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Model for Competency Tracking in University Students

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ABSTRACT: The Higher Education Institutions (HEI) in their educational policy aim to develop the necessary competencies in university students to prepare them for the workforce. Consequently, it is important to formalize competency tracking in a way that allows us to identify specific milestones and determine whether expected outcomes are being achieved. In this article, we propose a model for tracking competency achievement through various learning strategies. To achieve this, we conducted a literature review, identified relevant stakeholders, and integrated national policies. This empirical model can be validated in a university setting, such as the Politécnico Colombiano Jaime Isaza Cadavid.

KEYWORDS: Competencies, competency model, competency monitoring.

I. INTRODUCTION

The current educational system evidences the need to align academic training with the demands of the productive sector. For many years, the business sector has emphasized the implementation of pedagogical strategies that allow students to acquire labor competencies according to market demands. This situation has led to rethink and plan to transform the educational environment, but with emphasis on the formation of competencies and their respective follow-up.

The current challenge lies in finding a balance between Higher Education Institutions and the labor reality, because even though some practical activities are similar to the business environment, the gap is enormous since they do not prepare students for labor insertion. Therefore, the aim is to adjust the strategies implemented through the collection of information to monitor the competencies that students are achieving and minimize the labor gap, without neglecting the conceptual, procedural and attitudinal competencies.

This article addresses a general contextualization of the problem with its respective justification and based on this, it proposes the methodology to be used, analyzes the information collected to propose the model and finally delivers the conclusions of the work carried out.

II. RELATED WORK

The modern world seeks that professionals have the necessary competencies to perform a role within a company, so Higher Education Institutions propose competency-based teaching models seeking to train competitive students. Although "the competency-based approach is a pedagogical-didactic alternative that has gained strength in recent years, especially in underdeveloped countries, however, it is not something new in the world's educational systems" [1], it is also necessary to propose a model for monitoring competencies in such a way that the achievement of university students can be evidenced. Analyzing the situation integrally, González and González plan that "competencies are understood as isolated, eminently cognitive qualities that predetermine professional success in specific work scenarios" [2].

Therefore, the monitoring of competencies in the educational field is one of the most relevant, but at the same time complex processes as Tobón puts it

The assessment of competencies is a new paradigm in the field of education and human talent management, which is helping to identify more clearly the achievements and aspects to be improved in people, based on comprehensive performance in contextualized situations and problems. This is transcending the traditional approach to assessment, which is oriented to fragmented contents without considering the context. [3, p. 8]

Based on this assertion, the concept of competency monitoring and learning assessment must change and have an integral vision that adjusts to the needs of the productive sector, and for this purpose the curricula in the educational system must be made more dynamic. Based on the above, it is also necessary to rethink the way teachers work, since they are an important actor in the process of monitoring and achieving competencies. Added to the above, Martínez-Huamán et al. [4] mentions that "in this paradigm the teacher is a facilitator of learning, who accompanies the student in the process of building their learning, as well as in the development of skills and attitudes." Based on this, it is necessary to propose a model that guides the entire academic community in the monitoring of competencies, but specifically in the evaluation, since "it implies a series of tests that include quantitative and qualitative aspects that allow reflection based on the results obtained in the qualification and evaluation by those involved in the teaching-learning process" [1].

Among the aspects to consider in the monitoring of competencies is what is stated by the Colombian Ministry of Education - MEN, in which it mentions that competencies

are articulated sets of knowledge, abilities, skills, dispositions, attitudes and aptitudes that make it possible to understand and analyze problems or situations and act coherently and effectively, individually or collectively, in certain contexts. They can be assessed through learning outcomes and can be materialized in the demonstrated ability to use personal, social, professional and methodological knowledge, skills and abilities in work or study situations and in professional and personal development. Competencies belong to the individual, who continues to develop them throughout life through professional practice and learning. [5, p. 17]

Based on this concept that governs us as a nation, a range of possibilities opens to carry out this process, and the MEN classifies the competencies, as shown in Figure 1.

