

CONCEPTIONS OF ASSESSMENT IN HIGHER EDUCATION: AN EXPLORATORY STUDY OF PORTUGUESE FACULTY

CONCEPÇÕES DE AVALIAÇÃO NO ENSINO SUPERIOR: UM ESTUDO EXPLORATÓRIO COM PROFESSORES PORTUGUESES

CONCEPCIONES DE LA EVALUACIÓN EN LA ENSEÑANZA SUPERIOR: UN ESTUDIO EXPLORATORIO CON PROFESORES PORTUGUESES

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ABSTRACT

Under the Bologna process, it is important that educators understand and use assessment for formative purposes as well as traditional summative purposes. This small-scale exploratory study tested the Teachers Conceptions of Assessment (TCoA) inventory in the Portuguese higher education context. A convenience sample of Portuguese academic faculty (n=185) from five public universities and across multiple scientific areas were surveyed. Confirmatory factor analysis rejected the original model and preferred a four-factor model (i.e., improvement, assessment quality, institutional quality, and reject assessment use) using just 15 of 27 items. Findings from this study indicate that, in line with Bologna intentions, Portuguese faculty seem to be taking a positive and constructive view of assessment as a tool for improved outcomes and have confidence in their evaluative practices. Faculty agreed that assessment was a high-quality process for improved outcomes and rejected its irrelevance. At the same time, they had a much weaker but positive view that assessment evaluated institutional quality. The study indicates that the TCoA inventory needs to be supplemented with different items and factors to capture the quality of Portuguese faculty conceptions of assessment.

KEYWORDS: Higher Education. Faculty. Teachers Conceptions of assessment (TCoA).

RESUMO

No âmbito do Processo de Bolonha, é importante que os educadores compreendam e utilizem a avaliação para fins formativos, mas também para a avaliação sumativa tradicional. Este estudo exploratório de pequena escala testou o inventário de Concepções de Avaliação dos Professores no contexto do ensino superior português. Foi inquirida uma amostra de conveniência de professores de 5 universidades públicas de diferentes áreas científicas (n=185). A AFC rejeitou o modelo original sendo definido um modelo de quatro fatores (melhoria, qualidade da avaliação, qualidade institucional, e, a rejeição do uso da avaliação) utilizando apenas 15 de 27 itens. Os resultados deste estudo indicam que, à luz dos propósitos de Bolonha, os professores portugueses parecem ter uma visão positiva e construtiva da avaliação como instrumento para melhorar os resultados e têm confiança nas suas práticas de avaliação. Os docentes concordaram que a avaliação é um processo de elevada importância na melhoria dos resultados dos estudantes e rejeitaram a sua irrelevância. Ao mesmo tempo, apresentam uma visão menos forte, contudo positiva, de que a avaliação permite aferir a qualidade institucional. O estudo indica que o inventário de Concepções de Avaliação de Professores precisa de ser complementado com diferentes itens e fatores para captar a qualidade das concepções de avaliação dos docentes portugueses do ensino superior.

PALAVRAS-CHAVE: Ensino Superior. Professores. Inventário de Concepções de Avaliação de Professores.

RESUMEN

En el contexto del Proceso de Bolonia, es fundamental que los educadores entiendan y apliquen tanto la evaluación formativa como la evaluación sumativa tradicional. Este estudio exploratorio de pequeña escala puso a prueba el Inventario de Concepciones de los Profesores sobre la Evaluación en el contexto de la enseñanza superior portuguesa. Se sondeó una muestra de conveniencia de profesores de 5 universidades públicas de diferentes áreas científicas (n=185). El AFC descartó el modelo original, definiendo un modelo de cuatro factores (mejora, calidad de la evaluación, calidad institucional y rechazo al uso de la evaluación) utilizando sólo 15 de los 27 ítems. Los resultados de este estudio indican que, en consonancia con las intenciones de Bolonia, los profesores portugueses parecen tener una visión positiva y constructiva de la evaluación como herramienta para mejorar los resultados y confían en sus prácticas de evaluación. Los profesores están de acuerdo en que la evaluación es un proceso muy importante para mejorar los resultados de los alumnos y rechazan su irrelevancia. Al mismo tiempo, tienen una opinión menos firme, pero positiva, de que la evaluación permite calibrar la calidad institucional. El estudio indica que el inventario debe complementarse con diferentes ítems y factores para captar la calidad de las concepciones de evaluación de los profesores portugueses de enseñanza superior.

