phenomena; describe the cultural and technological factors that influence valid or invalid outcomes of the business; respect individual traits, and those of other people by true or simulated actions during the process; recognize situations of discrimination and abuse by disrespecting people's individual traits (religion, ethnic group, gender, disability, and the like), which limit their right to social

and economic development, so they can recommend ways of transforming them, among many real cases that can be taken to the teaching-learning process.

This is a *sine qua non* condition that will allow them to better understand the human performance and essence, and social reality, which will enable them to orient their decisions and actions appropriately. In that sense, it is important to conduct inter and transdisciplinary education, as the essence of mini-company project management; students must become professionals with fair and responsible criteria of their actions, with cognitive possibilities to interpret and understand reality, having speech competencies associated to the meta language of their profession, but adjusted to that of the community and the people they interact with, in order to provide explanations and grounds in relation to the truth of social and productive events, having propositional powers to offer solutions to the problematic of the mini-company, from the pertinence of the curriculum.

In that respect, the teaching-learning process should articulate the institution's educational purposes with the social needs, which are currently being deteriorated in terms of ethical values; the rupture of the sense of life; the loss of the concept of family as a social institution and peaceful living; the deterioration of human sensitivity and insight on what is transcendental and supernatural; the ever-growing shortcomings in relation to environmental protection; the corruption of quite a few democratic systems in detriment of the least-favored classes; and coercion to full freedom and personal will.

These ideas about social consciousness and their relation to the environment are intended, during the developing process of competency mini-company project management at the university, for educators to encourage students to gain full consciousness of the problems found in the concept of development; appeal to their argumentative potential to explain them with an inter and transdisciplinary viewpoint; that it becomes propositional, so that in light of truth, justice, and shared good, it can provide solutions to the problems that strike society, specifically as to the importance of mini-company development as a source of employment, wealth, and stability of a generally neglected sector.

- Considering logical processes of thinking in undergraduate students, they are the recipients of a highly important pillar, as an attitude to life that must be achieved through the educational process, embodying the analytical and synthetic process of intelligence, one of the superior faculties of humans. In that sense, working to achieve proactive communication is critical for cognitive development, since it offers the means to express ideas, categories, and concepts of thinking, and it helps articulate past and future based on present. This relationship will serve, from a PBL position, to internalize logical processes, allowing for understanding and operating with other abstract character relationships, especially of mini-company project management processes (Fig. 1).

  Naturally, all knowledge process starts in the reflection that humans have about the reality and its contradictions, particularly problems related to the business environment, making students show development by responding to a cause that may have been originated in the natural, social, cultural environments, or in the thinking subject. Hence, the development of logical thinking processes must follow certain path, it moves into conclusions and, therefore, the solution to a problem (in the PBL), and the rationale of these results, though not linearly, but as advances and setbacks in the form of coherent and constituted integrity.

  In that sense, teaching activities with students to foster conscious development of logical processes is intended to encourage students to find a logical way of explaining and stating the facts of the problem, apart from accomplishing comprehensive training to calculate success and coincidence probabilities in it.
- In relation to achieving a mini-company culture, keeping with the purposes described on a PBL perspective, university educators must organize teamwork collectively, collaboratively, and cooperatively, to support project management (Guerra *et al.*, 2020), seeking responsible efficiency of human efforts over resources, inspired in solidarity, subsidiarity, and justice, based on business efficacy that enables sustainable development within their technological, environmental, social, and economic sides (Fig. 1).

This aspect is thought to favor the formation of a mini-company spirit in the future economists, allowing them to cope with difficulties in terms of leadership, and the possibility of managing risk anticipation, along with various agents, a mini-company for their own or the others', by understanding administrative processes of planning, organization, implementation and control, and optimization of financial and material resources, as well as proper use of human potentials. Hence, there is a reassured need of achieving a creative and innovating capacity, resulting from the previously dealt with concept of humanism, for the creation of mini-companies with efficient and effective operation, having an impact on society.