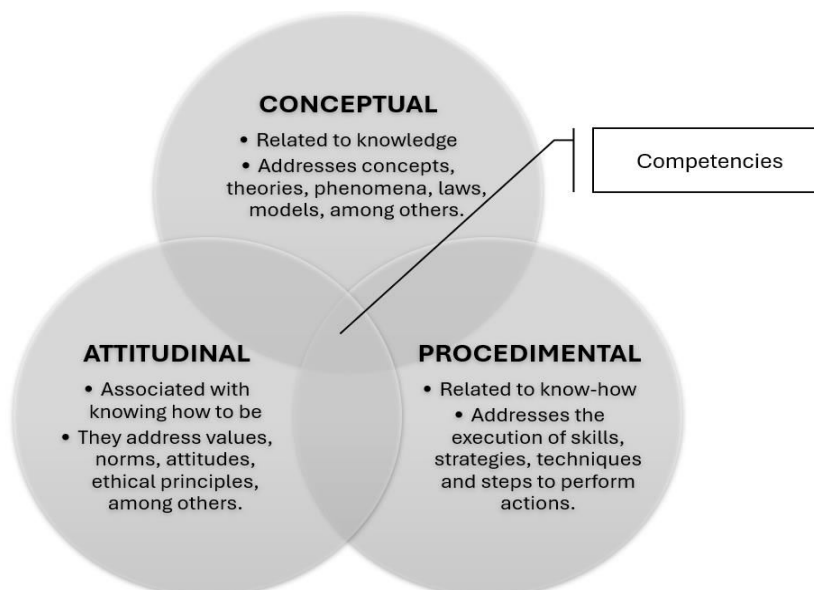


Fig. 1 Classification of competencies Adapted from MEN [6]

Therefore, in the literature review it was found that the monitoring or evaluation of competencies "can be defined in pedagogical terms, as an activity whose objective is the assessment of the process and results of student learning, for the fundamental purpose of guiding, regulating teaching and contributing to the achievement of the formative purposes." [7, p. 112]. However, several authors affirm that evaluations must be integral, regulated, which measure student performance and certify learning, but generate the following doubts: When to evaluate, how to evaluate, with what to evaluate, the only clear aspect is Who evaluates, which is easily identified as the teacher or facilitator, who is notably responsible for this activity, therefore, Morales, Hershberger and Acosta confirm this, where they state that

it is essential to train the teacher and/or evaluator in the evaluation techniques applied in the scenarios and practices, since the reliability of this type of evaluation depends to a great extent on him/her. Equally relevant is to establish a methodology to analyze the results, to fulfill the purpose of the evaluation, to give feedback to the teaching-learning process to students, teachers and evaluators, with the purpose of continuous improvement. [8, p. 56]

However, Valverde et al. indicate that "competency-based assessment offers new opportunities to students by generating meaningful learning environments that bring their academic experiences closer to the professional world" [9, p. 53]. 53] and this is relevant in Higher Education Institutions since they are educating students for life, so that they can face the challenges offered by today's world with their skills and abilities. Several businessmen affirm that in Colombia there is a lot of talent, but it is necessary to work together between University, Business and State to move the country forward and make a special emphasis on innovation to be at the forefront worldwide, in this sense "the teacher must also encourage interdisciplinarity in different areas to carry out any innovative project. It is not only important to motivate, but also the technical knowledge of what is being done" [10, p. 217].

III. METHODOLOGY

This project is established within the feasible project modality, according to Tamayo [11] the feasible project "consists of developing a viable proposal that meets needs in an organization that have been evidenced through field research". All this framed in field research, and in the scientific research method, which is derived from a documentary type of research. The project bases its importance on the design of a model for the follow-up of competencies, which is organized and designed considering particular aspects of the object of study, updated bibliographic review, adapting it to the context, taking as a basis the purpose proposed.

For the development of the model for monitoring competencies, the following phases were proposed, which can be seen in Figure 2.

