# AN EXAMINATION OF THE HIGHER EDUCATION SATISFACTION INDEX AS A MEASURE OF STUDENT SATISFACTION

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## ABSTRACT

***Purpose of the Study:*** *The primary aim of this research was to introduce and validate the Higher Education Satisfaction Index, a comprehensive instrument designed to assess student satisfaction in academic institutions.*

***Method, Design, and Sample:*** *A total of 2687 students of higher education students in Portugal participated in the study. They were surveyed using the Higher Education Satisfaction Index. Two independent samples were created, and a confirmatory factor analysis was conducted to test the model, which was composed of four correlated factors: Institutional Integration; Socio-Relational Satisfaction; Expectations of Professional Integration; and Student Personal Resources.*

***Results:*** *The findings indicated strong validity and robustness of the index in gauging student satisfaction across the participating institutions.*

***Value to Marketing Educators:*** *The Higher Education Satisfaction Index stands out as a potent tool for both institutions and researchers. It provides an efficient method to measure student satisfaction, thus aiding academic institutions in improving educational experiences and, subsequently, their overall value proposition to students.*

**Keywords:** Satisfaction; Higher Education; Higher Education Satisfaction Index

## INTRODUCTION

Academic institutions are important sources of intellectual and professional development. They are spaces where knowledge, ideas, and experiences are shared. Because of the profound changes in recent decades in higher education, which are reflected in new contexts and requirements, the main issue today is not about access to this level of education for a small minority, but the need to ensure adequate training for a population increasingly comprehensive and heterogeneous in terms of their motivations, expectations, skills, and knowledge (Almeida, Marinho-Araujo, & Dias, 2012; Almeida & Vasconcelos, 2008; Esteves, 2014; Ribeiro, Ribeiro, & Pereira, 2019).

In the context of current changes associated with the development of the knowledge society, new challenges are currently emerging regarding the continuing need to generate and disseminate knowledge that can help develop the emerging knowledge economy and for the proper formation of a new class of professionals to integrate with the knowledge society (Butera, 2000; Hammershøj, 2018; McCune, 2017).

Because of the need to form an increasingly comprehensive set of professionals, we should point out that academic satisfaction is a strong predictor of students' performance, specifically pertaining to academic outcomes such as grades, persistence, and graduation rates (Al-Rahmi, Othman, & Yusuf, 2015; Ribeiro, 2019). Additionally, high student satisfaction can lead to positive behaviors like continued enrollment, referrals to peers, and engagement in campus activities (Ribeiro, 2019). For this reason, an academic institution needs to know the level of student satisfaction and ensure it is high.

There exists a noticeable gap in the literature concerning the validation of indices that measure satisfaction within higher education, especially in specific contexts and populations. Addressing this void, this study aims to validate the Higher Education Satisfaction Index (see Appendix A and Appendix B), developed by Ramos and Gonçalves (2014), and to test on a large index the areas of satisfaction with higher education proposed by these authors. Through this investigation, the validity and robustness of the Higher Education Satisfaction Index were verified by conducting two confirmatory factor analyses for each

sample. By doing so, our research not only seeks to validate an existing tool but also to contribute significantly to the current body of knowledge by filling this aforementioned gap. Consequently, this validation provides empirical substantiation of the index's applicability and reliability, thereby serving as a foundational reference for future research in similar contexts.

## LITERATURE REVIEW

### Satisfaction with Higher Education

Satisfaction, a term etymologically derived from the Latin *satisfacere*, is a multidisciplinary concept (Santos, 2018) that currently has great relevance in the context of higher education, as it represents an important indicator in the evaluation of teaching performance and management training, making student satisfaction a key factor for the success of higher education institutions (Martínez & Toledo, 2018). Satisfaction in the academic realm can be succinctly defined as the degree to which students feel content with their educational experiences (Ribeiro, 2019; Santos, 2018). However, we must keep in mind that conceptualizing satisfaction is not as simple as delineating its strategic value (Naylor & Kleiser, 2002).

Carter and Yeo (2015, p. 2) conceptualize satisfaction in the academic context as "a measure of student contentment with each course or program". Specifically, Santos (2018) defines satisfaction with higher education as the overall result obtained from the various aspects of the university experience, including the curriculum, teaching, facilities, and other aspects of campus life, and can represent only a feeling or rational knowledge. In addition, we must consider the continuous process of satisfaction, as "student satisfaction is being shaped continually by repeated experiences in campus life" (Elliott & Shin, 2002, p. 198). Therefore, satisfaction can be represented as a result of an activity or consumption experience or as a process, although the latter representation is more common in the literature, so when considering satisfaction as a process the analysis is also centered on the antecedents of satisfaction and not just in the satisfaction itself (Parker & Mathews, 2001).

Westbrook and Oliver (1991) stated that satisfaction is a one-dimensional concept since the judgment of satisfaction in terms of service performance, or other results is perceived by the consumer as a unique standard of assessment. However, it's essential to clarify that while the sentiment of satisfaction is unidimensional—a student is either satisfied or not—the object or source of this satisfaction can vary. Several studies have defined sources regarding the concept of satisfaction with higher education. Navarro, Iglesias, and Torres (2005) stand out for defining five sources that determine student satisfaction: teaching methods, course administration, teaching staff, enrolment, and infrastructure. In addition, Wiers-Jenssen, Stensaker, and Grogaard (2002) point out eight satisfaction structures in the context of higher education (1. Quality of teaching; 2. Quality of supervision and feedback from academic staff; 3. Composition, content, and relevance of curriculum; 4. The balance between different forms of organized teaching activities and self-tuition; 5. Quality of support facilities; 6. Quality of physical infrastructure; 7. Quality of, and access to leisure activities; 8. Social climate) and they defined five sources of satisfaction: the quality of teaching, the quality of support facilities and physical facilities, social climate, and leisure activities.

