FelicFelicetti, V.L. y Cabrera, A.F. (2022). Students' experiences with graduate education in Brazil. A Confirmatory Factor Analysis Approach. *Revista de Investigación Educativa, 40*(2), 319-339.
DOI: http://dx.doi.org/10.6018/rie.513171

Students' experiences with graduate education in Brazil. A Confirmatory Factor Analysis Approach

Experiencias de estudiantes de posgrado en educación en Brasil. Un enfoque de análisis factorial confirmatorio

Vera L. Felicetti[1]* y Alberto F. Cabrera**
*Graduate Program in Education. La Salle University (Brazil)
**Center for Postsecondary Readiness & Success. American University (USA)

Abstract

Assessing graduate student instruction is a complex task. After all, graduate education is the result of an intricate exercise involving course experiences, teaching, learning engagement, skill-building, collaboration, and learning satisfaction. This article presents the results of a study seeking to assist in the assessment of graduate education in Brazil through a survey about graduate education experiences. A confirmatory factor analysis (CFA), performed on 462 graduate students of various master's and doctoral programs from six Brazilian universities, indicates that student experiences with graduate education underscore three interrelated processes: Engagement in Learning, Collaborative Learning, and Intellectual Growth. The survey that informs this study can contribute to the self-assessment of graduate programs in Education at different faculties and universities, while also facilitating regular graduate education assessment by accreditation agencies such as the Brazilian's Coordination for the Improvement of Higher Education Personnel (CAPES).

Keywords: Graduate programs; student education; self-assessment; Confirmatory Factor Analysis.

1 **Correspondencia:** Dr. Vera L. Felicetti, verafelicetti@gmail.com, Av. Victor Barreto n.2288, Prédio 8 Térreo, CEP 9201-000 Canoas. Rio Grande do Sul, Brasil.

Este artículo es parte del resultado del proceso de autoevaluación del programa de posgrado en educación de la Universidad La Salle.

Agradecemos a las universidades que participaran en este proceso de autoevaluación (UNILASALLE , PUCRS , UNIPLAC , UNIJUÍ , UCS , UFMG) y a los estudiantes que participaron en la encuesta.

Resumen

Evaluar la formación de los estudiantes de posgrado es una tarea compleja. Después de todo, la educación de posgrado es el resultado de un proceso complejo que involucra experiencias de curso, enseñanza, participación en el aprendizaje, dominio de habilidades, la capacidad de trabajar con otros y la satisfacción con lo que se aprende. Este artículo informa los resultados de un estudio que busca ayudar en la evaluación de la educación de posgrado en Brasil mediante la prueba de un instrumento de encuesta destinado a capturar experiencias de educación de posgrado. El análisis factorial confirmatorio, basado en 462 estudiantes de posgrado de programas de educación de maestría y doctorado de seis universidades brasileñas, indica que las experiencias de los estudiantes con la educación de posgrado subrayan tres construcciones interrelacionadas: comprometimiento en el aprendizaje, aprendizaje colaborativo y crecimiento intelectual. El instrumento de encuesta puede contribuir a la autoevaluación de los Programas de Posgrado en Educación, a las facultades y universidades, mientras que también puede contribuir con la evaluación periódica por parte de agencias de acreditación como la Coordinación Brasileña para el Perfeccionamiento del Personal de Educación Superior (CAPES) de Brasil.

Palabras clave: programas de Posgrado; educación estudiantil; autoevaluación; Análisis Factorial Confirmatorio.

Introduction and aims

Across most countries, postsecondary education is regarded as a public good (Altbach, 2009), one that accrues benefits to the whole society (Kezar et al., 2015). Given its social impact, the state recognizes the fact that postsecondary education deserves public investment and support (Altbach, 2009). From a principal-agent theory perspective, governments engage universities as the agents for providing this public good (Lane, 2012). In such an agreement, the state recognizes that colleges and universities are uniquely qualified given their expertise in teaching and research (Cooley, 2015). In this contractual relationship, however, the government retains the right to hold universities accountable for their use of public funds (Lane, 2012). It does so by setting up mechanisms and procedures universities need to follow to report, explain, justify, and answer questions of how public resources have been used, and to what effect (Trow, 1996). Educational assessment is one of such tools by which universities are held accountable (Volkwein, 2010). Assessment, basically, ascertains the quality of postsecondary educational programs, and the proficiency of postsecondary degree recipients (Polidori & Carvalho, 2016).

While accountability is recognized to be a state prerogative, the assessment of postsecondary education varies substantially across countries in terms of scope and degree of centralization (Altbach, 2009). In the European Union (EU), for example, the assessment of postsecondary education rests on a complex process of mutual assurance set up by the Bologna treaty (Hoareau, 2012). While each of the 48 members of the EU union enacts its own regulations in terms of programmatic offerings, the EU commission of postsecondary education makes certain that each country grants postsecondary degrees that meet commonly agreed upon standards (European Higher Education Commission, 2018). This mutual assurance scheme facilitates recognition of

postsecondary degrees granted by a member of the union; for example, Architectural degrees granted by the Sorbonne University of France are recognized by any other member of the EU community, say Germany.

In the USA, under the Constitution, education is a state prerogative (Thelin, 2019). Consequently, overseeing the offering of postsecondary degrees, and the certification of credentials of college graduates rests on each of the 50 states of the union and its territories (McGuiness, 2016). While most states entrust to their governmental agencies the task to oversee and coordinate their institutions of postsecondary education (Bess & Dee, 2012), all states and territories rely on accreditation agencies, which are private and non-profit organizations, to make certain that their universities offer postsecondary education degrees that meet quality standards (Gaston, 2014). In terms of scope and specialization, there are two types of accreditation agencies in the USA: regional and specialized (Volkwein, 2010). The regional accreditation agencies certify that colleges and universities meet educational standards within the region. For that effect, the territory of the USA is divided into six regions, each of them entrusted to a particular accreditation agency (Gaston, 2014). For example, the Southern Association of Colleges and Schools oversees 11 states in the southern region of the USA (e.g., Texas, Florida). Rather than certifying universities, the focus of specialized agencies is the accreditation of educational programs in particular fields or disciplines (e.g., Nursing, Medicine, Teachers Education). ABET, for instance, is the main non-governmental agency that accredits postsecondary programs in engineering, engineering technology, computing and applied sciences (ABET, 2021).