- In terms of research skills, this is one of the pillars of the teaching-learning process, in which faculty and students constitute, systematically, a culture of research within the frame of the scientific and responsible practice associated to the advancement of knowledge (Marcillo, 2018). In this sense, the future graduates of economic and related degrees must be formed, not necessarily as researchers *per se*, they should also acquire it as a mode of professional performance; that is, becoming part of their professional life through systematic application of processes of observation, analysis, and synthesis, the search for the truth, in keeping with the syllabus, which in addition, refers that this type of education must be present in all the university course programs. Accordingly, educators must incorporate, as part of the PBL, contextual and characterizing screenings of the reality; interview mini-company business people, determine the amount of credit scientifically, as well as the type of production, risks, among other activities thought to rely on research methods and techniques (Fig. 1).

  Hence, this component pursues that the graduate-to-be acquires cognitive and procedural skills in the search for the truth of events; interpretation and argumentation of problems within the business environment, in order to utilize market research methods that ensure the validation of conclusions and findings of events, that can be used to assist the people who are in need of it.
- The technological culture states the need that university students are trained to be subjects with the social responsibility needed for their professional performance, by dignifying people and common good. These are dimensions oriented to human

progress and development, as a contribution to the solution of present-day social problems, such as the case in this paper analyzing the Ecuadoran context. Therefore, these professionals should master information and communication technologies to organize, plan, run, and control project management, and for the analysis of national and foreign trends in this area, among many other examples of use (Fig. 1).

In the same direction, the teaching-learning process should pay attention to the mastery and utilization criterion of these media, to obtain and sustain results, from a PBL perspective, namely the Internet and its possibilities, mobile devices such as cell phones, project management application software, calculation assistants, artificial intelligence, and so on, thus optimizing the possibilities of convergence of means offered by the new technologies. However, they must inevitably be used following an ethical criterion, depending on professional activities.

As mediator –of the conceptualization made so far– the context of mini-company dimension (Fig. 1) signals the conditions and political, scientific, and economic conditions, among others which are used as referents to manage such projects, and are very important to achieve one essential quality in university students: humanist management of mini-company development.

Thus, the process of developing this competency leads to a progressive formation of students from their own problems within the performance context, in accordance with the acquisition of knowledge, education of values, and the development of micro and macro processes so they are capable of managing mini-company projects. All this is done from other multiple processes that include orientation toward metacognition, motivation, sustainable development, environmental protection, through which students can achieve proper interpretation in relation to the scope of their profession, for instance argumentative of issues with subjects in relation to the social and min-company realities, the solution to problems found in the disciplines, or subjects following that purpose, and others. That is, knowing how to establish links with needs and circumstances, and a profound social consciousness of the problematic through service and solidarity, for the benefit of a fair and humane society.

In organizations, in general, and mini-companies, in particular, there is usually a ranking that determines the type of actions performed inside them, and consequently, the type of decisions that must be taken, depending on the context. In the mini-company context, there are direct and indirect forces that can condition its life and durability, people's actions, their economic, social, technological, and environmental achievements and failures, among many other factors.

This way, within the direct context of a mini-company, suppliers, customers, and competition established in the sale of goods or services are confronted. In the indirect, with a determinant influence and immediate impact on it, technology, politics, the environment, social practices, and others; all of it is an explicit part of the teaching-learning process and PBL.

The procedural dimension of project management (Fig. 1) emphasizes on the technical or technological aspect of project management (mini-company), with its active components: definition of the managing process to be conducted, situational analysis, the development of the process itself, the identification component of manufacturing mechanisms; and finally, management organization, planning, implementation, and control.

This execution setting can spoil the procedure from a methodological perspective of moments through which mini-company project management moves, which also consider the professional context of the future economist.

Naturally, the government of Ecuador emphasizes more and more on the creation of these projects in order to solve, as in other countries, economic, social, and environmental issues, in a century characterized by globalization in every area of society, whose most stricken subjects have been the historically marginalized populations.

Hence, though project typology can vary from a technical to a didactic perspective, the definition of success is always the same. Basically, the key consists in keeping the results within the expected terms and costs, and above all, that they can satisfy all the interested parties. To achieve that goal, it is important to master all the phases of a mini-company project.