On the other hand, Elliott (2002), Elliott and Healy (2001), and Elliott and Shin (2002) used the Student Satisfaction Inventory prepared by the USA Group Noel-Levitz, consisting of 116 items, and eleven sources: effectiveness of academic advice; campus climate; campus life; campus support services; concern for the individual; instructional effectiveness; recruitment and financial aid effectiveness; registration effectiveness; campus safety and security; service excellence; and student-centeredness. Elliott and Shin (2002) found that overall, a student's satisfaction with a university's performance is composed of satisfaction with the excellence of instruction in the major; ability to take desired classes; quality of advice; expertise of the faculty; overall quality of instruction; value for money in terms of tuition fees; approachable advisors; safe and secure campuses; clear and reasonable requirements for the major; availability of the advisor; adequate computer labs; fair and unbiased faculty; and access to information. In addition, Elliott and Shin (2002) found that the key determinants of student satisfaction are students 'feelings of belonging.

## METHODOLOGY

This study aims to evaluate the psychometric proprieties of the Higher Education Satisfaction Index, developed by Ramos and Gonçalves (2014), and to test on a large index the instrument proposed by these authors, as well as, its validation.

**Participants**

Given the purpose of this study, 2687 students of higher education completed an online survey using the Higher Education Satisfaction Index from October 2018 to January 2019. Two independent samples were created; sample A, with 1344 students, and sample B, with 1343 students, to specify the index using sample A and validate using sample B.

Both samples had a national coverage involving all Portuguese universities and polytechnics. Sample A is made up of 493 male students (36.7%) and 851 female students (63.3%), with an average age of 22.11 years in the period of data collection. In turn, sample B included 407 male students (30.3%) and 936 female students (69.7%), with an average age of 21.74 years in the period of data collection.

**Instrument**

The Higher Education Satisfaction Index (HESS) was developed by Ramos and Gonçalves (2014) and resulted from a literature review process that culminated in the definition of 25 items, provided in table1, evaluated by a Likert-type scale with six response points, ranging from zero to total satisfaction, grouped into four areas: Institutional Integration - referring to the perception of the quality of academic services in the institutional aspect provided to the student; Socio-Relational Satisfaction - referring to the perception of the process of integration, construction, and maintenance of the relationships established with the different actors in the context of higher education; Expectations of Professional Integration - regarding the expectation of integration in the job market on the part of the student; and Student Personal Resources - referring to the student's evaluation of the resources provided to help them face the demands of higher education (Ramos & Gonçalves, 2014).

**Table 1. Higher Education Satisfaction Index of Ramos and Gonçalves (2014)**

**Items of the Higher Education Satisfaction Index**

1. Organization and study skills you currently have.
2. Study facilities.
3. Employment opportunity in your area of training.
4. Personal academic integration process.
5. Ability to deal with the demanding levels of the proposed jobs.
6. Organization of physical spaces in facilities (e.g.: classrooms and library).
7. Job opportunities.
8. Integration in the academic environment.
9. Ability to strive to achieve your goals.
10. Student safety.
11. Articulation of the faculty with the job market towards the professional integration of students.
12. Quality of the relationship between students.
13. Confidence in your current skills as a student and personal desire to achieve good results and academic success.
14. Space and physical conditions for learning.
15. Social representation (e.g., prestige) of the course you attend.
16. Social adaptation to the course and college/university.
17. Ability to obtain the notes you want.
18. Facilities hygiene.
19. Clarification of students regarding professional opportunities.
20. Celebrations and ceremonies.
21. Ability to make decisions.
22. Possibility of using new technologies.
23. Prestige of the educational institution you attend.
24. Ability to handle the amount of work proposed.
25. Leisure spaces.

Note: The indicated values refer to the measurement index: 1-Not Satisfied; 2-Little Satisfied; 3-Partially satisfied; 4-Satisfied; 5-Very Satisfied; 6- Totally Satisfied.

**Data analysis**

To analyze the data mentioned above, we used the statistical software SPSS (v. 25, SPSS Inc., Chicago, IL) and AMOS (v. 25, SPSS Inc., Chicago, IL). Thus, we proceeded to study the descriptive statistics of the areas of the Higher Education Satisfaction Index for both samples. Besides that, in sample A, a confirmatory factor analysis was conducted to test the model, composed of four correlated factors: Institutional Integration; Socio-Relational Satisfaction; Expectations of Professional Integration; and Student Personal Resources. The respecified module obtained was validated in sample B.

## RESULTS

Descriptive statistics are presented for each area of the Higher Education Satisfaction Index in Table 2.

**Table 2. Higher Education Satisfaction Index: Descriptive statistics**

| Items of the Higher Education Satisfaction Index | Sample A (*n* = 1344) | | Sample B (*n* = 1343) | |
|---|---|---|---|---|
| | M | SD | M | SD |
| 1. Organization and study skills you currently have. | 4.06 | 1.314 | 4.12 | 1.304 |
| 2. Study facilities. | 4.01 | 1.457 | 4.09 | 1.452 |
| 3. Employment opportunity in your area of training. | 4.12 | 1.393 | 4.02 | 1.442 |
| 4. Personal academic integration process. | 4.33 | 1.357 | 4.33 | 1.363 |
| 5. Ability to deal with the demanding levels of the proposed jobs. | 4.22 | 1.236 | 4.19 | 1.216 |
| 6. Organization of physical spaces in facilities (e.g.: classrooms and library). | 4.12 | 1.418 | 4.10 | 1.425 |
| 7. Job opportunities. | 4.10 | 1.398 | 3.99 | 1.395 |
| 8. Integration in the academic environment. | 4.32 | 1.414 | 4.33 | 1.388 |
| 9. Ability to strive to achieve your goals. | 4.57 | 1.264 | 4.57 | 1.248 |
| 10. Student safety. | 4.45 | 1.363 | 4.48 | 1.366 |
| 11. Articulation of the faculty with the job market towards the professional integration of students. | 4.10 | 1.397 | 4.04 | 1.406 |
| 12. Quality of the relationship between students. | 4.40 | 1.335 | 4.43 | 1.291 |
| 13. Confidence in your current skills as a student and personal desire to achieve good results and academic success. | 4.56 | 1.279 | 4.54 | 1.291 |
| 14. Space and physical conditions for learning. | 4.26 | 1.356 | 4.25 | 1.358 |
| 15. Social representation (e.g., prestige) of the course you attend. | 4.15 | 1.387 | 4.12 | 1.384 |
| 16. Social adaptation to the course and college/university. | 4.33 | 1.344 | 4.36 | 1.311 |
| 17. Ability to obtain the notes you want. | 4.11 | 1.265 | 4.12 | 1.253 |
| 18. Facilities hygiene. | 4.30 | 1.401 | 4.32 | 1.362 |
| 19. Clarification of students regarding professional opportunities. | 3.97 | 1.407 | 3.92 | 1.424 |
| 20. Celebrations and ceremonies. | 3.74 | 1.606 | 3.77 | 1.606 |
| 21. Ability to make decisions. | 4.38 | 1.269 | 4.37 | 1.283 |
| 22. Possibility of using new technologies. | 4.36 | 1.344 | 4.30 | 1.379 |
| 23. Prestige of the educational institution you attend. | 4.50 | 1.321 | 4.55 | 1.312 |
| 24. Ability to handle the amount of work proposed. | 4.07 | 1.350 | 4.07 | 1.317 |
| 25. Leisure spaces. | 3.83 | 1.485 | 3.87 | 1.532 |

