

# Structuring of a Performance Assessment Model for the Management of Accountancy Programs at Universidade Tecnológica Federal do Paraná

## Abstract

A review of the literature reveals the need to structure a Performance Assessment model for the internal management of higher education courses. In this context, the aim of this research was to structure a Performance Assessment model for the Accountancy program at Universidade Tecnológica Federal do Paraná that integrates the internal and external assessment perspectives, using the Multicriteria Decision Aid Constructivist (MCDA-C). To respond to the research objectives, an exploratory research was undertaken, including the application of a case study. Based on the structured model, the following were identified: (i) three large areas that correspond to the general course performance: Teaching, Research and Community Services; (ii) eight Fundamental Viewpoints, four for teaching (teaching staff, infrastructure, internal processes and curriculum), two for research (scientific production and scientific dissemination) and two for community services (external projects and external partnerships); and (iii) 84 performance indicators to be considered in Performance Assessment in this context. In conclusion, an assessment model could be structured to respond to the particularities of the Accountancy program.

**Key words:** Performance; Higher Education; MCDA-C; Accountancy; SINAES.

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## 1. Introduction

In Brazil, most undergraduate programs do not assess performance through an assessment system that considers internal and external objectives. Hence, the managers administer their courses solely based on the performance indicators used by external regulatory entities, that is, in many cases, they do not to evaluate highly-relevant factors (Piratelli & Belderrain, 2010).

It is highlighted that, to respond to undergraduate programs' management needs, a Performance Assessment (PA) model needs to be structured that attends to the particularities of the decision process and considers the complexity of performance assessment. Thus, a PA model needs to address all contextual factors, including qualitative and quantitative information; objective and subjective aspects; power relations among the stakeholders in the process; value conflicts and objectives of the groups interested in the decision (Bortoluzzi, Ensslin & Ensslin, 2011; Bortoluzzi, Ensslin & Ensslin, 2010a; Bortoluzzi, Ensslin & Ensslin, 2010b; Ensslin, Montibeller & Noronha, 2001; Montibeller, Belton, Ackermann & Ensslin, 2008; Montibeller & Belton, 2009;).

In that context, the research question emerges: "What performance indicators need to be considered in a Performance Assessment model for the higher education program in Accountancy, taking into account the particularities of the decision-making context?" to answer the research question, the general aim is to structure a Performance Assessment model for the Accountancy program at Universidade Tecnológica Federal do Paraná (UTFPR), which considers the decision maker's perceptions through the Multicriteria Decision Aid Constructivist (MCDA-C).

To reach the general objective that was proposed, the Multicriteria Decision Aid Constructivist Method was selected as the intervention instrument, which permits: (i) identifying the research objectives of the undergraduate program; (ii) identifying course performance dimensions; (iii) constructing performance indicators to measure the course objectives.

This study is justified as follows: (i) it contributes to the scientific community by developing a research on Performance Assessment in Higher Education; (ii) it contributes to the academic community as it presents a case study in which the MCDA-C method is applied; and (iii) it contributes to the theme Performance Assessment of higher education as it applies a scientifically consolidated method to structure a multi-criterion assessment model, which considers the particularities of the decision-making context.

Besides the introductory aspects presented, the research is organized in the following sections: (i) theoretical framework; (ii) research method; (iii) research results; and (iv) final considerations.

## 2. Theoretical Framework

Education, mainly at the higher level, plays an important social role: to contribute not only to economic development, but also to human development, graduating ethical and competent professionals who are capable of constructing relevant scientific knowledge. Hence, besides considering the quality of teaching, educational assessment should also take into account whether society's expectations are being attended to (Sobrinho, 2008).

In that context, the need for course performance assessment emerges in Higher Education Institutions (HEI). First, however, the external assessment process higher education programs are submitted to needs to be discussed through, as the higher education assessment process has gone through great changes in the last two decades, mainly to adjust to the alterations that have taken place in the context of higher education (Polidori, 2009).

In Brazil, according to Polidori (2009, p. 444), educational assessment processes can be divided in four cycles:

In the first cycle (1986 to 1992) – several initiatives to organize an evaluation process, and the existence of isolated assessments in the country, without a national assessment (PARU, GERES);

Second cycle (1993 to 1995) – called policy formulation. Establishment of Institutional Assessment Program at Brazilian Universities (PAIUB);

Third cycle (1996 to 2003) – called consolidation or implementation of the governmental proposal. The National Course Exam (ENC), aka *Provão*, and the Supply Condition Assessment (ACO) were developed, later called Teaching Condition Assessment (ACE). Finally, some Decrees were issued to regulate and organize the assessment of HEI;

Fourth cycle (2003 until today) – called construction of emancipatory evaluation. The SINAES was implemented in the intent to develop a formative assessment in which the particularities of HEI in the country were considered.

In the first cycle, no structured educational process exists at the national level. The two processes that stood out in this period were the Evaluation Program of the University Reform (PARU) and the assessment proposal of the Executive Group of the Higher Education Reform (GERES).

In 1993, in the second cycle, the Institutional Assessment Program of Brazilian Universities was created (PAIUB). The PAIUB was focused on the institution itself and adherence was voluntary. The program was intended at creating an evaluation committee in each institution, which would elaborate a self-assessment project, based on self-regulation. Some universities ended up developing the PAIUC, but it was extinct when the National Course Exam was adopted (Barreyro & Rothen, 2006).

The third cycle starts with the implementation of the National Course Exam, aka *Provão*. The *Provão* was an annual and compulsory test for all graduating students and a condition to receive their degree. The main criterion the program received was related to being an HEI assessment process, using only the students' performance results as, according to the students' test results, the Higher Education Institution received a concept ranging between "A" and "E", where "A" was the "best" and "E" the "worst" result (Polidori, 2009).

In the same cycle, other evaluation forms were introduced, which were less disseminated and only served regulatory purposes though, including: Teaching Condition Assessments (ACE), which regulated the recognition or renewal of course recognitions and the accreditation assessment of new Higher Education Institutions (HEI) or re-accreditation of active HEI. In the same period, the Education Law (LDB) was approved, determining that the validity of institutional functioning permits and course recognitions would be limited and linked to assessments (Barreyro & Rothen, 2006).

The fourth cycle starts in 2003, when the National Higher Education Assessment System (SINAES) was put in practice, in force until today. This system, according to Art. 1º of Law 10.861/2004, is aimed at the qualitative improvement, control of expanded supply, increased efficacy and effectiveness and deepening of Higher Education Institutions' commitments and social accountability.

To reach its objectives, the system departs from three pillars: (i) self-assessment and external assessment of Higher Education Institutions; (ii) assessment of undergraduate programs; and (iii) Performance Assessment of Higher Education Students.