The Brazilian federal government, through the National Higher Education Assessment System - Sinaes (Law 10.861/2004), assumes both the role of principal agent and the role of accreditor of postsecondary educational programs across all disciplines (Leite & Polidori, 2021). The Brazilian approach of monitoring and evaluating postgraduate education is to make certain that postsecondary graduate education offerings produce graduates that respond to growing social demands. Housed in the Brazilian Ministry of Education and Culture, CAPES (Coordenação de Aperfeiçoamento de Pessoal de nivel Superior) is the sole governmental agency responsible for evaluating master's and doctorate programs. Every four years, CAPES evaluates master and doctoral programs across all 4,631 Brazilian programs of higher education. The current evaluation system for the 2017-2020 period contemplates three domains (quesitos in Portuguese) of evaluation: 1) program structure, 2) the quality of the graduates, and 3) the social impact of the graduate program.

The 2017-20 evaluation system is rooted on CAPES' emphasis on creating opportunities for universities for self-reflection of the impact their educational programs have on students. CAPES also want universities to self-reflect on the extent to which their college graduates have a positive impact on society (CAPES, 2018). According to Leite et al. (2020) such strategy may promote programmatic change "[...] because the evaluation, when shared, begins to make sense to people...they can be owners, holders of the process and their application" (p.01). The self-assessment proposal approved by CAPES and coordinated by Dr. Robert Verhine, "involves the participation of different actors from academia or external to it (professors, students, graduates, technicians and others), at different hierarchical levels, from strategic to more operational." (CAPES,

2018, p.4) The results of the self-assessment enable graduate programs to build their strategic plans based on evidence, giving greater argumentation power to program coordinators at the highest levels of management in universities.

While the emphasis on institutional self-evaluation is commendable, CAPES has not provided universities with clear directions and tools to carry on this mandate. It has been left to the educational program coordinators to figure out how to include indicators that would enable them to self-reflect on the quality of their graduate programs.

The purpose of this paper is to address the absence of tools for self-reflection. Essentially, we recommend the use of student surveys that capture key elements of the students' experiences with their graduate education program. Our approach is informed by both organizational theory (Bess & Dee, 2012), and the literature on postsecondary education assessment (Cabrera et al., 2001; Campbell, 2015; Volkwein, 2010). As noted by Kezar (2018), long term change in higher education is most likely to take place when self-assessment rests on information on key functions of the university. By relying on student surveys, for instance, Volkwein et al. (2007) documented the impact of ABET accreditation criteria on adopting effective teaching practices among 140 engineering programs across the USA.

Essentially, our approach stresses the classroom experience as the focus of self-assessment. This emphasis on learning and teaching is consistent with the accreditation processes enacted in the European Union (Gaebel et al., 2018), and among American most important regional (Middle States Commission of Higher Education, 2021) and specialized accreditation agencies (ABET, 2021). This approach is also aligned with the assessment literature, which has singled out the classroom as a key element in judging college educational quality (Cabrera, et al; 2001; Campbell, 2015; Volkwein et al., 2006). Moreover, the impact of the classroom experience goes beyond teaching and learning. Tinto (1996) demonstrated that positive classroom experiences are conducive of persistence in college. In informing the content of the survey itself, we relied on a variety of theories of student engagement (Astin, 1993; Felicetti, 2011; Felicetti & Morosini, 2008; Harper & Quaye, 2009; Kuh et al, 2005), the learning outcomes model (Terenzini et al., 1995), Chickering and Gamson's (1987) principles of good practice in postsecondary education, and models of the classroom experience (Cabrera, et al., 2001; Renn & Reason, 2021; Tinto, 1996; Volkwein et al., 2006).

In the next sections, we provide background information to our study by summarizing CAPES evaluation criteria. We also allude to the conceptual models that guided our survey development. We then report the methodology followed in validating the self-assessment survey of educational experiences. This instrument was applied to 462 graduate students pursuing masters and doctoral programs in six Brazilian Graduate Programs in Education in 2016. In doing so, our focus was to capture students' experiences with developmental courses across the six graduate education programs. Finally, we discuss the implications of our findings to inform programmatic self-evaluation.

CAPES evaluation criteria

Housed in the Brazilian Ministry of Education and Culture, CAPES is the agency responsible for evaluating master's and doctorate programs in Brazil to promote the

expansion and consolidation of these programs in the Brazilian context. To fulfill this mission, CAPES has enacted a complex assessment system which focuses on two distinct processes.

The first process concerns the program proposals to be implemented. If this assessment is on the scale of concepts 1 and 2, the programs are not implemented. Therefore, the minimum concept for implementation is 3. The second evaluation process addresses graduate education programs already in place and ranges from 1 to 7. The evaluation of those graduate education programs takes place every four years. For programs already in operation, which receive concepts 1 and 2, they are disaccredited (closed). The assessment is carried out in 49 areas of knowledge, and follows the same systematic in a set of basic requirements defined by the Technical Scientific Council for Higher Education (CTC-ES). The quadrennial assessment is a quantitative and qualitative process whose results are based on Assessment Forms, Assessment Reports and Area Documents. (CAPES, 2018)

The evaluation form for the 2017-2020 consists of 3 domains to be evaluated: 1) program structure, 2) graduate students' quality 3) social impact. Each domain has a set of sections. Program structure with four sections; graduate students' quality with five sections and social impact with three sections. Each section has a set of indicators that total 45. The domains we will address in this study is the structure Program and its section "1.4, which deals with processes, procedures and results of the program's self-assessment, focusing on student training and intellectual production." (Diretoria de Avaliação, 2019, p. 7) The indicator associated with section 1.4 that we will address in this study is 1.4.4, which evaluates the "Systematic policy of listening to students and graduates about the training process." (Diretoria de Avaliação, 2019, p.8)

The description of how the metric used is performed and the conditions to be met for each of the domains, Very Good (MB), Good (B), Regular (R), Poor (F) or Insufficient (I) is shown in detail in the evaluation reports carried out by the evaluation committee. The analysis carried out in the evaluation uses both quantitative and qualitative indicators that are based on the report prepared by each program. The indicators are evaluated individually and the set of this evaluation forms the evaluation of the sections and, by extension, the evaluation of each domain. The indicator addressed in this paper (1.4.4) is new for the 2017-2020 quadrennium. CAPES' postgraduate assessment system is complex. In this sense, it is important that postgraduate programs in Brazil develop their own methods of self-evaluation, to reach the indicators pre-established by CAPES and improve the quality of their programs.

Theoretical frameworks

With the goal of assessing different aspects pertaining to everything that is carried out in the Graduate Program courses, such as teaching, learning and student self-assessment regarding learning and satisfaction with their education process in the courses taken, the research instrument that was constructed will be presented here. The instrument outlined here supports indicator 1.4 of the CAPES area document, which states that the program is responsible for "the processes, procedures and results of self-assessments of

the program, with a focus on student education [...]"[2] (Diretoria de Avaliacção, 2019). The courses taught in the master's and doctoral programs are part of the student's training, thus the construction of an instrument capable of providing evidence of how this training is going is justified.

