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METHODOLOGY FOR THE DESIGN AND VALIDATION OF CURRICULA IN HIGHER EDUCATION FOCUSED ON LEARNING OUTCOMES

Andrey David González Restrepo

Director of the CET Colsubsidio Curriculum, Master in Educational and Social Development, with experience in university teaching, research, higher education administration, didactic models, curriculum and technologies in education. Higher education consultant on issues associated with curriculum management, design and development; Training of educators in specific didactics and management of academic programs.

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Abstract: The article presents an analysis of the curricular design in the educational context of Colombia, focusing on Law 1330 of 2019 and its regulatory decree 21795 of 2020. From which a proposal is derived, a unified proposal called Didactic Disaggregation of Taking Learning; which results from the analysis of the implementation of regulations in 33 academic programs from five universities in Colombia. Curriculum analysis tools were applied to understand and design the essential aspects of the curriculum. The approach made it possible to identify deficiencies in the verification of the graduation profiles, the consistency in the formulation of the profiles and the lack of articulation between the courses and subjects, but common patterns were also found in the curricular design. Five key categories are proposed for the curricular design in higher education, which include the comprehensiveness of the graduation profile, the articulation of academic spaces, the unification of the syntactic structure, the focus on the student, and the interdependence of the micro curricular level. In conclusion, the need to improve coherence, consistency and articulation in the curricular design is established, proposing key guidelines and categories to achieve greater academic quality, through the adjustment and updating of the curricular design, the adequacy of evaluation mechanisms, the traceability of the training processes, the articulation between courses, among other aspects.

Keywords: Curricular Design, Learning Results, Curricular Analysis, Curricular Design Methodology, Academic Quality.

INTRODUCTION

A comprehensive approach to the different conditions that affect the curricular design in higher education in Colombia must be understood as an analytical process, which incorporates the various approaches to the

practices of modeling, development and evaluation of the formative proposals that, from the doing, establish the comprehensive limits of the educational processes in the different programs.

In this sense, the process will attend to the recognition of the singular and collective experiences of the academic communities, about the ways in which the curricular design processes have been developed, and knowledge management, in order to recognize the factors that have influenced the program modeling.

PROBLEM STATEMENT

In the specific case of the state of Colombia, Law 1330 of 2019 and its regulatory decree 21795 of 2020 promulgate the fundamental parameters for the provision of educational services in the national territory, and although the issues addressed are comprehensive in nature with the Educational quality, perhaps its most distinctive element in terms of curriculum design, is established in the RA Learning Results statement that will define each of the aspects of the student's training process.

The norm leaves the interpretation of the academic units and institutions, the understanding of the scope of the RA, but speeds up an approach that links them, the RA, with what the subject must know, do and be, at the end of its formative process, one can speak of a certain relationship with the graduation profile; This for Institutions establishes at least three considerations:

- i. Coherence, consistency, sufficiency and opportunity in the approach of a graduation profile related to the contextual and social needs and that has the potential to be demonstrated in its execution, so that the approaches made in the design of the profiles are clear, achievable, measurable and understandable for the educational community in general and

the communities they impact.

ii. Real and detailed articulation of the graduation profile approach with the design of each one of the academic spaces that make up the entire curriculum.

iii. Real evaluation mechanisms that demonstrate the consistency of the curricular approaches and, above all, the state of development of student learning.

Consequently, the design of a curriculum is an academic product, which requires that in addition to disciplinary expertise, a mastery of educational policy, pedagogical and didactic aspects, and the considerations of curricular administration; that allow the evident articulation between the approaches of the profiles, and their deployment to the activities that are established in the student's training process, going through the design of the curricular areas or components, the study plan, evaluation mechanisms among others. This is how Becker establishes it when he states that:

Learning-focused curricular design implies the development and assessment of skills in school, recognizing the importance of competencies and promoting teaching and learning based on reflective practice and teacher professionalization (Beckers, 2002).