The first pillar, the assessment of Higher Education Institutions, takes for through self-assessment and external assessment processes and addresses ten evaluation dimensions: (i) mission and institutional development plan (IDP) – verifies the institution's mission and whether the proposals included in the IDP are put in practice in accordance with the programs' functioning; (ii) the teaching, research, graduate education and community service policy – describes the didactical-pedagogical organization, curriculum development and checks the procedures to stimulate academic production; (iii) social accountability of the institution – analyzes its contribution to social inclusion, social and economic development and its relation with the public and private sectors and job market; (iv) communication with society – examines how the institution's image is disseminated in society and internal and external communication processes; (v) staff policies – checks the careers of the teaching staff and technical-administrative staff,

qualification, professional development and job conditions; (vi) institutional organization and management – describes the functioning and representativeness of management boards and the participation of the university community in decision processes; (vii) physical infrastructure – checks the entire teaching and research infrastructure, library, information and communication resources; (viii) planning and evaluation – particularly assesses processes, outcomes and efficacy of institutional self-assessment; (ix) student monitoring policies – checks alumni monitoring and pedagogical monitoring of students; (x) financial sustainability – describes funding and resource application policies in view of the continuity of the higher education supply. The analysis of the system's internal and external HEI assessment proposal reveals that SINAES intends to go beyond the regulation and bureaucratic control of the HEI. Through SINAES, the government intends to play an educative role, offering support to allow the HEI to be able to assess themselves, improve their management processes and the quality of their services (Rothen, 2006).

The second pillar, the assessment of higher education courses, in accordance with Law 10.861/2004, is aimed at verifying the teaching conditions students are offered, identifying (i) the teaching staff profile; (ii) the quality of physical infrastructure; and (iii) the didactical-pedagogical organization of the undergraduate program.

The third pillar, the assessment of higher education students' performance, is accomplished by applying the National Student Performance Assessment Exam (ENADE). The test, which combines general and specific questions, is applied to a student sample every three years, at the end of the first and final course year, to check the knowledge evolution or value the institutions have added to the students' skills and competences (Verhine, Dantas & Soares, 2006).

Each of the system pillars and evaluation dimensions develop into indicators that permit Performance Assessment. As this research is focused on the Performance Assessment of a higher education program, in Figure 1, the variables/indicators of the second pillar are presented, grouped in the three component dimensions.

<b>Variables Dimension 1: Didactical-Pedagogical Organization</b>	
1	Implementation of institutional policies in Institutional Development Plan
2	Self-assessment of the program
3	Activities of program coordinator
4	Program objectives
5	Graduate student profile
6	Number of places
7	Curriculum contents
8	Method
9	Attendance to students
10	Encouragement of academic activities
11	Supervised training and professional practice
12	Complementary activities
<b>Variables Dimension 2: Teaching Staff</b>	
1	Composition of NDE (Structuring Teaching Staff)
2	Degree and academic education of NDE
3	Work regimen of NDE
4	Degree and education of program coordinator
5	Work regimen of program coordinator
6	Composition and functioning of course management board or equivalent
7	Degree of teaching staff
8	Work regimen of teaching staff
9	Work experience in higher education teaching or experience of teaching staff

10	Number of places authorized per year per "full-time lecturer"
11	Students per class in theoretical subject
12	Mean number of subjects per lecturer
13	Research and scientific production
<b>Variables Dimension 3: Physical Infrastructure</b>	
1	Teacher rooms and meeting room
2	Work cabinets for teachers
3	Classrooms
4	Student access to informatics laboratories
5	Academic records
6	Basic bibliography books
7	Complementary bibliography books
8	Specialized, indexed and current journals
9	Specialized laboratories
10	Specialized laboratory infrastructure and services

**Figure 1.** Indicators/variables used by SINAES system for undergraduate program performance assessment

Source: Ministry of Education.

Based on the above, the dimensions the Ministry of Education assesses through the SINAES system are important in the context of a teaching institution, although other aspects need to be taken into account in the performance assessment of a higher education course, mainly the particular aspects of each undergraduate program in the context it is inserted in.

The educational assessment process is frequently discussed in Brazil, whether in the sphere of regulators, teaching institutions or society in general. In the educational assessment context, research with a focus on the SINAES system is identified in the literature (Giolo, 2008; Limana, 2008; Polidori, Marinho-Araújo & Barreyro, 2006; Reis, Silveira & Ferreira, 2010; Rodrigues, Ribeiro & Silva, 2006; Sobrinho, 2008; Vieira & Freitas, 2010).

Nevertheless, few studies are focused on the Performance Assessment of undergraduate program. It is highlighted, however, that although few studies address the theme, Performance Assessment is an important organizational management tool, and this assertion is no different for undergraduate programs at Higher Education Institutions (HEI). Nevertheless, the educational assessment process is complex, as it involves not only several variables that are hard to measure and integrate, but also different interests of many stakeholders (Barreyro & Rothen, 2006).

In addition, different Performance Assessment concepts are identified in the literature. In that context, this research's theoretical affiliation should be clarified with regard to the Organizational Performance Assessment (OPA) concept, which is the management process used to construct, fix and disseminate knowledge through the identification, organization, measurement and integration of the aspects that are necessary and sufficient to measure and manage the performance of strategic objectives in a given organizational context (Ensslin & Ensslin, 2009). For the sake of this study, the Performance Assessment concept is restricted to organizational contexts, that is, to environments that involve multiple actors with different degrees of power, not well-known objectives and interests, usually conflicting and dissatisfactions of not well-identified origins for the stakeholders themselves (Ensslin & Ensslin, 2009).

### 3. Research Method

In this section, (i) the methodological framework; and (ii) procedures to construct the model are presented.

### 3.1 Methodological framework

Considering the nature of the study objective, this is an exploratory study, as it is aimed at gaining further familiarity with the problem and making it more explicit (Gil, 1999). The exploratory characteristics of the research can be perceived in the development of the model structuring phase in which, through the facilitator's interaction with the coordinator of the Undergraduate Accountancy program (decision maker), further knowledge on the context was produced, making concerns with the course performance more explicit.

The nature of the research is characterized as practical, through the development of a case study. A practical research, like a case study, emerges from the need to understand complex social phenomena, preserving real-life characteristics (Yin, 2005). As a research modality, the case study is aimed at investigating a specific case that is outlined and contextualized in time and space to seek information (Ventura, 2007). This research design was chosen as the performance of a higher education course is a complex phenomenon, in view of different stakeholders, with distinct interests and objectives. As the objective of a case study is not the construction of generalized knowledge on the theme, but the understanding of the research context's reality, this research practice is compatible with the knowledge view and scientific paradigm adopted in this research. Thus, the specific Performance Assessment model was elaborated for the Accountancy program, in accordance with the particularities of this context, through direct interaction with the course coordinator.

As regards the data collection and instruments used for this process, primary data were used, collected through interviews; as well as secondary data, applying documentary analysis as a research instrument (Richardson, 2008). In the research, the primary data were obtained through interviews with the program coordinator, aimed at structuring the Performance Assessment model. The secondary data consulted to structure the model was the program's Pedagogical Project, as well as the legislation that regulates Brazilian higher education assessment processes.

Concerning the problem approach, this research is characterized as qualitative (Richardson, 2008), as only the model structuring phase was accomplished.