The research instrument was prepared based on an instrument created and applied by Felicetti in 2012, to his students at the end of courses taken in the LaSalle's Graduate Education Program, in order to assess student learning, as well as their own practice as a professor. Other research instruments also provided support for building the one used in this work (Felicetti et al., 2013; Morosini et al., 2011; Morosini & Felicetti, 2010).

The instrument, which included 28 indicators, aimed to capture a self-assessment of the student experience in five constructs: Satisfaction (3 indicators), Learning (3 indicators), Course teaching processes (12 indicators), Collaborative learning (4 indicators) and Student engagement (6 indicators).

The learning indicators incorporated in our survey sought to capture important students' experiences with their courses as well as the attainment of course related outcomes (Astin, 1993; Felicetti & Cabrera, 2017; Kuh et al, 2005). The instrument also recognizes that learning occurs differently for every student. For example, Felicetti (2011) notes different styles of learning. Accordingly, the construct of student engagement reflects this diversity by incorporating indicators of learning by oneself, learning in a collaborative setting, learning by adding additional material. For example, for a student it is better to learn writing, for another's reading. Thus, the learning process is complex to be measured, making the construction of indicators to assess learning also complex. In line with this, the central idea of the indicators created here is for the student to be aware of their satisfaction with their learning process and knowledge development. In this way, the instrument captures different forms of learning, such as: summarizing texts, using computer programs, etc. (Chickering & Gamson, 1987; Kuh, et al., 2005).

The indicators aimed at teaching are equally complex to build, since the teaching process involves a set of indicators that can vary according to the context. However, for this instrument, we created indicators that are, or should be, present in different Graduate Programs such as the course content was aligned with the Brazilian socioeconomic, political and environmental context, the course's exercises, labs and assignments were appropriate, etc.

Engagement, in turn, consists of a set of actions aimed at what is done and how it is done (Felicetti, 2011; Felicetti & Morosini, 2008; Harper & Quaye, 2009). For this instrument, key aspects of student's engagement in the scope of graduate studies were chosen, such as the total time and effort students dedicate to their learning (Kuh et al., 2005). Time dedicated to tasks and cooperation among students are taken to be good practices in Higher Education by Chickering and Gamson (1987). As such, the cooperation construct and the indicators pertaining to it were incorporated into the instrument.

2 Original text: "os processos, procedimentos e resultados da autoavaliação do programa, com foco na formação discente [...]".

Methodology

The methodology adopted in this study was of a quantitative nature, being presented in the sequence of this section, the instrument and the indicators used; the source of data collection; the instrument validation; the exploratory and confirmatory factor analysis performed.

Instrument and indicators

Table 1 shows the 28 indicators and their respective constructs. The construct of Satisfaction is appraised by three items assessing satisfaction with the course, and the extent to which the student sees a connection between the course content and her/his professional career. The construct Learning captures attainment of course goals. The Satisfaction and Learning items were appraised by a Likert scale ranging from 1 (completely dissatisfied) to 5 (completely satisfied). Course teaching processes assess the impact of course content on several facets of a student's intellectual and professional development. Collaborative learning appraises several characteristics of working in groups while attending classes such as collaborating on class assignments, giving and receiving assistance from classmates. Both course teaching processes and collaborative learning items were appraised by a Likert scale ranging from 1 (completely disagree) to 5 (completely agree). Finally, the construct of Student Engagement consisted of several indicators of the amount of effort allocated to preparing for the course. The time scale employed asked for estimating the number of hours per week spent on class preparation according to five interval options; namely, 0 (for none), 1 (less than 5 hrs), 2 (less than 10 hrs), 3(less than 15 hrs), 5(15 hrs or more).

Table 1

Graduate education experiences: Indicators and their constructs

INDICATORS/ITEMS	Construct (Concept)
1. The course was relevant for my professional career	**Satisfaction**
2. Satisfied with the course	
3. Would recommend the course to classmates	
1. Learned what the course sought to teach	**Learning**
5 was able to adapt myself to the teaching practices used by the course instructor	
6. The course's learning goals were met	
7. The course contributed to my intellectual development	**Course teaching processes**
8. The course content was aligned with professional careers	
9. The course content was aligned with the Brazilian socioeconomic, political and environmental context	

INDICATORS/ITEMS	Construct (Concept)
10. The course load was manageable	**Course teaching processes**
11. The course's exercises, labs and assignments were appropriate	
12. The course syllabus clearly described what the course content and objectives	
13. The course assessment tools (assignments, seminars, etc.) were aligned with the teaching plan used by the instructor	
14. The course content reflects several disciplines b	
15. The instructor's effort spent in teaching by the was compatible with the degree of effort spent by the students in learning	
16. The course's content is aligned with the objectives of the program	
17. The instructor enriched the classes by relying on different teaching strategies to attend to the learning needs of the students.	
18. Class discussions allowed for deep and constructive reflections	
19. Worked with classmates during classes.	**Collaborative learning**
20. Collaborated with classmates on class assignments	
21. Got help from classmates	
22. Assisted other classmates during the course	
23. Number of hours per week studying alone	**Student engagement**
24. Number of hours per week reading the required readings (books, journal articles, etc.)	
25. Number of hours per week spent summarizing required readings	
26. Number of hours per week using computer programs Word, Excel, PowerPoint, etc.	
27. Number of hours per week researching on the internet	
28. Number of hours per week reading beyond what is required.	

Data source

The database consists of 462 students from master and doctoral programs in education from six Brazilian universities. The sample reflects two Brazilian regions. One university is located in the southeastern region of Brazil, while the others in the southern region. Our sample reflects a wide range of graduate education program quality as appraised by 2013-2016 CAPES ratings. One graduate education program, offered by UFMG, has the highest CAPES' score of seven, followed by graduate education program of PUCRS, with a score of 6, UNIJUÍ's graduate education program, with a score of 5, the graduate education programs of UCS and UNILASALLE with a score of 4, and UNIPLAC's graduate education program with a score of 3 (CAPES, 2018).

At a 2019 national conference of coordinators of graduate educational programs, the first author extended an invitation to join her project (FORPREd, 2019). The coordinators of six educational graduate programs agreed to share with their graduate students the link to the Google survey during the 2019 academic year. In exchange for their cooperation, the first author shared with each coordinator the results of the survey for their individual graduate program.