Note: The indicated values refer to the measurement index: 1-Not Satisfied; 2-Little Satisfied; 3-Partially satisfied; 4- Satisfied; 5-Very Satisfied; 6- Totally Satisfied.

The results emphasize the profound importance of students' intrinsic motivation and self-confidence in their academic journey. For both samples, item 9, which delves into the student's determination to achieve their goals, held the highest average (sample A, M = 4.57; sample B, M = 4.57). This showcases the

significance students place on personal ambition and perseverance in their educational experience. Similarly, item 13 underscores the importance of students' self-assuredness in their abilities and their hunger for academic success, as reflected by the averages (sample A, M = 4.56; sample B, M = 4.54).

On the other hand, the results indicate that while extracurricular aspects like ceremonies and leisure spaces are appreciated, they don't hold the same weight as core academic sentiments. Item 20, about satisfaction with ceremonies and celebrations, showed the lowest average across both samples (sample A, M = 3.74; sample B, M = 3.77). This was closely followed by item 25, touching on satisfaction with leisure amenities like libraries (sample A, M = 3.83; sample B, M = 3.87). Notably, the Chi-Square test confirmed that there was no significant difference between the two samples concerning the Higher Education Satisfaction Index, reinforcing the consistent patterns of satisfaction and priorities among students. Table 3 shows the descriptive statistics for each area.

**Table 3. Areas of the Higher Education Satisfaction Index: Descriptive statistics**

| Areas | Items | Sample A (n = 1344) M | SD | Sample B (n = 1343) M | SD |
|---|---|---|---|---|---|
| Student Personal Resources | 1, 5, 9, 13, 17, 21, 24 | 4,28 | 1,057 | 4.28 | 1.038 |
| Institutional Integration | 2, 6, 10, 14, 18, 22, 25 | 4,19 | 1,106 | 4.20 | 1.121 |
| Expectations of Professional Integration | 3, 7, 11, 15, 19, 23 | 4,16 | 1,102 | 4.11 | 1.107 |
| Socio-Relational Satisfaction | 4, 8, 12, 16, 20 | 4,22 | 1,160 | 4.24 | 1.143 |

Note: The indicated values refer to the measurement index: 1-Not Satisfied; 2-Little Satisfied; 3-Partially Satisfied; 4- Satisfied; 5-Very Satisfied; 6-Totally Satisfied.

These findings underscore the paramount importance of Student Personal Resources in determining student satisfaction. In both samples, this area emerged as the most crucial, averaging at M = 4.28. It suggests that students' intrinsic capabilities, personal growth opportunities, and self-efficacy are central to their overall contentment and success in higher education.

Following closely, the area of Socio-Relational Satisfaction, averaging M = 4.22 and M = 4.24 for samples A and B respectively, underlines the significance of healthy social relationships and the interpersonal environment within the educational setting. This is further echoed in the Pearson Correlation results, in table 4, which show that Expectations of Professional Integration and Socio-Relational Satisfaction hold the highest correlation. It indicates a strong interdependency between students' professional aspirations and their social interactions within the institution.

However, while all areas hold importance, the relatively lower correlation between Student Personal Resources and Institutional Integration (sample A, r = .57; sample B, r = .59) suggests that individual student attributes and the broader institutional framework might operate somewhat independently, each holding its distinct influence over student satisfaction.

**Table 4. Pearson Correlation Between the Areas of the Higher Education Satisfaction Index**

| Areas | Sample A (n = 1344) 1 | 2 | 3 | 4 | Sample B (n = 1343) 1 | 2 | 3 | 4 |
|---|---|---|---|---|---|---|---|---|
| 1. Student Personal Resources | - | | | | - | | | |
| 2. Institutional Integration | .57*** | - | | | .59*** | - | | |
| 3. Expectations of Professional Integration | .64*** | .65*** | - | | .63*** | .69*** | - | |
| 4. Socio-Relational Satisfaction | .65*** | .64*** | .67*** | - | .65*** | .68*** | .70*** | - |

*** Significant for $p < .001$

Table 5 shows the Cronbach's Alphas by area, the correlation of the Cronbach's Alpha and the Cronbach's Alpha if the area was excluded. From the numerical appreciation, it can be seen that it varies between α = .921 (Personal Resources) and α = .884 (Social-Relational), and all areas have an acceptable

level of internal consistency, given the classification proposed by Pestana and Gageiro (2000). On the other hand, it appears that in the case of the elimination of area "23. Prestige of the educational institution you attend." leads to an improvement in the internal consistency of the Socio-Relational Satisfaction area, to α = .885. It can also be seen that the area "20. Institution parties and ceremonies organized." would lead to an improvement in the internal consistency of the Institutional area, to α = .891.