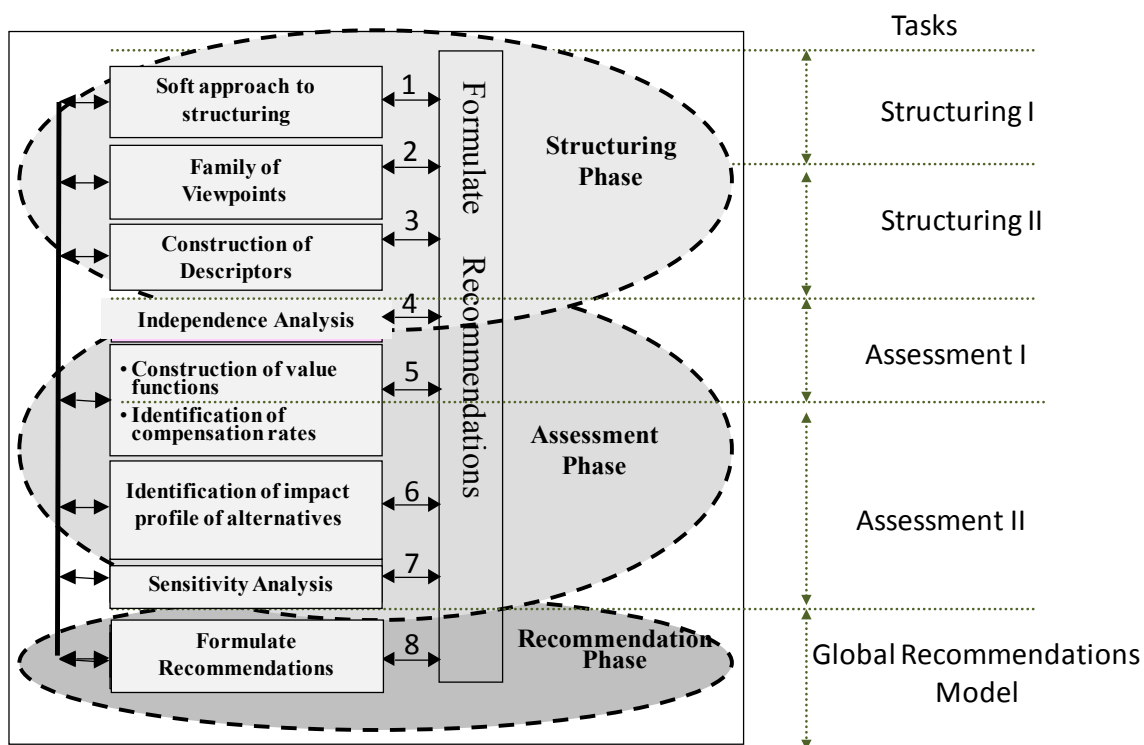
### 3.2 Procedures to construct the model

According to Ensslin *et al.* (2010, p. 128), MCDA-C became consolidated as a scientific management instrument as from the 1980's. The scientific bases of the MCDA-C method emerged when the studies by Roy (1996) and Landry (1995) were published, who defined the limits of objectivity for decision support processes; as well as the studies by Skinner (1986) and Keeney (1992), who acknowledged that the decision maker has his/her specific attributes (objectives, criteria) in each context.

The difference between the MCDA-C and traditional MCDA methods mainly relates to the fact that traditional MCDA restricts decision support to two phases: the first is formulation, and the other assessment to select, according to a defined set of objectives (with little or no participation by the decision maker), among previously set alternatives, the best (excellent) one (Ensslin *et al.*, 2010). According to the authors, the research logic of traditional MCDA is deductive rationalism, while MCDA-C uses a mixed (inductive and deductive) constructivist research logic.

According to Roy (1994, 1996, 2005), MCDA researchers are classified in two groups: those who assume a rationalist position and those who adopt constructivism as research logic. Even among the fans of the constructivist view, however, many experience difficulties to put in practice the structuring phase in a form that acknowledges the limits of objectivity. In line with Ensslin *et al.* (2010), This context stimulated some authors, who consider and prioritize this phase in their research instrument by designating it as MCDA-C to emphasize the research logic. The use of this designation is present in Bana and Costa; Ensslin; Corrêa; Vansnick, (1999); Ensslin, Dutra and Ensslin (2000); Bortoluzzi, Ensslin and Ensslin (2010c); Albuquerque (2011); Lacerda; Ensslin and Ensslin, (2011a); Lacerda; Ensslin and Ensslin, (2011b), among others.

In this context, and in accordance with the convictions and concepts of MCDA-C, this research was constructed based on the Multicriteria Decision Aid Constructivist Method (MCDA-C), which is divided in three main phases, demonstrated in Figure 2: (i) structuring; (ii) assessment; and (iii) elaboration of recommendations.



**Figure 2.** Activity flow of MCDA-C method

Source: Adapted from Ensslin, Montibeller, Noronha (2001).

It is highlighted that, in the present study, only the structuring phase of the Performance Assessment model was undertaken. The research phases are described under items 3.2.1, 3.2.2 e 3.2.3.

### 3.2.1. Contextualization

This phase is aimed at explaining the context and constructing a level of understanding about the environment that permits outlining what belongs to the problem and what does not. *Contextualization* starts with the identification of the decision context in which the actors are presented, that is, those who participate, direct or indirectly, in the management process. The actors in this process are: decision maker; facilitator; players and indirect stakeholders. Next, the problem should be labeled, which involves elaborating its summary, which should contain the main research focus, indicating the intended aim.

### 3.2.2. Hierarchical Value Structure

In this phase, the facilitator encourages the decision maker to talk openly about the context, recommending as few interruptions as possible. Then, the facilitator extracts a range of information, corresponding to the concerns and values of the decision maker and the properties of the context. This information is called Primary Assessment Elements (PAEs), which represent the aspects the decision maker

considers essential and are part of the set of elements that support the dimensions he takes into account when assessing the context. Hence, they are in a too summarized form. The next phase is to expand this information to transform it into concepts. This is accomplished by encouraging the decision maker to talk about the sense of his/her preference with each of the PAEs, as well as about the consequence of not achieving this goal. What results is a huge set of information in the form of preferential directions sought in the context. This information is now grouped per content or area of concern (Ensslin *et al.*, 2001). Each area of concern then consists of a set of concepts. To expand the knowledge for each, a cognitive map is constructed (Eden, 1988). Each map is then dismembered into its constituent clusters and this structure is transformed into a Hierarchical Value Structure (Ensslin *et al.*, 2001; Keeney, 1992).

### 3.2.3. Construction of Descriptors

The top part of the Hierarchical Value Structure represents the strategic objectives or dimensions of the decision maker for the context, which in the MCDA-C method are called Fundamental Viewpoints-FVP. Its bottom parts explain what tactical functions and, further down, what operational activities explain the strategic objectives. Thus, after evidencing the alignment between the strategic and operational objectives, the measurement is missing, which is performed in this phase. The concepts and means on the cognitive maps provide information on the performance of what contextual property should be measured (Bana & Costa *et al.*, 1999). To express the decision maker's preference in this ordinal scale, one should now specify the reference levels. The bottom level is named Neutral and the top Good (Ensslin *et al.*, 2001). This information closes off the construction process of a qualitative understanding in the MCDA-C method.

## 4. Results

In this section, the results of the research undertaken in the Higher Education program in Accountancy at Universidade Tecnológica Federal do Paraná (UTFPR) are presented. The section is organized as follows: (i) contextualization; (ii) hierarchical value structure; (iii) construction of descriptors; and (iv) comparison between SINAES and Performance Assessment model structured based on the MCDA-C.