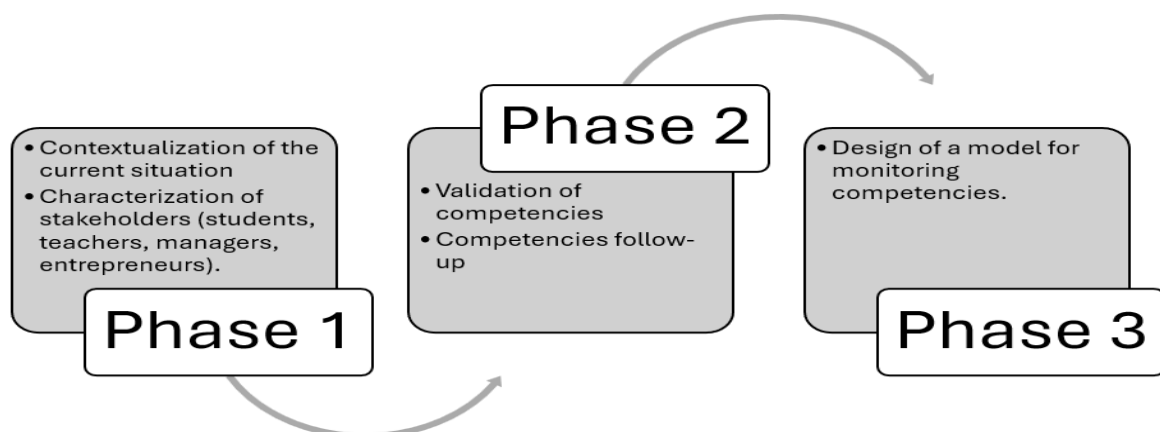


Fig. 2 Outline of methodology phases

Phase 1:

Stakeholder identification
Application of an instrument to collect information
Analysis of the information collected

In phase 2:

Identify university competencies
Monitoring of competencies in the curriculum

In phase 3:

Propose a model for the monitoring of competencies.

With the applicability of all these phases, it is intended to design a model that allows to monitor the competencies achieved by university students. It is important to clarify that this is a model that will be validated in the future at the Politécnico Colombiano Jaime Isaza Cadavid.

IV. EXPERIMENTAL RESULTS

Taking into account the information gathered, the competency monitoring model is proposed based on the competencies to be developed in the subject, but also analyzing its objective, since this includes everything, the student must achieve in a given period; in addition to the above, the training activities and evaluation methods must be taken into account, as shown in Figure 3.

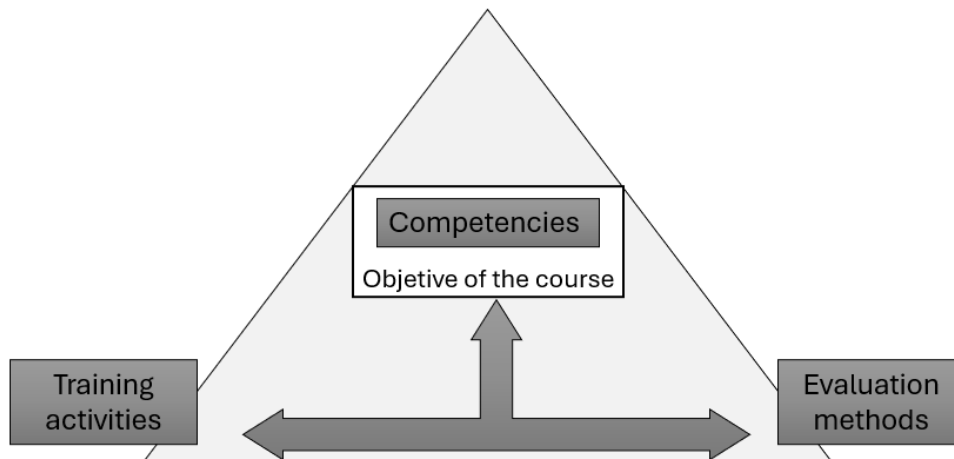


Fig. 3. Outline of methodology phases

Taking the above as a reference, it is proposed that the model has 3 fundamental pillars: the inputs, the process and the results; in each of these there are activities carried out by the actors in the training process. Figure 4 shows graphically the proposed model that makes it possible to demonstrate the monitoring of competencies in university students. In the model all the actors involved were considered and generalized since the protagonist of this process is the university student body, without leaving aside the professors, and it involves a continuous improvement plan so that the model is not static but dynamic and can be adapted to the changes that occur at the regional or global level.