PALABRAS CLAVE: Enseñanza superior. Profesores. Inventario de concepciones de evaluación de los profesores.

INTRODUCTION

Higher education faculty have influential beliefs about the nature of their work, their students, subjects, roles and responsibilities (Pajares, 1992) and about assessment itself. Assessment impinges on the quality of teaching, learning, and academic results (Estaji; Banitalebi; Brown, 2024). Existing literature suggests that teaching and learning beliefs and practices are intertwined with views of assessment (Dayal, 2021; Pereira; Flores, 2016;

Samuelowicz; Bain, 2002). The way faculty look at the teaching and learning process, as well as assessment, influences the way they teach, the way students learn, and their assessment practices (Brown, 2008; Fletcher *et al.*, 2012; Pereira; Flores, 2016). Teachers' conceptions of assessment play a central role in understanding and potentially transforming teaching practices (Postareff *et al.*, 2012; Brown *et al.*, 2024). Earlier studies on faculty's conceptions of assessment underline the importance of knowing and understanding faculty's' conceptions about assessment (Pastore; Pentassuglia, 2016; Diloreto, 2013; Fletcher *et al.*, 2012) including those in the Portuguese Higher Education context (Gonçalves, 2016; Pereira; Flores, 2016).

The implementation of the Bologna Process in Portugal makes clear academics are meant to use assessment formatively in addition to its conventional function of summative evaluation. Knowing how current academics conceive of the purposes of assessment would provide valuable insights for future research and professional development. Thus, this paper adapts a well-established self-report inventory (i.e., Teachers' Conceptions of Assessment inventory; Brown, 2006a) to determine what could be learned about both academic beliefs about assessment and the inventory's suitability for use in Portugal.

Assessment in Higher Education

Different conceptions about assessment could lead to different assessment practices. Significant attention has been paid to how university students conceive of assessment (e.g., Struyven *et al.*, 2005; Brown, 2013; Matos, 2010; Perereira *et al.*, 2016; Nasser-Abu Alhija, 2017). Earlier work suggests the need to analyse the impact of different methods of assessment (Watering *et al.*, 2008), especially so-called alternative methods (Sambell; Mcdowell, 1998) on student learning (Segers *et al.*, 2008) as well as the ways in which assessment practices relate to feedback mechanisms (Flores *et al.*, 2015). What is relatively absent is a systematic understanding of how faculty understand and believe about the nature and purpose of assessment.

In higher education, traditional and prescriptive assessment methods are often used (mainly written tests or examinations) (Fernandes *et al.*, 2023) and summatively converted into an evaluative grading system (Perrenoud, 1999). Reliance on such evaluative practices suggests that faculty have a view that assessment is about measuring recall of material transmitted in class (Sambell; Mcdowell, 1998; Samuelowicz, 1994). It has been argued that such approaches lead to less sophisticated learning outcomes among students (Kember, 1997).

Under the Bologna framework, there is an expectation that assessment methods will diversify (i.e., include alternative methods, including those that involve students) and that assessment will serve additional purposes than summative ranking, certifying, or grading. Adoption of other perspectives of assessment, such as Assessment for Learning (Mcdowell *et al.*, 2011), is in line with existing literature about the crucial role of feedback in assessment and learning process (BLACK; Wiliam, 1998; Carless *et al.*, 2011). This can be seen in learning-oriented assessment (Carless, 2009, 2015) which can be construed as a pathway to the construction of professional knowledge and self-regulated learning with implications for teaching practices (Van Den Bergh *et al.*, 2015). This framework implies that teachers ought not be mere evaluators of student learning; it assumes that instructors have a greater role and responsibility to use assessment to improve student learning (Flores; Veiga Simão, 2007; Pereira; Flores, 2012; Ion; Cano, 2011; Xu; Brown, 2016; Brown *et al.*, 2024). Under these circumstances, it is likely that faculty will endorse a conception in which assessment functions formatively to diagnose learning needs and inform improvement-oriented feedback. Nonetheless, the continuing role of assessment as a summative evaluation may interfere with this conception, often leading to tensions between accountability and improvement with implications for assessment practices (Ewell, 2009).