Instrument validation

We conducted two sets of factor analyses for documenting measurement properties of our survey instrument as recommended by the literature (Bandalos & Finney, 2010). The first set consisted of an exploratory factor analysis (EFA) of the 28 items listed in table 1. The EFA results informed our subsequent examination of the data using confirmatory factor analysis (CFA).

Exploratory Factor Analysis (EFA)

Two reasons led us to the selection of this exploratory method: 1) to examine our assumption that there were indeed five constructs underscoring the correlations among the 28 items (see table 1); and 2) to select the most representative items to be included in our confirmatory factor analyses. One important consideration for exploratory factor analysis is sample size. Research indicates a minimum sample size of 50 is required. (Brown, 2015; Wang & Wang, 2012). Our sample of 462 subjects meets this minimum condition. To carry out EFA, we used SPSS version 25 and Stata version 16. We relied on the factor analysis method with varimax rotation. Varimax rotation assumes that the factors are orthogonal to one another; that is, the correlation between pairs of factors is zero (Field, 2005).

Confirmatory Factor Analysis (CFA)

Once EFA informed us about the number of constructs and items to be retained, our next step was to rigorously test alternative hypotheses about graduate education experiences. In essence, CFA enables researchers to postulate and rigorously test models about latent factors and their item constituents (Bandalos & Finney, 2010; Kline, 2016; Nora & Cabrera, 1993). In CFA, the constructs represent concepts or an abstraction of reality. Each construct must have at least three indicators (Brown, 2015). We deemed items with loadings 0.50 or higher as the most representative of the factor (Wang & Lee, 2019). A loading of 0.5 means that 25% of the indicator's variability is explained by the factor it purports to measure (Brown, 2015). Instead of imposing arbitrary restrictions to the potential correlations among the constructs as EFA does, CFA allows the researcher to ascertain the degree of association among factors freely. Correlations among the constructs of 0.7 or higher negate the hypothesis of independence among two factors (Brown, 2015). In other words, the items measure one single construct instead of two (Byrne, 2012).

We relied on various model fit indices to assist in appraising the fitness of alternative models of graduate education classroom experiences. These indices included the

comparative fit index (CFI), the root mean square error of approximation (RMSEA), the standardized root mean square residual (SRMR) and the chi-square estimation. CFI values equal to or higher than .95 are indicative of a strong model fit (Brown, 2015). As in the case of CFI, the RMSEA index evaluates the overall fit of the model as well while adjusting by sample size. RMSEA values between .00 and .05 indicate a good fit, while values greater than .10 suggest a poor fit (Byrne, 2013; Li-tze & Bentler, 1999). We also estimated 90% confidence values for RMSEA (denoted as RMSEA CI90%), rejecting the model if the observed value exceeded the threshold of 0.10 (Byrne, 2012). Finally, SRMR values of less than or equal to 0.08 are deemed to signify a good model fit (Li-tze & Bentler, 1999).

We used Raykov's omega (ω)[3] (2009) to estimate the reliability of the latent factors. Though widely used, the Cronbach alpha (α) incorrectly assumes that the items are measured without error (Brown, 2015). Moreover, Cronbach alpha incorrectly assumes that each item has similar loading on the construction (Raykov, 2009). In contrast to Cronbach alpha, Raykov's omega assumes that the strength of the association varies across items. It also assumes that the items themselves are measured with some degree of error (Raykov, 2009; Stapleton et al., 2016).

We also relied on the robust maximum likelihood estimation (MLR) procedure, available in version 8 of Mplus (Muthén & Muthén, 2019), for our CFA analysis. The MLR is well equipped to deal with missing values due to its full information maximum likelihood (FIML) procedure. Moreover, MLR is robust against departures of normality (Heck & Thomas, 2015).

Results

Exploratory Factor Analysis

We carried out an exploratory factor analysis (EFA) of the 28 indicators using the principal components analysis with varimax rotation. The results revealed that a three-factor solution explained 88.8% of the total variation in the correlation between the 28 items. The varimax solution is reported in Table 2.

Table 2

EFA of graduate education experiences: Indicators and their constructs

INDICATORS/ITEMS	Factors 1	2	3	Construct (concept)
1. The course was relevant for my professional career **satisf1**	**.832**	.117	.211	Satisfaction
2. Satisfied with the course **satisf2**	**.906**	.111	.153	
3. Would recommend the course to classmates **satisf3**	**.915**	.120	.122	

3 We employed the composite reliability calculator by Colwell to estimate ω (Colwell, 2016).

INDICATORS/ITEMS	Factors 1	2	3	Construct (concept)
4. Learned what the course sought to teach **aprend1**	**.834**	.065	.220	
5.1 I was able to adapt myself to the teaching practices used by the course instructor **aprend2**	**.846**	.056	.216	**Learning**
6. The course's learning goals were met **aprend3**	**.898**	.099	.130	
7. The course contributed to my intellectual development **ensino1**	**.899**	.043	.084	
8. The course content was aligned with professional careers	**.857**	.056	.139	
9. The course content was aligned with the Brazilian socioeconomic, political and environmental context	**.790**	.065	.140	
10. The course load was manageable.	**.855**	.090	.106	
11. The course's exercises, labs and assignments were appropriate.	**.751**	.135	.124	
12. The course syllabus clearly describes the course content and objectives. **ensino2**	**.865**	.106	.099	
13. The course assessment tools (assignments, seminars, etc.) were aligned with the teaching plan used by the instructor.	**.833**	.108	.129	**Course teaching processes**
14. The course content reflects several disciplines.	**.845**	.072	.090	
15. The instructor's effort spent in teaching was compatible with the degree of effort spent by the students in learning.	**.877**	.057	.120	
16.The course's content is aligned with the objectives of the program.	**.905**	.070	.092	
17. The instructor enriched the classes by relying on different teaching strategies to attend to the learning needs of the students. **ensino3**	**.912**	.084	.071	
18. Class discussions allowed for deep and constructive reflections.	.874	.070	.066	
19. Worked with classmates during classes.	.198	.063	**.809**	
20. Collaborated with classmates on class assignments. **coop1**	.230	.074	**.853**	**Collaborative Learning**
21. Got help from classmates. **coop2**	.122	.052	**.833**	
22 Assisted other classmates during the course. **coop3**	.190	.063	**.782**	
23. Number of hours per week preparing yourself for classes by studying alone. **comp**1	.122	**.877**	.000	
24. Number of hours per week preparing yourself for classes by reading the suggested material	.178	**.853**	-.079	**Student engagemen**
25. Number of hours per week spent summarizing required readings. **comp2**	.097	**.846**	.070	

INDICATORS/ITEMS	Factors 1	2	3	Construct (concept)
26. Number of hours per week using computer programs Word, Excel, PowerPoint, etc.	.069	**.851**	.096	
27. Number of hours per week researching on the internet. **comp**3	.047	**.868**	.112	**Student engagemen**
28. Number of hours per week reading beyond what is required. **comp**4	.061	**.811**	.093	
Extraction Method: Principal Component Analysis Rotation Method: Varimax with Kaiser Normalization. Rotation converged after 7 interactions				

The first factor carries the strongest weight in the three-factor solution. It accounts for 66.2% of the total variation in the correlation matrix. The items' loadings ranged from .832 to .905, suggesting that a considerable part of each item variance is explained by this common factor. The item variance accounted for ranged from 69.2% to 82.0%. When treated as a scale, the alpha reliability of the factor is high (α = 0.979). Of the three-EFA factor solution, this factor is the most mixed. It grouped together items belonging to three factors we assumed to be distinct; namely: learning, satisfaction, and course teaching.