### 4.1 Contextualization

The case study was undertaken in the Higher Education program in Accountancy at Universidade Tecnológica Federal do Paraná (UTFPR), Campus Pato Branco. In the interviews with the program coordinator, who is responsible for its management, the intent was to check the functioning of the undergraduate program and the way it is managed. At the time the research was accomplished, the program was subject to sporadic assessment processes by external entities. Internally, the sole assessment process is the students' evaluation of the teachers. This reveals the need for a management instrument that informs about the current program performance with regard to the criteria that are considered important for the context and also permits the elaboration of strategies to improve the program performance.

After understanding this management process, the actors were identified who directly or indirectly influence the decision process, as presented in Figure 3.



Decision maker	Program Coordinators
Facilitators	Authors of the research
Players	Campus Dean; Dean of Teaching; Department Head and Course Teachers
Indirect stakeholders	Students

**Figure 3.** Actors involved in the course performance assessment process

Source: Research data.

The decision maker, the course coordinator, was the actor who actively participated in the entire structuring process of the model, as he is the person responsible for its performance, and his perceptions and values should be considered across the process. The facilitator, i.e. the research authors, were the people responsible for developing the method in the selected context. The players were the campus dean, the dean of teaching, the department managers and other course teachers, who did not participate actively in the structuring of the model but influence the decision maker. The indirect stakeholders are the students, whom the decision maker takes into account, but who exert no direct influence.

After defining the actors, together with the decision maker, the label was identified that best identifies the problem: management Performance Assessment of the Higher Education program in Accountancy at UTFPR.

## 4.2 Hierarchical Value Structure

The construction of the Hierarchical Value Structure starts with the identification of the Primary Assessment Elements (PAEs). This identification process of the PAEs happened through interviews with the Program Coordinator, in the attempt to motivate the decision maker to talk about all aspects he finds important and which direct or indirectly affect the performance of the Accountancy program; and also by consulting internal documents and legislation on the assessment of undergraduate higher education programs. After identifying the PAEs, knowledge about the context was further expanded by transforming each PAE into one or more action-oriented concepts. The concepts are also constructed through the interviews, in which the decision maker was asked to talk about each listed PAE in detail. In this phase, the intent was to identify what a good performance would be for each PAE, as well as the intended performance and what the worst performance would be, the minimum acceptable. The ellipsis (...) in each concept separate the intended hub from the psychological opposite and should read as “instead of”.

Figure 4 displays examples of Primary Assessment Elements and their respective action-oriented concept.

PAEs	Concepts
1. Degree of teachers	1 – Having more teachers with a Ph.D. degree... compromising class performance and research productivity.
2. Diligence of teachers	2 – Guaranteeing teachers’ diligence in classes... being unable to address the full program contents and causing students’ dissatisfaction.
3. Teachers’ available time	3 – Guaranteeing that teachers are available for the full time they were hired for... being unable to count on their participation in course decisions.
4. Teachers’ practical experience outside the classroom	4 – Permitting means for teachers to experience accounting practice... being unable to connect theory with practice in teaching.
5. Teachers’ participation in course activities	5 – Guaranteeing that all teachers participate in the activities developed in the course... not using teachers’ different skills.

**Figure 4.** Examples of Primary Assessment Elements and Action-Oriented Concepts

Source: Research data.

In this process: through the interviews with the decision maker and the analysis of the course functioning legislation, 78 Primary Assessment Elements (PAEs) and 96 action-oriented concepts were identified.

The construction of the concepts further expressed the decision maker’s concerns with the course performance. Thus, the concepts could be grouped into main areas of concern, as presented in Figure 5.

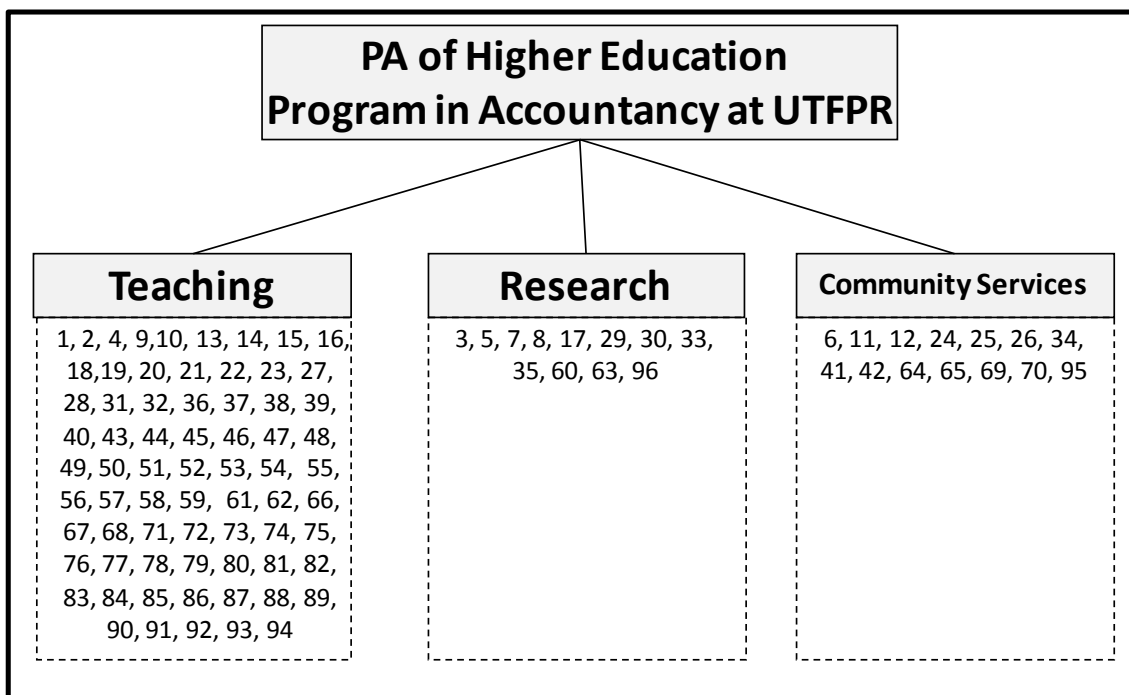


Figure 5. Grouping of Concepts into Main Areas of Concern

Source: Research data.

The three main concerns in terms of course performance are Teaching, Research and Community Services. These three main areas can be dismembered in a further level. Therefore, concepts in each area are read to verify those concepts with the same strategic concern for the decision maker. Through this process, the Fundamental Viewpoints (FVPs) are established.

In Figure 6, the concepts grouped in FVPs are displayed, within the main areas of concern.