Today, there is a wide variety of project types which are applicable to this area of attention, their utilization setting changes depending on the procedure implemented, accordingly. For instance, contract-based sales projects to produce new goods and products, R + D for capital investment, and others. Depending on the area and person a decision is made, it can be detailed by projects (internal and subcontracted) commissioned by the company, organization, customer, and other environments, through PBL.

However, the literature does not reflect a coincidence of didactic-organizational aspects to be conducted, in order to design a particular project (mini-company); or else, ideas and grounds are diverse, so the authors of this paper have made a brief inclusion of several components that should be dealt with from a PBL perspective, as follows:

- Process definition, given the need that students come to determine why project management is important for a particular circumstance; what is expected in the mid and long-terms; the steps to follow to make a successful project (Fig. 1).

  This definition requires at least the deployment of three key actions: information management (quantitative-qualitative), the accomplishment of efficient and effective proposals, and the setting of a realistic, clear, quantifiable goal agreed by consensus. Effective and emotive communication should be established between those running and participating in project design, the work team, and customers, among others. When all this is defined, a proposal can be designed or run, which includes the development of a plan that meets the requisites of the goal set.
- Situational analysis using the project method is when students can identify the categories of knowledge, sources, and customers that demand mini-company-project management; the detection of breaches during implementation, and the establishment of initiatives so the project-design team can become a learning organization (Fig. 1).

- Project development is intended for students to identify, learn, store, transfer, and use individual knowledge from a specific didactic orientation, while being capable of determining explicit knowledge (Fig. 1).

- Identification of mechanisms and competencies needed for project management; in this case, teachers can use PBL to show students the breaches that facilitate motivation of tasks (as manager), to ensure transference and exchange of knowledge, both explicit and tacit with users or customers (Fig. 1).

- Organization, planning, implementation, and control as synthesis during design, which is intended for educators using PBL to make the existence of moments or phases of associated mini-company project management explicitly, where a methodology is offered to achieve it, so cultural change can be achieved as a critical factor of success (Fig. 1).

  Specifically, the organization is important, since it permits to pool necessary activities to encourage undergraduate students to manage projects in managing units, and to define the relationships between those running the processes, and the ones in the work teams of such units. In this problem, the educator can use PBL so that the manager (student) appointed can define the structure of the group that will work on it. Accordingly, it encourages them to design timetables that show levels of authority and hierarchy, the places where each team member should be, and the relations among them. The relations established among team members, between them and the outside, and their responsibilities, will be set.

  It is important to provide undergraduate students with the necessary means to deal with project-based learning, and their responsibilities within the teaching-learning process. In all of it, it is important to create a working and cultural environment that favors its operation.

  The organizational work based on the formative process in universities must comply with two basic principles of mini-companies: objectivity, through which all the members of the group in the project must have a mission and a clear function to fulfill; and efficiency, through which everyone’s work is expected to be as effective as possible.

  Naturally, and fundamentally, that of the organization which in this moment, each student should know the basic function used to measure and assess in the PBL process. For example, when assigning tasks for execution, the field of self-

management and fulfillment of every responsibility, though with sufficient flexibility so that the job done, and the person who does it, becomes more important, with a higher dimension of the benefit brought by the project. Therefore, the learning tasks assigned in the organization phase as part of the project must be sufficiently explicit so that resource scattering, ranking and responsibility problems are prevented, making it as flexible and permissive as possible, not to halt growth and expansion.

Planning is the transcendental pillar to manage mini-company projects. Accordingly, using PBL, educators must foresee a sequence of necessary activities with students to fulfill their objectives, establishing what human, material, and financial resources are required. The plan will also become a tool of communication, coordination, and control that helps meet these requisites.

It is important to assure, during the teaching-learning process, that planning made by students organized by teams is qualified, and that during project implementation, work segmentation is observed, which consists in dividing the job into simpler operations. If the project assigned is well defined, the possibility of omitting important actions is reduced, which allows for the establishment of a logical relationship between them. Moreover, it facilitates cost estimation and calculation. They are also assigned the task of network diagram design to identify relations between project activities; that is, the description of every activity (content, necessary resource, deadlines, and costs). For example, Grantt diagrams can be designed to perform graphic observation of the relationship among such activities throughout the duration of the project.