Conceptions of assessment

Teachers' beliefs about assessment arise both from the nature of their work, their students, subjects, roles and responsibilities, as well as from their experiences of having been assessed as students (Pajares, 1992). Beliefs are individual mental structures, value-laden and subjectively true (Opre, 2015) and reflect "teachers' attitudes about education - about schooling, teaching, learning, and students" (Pajares, 1992, p.316). Teachers' beliefs about assessment influence teaching and learning processes (Brown, 2004; Diloreto, 2013; Brown, 2024). Nonetheless, because assessment practices are strongly dependent upon external influences (Diloreto, 2013), such as faculty professional development (Aleamoni, 1997), it is not surprising that teacher practices may not align well with their personal conceptions of assessment (Deneen *et al.*, 2019). The term conception of assessment is used in this study to refer to a person's "beliefs, meanings, and understandings of assessment" (Fletcher *et al.*, 2012, p.120).

Teachers' beliefs are part of a "complex multidimensional system" that may include "contrasting beliefs" and produce different effects on educational practice (Opre, 2015, p.230).

Research on teachers' beliefs, particularly on beliefs about assessment, is “fundamental for the understanding of the complex nature of teaching and learning within the present educational environments” (Opre, 2015, p.232). Major reviews of research into teachers' beliefs or conceptions surrounding assessment point to the tension between using assessment for improvement purposes and uses of assessment to make either or both students and teachers accountable for outcomes (Barnes *et al.*, 2015; Bonner, 2016). A strong case has been made for the dependence of teacher conceptions upon cultural, social, and policy contexts (Brown *et al.*, 2019; Brown; Harris, 2009; Fulmer *et al.*, 2015) meaning that teachers are likely to have conceptions that are ecologically rational (i.e., they make sense and are successful within context; Rieskamp; Riemer, 2007).

Existing studies demonstrate the existence of a key influence of assessment conceptions on teachers' decisions and practices (Brown, 2009; Opre, 2015; Brown *et al.*, 2024). Systemic changes in assessment practices necessarily involves engagement with teachers' extant conceptions of assessment, (Xu; Brown, 2016). This engagement is likely to be especially challenging between summative accountability and formative improvement-oriented purposes (Brown, 2023). Because conceptions of assessment are context-dependent, studies with faculty in other jurisdictions do not necessarily generalise to a different context.

The Bologna Process and the Portuguese context

The Bologna Process and the creation of the European Higher Education Area challenged European countries, including Portugal, to change their teaching-learning practices by focusing on student-centred pedagogies, problem-solving initiatives, and innovative assessment practices. Higher education was expected to take an active part in satisfying the needs and requirements of today's increasingly complex society in the context of the labour market and, more generally, in the different contexts of collective life. This required an adjustment to the traditional conventions of transmitting knowledge and testing for its accumulation to the “development of students' competences”, with an emphasis on experimental work, project work, and transversal skills (Decree-Law n° 107/2008).

Access to higher education in Portugal is gained by national exams at the end of secondary education. Students must obtain on the entrance examinations a classification equal to or higher than the minimum required classification for their preferred programme (Decree-law n.° 90/2008). Previous studies in Portuguese context reveal the coexistence of a multitude of modes of pedagogical work, of learning strategies and modes of assessment in Portuguese

higher education with some use of "student-centered methods" along with a continuity of summative assessment and some formative procedures (Pereira; Flores, 2012; Pereira *et al.*, 2016; Fernandes & Flores, 2022; Fernandes *et al.*, 2023).

Additionally, in Portugal, all universities are required to report on their implementation of the Bologna Process, including design and uses of assessment. Given that assessments are used to select students for entry to university and that universities are expected to implement formative approaches to assessment, or at least to use diverse forms of assessment, we expect faculty conceptions of assessment to endorse formative purposes, but not reject the summative use of assessment to evaluate students. This suggests that teacher conceptions of assessment will be ecologically rational (Rieskamp; Reimer, 2007), resulting in endorsement of improvement and student accountability functions. Considering tensions between improvement and accountability (Bonner, 2016; Ewell, 2009), it is expected that faculty will be less enthusiastic for using student assessments to evaluate the quality of teaching or institutions.

THE STUDY

The aims of this paper are to explore Portuguese faculty's conceptions of assessment using the TCoA. The following research questions are addressed:

- 1 – What are the factors that best represent Portuguese faculty's conceptions of assessment?
- 2 – What effect do characteristics of faculty and their teaching contexts have on those conceptions?