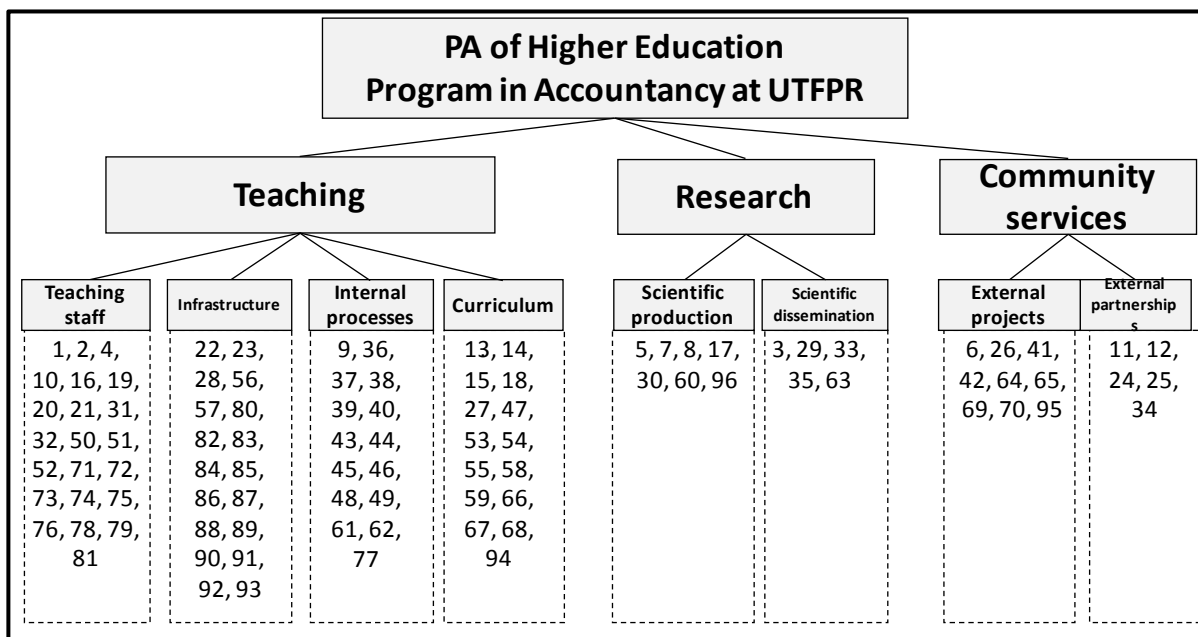


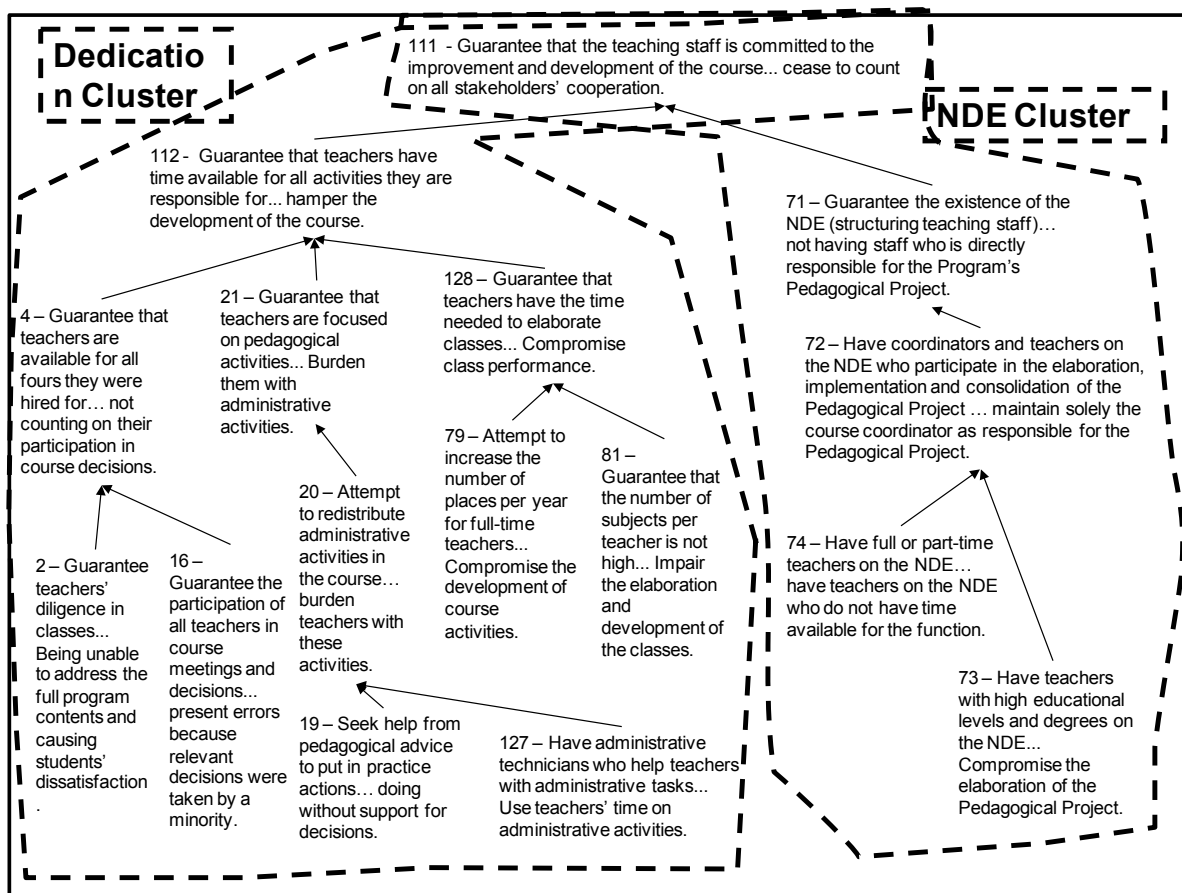
Figure 6. Grouping of Concepts in Fundamental Viewpoints (FVPs)

Source: Research data.

The concern “teaching” corresponds to four areas: “teaching staff, infrastructure, internal processes and curriculum”. The concern “research” corresponds to “scientific production and scientific dissemination” and the concern “community services” to “external projects and external partnerships”.

Based on this grouping into eight FVPs, the means-ends relation maps or cognitive maps can be constructed. The elaboration of the means-ends maps is the next phase in the structuring of the mode. In this phase, the concepts of each FVP are listed in the form of a map, which contains the concepts-means or operational concerns at the bottom, and the concepts-ends or strategic concerns at the top.

In this study, ten Means-Ends Relation Maps were elaborated. Figure 7 only presents the “Teaching Staff” map through, for the sake of illustrating the process developed.