The second factor explains 11.5% of the variance in the correlation matrix. It groups together all four items we hypothesized captured different elements of collaborative learning. Moreover, each of the four items has high loadings on the factor, ranging from .782 to .833. In other words, a substantial portion of each item's variance, ranging from 60.8% to 69.4%, is explained by the factor. When treated as a scale, the alpha reliability of the factor is also high (α = .865).

Finally, the third factor, student engagement, explains 11.1% of the variation in the correlation matrix. All six items display high loadings on the factor, ranging from .811 to .877. In other words, the factor is responsible for a large part of the variance of each of the six items, ranging from 65.8% to 76.9%. When treated as a scale, the alpha reliability of the factor is high (α = .928).

Confirmatory Factor Analysis

EFA results supported two of our factors underscoring educational experiences in graduate courses; namely, collaborative learning and student engagement. On the other hand, the EFA results did not corroborate our hypothesis of three independent constructs associated with satisfaction, learning and course teaching processes. Instead, all 18 indicators corresponding to these three constructs loaded onto a single factor.

As its name implies, EFA is a method that explores, rather than rigorously test hypotheses about the factors and their constituent indicators (Brown, 2015; Nora & Cabrera, 1993). In doing so, EFA imposes arbitrary restrictions on the correlations among the factors. To avoid these EFA shortcomings, we submitted to rigorous testing our initial hypothesis of five dimensions of graduate experiences via confirmatory factor

analysis (CFA). The next section documents our confirmatory factor analysis results associated with testing two alternative hypotheses on the factorial structure underscoring student experiences with their graduate education program.

A five-factor approach to students experiences in graduate education courses (model 1)

Consistent with our original hypothesis, our first confirmatory factor model postulated that student experiences with their graduate education programs underscore five unique, but interdependent dimensions (model 1). Our model also hypothesizes that each of these five domains is assessed exclusively by its own set of indicators. Accordingly, *student engagement* was presumed to be measured by 4 items: comp1 comp2, comp3 and comp4 (see table 2). *Collaborative learning* was assessed by 3 items: coop1, coop2 and coop3 (see table 2). *Satisfaction* was assessed by satis1, satis2 and satis3. We relied on three indicators to assess *learning*, namely: aprend1, aprend2 and aprend3. And, the *course teaching process* was appraised by three items, namely: ensino1, ensino2 and ensino3. We also hypothesized that these five latent factors, while interrelated, would represent distinct dimensions of student experiences with graduate education courses. In other words, we hypothesized that the correlations between the pairs of latent factors would be less than .7. It is also important to note that we tested a model with a reduced number of items. The items we retained, while providing a unique perspective of the latent factor, were those that EFA documented to have the highest loading in the factor. Consequently, the number of indicators went down from 28 to 16 (see table 2).

The results of testing our first hypothetical model (model 1) are displayed in figure 1. All indicators of fit support the model: CFI = .964; RMSEA = .053; RMSEA $CI_{90\%}$ = [.043, .062]; and SRMR = .033. The Confirmatory Factor Analysis (CFA) also confirms that the items selected are good indicators of each corresponding construct. Each item has a loading greater than .5 on its corresponding construct (see figure 1).

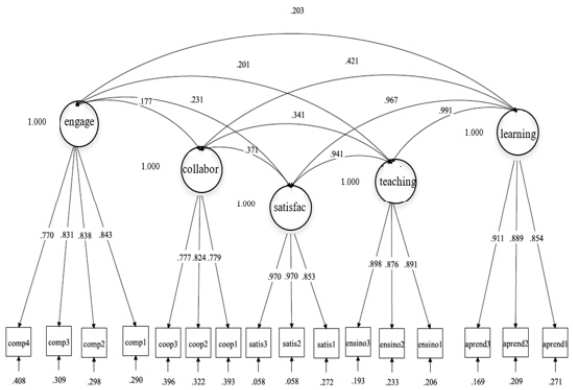

Figure 1. Experiences with graduate education: A five-latent factor approach (Model 1).

Results also suggest that collaborative learning and student engagement are unique dimensions of the graduate education experience. The correlations of each of these two latent factors among themselves and with the rest of the latent factors are less than .70 (see table 3). However, our hypothesis that satisfaction, course teaching processes and learning are distinct dimensions of graduate education experiences constructs was not supported. As shown in figure 1 and table 3, the correlations among these three factors are well above the .7 threshold (Brown, 2015), suggesting they represent a single construct. For instance, the correlation between course teaching processes and learning is .991. The correlation between course teaching processes and satisfaction is .941; and, learning and satisfaction are also highly intertwined (.967).

Table 3

Experiences with graduate experiences: A five factor model approach (model 1)

	Correlation between the latent factors				
	Collaborative Learning	**Course Teaching Processes**	**Student Engagement**	**Learning**	**Satisfaction**
Collaborative learning	-				
Course Teaching Processes	.341	-			
Student Engagement	.177	.201	-		
Learning	.421	.991	.203	-	
Satisfaction	.371	.941	.213	.967	-

A three-factor approach to students experiences in graduate education courses (model 2)

The high correlations among learning, satisfaction, and course teaching (see figure 1 and table 3) suggest that these three constructs may represent a single latent factor, a finding which is consistent with our EFA results. Accordingly, our alternative model postulates that learning, satisfaction, and course teaching processes are a single construct, labeled intellectual growth due to the congruence among them. This model also allows for a correlation between the measurement errors associated with the indicators satis2 (satisfaction with the course) and satis3 (recommend the course). The modification indices suggested that this potential correlation would improve the model fit, which, in fact, it did.