Execution is critical, since students must enter a concrete environment, and establish a relation with mini-entrepreneurs, or stakeholders, as this part is the one that allots resources and capacities needed within the organization. Educators must previously assign a detailed analysis of the environment associated to project start-up, clear diagnostic of the situation through investigative procedures, setting goals in time that can be motivating, reachable, easily understandable, shared by all the members of the team, and transmitted properly.

Control during PBL is a key task to know the evolution of its dynamics, and every student during this process. It is intended to offer information about the situation of

the process of mini-company project management, identify problems, know if the goals in the plan are fulfilled, and facilitate decision-making to correct any imbalances. So that control is performed properly, the objective should be well-defined, with clear landmarks or checkpoints throughout the mini-company project management process assigned as part of the teaching-learning process. Control affects several of its aspects, such as quality control, deadline control, and cost control. It is linked to student and stakeholder motivation to reach standards, the comparison of results, and implementation of correcting actions when the reality diverts from expectations. It all is done from a dialogic perspective.

This PBL moment offers performance criteria to students so that the level of competency development can be measured.

As a result of all these processes leading to the development of competency mini-company project management (Fig. 1), training students will be able to unveil a quality consisting of humanist management of mini-company development (Fig. 1), a condition part of the outcome of PBL application, which stimulates the development of its human potentials, and instrumentation in a specific field, so that the purposes of the teaching-learning process can be attained, which is the most important factor for further fulfillment of short, mid, and long-term goals, in manufacturing or service institutions, when students graduate. Hence, a feeling of belonging and integration to project management can be achieved when common goals, learning, and results are shared.

Thus, such humanistic management of mini-company development shows that

- People, users, society, and others, are the essence of the group that manages a project, and their most valuable capital.
- Communication is the necessary means and end to generate a network of growth, commitment, and internal collective knowledge.
- Individual and collective PBL is the didactic key to developing mini-company project management.
- An adequate didactic-organizational climate in universities favors relations of identity among all the participants, permitting the emergence of the best qualities of every one and the team as a whole.

- It is necessary that, from a PBL perspective, with an integrated vision, the mini-company context is interpreted so that students learn to analyze reality, from the teaching-learning process, and offer responses in face of dynamic changes in tendencies and situations.

- It is important to train the future professionals in the universities to manage mini-company projects with a humanist foundation, as the only way of consolidating the goals of sustainable development across the Republic of Ecuador.

CONCLUSIONS

The process studied in this paper revealed two context-mediated macroprocesses, in which PBL is inserted from a dialectical point of view, with the purpose of developing the mini-company project management competency. They are essential for introduction in the teaching-learning process in studies of economics. Naturally, graduates can incorporate this mode of education, both to project their own companies, or as advisors to others who require reliable information and counseling.

Essentially, this study evidences relevant aspects that will eventually assist in the design and implementation of a didactic strategy that rests on the teaching-learning process of degrees with an economic component, therefore being able to satisfy the objectives explained herein.

In short, the following becomes evident:

- Among formative processes associated to the mini-company project management competency and procedures there is a direct synergistic and complementary link that reveals a direct relation between the teaching-learning process and the process of production.

- The mini-company context is an inevitable mediator of the teaching-learning process, which sets a significant and determinant relationship during the implementation of previous processes, since this type of context grants meaning to

the project that must be managed. Moreover, it is an essential constituent of competency development, which pertain to it.

- Summarizing, humanist management of mini-company development from a teaching-learning perspective in universities considers the criteria of sustainability, emphasizing on the satisfaction of human resources and society.

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Conflict of interest and conflict of ethics statement

The authors declare that this manuscript is original, ans has not been submitted to another journal. We are responsible for the content published in this paper, and certify the existence of no plagiarism, or interest or ethical conflicts.

Authorship statement:

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