**Figure 7.** Means-Ends Relation Map of FVP “Teaching Staff”

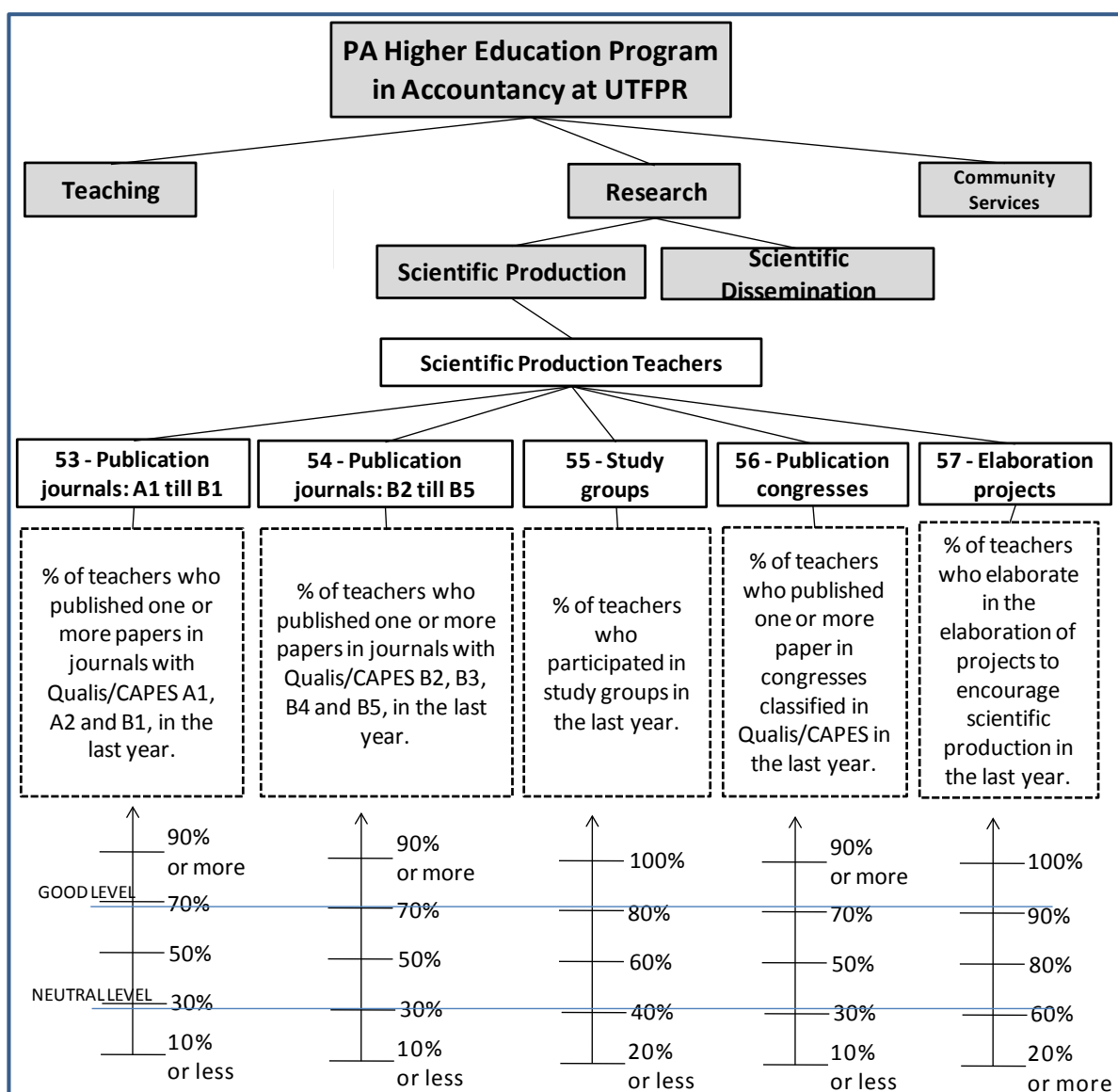
Source: Research Data.

As verified in Figure 4, the map of the FVP “teaching staff” contains two clusters: the first, containing aspects of the teaching staff’s dedication; and the second containing aspects of the “Structuring Teaching Staff (NDE)”. The cognitive map permitted building the decision maker’s knowledge on the strategic course objectives and, consequently, identifying the operational concepts that need to be pursued to reach the strategic objectives.

### 4.3 Construction of Descriptors

In this phase, the means-ends relation maps are transcribed to the Hierarchical Value Structure and the descriptors are constructed. The construction of the descriptors and impact levels is based on the information from the means-ends relation maps. The opposite extremes on the maps help to define the lowest impact level of a descriptor, and the present extremes help to define what the decision-maker considers as the level of excellence. Thus, the concept helps to construct the scale for the descriptors (Ensslin *et al.*, 2001).

In this transition process, 84 performance indicators were identified. Thus, as the model is extensive, in Figure 8, the Hierarchical Value Structure of the FVP “scientific production” and the Elementary Viewpoint (EVP) “teachers’ scientific production” are presented.



**Figure 8.** Hierarchical Value Structure and Descriptors of FVP Teaching Staff-Dedication

Source: Research data.

In Figure 8, performance indicators are constructed for each operational objective, that is, for all concepts situated at the base of the Hierarchical Value Structure. It is highlighted that the descriptors constructed in this phase are ordinal, i.e. the difference between several levels of the descriptor is the same.

As regards teachers' scientific production, the decision-maker is concerned with the quality of the teachers' publication. Performance indicator 53 measures the teachers' publication in Qualis/CAPES journals A1, A2 and B1, which are considered top-quality and the most relevant. Indicator 54 measures the teachers' other publications in Qualis/CAPES journals B2, B3, B4 e B5. Indicator 56 also reveals the decision-maker's concern with teachers' publications in congresses. Indicator 57 shows the decision-maker's concern with the teachers' elaboration of research projects, while indicator 55 shows his concern with the teachers' participation in study groups.

Next, the list is presented of all indicators constructed to measure the performance of the Higher Education program in Accountancy at UTFPR - Campus Pato Branco. The indicators are presented as a figure because they are very numerous.

In Figure 9, the performance indicators constructed for the teaching area are presented.

Name of the Indicator	Description of the Indicator	Name of the Indicator	Description of the Indicator
Diligence	% of teachers with unjustified absences in the last two years.	Students per subject	% of subjects with 40 registered students or less.
Participation in Meetings	% of teachers who participated in all course meetings in the last year.	Infrastructure	Number of classrooms with complete infrastructure completa.* *multimedia, quilted chairs, air-conditioning, whiteboard, computer, individual tables.
Pedagogical Advice	Number of times pedagogical advice was summoned to help with pedagogical course issues in the last year.	Course Resources	% of infrastructural improvement funding taken from course budget in the last year.
Administrative Assistance	Number of trainees and administrative technicians divided by the number of teachers active in the program.	Institutional Resources	% of infrastructural improvement funding taken from HEI budget in the last year.
Work Regimen	% of teachers working under exclusive dedication.	Work Rooms	% of teachers with individual work offices.
Number of Subjects	Relation between teachers' hour load in the program and number of teachers.	Meeting Rooms	The program has its own room for teacher meetings.
Dedication to Structuring Teaching Staff	% of teachers in Structuring Teaching Staff working under exclusive dedication.	Collection Register	What type of register the program maintains for its collection.
Qualification Structuring Teaching Staff	% of teachers in Structuring Teaching Staff with a Ph.D. degree.	Academic Register	What type of academic register the program maintains.
Administrative Technicians	% of administrative activities of coordinator performed by administrative technicians in the last year.	Course Assessment by Students	% of students who assessed the course with score 7 or more in the last year.
Department Head	% of administrative activities of coordinator performed by department head in the last year.	Assessment of Didactic Material	% of teachers who use all* didactic material sources available in their subjects. *books, newspaper articles, congress and journal articles and business newspapers.
Work Regimen	Type of work regimen of current coordinator.	Assessment of Teachers	% of teachers whose performance was scored 7 or more by the students.
Pedagogical Project	Participation and review by coordinator in the elaboration of the program's pedagogical project.	ENADE score	ENADE score students achieved on the most recent assessment.