We found support for this alternative model of graduate education. All fit indices reported acceptable values: CFI = .964; RMSEA = .051; RMSEA CI90%= [.042, .060]; SRMR = .034. CFA also confirms that the items selected are good indicators of their allied construct. Each item has a loading greater than .5 on its corresponding construct.

Moreover, as assessed by Raykov's omega index (ω) (2009), the reliability of the three latent factors is high. It is .892 for student engagement, .837 for collaborative learning, and .972 for intellectual growth (see last row, in table 4).

The results also suggest that student engagement, collaborative learning and intellectual growth are three distinct dimensions of a student's experience with her or his graduate program. The correlations between each of these three latent factors are well below the .7 threshold (see figure 2 and table 4). Moreover, Raykov's omega (ω) (2009) indicates that each dimension of the graduate experience is appraised with a high level of reliability by their corresponding items (see last row in table 4). In sum, the final model suggests that the experiences with courses taken in graduate education programs underscore three well-defined and highly reliable latent factors, each composed of an exclusive set of indicators.

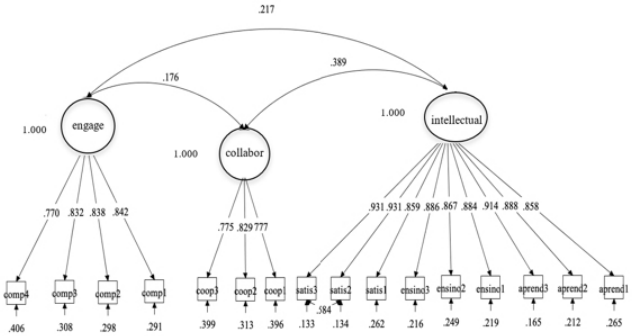

Figure 2. Experiences with graduate education: A three-latent factor approach (Model 2).

Table 4

Experiences with graduate education: A three latent factor approach

	Correlation between the three constructs		
	Student Engagement	**Collaborative Learning**	**Intellectual Growth**
Student Engagement	-		
Cooperation	.176	-	
Intellectual growth	.217	.389	-
Omega index (ω)	.892	.837	.972

Discussion

Our study indicates that graduate education course experiences are multidimensional. Grounded on the literature we proposed 5 dimensions. However, our CFA analyses documented three unique but interrelated dimensions; namely, student engagement,

collaborative learning and intellectual growth (the latter one corresponding satisfaction with the courses and the teaching and learning processes) experienced in the courses.

In this sense, we observe the importance of having an evaluative feedback cycle (Laurillard, 2012), that is, a self-assessment cycle articulating indicators among the dimensions found. And that's what we did, we built an instrument made up of indicators that correspond to the constructs: student engagement, collaborative learning and intellectual growth.

This way, in the educational context, indicators regarding teacher training are relevant to the extent that they indicate aspects that can lead to improvements, whether to teaching and learning processes or different forms of administration of and in educational systems. It is with this perspective that we worked here, to enable improvements in the cycle of self-assessments in Graduate Education Programs, according to the assessment criteria contained in the area's documents established by CAPES.

The statistical validation of the instrument in question allows us to observe that when we talk about the classroom context (Cabrera et al., 2001), aspects beyond teaching and learning permeate it. Indicators related to student engagement and collaborative learning are also relevant and complementary to their education contributing to a quality education. Thus, they are constructs that include a set of indicators that allow us to better observe and/or understand the education provided within the scope of courses taught in the graduate education programs. In this sense, the instrument validated here is a tool that can be applied in the self-assessment of programs, in order to capture information about the development of student education. Thus, it becomes a contributing tool to the question of constant training in the documents in the area of evaluation of CAPES.

Obviously, we are not being simplistic and saying that these constructs are enough to represent education as a whole. Certainly, there are other influences, such as, for example, culture, socioeconomics and motivation. They can influence education, but they are constructs that are more indirect in nature than those presented here, which are directly experienced in the context of classroom courses.

Observe that the indicators aimed at course teaching processes correspond to aspects aimed at selecting, organizing, and planning the content in the scope of the course studied, thus materializing in tasks to be developed by the professor (Libâneo, 1994). This highlights the professor's relationship with the knowledge to be developed with the student, and not specifically a set of practices in and of themselves, guided by the professor's standards or behaviors, which can be used in the daily routine of the classroom.

It is worth noting that the indicators related to learning and satisfaction are more closely related to the student's subjective view, as it is something very particular and somewhat difficult for others to measure, except through tests or exams that are graded. This is not the case here, in which the focus is on student perceptions regarding their learning in courses taken. One might even say that evidence of learning can be seen. Obviously, it can be, and it is. An example is the repercussions of graduates in society. But what we want to emphasize here is that teaching and learning are processes, which, though unique and with distinct objectives, converge on the same point: student education. This allows us to see that teaching and learning interact synchronously, in which teaching is associated to the relation that the professor establishes with knowledge

and, learning is associated to the relation that the student establishes with knowledge. Hence, reflections on learning occur over time and according to the specific characteristics of each student on a continuum in the teaching processes. In other words, the learning process is a process of transformation (Sacristán & Pérez, 2007), that is, a (re) construction resulting from the teaching process, which leads to student satisfaction when they come together, thus indicating a quality education.

Limitations & strengths

Every study has its limitations and strengths. It is no different with the research reported here. We highlight its strengths, such as the construction of indicators, that is, the questions created from different qualitative and quantitative instruments, constructed and then applied to Brazilian students, who answered the instruments. Therefore, the items reflect the Brazilian context, instead of being a simple translation of items from other countries. Moreover, the indicators created are supported by the literature review and relevant theory. Another strong point is with respect to the assessment score attributed to the participating Graduate Education Programs, which ranged from 3 to 7, including all assessment levels considered by CAPES. Another point to be highlighted is the use of advanced methods to document the constructions underlying the indicators, which provided greater support for the indicators in the instrument.

However, as a limitation, with respect to the participating programs, we observed that five programs are located in the Southern region of Brazil and are non-profit institutions. Only one is located outside of this Region and is a federal institution. A wider variety of Graduate Education Programs from different Brazilian regions and in different administrative categories (federal, state, municipal, non-profit and for-profit) may favorably contribute to the development of another instrument capable of including other aspects and constructs related to Education.

Conclusion

Periodically assessing graduate programs is one of the responsibilities of CAPES, which aims to consolidate the master and doctorate programs in Brazil with high-level professional training. The practice of self-assessment in the scope of the Graduate Education Program at La Salle University, includes the strategy of listening to students and graduates in different ways, one of them being statistically validated assessment instruments. With respect to following up on the education provided to students in the scope of courses, the instrument in focus here constitutes one among different self-assessment strategies used in our program.