Participants

The survey studyⁱ, administered between February and July 2017, used a convenience sample of faculty from five Portuguese universities representing both new (created in the 70s) and classic (old) universities. Participants' scientific areas were identified according to the Portuguese National Foundation for Science and Technology discipline definitions. With Faculty or Institute permission, Programme Directors were asked to supply a contact list of faculties who were approached to schedule a time and place to complete the questionnaires. All procedures were approved by the University of Minho Ethics Committee (Ref. SECSH035/2016 and SECSH036/2016). All participants were fully informed and provided signed written consent.

The sample consisted of 185 faculties from the different teaching cycles (i.e., Undergraduate degrees; Master degree; Integrated Master Degree; Ph.D.) in five different

scientific areas (i.e., Exact Sciences, Engineering and Technology Sciences, Medical and Health Sciences, Social Sciences, and Humanities). Just over four-fifths (83.8%) taught in undergraduate degree programmes; 77.3% taught in “Master degree programmes”; 41.5% taught in “Integrated Master Degree programmes”; 55.8% taught in “PhD courses”; and, 1.7% in other programmes (e.g., non-awarding degree courses, professional courses, among others).

A small majority of participants were female (54%) (cf. table 1) and are over 45 years old (55.7%). Out of the 185 faculty, 118 did the questionnaire on paper and 67 faculty answered an online version. The participants are mainly “assistant professor” (63.2%), holding a “Ph.D. qualification (74.6%). Regarding their experience as academics, most of them have more than 15 years of experience: 42.2% of them have between 15 and 25 years and 28.6% for over 25 years.

Table 1 - Portuguese Higher Education Sample

Demographic characteristics	<i>n</i>	Percentage (%)
<i>University</i>		
A	36	19,5
B	34	18,4
C	60	32,4
D	36	19,5
E	19	10,2
<i>Gender</i>		
Male	74	46,0
Female	87	54,0
<i>Missing</i>	24	
<i>Field of knowledge</i>		
Medical and Health Sciences	21	11,4
Exact Sciences	16	8,6
Engineering and Technology	50	27
Social Sciences	77	41,6
Humanities	21	11,4
<i>Professional category</i>		
Full Professor	10	5,4
Associate Professor with aggregation/qualification	11	5,9
Associate Professor	15	8,1
Assistant Professor with aggregation/qualification	8	4,3
Assistant Professor	117	63,2
Lecturer	12	6,5
Other	12	6,5
<i>Teaching experience</i>		
Between 1 and 5 years	17	9,2
Between 6 and 14 years	37	20,0
Between 15 and 25 years	78	42,2

Demographic characteristics	<i>n</i>	Percentage (%)
More than 25 years	53	28,6
Total	185	100,0

Research instrument: the teachers' conceptions of assessment inventory

Given the extensive international research with the Teachers' Conceptions of Assessment (TCoA) inventory (e.g., *Australia*: Brown *et al.*, 2011; *Canada*: Daniels *et al.*, 2014; *Catalunya*: Brown; Remesal, 2012; *China*: Li; Hui, 2007; *Colombia*: Munozs *et al.*, 2012; *Cyprus*: Brown; Michaelides, 2011; *Egypt*: Gebril; Brown, 2014; *Hong Kong*: Brown *et al.*, 2009; *Indonesia*: Aziz, 2014; *Iran*: Moiinvarizi, 2015; *Ireland*: Darmody, 2017; *Israel*: Levy-Vered; Nasser-Abu Alhija, 2015; *the Netherlands*: Segers; Tillema, 2011; *New Zealand*: Brown, 2002; 2006b; 2011; Fletcher *et al.*, 2012; Yates; Johnston, 2017; *Portugal*: Gonçalves, 2016; *USA*: Diloreto, 2013; *Sweden*: BROWN *et al.*, 2024), it was adopted for this study. In the TCoA "assessment is understood as any act of interpreting information about student performance, collected through any of a multitude of means or practices" (Brown, 2002, p.26).