**Table 5. Cronbach's alpha in the case of individual exclusion of the area by the areas of the Higher Education Satisfaction Index (sample A).**

| | Cronbach's alpha if the area is deleted | Cronbach's alpha |
|---|---|---|
| **Student Personal Resources** | | .921 |
| 1. Organization and study skills you currently have. | .915 | |
| 5. Ability to deal with the demanding levels of the proposed jobs. | .907 | |
| 9. Ability to strive to achieve your goals. | .906 | |
| 13. Confidence in your current skills as a student and personal desire to achieve good results and academic success. | .906 | |
| 17. Ability to obtain the notes you want. | .909 | |
| 21. Ability to make decisions. | .912 | |
| 24. Ability to handle the amount of work proposed. | .911 | |
| **Expectations of Professional Integration** | | .898 |
| 2. Study facilities. | .883 | |
| 6. Organization of physical spaces in facilities (e.g.: classrooms and library). | .873 | |
| 10. Student safety. | .886 | |
| 14. Space and physical conditions for learning. | .873 | |
| 18. Facilities hygiene. | .886 | |
| 22. Possibility of using new technologies. | .893 | |
| 25. Leisure spaces. | .888 | |
| **Socio-Relational Satisfaction** | | .884 |
| 3. Employment opportunity in your area of training. | .855 | |
| 7. Job opportunities. | .850 | |
| 11. Articulation of the faculty with the job market towards the professional integration of students. | .858 | |
| 15. Social representation (e.g., prestige) of the course you attend. | .869 | |
| 19. Clarification of students regarding professional opportunities. | .867 | |
| 23. Prestige of the educational institution you attend. | .885 | |
| **Institutional Integration** | | .878 |
| 4. Personal academic integration process. | .842 | |
| 8. Integration in the academic environment. | .832 | |
| 12. Quality of the relationship between students. | .848 | |
| 16. Social adaptation to the course and college/university. | .847 | |
| 20. Celebrations and ceremonies. | .891 | |

In sample A, confirmatory factor analysis was conducted to test the model composed of four correlated

factors: Personal Resources Professional, Socio-Relational Satisfaction, and Institutional Integration. In specific terms, it is intended to proceed to the identification of the latent variables that explain the correlational structure observed in the set of manifest variables (Kline, 2011). As a way of estimating the parameters of each area, to index the factors, their variance was set to 1.

Preliminary analyses were conducted to verify the distribution of all manifest variables. Thus, outliers p1 and p2 less than .004 and simultaneously $D^2$ less than 170.000 were defined. In this sense, the existence of outliers in the sample was not verified. It should be noted that, despite the violation of the assumption of continuity and multivariate normality associated with the use of the Likert-type index, several computer simulation studies show that the results obtained are credible as long as the number of classes of the variable is high ( at least five, in this case, consisting of six classes, as previously described) and the frequency distribution of the classes approaches the normal distribution (Kline, 2011), which is verified. Univariate normality was assessed by the coefficients of asymmetry (Sk <| 3 |) and kurtosis (Ku <| 10 |) (Kline, 2011) with no significant deviations from normality, as a maximum value was found from | 0.843 | for asymmetry and | 1,100 | for kurtosis.

In the analysis, the Maximum Likelihood was used as an estimator. The results show, for sample A, a reasonable adjustment of the model, $X^2/df$ = 11.011, CFI = .886, NFI = .876, RMSEA = .086, 90% IC [.084, .089], $P$ (rmsea <= .05) < .001. In this sense, an analysis of standardized residues and modification indices (MI) was carried out to identify possible local sources of this deviation. There was a high modification rate between item 3 and item 7 (item 3 ↔ item 7, MI = 461,951), and these two areas were correlated. It was also found that item 22 showed a high modification rate (higher between item 22 and item 21, MI = 134.060) and standardized residues equally high (there was a higher residue of 8,353 between item 22 and item 23 ). In this sense, item 22 was removed from the model. There was a high modification rate between item 10 and item 18 (item 10 ↔ item 18, MI = 55,601) and, equally, a high residue (3,042), which correlated these two areas. It was also found that item 23 presented a high modification rate (higher between areas 23 and item 25, IM = 47,523) and standardized residues equally high (there was a higher residue of 5,017 between item 23 and item 25). In this sense, item 23 was removed from the model. It was found that item 16 showed a high modification rate (higher between areas 16 and item 15, IM = 96,606) and standardized residues equally high (there was a higher residue of 6,823 between item 16 and item 15). In this sense, item 16 was removed from the model. It was also found that item 20 presented a high modification rate (higher between item 20 and item 25, IM = 54,816) and standardized residues equally high (there was a higher residue of 7,112 between item 20 and item 25). In this sense, item 20 was removed from the model. Finally, it was found that item 17 showed a high modification rate (higher between areas 17 and item 8, IM = 43.332) and standardized residues equally high (there was a higher residue of 3.881 between areas 17 and item 25), so item 17 was removed from the model.

The respecified model showed a very good fit, $X^2/df$ = 5.83, CFI = .957, NFI = .949, RMSEA = .060, 90% IC [.056, .064], $P$ (rmsea <= .05) < .001. The analysis of the parameter estimates, described in Table 6, revealed that the Institutional Integration and Student Personal Resources factors have the highest correlation ($r$ = .726, $p$ <.001), followed by the Institutional and Socio-Relational Satisfaction factors ($r$ =. 714, $p$ <.001). All indices saturate in the respective factor with factor weights varying between .863 and .681, so all the manifested variables proved to be good indicators of the respective latent variables. Foremost, the "Student Personal Resources" area demonstrates a robust positive relationship with its items. For instance, a unit increase in "Student Personal Resources" predicts a significant elevation in "Item 1", signifying its strong influence. This relationship's strength remains consistent across various items like Item 5, 9, 13, 21, and 24, with all showing standardized coefficients (β values) greater than 0.7, indicating pronounced positive relationships. Similarly, "Expectations of Professional Integration" exhibits profound relationships with its items, with some items like Item 6 and 14 showing particularly strong ties, reflecting the critical role of professional integration expectations in the satisfaction index. "Socio-Relational Satisfaction" also presents considerable relationships with its items. Especially notable is its relationship with "Item 11," suggesting that socio-relational aspects are pivotal for students' satisfaction. Regarding "Institutional Integration," its influence is evident across its items, particularly with "Item 8", suggesting that how well students feel integrated into the institution profoundly impacts their satisfaction. Moreover, interrelationships between areas like "Institutional Integration" and "Socio-Relational Satisfaction" are strong, underlining the interconnected nature of institutional experiences and socio-relational factors in influencing student satisfaction.