Institutional Policy	% of meetings of HEI board with the coordinator's participation and discussion about IDP on the agenda in the last year.	Leveling Activities	Number of extra class hours made available in the last year to level students' knowledge with a view to ENADE.
Degree and Experience	Degree and teaching experience of course coordinator.	Communication with Students	Number of communication means* used by the coordination to update students in the last year. *own website, institutional website, e-mail, internal newspaper, notice board.
Selection Criteria	% of selection criteria* the candidate coordinator complies with. * criteria to be established	Course Management Board	% of course management board the student representative participated in in the last year.
Teaching Experience	% of teachers with ten years or more of teaching experience in higher education.	Communication with Administrative Staff	Number of communication means* used by coordination to update administrative staff in the last year. *telephone, own website, institutional website, e-mail, internal newspaper, notice board.
Degree	% of teachers with Ph.D. degree.	External Community	Number of news items* in which the program was cited in the last year in newspaper, magazines, TV, radio, websites. *regional and Brazilian
Internet	% of laboratory computers with Internet access.	Participation in External events	Number of events in which the course participated with the coordinator or a representative's presence in the last year.
Equipment	Number of laboratory computers divided by number of course students.	Promotion of Open-House Events	% of participants from external community* in events held by the course in the last year. *in relation to total number of participants
Rules	Existence and dissemination of informatics laboratory rules.	Course Syllabus	% of teachers who fully* complied with the course syllabus in the last year. *in relation to contents in class diary.
Dissemination of Bibliography	% of students who receive two or more e-mails per year with information about updates in the collection.	MEC Requirements	% of MEC requirements* regarding curriculum structure the program complies with. *see SINAES
MEC Requirements	% of MEC requirements* the collection attends to. *see SINAES document	IDP Policies	% of IDP requirements the program's curriculum structure complies with.
Updates	% of new acquisitions in the last year in relation to the total number of course references in the library.	Changes in Pedagogical Project of the Program	Frequency of restructuring in the Program's Pedagogical Project.
Journals	% of collection consisting of specialized print or computer journals.	On Curriculum Matrix	Supervised training is included in the program's curriculum matrix, with a defined current hour load.
Basic Bibliography	Relation between number of basic bibliography books and number of course students.	Supervision Process	% of training covered by any program teacher's supervision process in the last year.
Complementary Bibliography	Relation between number of books in the complementary bibliography and number of course students.	Laboratory Classes	% of total practical classes that took place in the laboratory in the last year.

**Figure 9.** Performance indicators constructed for the teaching dimension

Source: Research data.

In accordance with Figure 9, the constructed indicators are aimed at measuring and managing important course management aspects, which comprise aspects assessed by external entities, while others are concerns inherent in the particularities of the program in the context it is inserted in.

It is highlighted that, in the performance indicators, the main concerns or objectives for which the decision-maker wants to improve the performance are related to: (i) teaching staff; (ii) infrastructure; (iii) internal processes; and (iv) curriculum.

In Figure 10, the performance indicators constructed for the research area are presented:

Name of the Indicator	Description of the Indicator	Name of the Indicator	Description of the Indicator
Publication journals: A1, A2, B1	% of teachers who published one or more papers in Qualis/CAPES journals A1, A2 and B1 in the last year.	Publication Congresses	% of students who published one or more papers in congresses classified by Qualis/CAPES in the last year.
Publication journals: B2, B3, B4, B5	% of teachers who published one or more papers in Qualis/CAPES journals B2, B3, B4 and B5 in the last year.	Lectures/ Seminars	% of teachers who presented one or more lectures in the last year.
Study Groups	% of teachers who participate in study groups in the last year.	Mini-courses	% of teachers who presented one or more mini-course in the last year.
Publication Congresses	% of teachers who published one or more papers in congresses classified by Qualis/CAPES in the last year.	Internet Dissemination	% of studies by teachers published on the institutional website in the last year.
Elaboration Projects	% of teachers who participate in the elaboration of scientific production encouragement projects in the last year.	Lectures/ Seminars	% of students who presented one or more lectures in the last year.
Publication Journals	% of students who published one or more papers in Qualis/CAPES journals in the last year.	Participation Internal Events	% of students who participated in internal course events in the last years.
Distribution of Students	Relation between number of students under advice for course conclusion paper and number of program teachers in the last year.	Mini-courses	% of students who presented one or more mini-course in the last year.
Quality course conclusion papers	% of course conclusion papers approved with score 9 or higher in the last year.	Internet Dissemination	% of studies by students published on the institutional website in the last year.
Scientific Initiation Subject	% of teachers who required scientific initiation papers in their subjects in the last year.		

**Figure 10.** Performance Indicators constructed for research dimension

Source: Research data.

In accordance with Figure 10, the indicators for the research area are aimed at measuring and managing important aspects to improve the course performance in terms of research. According to the decision-maker, course management should include aspects previously assessed by external entities, as well as others that are concerns inherent in the particularities of the course in the context it is inserted in.

It is highlighted that, in the performance indicators, the main concerns or objectives the decision-maker wants to improve with regard to research are related to: (i) scientific production; and (ii) scientific disclosure.

In Figure 11, the performance indicators constructed for the community service area are presented.

Name of the Indicator	Description of the Indicator	Name of the Indicator	Description of the Indicator
Accounting Practice	% of teachers whose activities were linked to accounting practice (consulting, advice and continuous activities) in the last year.	Activities Complementary Themes	% of additional activities that address themes complementary to the program (finance, economics, administration and others).
Advice Projects	% of teachers who participated in one or more social projects on accounting advice in the last year.	Class Organs and Entities	% of funding for the organization of events that departed from partnerships with class organs and entities in the last year.
Community Service Projects	% of teachers who participated in one or more community service projects in the last year.	Private Initiative	% of funding for the organization of events that departed from partnerships with private initiative in the last year.
Organization Seminars	% of teachers who spent four hours or more on the organization of the most recent course seminar.	Course Budget	% of funding for the organization of events that departed from the course budget in the last year.
Event Organization	% of students who participated in the organization of external events in the last year.	Technical Visits	% of students who made technical visits to organizations in the last year.
Participation External Events	% of students who participated in external events related to accounting in the last year.	Job Contracts	% of students who work in the accounting area.
Advice Projects	% of students who participated in social projects on accounting advice in the last year.	Traineeships and Case Studies	% of subjects that required the elaboration of practical studies in the last year.
Activities Cross-Sectional Themes	% of complementary activities that address cross-sectional themes (sustainability, diversity, human rights and others).		

**Figure 11.** Performance indicators constructed for the community service dimension

Source: Research data.

The indicators reveal that the community service area corresponds to teachers and students' participation in external projects and the ability to close external partnerships.

#### 4.4 Comparison between the SINAES system and the performance assessment model constructed through MCDA-C

In addition to the performance assessment model constructed to manage the Accountancy program at UTFPR, it is considered relevant to compare the model developed with the SINAES system the Ministry of Education uses to assess undergraduate programs.

In Figure 12, the comparison between the two models is described to confront the variables considered by the SINAES system with the variables identified in the present study. In the same Figure, the presence of the variable in the SINAES system and/or in the present study is marked with an "X".