Now that regardless of the approaches and practices that make up the methodological body associated with curricular development in the Institutions, and despite the activation of devices and mechanisms that respond to regulatory requirements, in many of these, there are ruptures between the articulation of the curricular design (which are mostly established by a group of experts who do not always have an association in the development of the program), with the curricular development (understood as the implementation of the program, and which is extended to teachers to sometimes transitory, sometimes permanent and that do not always

have an understanding of the scope of the proposed profile), and curricular evaluation (which for the most part are not articulated with the scope of the graduation profiles nor do they account for them).

A reflective process is then required that allows the program design teams to incorporate pedagogical reflections, maintain vigilance over each of the planning aspects until the construction of the academic spaces, making rational use of the programming of the times, knowledge, relationship of these and necessary conditions of the teaching practice.

METHODOLOGY:

This proposal is the result of accompanying the analysis and adjustment to Learning Results with 33 programs from five universities in the country (three private and two public) between 2019 and 2002, with which analysis tools of the curricular approach were applied from three categories associated with the curriculum: -Understandings, Frameworks and Curricular Fundamentals, -Methodologies, Design Tools, and - Management Mechanisms and Academic Evaluation; that were used to know the practices for the definition of the profiles, the degree of understanding in their design, the adaptability of the institutional processes to the specific design of the programs and definition of the progression of learning, among others. Thus the development was raised in three moments:

I. Characterological approach with the 33 academic programs, which allowed recognizing the general factors for the adaptation of a methodology of curricular design focused on Learning Results; Discourse Analysis was used, with a participatory approach in which, through mechanisms such as workshops and work groups, comprehensive bases derived from the academic-

administrative actions of the curriculum were identified.

II. Application of instruments for curricular design focused on the Development of Learning Results; Excel-based mediators were designed, which address the main problems in the development of curricular design focused on learning outcomes.

III. Conceptual approach to the different development frameworks of the curricular design that allow establishing a comparative framework of the curricular development in higher education.

In this sense, text analysis, as a technique, offers a valid solution to establish patterns and recurrences in information of qualitative origin; Thus Corvin & Strauss, support their methodological developments from the understanding that, in the systematic and comprehensive approach to issues related to the ways in which social events are produced (relationships, understandings, actions, among others), there are the essential elements for the construction of a new theory (CORBIN & STRAUSS, 2002).

Here a new theory was not established, but they were able to identify common and, ultimately, invariable patterns in the mechanisms for defining the curricular design. Each of the academic programs was taken as a specific case with which a strategy was designed that allowed, through a set of guiding questions, to recognize the essential aspects of curriculum design; the illustration shows the initial framework of the presented approach. A total of 6 meetings were held with each academic unit in which understandings and design parameters were established taking the table of categories as a reference.

The guiding documents of each institution were analyzed and contrasted with the practical understandings that each academic unit operated. With each of the programs, a design proposal was made that allowed establishing, in some cases and ordering the design commitments of the academic programs.

The results obtained in the analytical process were compared with various curricular and educational theories, which allowed establishing nominal coincidences, mainly related to cognitive approaches, in the mechanisms established by the different programs for the design of their curricular approaches. The following section develops a synthesis of the process.

Cat	Associated questions
Curriculum understandings, frameworks and rationales	<ul style="list-style-type: none"> • ¿Cuáles son los mecanismos que en su institución o programa orientan el diseño del currículo? • ¿Cuáles son los referentes principales de la institución y/o el programa para el diseño y gestión del currículo? • ¿cómo se define el perfil de egreso? • ¿cómo se ha definido la noción de resultado de Aprendizaje?
Methodologies, design tools	<ul style="list-style-type: none"> • What are the characteristics of the curricular model of the institution and/or program? • What are the mechanisms that the institution and/or program establishes for the definition of the graduate profile? • What are the mechanisms for the curricular definition at the macro, meso and micro curricular levels? • Has the institution and/or program defined the use of taxonomies for the curricular definition process? What are their applications?
Academic management and evaluation mechanisms	<ul style="list-style-type: none"> • How is the sufficiency and relevance of the graduate profiles verified and validated? • What are the curricular design mechanisms to define the assignment of academic credits to a course? • How is the degree of relationship between the didactic strategies, the scope of the courses, the credits and the topics verified?