The composite reliability of the factors under study proved to be high, being .947 for the Personal Resources factor, .936 for the Professional Integration factor, .922 for the Socio-Relational Satisfaction

factor, and .922 for the Institutional factor. A composite reliability greater than .70 indicates the appropriate reliability of the construct (Marôco, 2010), which is verified. In turn, the convergent validity of the factors was evaluated employing the Average Extracted Variance (AEV), which proved to be equally adequate, being 0.751 for the Student Personal Resources factor, 0.709 for the Expectations of Professional Integration factor, 0.704 for the Socio-Relational Satisfaction factor and 0.798 for the Institutional Integration factor. An AEV greater than or equal to 0.50 indicates an appropriate convergent validity of the construct (Marôco, 2010), which was verified.

Considering sample B, based on the areas previously considered and the respective areas, a reliability analysis was performed using Cronbach's alpha.

**Table 6. Estimated parameters for the re-specified model of the
Higher Education Satisfaction Index (Sample A)**

| Paths | B | β | SE | p |
|---|---|---|---|---|
| Student Personal Resources → Item 1 | 0.958 | .729 | .032 | < .001*** |
| Student Personal Resources → Item 5 | 1.011 | .818 | .028 | < .001*** |
| Student Personal Resources → Item 9 | 1.060 | .839 | .029 | < .001*** |
| Student Personal Resources → Item 13 | 1.065 | .833 | .029 | < .001*** |
| Student Personal Resources → Item 21 | 0.979 | .772 | .030 | < .001*** |
| Student Personal Resources → Item 24 | 1.027 | .761 | .032 | < .001*** |
| Expectations of Professional Integration → Item 2 | 1.112 | .764 | .035 | < .001*** |
| Expectations of Professional Integration → Item 6 | 1.219 | .860 | .032 | < .001*** |
| Expectations of Professional Integration → Item 10 | 0.954 | .700 | .034 | < .001*** |
| Expectations of Professional Integration → Item 14 | 1.168 | .862 | .030 | < .001*** |
| Expectations of Professional Integration → Item 18 | 0.954 | .681 | .035 | < .001*** |
| Expectations of Professional Integration → Item 25 | 1.036 | .698 | .037 | < .001*** |
| Socio-Relational Satisfaction → Item 3 | 1.034 | .743 | .034 | < .001*** |
| Socio-Relational Satisfaction → Item 7 | 1.078 | .771 | .034 | < .001*** |
| Socio-Relational Satisfaction → Item 11 | 1.129 | .809 | .033 | < .001*** |
| Socio-Relational Satisfaction → Item 15 | 0.976 | .704 | .035 | < .001*** |
| Socio-Relational Satisfaction → Item 19 | 1.075 | .764 | .034 | < .001*** |
| Institutional Integration → Item 4 | 1.158 | .854 | .031 | < .001*** |
| Institutional Integration → Item 8 | 1.220 | .863 | .032 | < .001*** |
| Institutional Integration → Item 12 | 1.017 | .762 | .032 | < .001*** |
| Institutional Integration | | | | |
|    Socio-Relational Satisfaction | 0.714 | .714 | .018 | < .001*** |
|    Expectations of Professional Integration | 0.618 | .618 | .020 | < .001*** |
|    Student Personal Resources | 0.726 | .726 | .017 | < .001*** |
| Socio-Relational Satisfaction | | | | |
|    Expectations of Professional Integration | 0.662 | .662 | .019 | < .001*** |
|    Student Personal Resources | 0.706 | .706 | .018 | < .001*** |
| Expectations of Professional Integration | | | | |
|    Student Personal Resources | 0.580 | .580 | .021 | < .001*** |
| e 3 | | | | |
|    e 7 | 0.604 | .727 | .036 | < .001*** |
| e 10 | | | | |
|    e 18 | 0.226 | .227 | .031 | < .001*** |

*** Significant for *p* <.001. Legend: *B* - Saturation not standardized; *β* - Standardized saturation; *SE* - Standard Error, *p* - Proof value.

From the numerical appreciation of Table 7, it can be seen that Cronbach's Alpha varies between α = .904 (Personal Resources) and α = .874 (Institutional), with all other areas showing an acceptable level of internal consistency, given the classification proposed by Pestana e Gageiro (2000) presented above. It appears that, for all areas, they present a high correlation with the total area and are corrected for the area in which it is integrated. On the other hand, it appears that in the case of elimination of area "15. Social representation (e.g., prestige) of the course you attend." leads to a slight improvement in the internal consistency of the Socio-Relational Satisfaction area, to α = .888.