Criteria/Indicators	SINAES	Present Study
Diligence		X
Participation in Meetings		X
Pedagogical Advice	X	X
Administrative Assistance		X
Work Regimen - Teachers	X	X
Number of Subjects	X	X
Dedication to NDE	X	X
Qualification NDE	X	X
Composition of NDE	X	
Administrative Technicians		X
Department Head		X
Work Regimen - Coordinator	X	X
Activities program coordinator	X	X
Pedagogical Project		X
Students per subject	X	X
Number of authorized places per year per "teacher equivalent to full time"	X	
Infrastructure	X	X
Program Resources		X
Institutional Resources		X
Offices	X	X
Meeting Rooms	X	X
Register of Collection	X	X
Academic Register	X	X
Student Assessment of Program	X	X
Assessment Didactic Material	X	X
Teacher Assessment	X	X
ENADE Score		X
Institutional Policy	X	X
Degree and Experience - Coordinator	X	X
Selection Criteria - Coordinator		X
Teaching Experience	X	X
Degree Teachers	X	X
Internet	X	X
Equipment	X	X
Rules	X	X
Dissemination of Bibliography		X
MEC Requirements Collection	X	X
Updates	X	X
Journals	X	X
Basic Bibliography	X	X
Complementary Bibliography	X	X
Leveling Activities	X	X
Communication with Students	X	X
Course Management Board	X	X
Communication with Administrative Staff		X

External Community		X
Promotion Open-House Events	X	X
Course Syllabus		X
MEC Requirements – Curriculum Structure	X	X
IDP Policies	X	X
Changes in CPP		X
In Curriculum Matrix	X	X
Supervision Process	X	X
Laboratory Classes		X
Publication journals: A1, A2, B1	X	X
Publication journals: B2, B3, B4, B5	X	X
Study Groups		X
Publication Congresses	X	X
Elaboration Projects		X
Publication Journals - Students	X	X
Distribution of Students		X
Quality Course Conclusion Paper		X
Scientific Initiation Subject	X	X
Publication Congresses	X	X
Lectures/Seminars – Teachers	X	X
Mini-courses	X	X
Internet Dissemination – Teachers		X
Lectures/Seminars – Students	X	X
Participation Internal Events		X
Mini-courses	X	X
Internet Dissemination – Students		X
Accounting Practice	X	X
Advice Projects - Teachers		X
Community Service Projects		X
Organization Seminars	X	X
Organization Events	X	X
Participation External Events	X	X
Advice Projects - Students		X
Activities Cross-Sectional Themes	X	X
Activities Complementary Themes	X	X
Class Organs and Entities		X
Private Initiative		X
Course Budget		X
Technical Visits		X
Job Contracts		X
Traineeships and Case Studies	X	X
Contratos de Práticas y Estudios de Caso	X	X

**Figure 12.** Comparison between variables used in SINAES system and model developed in the present study

Source: Elaborated by the authors.

As presented in Figure 12, the assessment of higher education programs according to the SINAES system considers three dimensions: (i) didactic-pedagogical organization; (ii) teaching staff; and (iii) physical infrastructure. The model structured in this study also presents three dimensions or areas of concern: (i) teaching, (ii) research; and (iii) community services.

In the document “Assessment of Undergraduate Programs: Bachelor and Teaching Diploma (2008)”, SINAES has published a list of 35 variables that need to be considered in the Performance Assessment of a higher-education program, while the model developed in this research includes 84 variables. Part of this difference in the number of variables is due to the fact that SINAES adopts a broad analysis criterion to score each indicator and due to the decision-maker’s more detailed perception. To give an example, in the SINAES system, Teaching Staff dimension, indicator 13 (research and scientific production), the highest concept for the indicator would be: “When excellent research development exists in the program, involving students (scientific initiation); and when program teachers have published at least an average three productions per teacher in the last three years”. This indicator presents more than one concern the decision-maker has listed (scientific initiation of students and publication by teachers). Thus, in the model structured in this research, this criterion takes a different form than in SINAES, but corresponds to the same variables.

As regards the proposed comparison, the Performance Assessment model structured in this study does not address two indicators that are considered in SINAES, as the decision-maker did not list these as concerns.

Based on the analysis of Figure 12, various indicators listed in the model developed are not addressed in the SINAES system, mainly in the “Community Service” dimension. Therefore, the importance of a higher education program performance assessment that considers the particularities of the decision context is highlighted.

## 5. Final considerations

This research was aimed at structuring a Performance Assessment model for the Accountancy program at UTFPR - Campus Pato Branco, which would consider the decision-maker’s perceptions about the particularities of the decision context. The Multicriteria Decision Aid Constructivist (MCDA-C) method was the intervention instrument chosen to construct the assessment model in function of its ability to incorporate qualitative and quantitative aspects, objective and subjective aspects and, mainly, to build the decision-maker’s knowledge on what objectives to pursue. To achieve the proposed objective, the following was necessary: (i) establish the context to understand what environment the course was inserted in, the actors involved in the management process and what the course intended; (ii) identify the primary evaluation elements and action-oriented concepts; (iii) elaborate the Means-Ends Relation Maps; and (iv) construct the Value Hierarchy Structure and the performance indicators.

The first step in the structuring of the model was made feasible through interviews with the course coordinator and the analysis of knowledge and laws that regulate Brazilian higher education programs, with a view to producing knowledge about the context and listing all concerns the decision-maker believed that affected the program’s performance, that is, the Primary Assessment Elements (PAEs) were identified. In this process, 78 PAEs were identified, which revealed both internal aspects and concerns with the external assessment by the Ministry of Education (MEC).

Next, also through interaction with the decision-maker, knowledge was enhanced and the PAEs were transformed into action-oriented concepts, totaling 96 concepts or action-oriented objectives. The next phase was to group the concepts into large areas of concern, resulting in three areas: “teaching, research and community services”. The next phase was to construct the Means-Ends Relation Maps or cognitive maps, with a view to verifying the cause-effect relations of each concept or objectives and identify the strategic, tactical and operational objectives. In the next phase, the intent was to make the transition from the cognitive maps to a Hierarchical Value Structure and, then, the 84 performance indicators were constructed.

It is highlighted that the research objective was achieved, which was to structure a Performance Assessment model to manage the program. The developed model considered the particularities the program is inserted in and was constructed through the decision-maker's perception. The Hierarchical Value Structure and descriptors revealed that the model considered the external evaluation aspects as well as the particular needs of the program that were not considered in the external assessment process.

In addition to the constructed model, in this research, the variables considered in the SINAES system were compared with the model constructed for the Accountancy program at UTFPR. Thus, it was concluded that the model constructed specifically for the UTFPR program is broader, as it considers different variables the SINAES system does not take into account.

Hence, for the management of a higher education program, the SINAES system presents important variables teaching institutions need to consider. Nevertheless, the model needs to be expanded to respond to some particular characteristics of each higher education program's decision context, which attends to the singularity of its objectives and considers the regional culture, the institutional culture and that of its teachers and collaborators (Bortoluzzi *et al.*, 2010a; Bortoluzzi *et al.*, 2010b; Bortoluzzi *et al.* 2011; Ensslin *et al.*, 2001; Montibeller *et al.*, 2008).

The following research limitations are mentioned: (i) the model structured is valid for the study context. Therefore, its application to another program or HEI is unfeasible; (ii) the model considers the decision-maker's perceptions. Hence, it is legitimate for this decision-maker, within the study context; and (iii) only the structuring phase of the model was developed.

Hence, for future research, the methodology phases that were not addressed in this study should be developed in the Accountancy program, as well as the evaluation phase and recommendations. Also, the proposed method should be apply in other contexts, with other decision-makers, validating it as a Performance Assessment tool that considers the particularities of the decision context.

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