Illustration1: Analysis categories

ANALYSIS OF RESULTS

Differentiated patterns were established in the development of the emphases and models that guide the curricular management in each one of the institutions (educational approach, comprehension of competence, didactic modeling, among others), however in its practical realization (referring to the profiling approach, writing of competencies, scope of the graduation profile, use of taxonomies, among others) the academic teams do not present major differences among themselves, appeals to very similar structures and these are dependent on the personal understandings of each one of the teachers. Here are some analyzes

I. The approach of the graduation profiles is established without verification criteria that facilitate the identification of mechanisms for their validation and measurement.

II. There is no consistency between the formulation of the graduation profiles and the definition of the needs of the identified environments.

III. The models for the definition of the curricular structures in the institutions are proposed from non-relational mechanisms, without a logical sequence that allows to trace a clear route between each one of the proposed moments (-purpose, -purposes of the program, -graduation profile, -competences, -course competences, -transversal and/or institutional competences, -course objectives, -themes, -subthemes)

IV. A unified criterion is not identified in each program and/or institution, derived from a pedagogical commitment, which articulates each one of the aspects raised in the curricular structure, thus, each one of the elements of the program design is projected and managed in a different,

according to the understandings of the teachers, which affects the consistency of the curricular design.

V. Aspects such as research, the development of mathematical, linguistic, and second language skills, as well as those related to social, personal, and intrapersonal development, among others, are separated from the disciplinary development of the program, which makes it difficult to articulate it in the formative process.

VI. The design of the micro curricula, syllabus or course plans, etc., is developed mostly without taking into account the graduation profiles, and in many cases there is no articulation between the courses or subjects of the program, so that thematic reiterations are presented. In the general process, in turn, courses are established that do not have a clear purpose in the development of the program profiles.

VII. There is no clear consistency between the approach of the competences or course objectives, with the thematic development, the activities and the evaluation.

VIII. A very low management is observed in the understanding and adaptation of the academic credits for the definition of the activities, and the general design of the course.

IX. In only four of the academic programs addressed, a joint course planning work between teams of teachers was presented, the other programs did not provide spaces for the joint definition of the training processes.

The foregoing affects the academic quality processes, regarding the adjustment of the design and updating of the courses, adaptation

of evaluation mechanisms and techniques consistent with the training process, development of registration mechanisms for academic activities, traceability of the student training processes, articulation between courses or subjects, adjustment and revision of the graduation profile of the program, revision of the academic credits of the course, and in general of the program,

and other aspects that present an overload to the curricular administration, for Lack of consistency in design.

Five emerging categories were identified, which are considered as key aspects that the different programs and institutions establish as desirable conditions in the curricular approach of higher education programs:



Illustration2: Emerging Categories

I. The approach of the graduate profiles, regardless of its name, Competences, Learning Results, Capacities, among others, must be a comprehensive approach with projective characteristics, associated with possible impacts of the program in a determined time; It must integrate reflections of the current performance of the graduates. His declaration varies according to the institutional conditions, but includes the performances and impacts that the graduate establishes in his professional deployment. It can include direct relationships with trade

union definitions, classification systems such as the National Qualifications Framework, the Unified Occupation Classification for Colombia, among others, that allow predicting the impact in the contexts.

II. Curriculum design proposals must be adjusted as an integral process that allows explaining the association of the different academic spaces in relation to the scope of the profiles, and that allows integration with the base structure proposed by the institution and the program, in areas, components, nuclei,

among others.

III. **It is necessary to unify the syntactic structure for the definition of each one of the curricular levels**, so that a reference pattern is established in the academic community for the definition of the central aspects of the curriculum, and that allows to identify the level of achievement of the actors, in this case as the design focused on Learning Results, requires that the student is established as the center, of a measurable structure, derived from the pedagogical analysis that includes at least verb, object of knowledge, quality condition, purpose and context of realization, the structure may vary according to the curricular approaches, but This must be raised in direct relation to what the student is expected to achieve at the end of the training process.