A Confirmatory Factor Analysis was again conducted to test the model previously proposed in a new sample, sample B, as a way of validating the model. In this sense, preliminary analyzes were conducted to verify the distribution of all manifest variables. Thus, the existence of outliers was assessed by the square distance of Mahalanobis ($D^2$) and by the reference of the values of p1 and p2 (Kline, 2011), having been defined as outliers p1 and p2 less than .004 and simultaneously $D^2$ less than 170.000. In this sense,

**Table 7. Cronbach's alpha in the case of individual exclusion of the area by the areas of the Higher Education Satisfaction Index (sample B).**

|  | Cronbach's alpha if the area is deleted | Cronbach's alpha |
|---|---|---|
| **Student Personal Resources** |  | .904 |
| 1. Organization and study skills you currently have. | .897 |  |
| 5. Ability to deal with the demanding levels of the proposed jobs. | .885 |  |
| 9. Ability to strive to achieve your goals. | .878 |  |
| 13. Confidence in your current skills as a student and personal desire to achieve good results and academic success. | .882 |  |
| 21. Ability to make decisions. | .892 |  |
| 24. Ability to handle the amount of work proposed. | .886 |  |
| **Expectations of Professional Integration** |  | .897 |
| 2. Study facilities. | .882 |  |
| 6. Organization of physical spaces in facilities (e.g.: classrooms and library). | .867 |  |
| 10. Student safety. | .884 |  |
| 14. Space and physical conditions for learning. | .865 |  |
| 18. Facilities hygiene. | .886 |  |
| 25. Leisure spaces. | .890 |  |
| **Socio-Relational Satisfaction** |  | .884 |
| 3. Employment opportunity in your area of training. | .844 |  |
| 7. Job opportunities. | .843 |  |
| 11. Articulation of the faculty with the job market towards the professional integration of students. | .849 |  |
| 15. Social representation (e.g., prestige) of the course you attend. | .888 |  |
| 19. Clarification of students regarding professional opportunities. | .865 |  |
| **Institutional Integration** |  | .874 |
| 4. Personal academic integration process. | .807 |  |
| 8. Integration in the academic environment. | .790 |  |
| 12. Quality of the relationship between students. | .865 |  |

the existence of outliers in the sample was not verified. It should be noted that, despite the violation of the assumption of continuity and multivariate normality associated with the use of the Likert-type index, several computer simulation studies show that the results obtained are credible as long as the number of classes of the variable is high (at least five, in this case, consisting of six classes, as previously described) and the

frequency distribution of the classes approaches the normal distribution (Kline, 2005; Marôco, 2010), which is verified. Univariate normality was assessed by the coefficients of asymmetry (Sk <| 3 |) and kurtosis (Ku <| 10 |) (Kline, 2011) with no significant deviations from normality, as a maximum value was found from |0.805| for asymmetry and |0.889| for kurtosis. In the analysis, the Maximum Likelihood was used as an estimator. The results show a good fit of the model, $X^2/df$ = 5.812, CFI = .958, NFI = .950, RMSEA = .060, 90% IC [.056, .064], $P$ (rmsea <= .05) < .001.

**Table 8. Estimated parameters for the re-specified model of the Higher Education Satisfaction Index (Sample B)**

| Paths | B | β | SE | p |
|---|---|---|---|---|
| Student Personal Resources → Item 1 | 0.925 | .709 | .032 | < .001*** |
| Student Personal Resources → Item 5 | 0.965 | .794 | .028 | < .001*** |
| Student Personal Resources → Item 9 | 1.056 | .846 | .028 | < .001*** |
| Student Personal Resources → Item 13 | 1.069 | .828 | .029 | < .001*** |
| Student Personal Resources → Item 21 | 0.949 | .740 | .031 | < .001*** |
| Student Personal Resources → Item 24 | 1.023 | .777 | .031 | < .001*** |
| Expectations of Professional Integration → Item 2 | 1.110 | .765 | .034 | < .001*** |
| Expectations of Professional Integration → Item 6 | 1.217 | .854 | .032 | < .001*** |
| Expectations of Professional Integration → Item 10 | 0.984 | .720 | .033 | < .001*** |
| Expectations of Professional Integration → Item 14 | 1.191 | .877 | .030 | < .001*** |
| Expectations of Professional Integration → Item 18 | 0.952 | .699 | .034 | < .001*** |
| Expectations of Professional Integration → Item 25 | 1.077 | .703 | .038 | < .001*** |
| Socio-Relational Satisfaction → Item 3 | 1.064 | .738 | .035 | < .001*** |
| Socio-Relational Satisfaction → Item 7 | 1.038 | .744 | .034 | < .001*** |
| Socio-Relational Satisfaction → Item 11 | 1.177 | .838 | .033 | < .001*** |
| Socio-Relational Satisfaction → Item 15 | 0.939 | .678 | .035 | < .001*** |
| Socio-Relational Satisfaction → Item 19 | 1.126 | .791 | .034 | < .001*** |
| Institutional Integration → Item 4 | 1.185 | .870 | .031 | < .001*** |
| Institutional Integration → Item 8 | 1.203 | .867 | .031 | < .001*** |
| Institutional Integration → Item 12 | 0.999 | .774 | .031 | < .001*** |
| Institutional Integration | | | | |
|    Socio-Relational Satisfaction | 0.721 | .721 | .017 | < .001*** |
|    Expectations of Professional Integration | 0.674 | .674 | .018 | < .001*** |
|    Student Personal Resources | 0.749 | .749 | .015 | < .001*** |
| Socio-Relational Satisfaction | | | | |
|    Expectations of Professional Integration | 0.711 | .711 | .017 | < .001*** |
|    Student Personal Resources | 0.682 | .682 | .018 | < .001*** |
| Expectations of Professional Integration | | | | |
|    Student Personal Resources | 0.610 | .610 | .020 | < .001*** |
| e 3 | | | | |
|    e 7 | 0.628 | .695 | .037 | < .001*** |
| e 10 | | | | |
|    e 18 | 0.208 | .225 | .029 | < .001*** |

*** Significant for *p* <.001. Legend: *B* - Saturation not standardized; *β* - Standardized saturation; *SE* - Standard Error, *p* - Proof value.