This article presents the validation of a self-assessment instrument applied in six Graduate Programs in Education in Brazilian contexts, focusing on the development of the courses. The validation noted to identify to what extent the Satisfaction Learning, Course teaching processes, Collaborative learning and Student engagement constructs contribute to the self-assessment process of master's and doctoral programs.

The self-assessment of student education evidences aspects relevant to training the future research professor, with respect to course teaching processes, learning, satisfac-

tion, engagement and collaborative learning among students, permeating the courses. This evidence led to the construction of instruments capable of capturing more than education, aimed at the distinct, but intertwined processes, connected as accomplices in the development of graduate student education, aspects that are explicit in the convergence of teaching, learning and satisfaction on the same construct. Moreover, a future professional is not trained without having a sense of cooperation, working together and solidarity, an engagement to one's learning.

In line with this, this research instrument, validated by the Confirmatory Factor Analysis, can be used to monitor student education in the courses, providing support for course management planning, since all indicators have shown that the instrument is a good representation of it. Therefore, for the six Graduate Education Programs participating in this study, we have a robust model capable of showing how student education is taking place by evaluating the courses and perhaps initiating discussions and/or answers to questions, such as: How do we teach and learn at the graduate level? How do we assess student education in the scope of the courses they take, keeping in mind that they form a psychosocial group? And that there are interactions in this group that are capable of affecting those who participate in it? These are complex questions that are certainly not exhausted in a single set of indicators, since they are not unambiguous, but polysemic, variants associated to the context and its subjects, when the intention is to be observed and/or studied.

In addition, the study presents advanced factor analysis methods to document the underlying dimensions of students' experiences in graduate education courses. Therefore, we present the development of an instrument that includes the self-assessment part of the courses taught in the programs

Obviously, the constructs and indicators found here are not exhaustive or fixed on their own, since they are student assessments of courses taken in 2019 in six Graduate Programs. Given the diversity that exists among the 190[4] Graduate Education Programs in the Brazilian context, a Structural Model 2 - Student Education, can be the starting point for new studies to be carried out. In other words, it is open to new participants, analyses and adaptations, thus contributing to self-assessments carried out in the Brazilian Stricto Sensu and established by CAPES. This is justified, because the context that involves course development encompasses historical, immediate, unpredictable, unique, simultaneous, complex and multidimensional characteristics.

Referencias

ABET. (2021). About ABET. https://www.abet.org/about-abet/

Altbach, P. G. (2009). *Educación superior comparada. El conocimiento, la universidad y el desarrollo.* Universidad de Palermo.

Astin, A.W. (1993) *What matters in college?: Four critical years revisited*. Jossey-Bass.

4 Information available at: https://sucupira.CAPES.gov.br/sucupira/public/consultas/coleta/programa/quantitativos/quantitativoAreaAvaliacao.jsf;jsessionid=IpC19tcuSCVdbQWNHKsjYjWE.sucupira-213

Bandalos, D. L., & Finney, S. J. (2010). Factor analysis: Exploratory and confirmatory. In G. R. Hancock & R. O. Mueller, (Eds.), *The reviewer's guide to quantitative methods in the social sciences* (pp. 93 – 114). Routledge.

Bess, J. L. & Dee, J. R. (2012). *Understanding college ad university organization: Theories for Effective Policy and Practice* (2nd ed., Vol. 1). Stylus.

Brown, T. A. (2015). *Confirmatory factor analysis for applied research* (2nd ed.). The Guilford Press.

Byrne, B. M. (2012). *Structural equation modeling with Mplus: Basic concepts, applications, and programming.* Routledge.

CAPES (Coordination for the Improvement of Higher Education Personnel), 2018. https://dadosabertos.capes.gov.br/dataset/2017-a-2020-cursos-da-pos-graduacao-stricto-sensu-no-brasil

Cabrera, A. F., Colbeck, C. L., & Terenzini, P. T. (2001). Developing performance indicators for assessing classroom teaching practices and student learning. *Research in Higher Education, 42*(3), 327-352.

Campbell, C. M. (2015). Serving a different master: Assessing college educational quality for the public. In M. B, Paulsen (Ed.). *Higher Education: Handbook of Theory and Research* (pp. 525-579). Springer.

Chickering, A. W., & Gamson, Z. F. (1987). Seven Principles for Good Practice in Undergraduate Education**,** 3–7. *AAHE Bulletin***.**

Colwell, S. R. (2016). *The composite reliability calculator.* https://www.thestatisticalmind.com/composite-reliability/

Cooley, A. (2015). Funding US higher education: policy making theories reviewed. *Journal of Higher Education Policy and Management, 37*(6), 673-681.

Diretoria de Avaliação (2019). D*ocumento de Área. Área 38: Educação*. Ministério da Educação (MEC). Coordenação de Aperfeiçoamento de Pessoal de Nível Superior (CAPES). https://www.gov.br/capes/pt-br/centrais-de-conteudo/educacao-doc-area-2-pdf

European Higher Education Commission. (2018). *The European Higher Education Area in 2018: Bologna Process Implementation Report*. https://ec.europa.eu/education/policies/higher-education/bologna-process-and-european-higher-education-area_en

Felicetti, V. L. (2011). *Comprometimento do estudante: um elo entre aprendizagem e inclusão social na qualidade da educação superior* [Doctoral dissertation, Pontifícia Universidade do Rio Grande do Sul].

Felicetti, V. L. (2012). *Graduados PROUNI: um estudo comparativo entre licenciados e não licenciados. EAE – Estudos em Avaliação Educacional, 23*(53), 280-301. http://www.fcc.org.br/pesquisa/publicacoes/eae/arquivos/1767/1767.pdf

Felicetti, V. L. & Cabrera, A. F. (2017). Resultados da Educação Superior. *Avaliação: Revista da Avaliação da Educação Superior. 22*(3), 871-893. http://doi.org/10.1590/S1414-40772017000300016

Felicetti, V. L., & Morosini, M. C. (2008). O Comprometimento do Estudante com a Aprendizagem. Onde está o Estado da Arte. In *ANPEDSUL - VII Seminário de Pesquisa em Educação da Região Sul*. Pesquisa em educação e inserção social.