IV. **The microcurricular level is an interdependent process between courses and towards the graduation profile**; This implies that it is the role of the curricular designers to establish the frameworks in which the course issues must be planned, and it is the teacher's spring to adapt the training process, according to the defined didactics, the evaluation mechanisms, the methodologies, the credits and the Expected learning results, to the specific thematic deployment of the course, in this sense, a system must be established that allows the didactics to be defined in relation to the times and taxonomic levels defined, guaranteeing articulation between the training processes.

V. **Learning evaluation mechanisms must be established**, that allow predicting the degree of appropriation of knowledge in students, and model strategies that guarantee an approach in

favor of student learning, this in order to adapt the didactics and the set of program strategies in the integral development of the students.

As indicated in the methodological development, a theoretical comparison process was established to define the conceptual frameworks, not defined in the narratives but which establish a common development framework for a unified curricular design proposal. The following table establishes the frameworks comparatives:

Cat-emerging	Theoretical comparison
I. Approach to the graduate profiles	<ul style="list-style-type: none"> Projective characteristics of graduation profiles: We can refer to the Projective Theory proposed by Michel Godet. Which focuses on the formulation of future scenarios and O arveception of the programs' impacts. Integaxida of the current performance of graduates: The Outcome-Based Learning Theory (ABR) of Robert Mager and Peter Pide may be relevant, as it emphasizes the Identification and evaluation of aPrendint outcomes to improve student performance. Direct relationships with ckfn guild dons and grading systems: Ali, the contributions of authors such as Robert Oven and his work in defining occupational classifications and job categories can be explored.
II. Adjustment of curriculum design proposals	<ul style="list-style-type: none"> Comprehensive definition of unionization of academic spaces: The Theory of Curricular Integration, proposed by Mida Taba and Joseph Schwab, which addresses the coherent and meaningful integration of the different curricula components. Integration of the base structure proposed by the institute mito and the Program: Here, the Theory of Curricular Design of Ralph 'Wel who highlights the importance of aligning educational objectives and goals with the curricular structure.
III. Identification of the syntactic structure for level definition	<ul style="list-style-type: none"> Reference standard in academic immunity: The Theory of Const NON smo, developed by Jean Piaget and Lev VVIOtSKY. It can be useful to understand how shared and consensual meanings are built in an academic community. Design Centered on Learning Outcomes: Bloom's Taxonomy, proposed by Benjamin Bloom, provides a framework for describing and classifying learning outcomes* at different cognitive levels.
IV. Micro-curricular level as an interdependent process	<ul style="list-style-type: none"> Role of curriculum designers: Here, one can consider the Contributions from authors such as John Biggs and his Theoris del Sprenzizaje Student Centered, which focuses on planning and developing effective learning experiences. Adaptation of the formadyo process by teachers: the Theorb of Active Learning by I- Dee Flnk and b Theory of Social constructivism by Lev Vygotsky may be relevant to understanding how teachers adapt teaching and assessment strategies to promote meaningful and collaborative learning

Board1: Theoretical Comparison Matrix

This model makes it possible to define a specific conceptual base that supports a model of curricular design focused on the modeling of learning.

PROPOSAL

An academic program is an object of knowledge, the product of the investigative reflection of a team of experts, who approach the different contexts to respond to particular needs of the contextual realities; Due to its complexity, the design of a program is affected by both internal and external factors, such as the organization of the teams, the disciplinary domains of each team member, the need to update, among others, and which ultimately affect the comprehensiveness of the result. It is necessary to establish some general approaches on the aspects of curricular organization that will allow the design of the program:

- **Didactic Disaggregation of Learning**

The Didactic Disaggregation of Learning is a curricular design strategy that is based on the analysis of the teachability characteristics that are established in a curricular proposal derived from an analytical process intended to facilitate the integration, articulation, delimitation and gradation of a set of matters defined by a community of knowledge, which have their origin in the need for coherence and cohesion that supports a training process according to the definitions of the model, the modality and the academic level, at least three aspects:

- Respect for the nature of knowledge and methodology.
- Consideration with the learning process
- Coherent approach to the teaching process.