The analysis of the parameter estimates, described in Table 8, revealed that the Institutional and Personal Resources factors have the highest correlation (*r* = .749, *p* <.001), followed by the Institutional and Socio-

Relational Satisfaction factors ($r =. 721$, $p <.001$). All indices saturate in the respective factor with factor weights varying between .877 and .678, so that all manifest variables were good indicators of the respective latent variables. Starting with "Student Personal Resources", there is a clear and strong influence on items ranging from Item 1 to Item 24. The highest influence is seen on "Item 9" and "Item 13", both having standardized coefficients (β values) above 0.8, emphasizing the critical role of students' personal resources in determining their satisfaction levels. "Expectations of Professional Integration" also play a significant role in influencing satisfaction. Its relationship with "Item 14" is particularly strong with a β value of 0.877. This highlights the importance of aligning professional expectations with the education being received, as it significantly contributes to overall satisfaction. The construct "Socio-Relational Satisfaction" demonstrates a pronounced relationship with its associated items, most notably "Item 11", emphasizing the role of social and relational factors in student satisfaction. "Institutional Integration" consistently shows strong relationships across its items. Especially noteworthy is its relation with "Item 4" and "Item 8", suggesting the profound impact of institutional integration on student contentment. The relationships between different constructs like "Institutional Integration" and "Socio-Relational Satisfaction", and "Expectations of Professional Integration" and "Student Personal Resources" are quite robust, indicating interdependencies between these factors in determining satisfaction. Overall, the results for sample B emphasize the intertwined nature of personal resources, professional expectations, socio-relational elements, and institutional integration in shaping student satisfaction in higher education.

The composite reliability of the factors under study proved to be high, being .951 for the Personal Resources factor, .937 for the Professional Integration factor, .934 for the Socio-Relational Satisfaction factor, and .882 for the Institutional factor. A composite reliability greater than .70 indicates the appropriate reliability of the construct (Marôco, 2010), which is verified. In turn, the convergent validity of the factors was assessed using the Average Extracted Variance (AEV), which proved to be equally adequate, being 0.735 for the Personal Resources factor, 0.716 for the Professional Integration factor, 0.742 for the Socio-Relational Satisfaction factor and 0.790 for the Institutional factor. An AEV greater than or equal to 0.50 indicates an appropriate convergent validity of the construct (Marôco, 2010), which is verified.

## DISCUSSION

The proposal of the present work presented as a core research objective the validation of the Higher Education Satisfaction Index. The inclusion of the 25 items within this index was carefully deliberated. These items were structured to span four areas: Student Personal Resources, Institutional Integration, Expectations of Professional Integration, and Socio-Relational Satisfaction.

The motivation behind the selection of these items pertains to their comprehensive coverage of satisfaction aspects within a higher educational environment. Each of the 25 items can be seen as a single-item specific satisfaction measure that collectively represents the multi-areas of the satisfaction in higher education context. The rationale for using a 6-point scale with no neutral point is to encourage respondents to take a stance, whether positive or negative, ensuring that the collected responses reflect genuine perceptions and avoiding potential middle-ground bias.

Both samples used to validate this index involved students from all universities and polytechnics in Portugal allowing a good representation of the study population. The samples are mainly made up of female students (for sample A, 63.3%; for sample B, 69.7%) meeting the trend of greater female expression seen in recent years, as a result of growth trends that began in the 60s in higher education and accentuated after the April 25th, 1974 revolution (Almeida et al., 2012; Dias, 2015; Vieira, 1995). There is also a greater concentration of students in the coastal districts in both samples, which is in line with the existence of a greater concentration of higher education institutions in these districts, dominated in particular by two large urban centers - Lisbon and Porto - and also by a greater concentration of people, industry and services on the coast, which has naturally led to a greater proliferation of higher education institutions in the coastal districts (Vieira, 1995). Both samples had an average age of 22 years (for sample A, 22.11 years; for sample B, 21.74 years) and it was found that a large part of the sample entered higher education soon after completing secondary/professional education (for sample A, 81.0%; for sample B, 70.9%). So, given the target population defined in this study (undergraduate students and integrated master's degree), the average age proves to be adequate. In addition, in both samples, it was found that the qualifications of the parents of the students surveyed correspond mainly to the level of basic and secondary education. Although several researchers emphasize that the full democratization of this level of education has not yet been

achieved (Borgues, 2013; Dias, 2015; Fonseca & Encarnação, 2012; Pascueiro, 2009; Sebastião & Correia, 2007), there has recently been a positive evolution, as verified by Cerdeira e Cabrito (2018).

In the initial attempt to validate the Higher Education Satisfaction Index, a Confirmatory Factor Analysis (CFA) was applied to Sample A. Results from this initial model reflected a reasonable, albeit not optimal, fit to the data: $X^2/df$ = 11.011, CFI = .886, NFI = .876, RMSEA = .086, 90% IC [.084, .089], $P$ (rmsea <= .05) < .001. This led us to further inspect the model by examining standardized residuals and modification indices, aiming to identify and rectify potential local sources of model misfit.

Drawing insights from this examination, it became evident that items 22, 23, 16, 20, and 17 were responsible for significant deviations from the expected model. Upon the removal of these items, the respecified model was retested on Sample A, and the results were markedly improved: $X^2/df$ = 5.83, CFI = .957, NFI = .949, RMSEA = .060, 90% IC [.056, .064], $P$ (rmsea <= .05) < .001. To ensure the robustness and generalizability of the revised model, it was essential to validate it on a separate, independent sample. Thus, Sample B was subjected to the same CFA with the revised model, and, reassuringly, the results mirrored those of the retested Sample A: $X^2/df$ = 5.812, CFI = .958, NFI = .950, RMSEA = .060, 90% IC [.056, .064], $P$ (rmsea <= .05) < .001. This consistency across samples attests to the reliability and validity of the revised model.

In light of these findings, it becomes clear that while the initial 25-item structure offered a comprehensive overview of student satisfaction, the modified version of the index, sans the five aforementioned Items, presented a more accurate and precise representation of satisfaction areas in the higher education context. These enhancements underscore the importance of iterative model validation, confirming that while foundational models like that proposed by Ramos and Gonçalves (2014) are crucial, they can often benefit from refinements when exposed to diverse and extensive datasets.