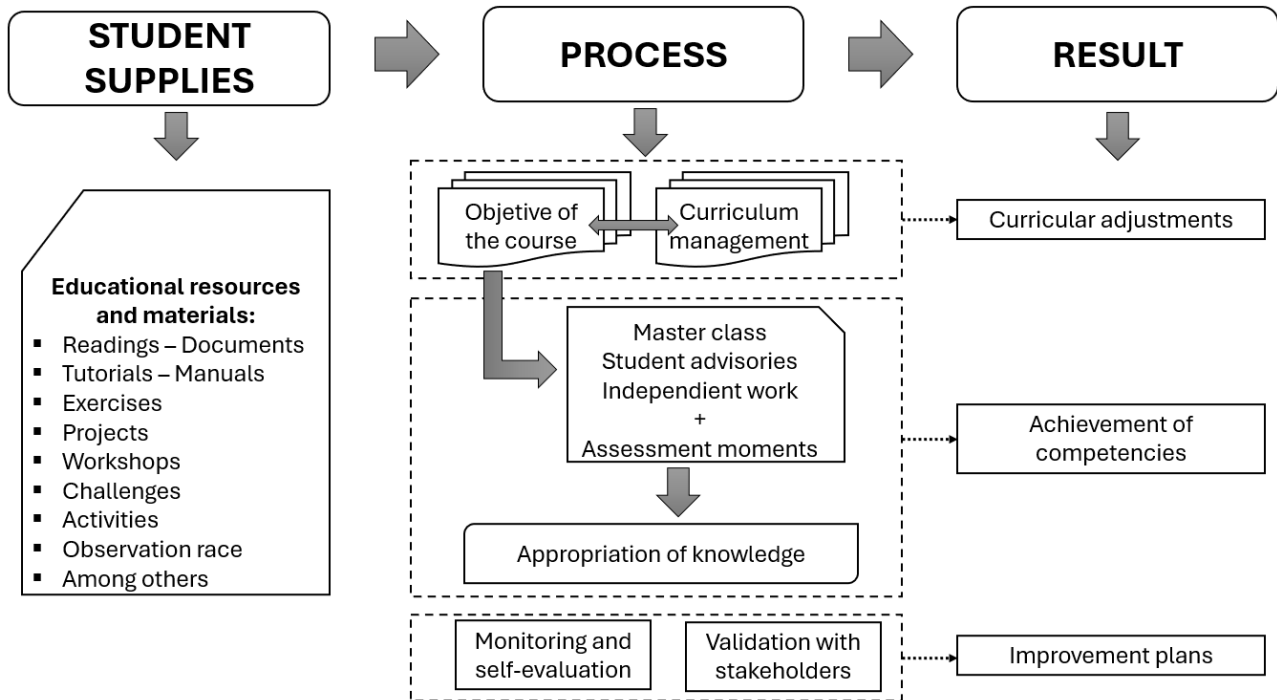


Fig. 4. Proposed model for the monitoring of competencies in university students

"*Student supplies* are purely educational material resources that are given to the student at a specific time, and with them, they begin to develop or strengthen conceptual, procedural, and attitudinal competencies. These are embodied in a series of individual and group activities that strengthen teamwork, leadership, among others, but in general, they are "those that provide knowledge, skills, and abilities in the educational environment; as those that have allowed the identification and definition of a professional suitable for the job market." [12]

On the other hand, there is the second pillar, which are *the processes*. In this aspect, the objective of the subject was analyzed to ensure it aligns with the curricular management, so that it is oriented towards the competencies to be developed through lectures, advisories, independent work, up to the evaluative moments. The latter refers to the possibility of conducting different types of assessments such as written evaluations, presentations, experiments, group activities, forums, among others. The important thing is that the student learns and can demonstrate the achievement of competencies. At this point, a follow-up can be carried out through the appropriation of knowledge. Subsequently, there is monitoring and respective self-evaluation for teachers and Higher Education Institutions, but the productive sector or entrepreneurs also intervene in this, as they know in the work environment how appropriate the being, knowing, and doing competencies are.

Finally, there is the third pillar, which corresponds to the *result*. At this milestone, with all the information available, curricular adjustments should be made where necessary, and if this change occurs, the competencies are inherently adjusted, and therefore, these can be monitored, leading to improvement plans.

In the future, it is intended to apply this proposed model for monitoring competencies in university students in a controlled population, in order to validate the model and make the respective adjustments."

V. CONCLUSION

It is important to take into account the alignment between academic training and the needs posed by the productive sector, as it is currently an imperative need in the educational system. Higher Education Institutions (HEI) are called to implement pedagogical strategies that develop conceptual, procedural and attitudinal competencies, in order to respond to market demands, minimizing the famous gap between academic training and labor reality.

It is very relevant and important to formalize the monitoring of the competencies achieved by university students. This follow-up should be done continuously at specific and punctual milestones during their formative process, making it possible to identify whether the expected results are being achieved and to facilitate adjustments in the teaching-learning strategies.

The proposed model for monitoring competencies in university students, based on a literature review, offers an empirical approach for monitoring competencies. This holistic approach has the potential to be validated in university environments such as the Jaime Isaza Cadavid Colombian Polytechnic, providing a valuable tool for the evaluation and continuous improvement of its programs.

The proposed model aims at an educational transformation that not only focuses on the formation of competencies, but also on their respective follow-up. This comprehensive approach prepares students in a more complete way for their insertion into the world of work.

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