It assumes the curriculum as a projective action, that is to say, that it is achievable in a certain time, that allows to identify the intentions, that includes evaluation mechanisms, of a flexible nature to reorder its structure in favor of the development of learning and the new knowledge derived; Thus, the development of the graduation profile is

essential as a discursive action that declares and intends the orientation of a training process and that allows the identification of each of the fundamental aspects associated with the professional's training.

The process intends to simplify the definition levels established by the academic programs and which, due to their complexity, are difficult to articulate with each other; Chilean, Mexican and Spanish curricular models were analyzed, as well as proposals derived from ANECA, as proposed in the National Qualifications Framework and the curricular design proposals proposed by Antoni Zabala and Philippe Perrenoud; As a general framework, a model centered on four levels of disaggregation can be unified and although each of the proposals establishes different nominations, a basic framework can be established that allows determining the scope of each of these:

- A higher or first level, understood as a comprehensive statement associated with the real scope of the program, which establishes the impact of this, based on the definition of what the graduate will do in professional contexts to meet the needs of the context, this level is related to the impact of the program that attends to the analysis of the context and determines its relevance. This level is related to the macro curricular level and adopts the specific intentions of the institution as its differentiating stamp.
- A level two that establishes It is the disaggregation of attributes and/or central characteristics of that of this higher level; in a set of knowledge related to each other in a methodological, conceptual and operational way and that allow identifying the degree of scope of the profile; These are associated with a specific professional performance, establishing the promise of the program's

value, thus they are linked to the professional performance possibilities of the graduate, and can be directly linked to the occupational profile, associating it with professions, positions or performances. This level is related to the meso-curricular level and includes the curricular organization purposes of the program, which can, according to the definition, be related to the learning trajectories of the program.

- A level three related to the formative process of the students, and that results from the analysis of the performance of the graduate, is understood as the basic and concrete division of the actions and/or knowledge of a performance of the program; allows to define the intentionality of the courses and the progression of learning; It is an objective approach to a comprehensive performance that allows evidence of the formative development of a student and is understood at the micro-curricular level, with the knowledge of the course, or academic space.
- A level four understood as the specific detail of knowledge achievable in a certain time, also related to the micro curricular level and that must be able to be expressed in a concrete, applicable and generalized way to a training process,

and according to its nature it can be conceptual, procedural and/or attitude,

Due to its complexity, the process must maintain a specific cohesion between each of the levels; It is called Didactic Disaggregation, since it requires an analytical process of the teachability characteristics of each of the bets presented in each of the levels, and as a deductive synthesis process, it begins with the definition of the central factors of the program, it is it analyzes the necessary conditions to deploy the student's formative process, guaranteeing the cohesion and sense of the formative processes, in what has been called a didactic path of competence.

Illustration three shows the structure of the model adapted for the CET Colsubsidio, however, the modeling can have several deployments depending on the conditions of the Institution and/or the program, this indicates that the proposal does not establish a mechanism focused on pedagogical definitions associated with the Educational development, on the contrary, is a structure focused on the understanding of the curriculum as a coherent, consistent and progressive structure, focused on the development of the student's skills and/or capacities, in this sense each of the elements that make up the curriculum, are related to each other, guaranteeing the scope of the learning proposed by the program

Some examples are listed below in Figure 3:

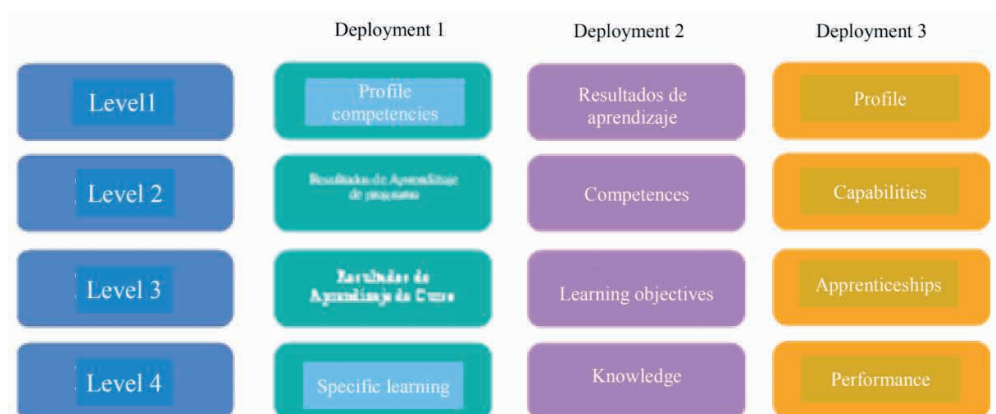


Illustration3: Disaggregation alternatives at the proposed Levels

In the case of modeling the CET, the process begins with the definition of the General Competence -CG- of the program, which is derived from the definition of the contextual, disciplinary, institutional and regulatory analyzes associated with the program, the competence is based on in the definition of the training problems associated with the program and establishes the reflection on the contribution of this to the social and economic development of the country, in terms of what the graduates will be able to do, know and be.

The second level, the Specific Competences -CE-, are the analytical breakdown of the CG, are understood in relation to the occupational profile of the graduate and define the professional framework; these two levels are related to the promise of value of the program and are associated with the approach of the occupational profile, illustration three also shows how the CE are integrally associated with the competition, they are smaller than the CG and the union of the CE establishes the integrity of the first.

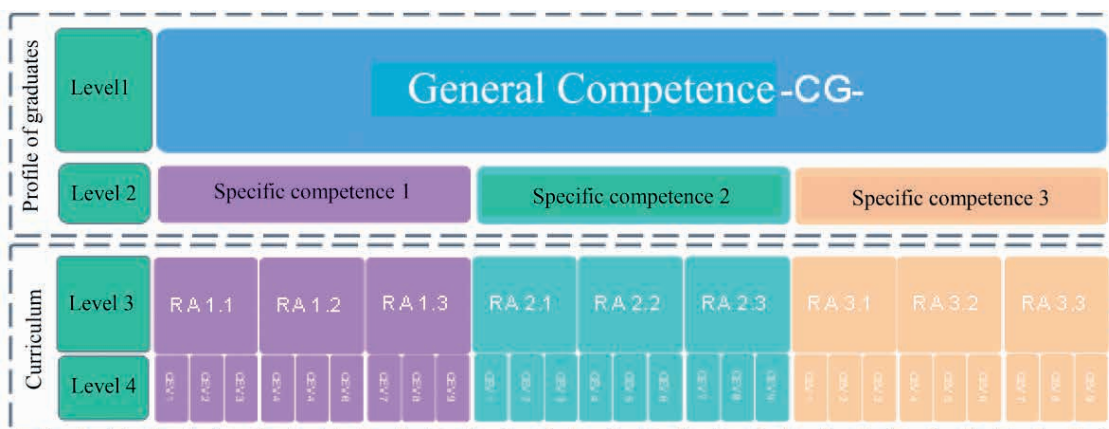


Illustration4: CET Didactic Disaggregation model

The dotted areas establish the link between the definition of the profiles and the design of the study plan, thus taking each of the CE as a basis and developing the didactic synthesis process in order to define the set of knowledge, skills, attitudes among others, necessary for the scope of the profiles, thus each CE, is broken down into Learning Results -RA-, which determine the scope of the courses and their level of taxation to the graduate profiles; Finally, each RA is broken down into Evaluation Criteria that establish the minimum level of detail of the training process.

This analysis demands a continuous decomposition of the discourse, in order to identify its central elements, therefore, each one of the analytical moments establishes

a maximum of interpretive approximation and understanding of the orientations and meanings of the exposed discourse.

What is exposed in this article comprises only one of the aspects derived from the analytical proposal, since didactic interaction mediators based on Excel were also established, which structurally facilitate the design of programs and their adaptation to AR-based models; as well as the design of evaluation models focused on the scope of their learning, to consult them and delve into the methodologies addressed, the mechanisms and the integral proposals can be consulted at <https://modelacioncurricular-dda.blogspot.com/>.

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