In this study, the area of Personal Resources has the highest average in both samples, as the student has the necessary resources to meet the demands of higher education (Ramos & Gonçalves, 2014; Ribeiro et al., 2019; Ribeiro et al., 2022). Likewise, the Socio-Relational Satisfaction, Institutional Integration, and Expectations of Professional Integration areas have a high average value for both samples, revealing a positive perception regarding the quality of academic services, the process of integration, and the construction and maintenance of the relationships established between the different actors in the context (Ramos & Gonçalves, 2014). These results were also verified by Silva (2015), and Sousa and Gonçalves (2016). In addition, it was found that the areas mentioned above have a strong correlation for both samples, also corroborating the results of Monteiro e Gonçalves (2011), Silva (2015), and, Sousa and Gonçalves (2016).

One notable limitation of our study revolves around the predictive capacity of the Satisfaction Index. While the overarching objective centered on the validation of the Higher Education Satisfaction Index, the predictive validity concerning performance, arguably an essential facet, was not examined. Predictive validity typically serves as a vital aspect when gauging the efficacy and utility of any instrument, especially one aimed at measuring satisfaction in such an influential realm as higher education.

## MANAGERIAL IMPLICATIONS

The Higher School Satisfaction Index is designed for general use, serving as a critical instrument for educational administrators across various institutions. This index provides a holistic insight into student satisfaction, guiding decisions, and resource allocation towards areas requiring enhancement. The ability to track satisfaction over time forms a foundation for effective long-term planning, aiding in refining institutional strategies. Benchmarking satisfaction levels allows institutions to strive for excellence and maintain high standards. Positive outcomes from this index not only reflect institutional strengths but also provide a powerful engagement tool for potential students, alumni, and donors. The 25 areas covered by the index ensure a comprehensive understanding of the student experience. While it's designed for broad application, its depth might be particularly appreciated by larger universities or research-focused institutions, capturing the nuances of diverse academic environments. Nevertheless, every institution, regardless of size or specialization, can harness this index's insights, potentially complementing it with additional measures to tailor it to their specific context.

## CONCLUSIONS

Higher education has assumed increasing importance in the current context in the training of high-level professionals and the development of societies. In this context, student satisfaction with higher education has become important for increasing academic performance since a satisfied student will perform better than a dissatisfied student.

Any measuring instrument must be continuously validated using different samples and at different moments. This investigation aimed to study the psychometric properties of the Higher Education Satisfaction Index, which led to a theoretical improvement through the evaluation of the indicator measurement contribution to the respective factor and its subsequent validation.

As a result of the good fit for both samples, this study allowed us to demonstrate the good psychometric quality of the index, highlighting its robustness, reliability, and adequacy in the evaluation of student satisfaction.

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# APPENDIX A

## Higher Education Satisfaction Index – Portuguese version

Com base na escala abaixo indique em que medida se sente satisfeito(a) com a formação superior relativamente aos itens que se seguem.

Nada Satisfeito    1      2      3      4      5      6    Totalmente Satisfeito

| Atividade | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|
| Competências que possui atualmente de organização e de estudo. | | | | | | |
| Espaços de estudo da faculdade. | | | | | | |
| Oportunidade de emprego na sua área de formação. | | | | | | |
| Processo de integração pessoal na faculdade. | | | | | | |
| Capacidade que possui para lidar com os níveis de exigência dos trabalhos propostos. | | | | | | |
| Organização dos espaços físicos nas instalações da faculdade (e.g., salas, corredores, biblioteca). | | | | | | |
| Oportunidades no mercado de trabalho. | | | | | | |
| Integração no ambiente académico. | | | | | | |
| Capacidade de se empenhar/esforçar para alcançar os seus objetivos. | | | | | | |
| Instalações da faculdade quanto à segurança dos estudantes. | | | | | | |
| Articulação da faculdade com o mercado de trabalho no sentido da integração profissional dos estudantes. | | | | | | |
| Qualidade do relacionamento entre estudantes. | | | | | | |
| Confiança nas suas competências atuais enquanto estudante e desejo pessoal de alcançar bons resultados e sucesso académico. | | | | | | |
| Espaço e condições físicas para a aprendizagem. | | | | | | |
| Representação social (e.g., prestígio) do curso que frequenta. | | | | | | |
| Instalações da faculdade quanto à higiene. | | | | | | |
| Esclarecimento dos alunos relativamente às oportunidades e saídas profissionais. | | | | | | |
| Capacidade que possui para tomar decisões. | | | | | | |
| Capacidade que possui para lidar com a quantidade de trabalho proposto. | | | | | | |
| Espaços de lazer. | | | | | | |

# APPENDIX B

## Higher Education Satisfaction Index – International Version

Based on the index below, indicate how satisfied you are with higher education in the following areas.

Not Satisfied    1    2    3    4    5    6    Totally Satisfied

| Activity | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|
| Organization and study skills you currently have. | | | | | | |
| Study facilities. | | | | | | |
| Employment opportunities in your area of training. | | | | | | |
| Personal academic integration process. | | | | | | |
| Ability to complete your coursework and study tasks. | | | | | | |
| Organization of physical spaces in facilities (e.g. classrooms and library). | | | | | | |
| Job opportunities. | | | | | | |
| Integration in the academic environment. | | | | | | |
| Ability to strive to achieve your goals. | | | | | | |
| Student safety. | | | | | | |
| Connection of the faculty with the job market with a view to the professional development of students. | | | | | | |
| Quality of the relationship between students. | | | | | | |
| Confidence in your current skills as a student and personal desire to achieve good results and academic success. | | | | | | |
| Space and physical conditions for learning. | | | | | | |
| Social representation (e.g. prestige) of the course you attend. | | | | | | |
| Hygiene and cleanliness of facilities. | | | | | | |
| Clarification of students regarding professional opportunities. | | | | | | |
| Ability to make decisions. | | | | | | |
| Ability to handle the amount of work proposed. | | | | | | |
| Leisure spaces. | | | | | | |

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