Felicetti, V. L., Morosini, M. C., & Somers, P. (2013). Affirmative action in the quality of higher education: the voices of PROUNI graduates. *Policy Futures in Education, 11*(4), 401-413. http://dx.doi.org/10.2304/pfie.2013.11.4.401

Field, A. (2005). *Discovering statistics using SPSS* (2nd ed.). Sage Publications.
FORPREd, 2019. https://www.anped.org.br/news/forpred-nota-e-convocacao-ao-debate-sobre-o-processo-de-avaliacao-da-pos-graduacao-em-educacao
Gaebel, M., Zhang, T., Bunesco, L., & Stober, H. (2018). *Learning and teaching the European Higher Education Area.* European University Association. https://eua.eu/downloads/publications/trends-2018-learning-and-teaching-in-the-european-higher-education-area.pdf
Gaston, P. L. (2014). *Higher education accreditation: How It´s changing and why it must?.* Stylus Publishing, LLC.
Harper, S. R., & Quaye, S. J. (2009). *Student Engagement in Higher Education: theoretical perspectives and practical approaches for diverse populations*. Routledge.
Heck, R. H., & Thomas, S. L. (2015). *An introduction to multilevel modeling techniques: MLM and SEM approaches using Mplus.* Routledge.
Hoareau, C. (2012). Deliberative governance in the European Higher Education Area. The Bologna Process as a case of alternative governance architecture in Europe. *Journal of European Public Policy*, *19*(4), 530-548. http://doi.org/10.1080/13501763.2011.610690
Kezar, A. (2018). *How colleges change: Understanding, leading and enacting change* (2nd ed.). Routledge.
Kezar, A., Chambers, A., & Burkhardt, J. C. (2015). *Higher education for the public good: Emerging voices from a national movement.* Jossey-Bass.
Kline, R. B. (2016). *Principles and practices of structural equation modeling* (4th ed.). The Guilford Press.
Kuh, G. D., Kinzie, J., Schuh, J. H., & Whilt, E. J. (2005). *Assessing Conditions to Enhance Educational Effectiveness: The Inventory for Student Engagement and Success.* Jossey-Bass.
Lane, J.E. (2012). Agency theory in Higher Education Organizations. In Bastedo (Ed.). *The organization of Higher Education: Managing colleges for a new era* (pp. 278-303)
Laurillard, D. (2012). *Teaching as a design science: Building Pedagogical patterns for learning and technology*. Routledge.
Law 10.861/2014, 14 de Abril de 2004. Institui o Sistema Nacional de Avaliação da Educação Superior - Sinaes e dá outras providências. https://legislacao.presidencia.gov.br/atos/?tipo=LEI&numero=10861&ano=2004&ato=b59Qzaq1UeRpWT347
Leite, D. B. C., & Polidori, M. M. (2021). Avaliação da educação superior. In M. Morosini (Ed.). *Enciclopédia brasileira de educação superior* (Vol. 1; pp. 390-476). EdiPucRs.
Leite, D., Verhine, R., Vinhares, L. M., & Godoy, J. C. (2020). A autoavaliação na Pós-Graduação (PG) como componente do processo avaliativo CAPES. *Avaliação, Campinas; Sorocaba, SP*, *25*(2) 339-353. http://periodicos.uniso.br/ojs/index.php/avaliacao/article/view/4023/3765
Libâneo, J. C. (1994). *Didática.* Cortez.
Li-tze, H. T., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling: A Multidisciplinary Journal*, *6*(1), 1–55. http://doi.org/10.1080/10705519909540118
McGuiness. A. (2016). The states and higher education. In P. G. Bastedo, R. Altbach, & P.J. Gumport (Eds.), *American higher education in the twenty-first century* (pp. 238-280). The Johns Hopkins Press.

Morosini, M. C. Cabrera, A. F., & Felicetti, V. L. (2011). Competências do pedagogo: uma perspectiva docente. *Educação, Porto Alegre*, *34*(2), 230-240.

Morosini, M. C., & Felicetti, V. L. (2010). International Cooperation Brazil-USA: a case of competences for training knowledge producers. In *The International Multi-Conference on Complexity, Informatics and Cybernetics.* (01-01). IMCIC / ICSIT/ icEME.

Muthén, L. K., & Muthén, B.O. (2019). *Mplus User's guide* (10th ed.) Muthén & Muthén.

Nora, A., & Cabrera, A. F. (1993). Examining Graduate Education Through Structural Modeling. In.: P. Terenzini and L. Baird (Eds.), *Increasing Graduate Retention and Degree Attainment.* (pp. 41-58). Jossey-Bass.

Polidori, M. M., & Carvalho, N. O. de. (2016). Acreditação de instituições de educação superior: uma necessidade ou uma normatização. *Avaliação: Revista Da Avaliação Da Educação Superior*, *21*(3), 821-836. http://periodicos.uniso.br/ojs/index.php/avaliacao/article/view/2773

Raykov, T. (2009). Evaluation of scale reliability for unidimensional measures using latent variable modeling. *Measurement and Evaluation in Counseling and Development*, *42*(3), 223–232. http://doi.org/10.1177/0748175609344096

Renn, K. A., & Reason, R. D. (2021). *College students in the United States: Characteristics, experiences and outcomes* (2nd edition). Jossey-Bass.

Sacristán, J. G., & Pérez, A. I. (2007). *Compreender e transformar o ensino* (4th ed.). Artmed.

Stapleton, L. M., Yang, Ji S., & Hancock, G. R. (2016). Construct meaning in multilevel settings. *Journal of Educational and Behavioral Statistics*, *41*(5), 481–520. http://doi.org/10.3102/1076998616646200

Terenzini, P. T., Springer, L., Pascarella, E. T., & Nora, A. (1995). Influences affecting the development of students' critical thinking skills. *Research in Higher Education*, *6*(1), 23–40.

Thelin, J. R. (2019). *A history of American Higher Education* (3rd ed.). Johns Hopkins Press.

Tinto, V. (1996). Classrooms as communities: Exploring the educational character of student persistence. *Journal of Higher Education*, *68*(6), 599-623.

Trow, M. (1996). Trust, markets, and accountability in higher education: A comparative perspective. *Research & occasional paper series: CHSE.1,96. Center for Studies in Higher Education.* https://escholarship.org/uc/item/6q21h265

Volkwein, J. F. (2010). The assessment context: accreditation, accountability and performance. *New Directions for Institutional Research*. http://doi.org/10.1002/ir.327

Volkwein, J. F., Lattuca, L.S., Harper, B. J., & Domingo, R. J. (2007). Measuring the impact of professional accreditation on student experiences and learning outcomes. *Research in Higher Education*, *48*(2), 251-282.

Wang, J., & Wang, X. (2012). *Structural equation modeling: Applications using Mplus*. John Wiley & Sons.

Fecha de recepción: 1 de marzo de 2022.
Fecha de revisión: 2 de marzo de 2022.
Fecha de aceptación: 22 de marzo de 2022.