The TCoA investigates a four-facet model of teachers' conceptions of assessment (Brown, 2002, 2017) involving: *Improvement* (i.e., teachers use assessment to improve their teaching and students use assessment to improve their own learning), *School accountability* (i.e., assessment as a means to evaluate schools and teachers), *Irrelevance* (i.e., teachers do not use assessment because it is oppressive and inaccurate), and *Student accountability* (i.e., assessment as a means to evaluate, certify, and examine students). These four conceptions are based on nine first-order factors, with four sub-factors that contribute to improvement; three sub-factors for irrelevance; and one factor each for student accountability and school accountability. Because "the inventory is multi-dimensional and there is no single overall score" (Brown, 2017, p.3), the inter-correlations of the factors become of interest. In New Zealand it has been shown that Improvement was strongly and negatively correlated with Irrelevance, while school accountability had zero relationship with Irrelevance (Brown, 2004). In contrast, Hong Kong teachers had a strong positive correlation between Improvement and Student Accountability (Brown *et al.*, 2009). These differences in correlations suggest that contextual factors matter substantively to responses on the TCoA.

Cross-cultural and cross-level comparative studies with the TCoA show that while many items fit the factors specified by Brown (2004, 2006b), there are substantial differences in factor structures and relationships in different contexts to Brown's original research with New Zealand primary school teachers. For example, studies with the TCoA in higher education (Diloreto,

2013; Fletcher *et al.*, 2012; Gonçalves, 2016; Hidri, 2016; Moioinvaziri, 2015) revealed divergent results from the original study. Research in the Catalan context, which has cultural and social similarities with Portugal, underlines the role of contextual variables in the analysis of TCoA cross-sample information (Brown; Remesal, 2012). The same divergence from the original model has been noted within the K-12 sector across nations, though in comparing multiple jurisdictions it was noted that many items replicated the original factor identification (Brown *et al.*, 2019). These studies reveal the clear influence of cultural and policy contexts on teachers' conceptions of assessment. The clear implication for this study is that, while responses from Portuguese faculty may recover some of the original factors in the TCoA, the original four dimensions of the TCoA are not likely to be recovered.

The version used in this study is an adaptation of the Portuguese translation of the TCoA. That version had been designed for use in the clinical context of nursing (Gonçalves, 2011, 2016) and so had to be adapted for use with faculty across the spectrum of university subjects. A group of educational sciences experts evaluated the item wording to ensure alignment with the Portuguese higher education culture and contexts. Two further changes were made compared to the original TCoA. In Brown's TCoA, item agreement is indicated using a positively packed, six-point scale (i.e., two negative and four positive options). This was changed to the conventional Likert balanced agreement scale with a neutral midpoint (i.e., *strongly disagree; disagree; neither agree nor disagree; agree; and strongly agree*) because this is relatively commonplace in higher education research in Portugal (e.g., Gonçalves, 2016). Furthermore, four items (i.e., 7, 8, 16, and 26) were rephrased to express a more positive perspective (e.g., item 7 " *Assessment forces teachers to teach in a way against their beliefs*" was replaced by " *Assessment that I do is congruent with my pedagogical beliefs*").

Factor analyses (exploratory factor analysis (EFA) and confirmatory factor analysis (CFA) using SPSS v. 22.0, AMOS v. 21.0, and JAMOVI v.0.9.5.16 were performed and data examined to analyse Portuguese faculty's conceptions of assessment.

ANALYSES

Small amounts of missing values (i.e., 39 missing responses across 27 items; $M=0.80\%$) were imputed with the expectation maximisation procedure (Dempster, *et al.*, 1977). Little's missing completely at random chi-square test was not statistically significant ($\chi^2= 631.21$, $df=585$, $p=.09$) indicating that the imputation did not distort the start values for item means, standard deviations, and covariance/correlation matrices.

Having adopted a multiple indicator, multiple causes (MIMIC) data collection framework, items were factor analysed to determine which items grouped into the factors for which they were designed. Given that the New Zealand TCoA model existed, confirmatory factor analysis (CFA) was used to determine if the data fit that model. Three different versions of the NZ TCoA statistical model were tested (i.e., hierarchical nine factors, inter-correlated nine factors, and inter-correlated four factors). Each model failed because the factor covariance matrix was not positive definite, suggesting that too many factors had been specified in the model and that fewer factors would be preferable. Given this inadmissible situation, exploratory factor analysis using maximum likelihood estimation (MLE) and oblique rotation was implemented (Costello and Osborne, 2005). Conventionally, eigen values >1.00 are used to indicate the number of factors or dimensions in a data set; however, this is not a strong basis for determining the number of factors (Courtney, 2013). The recommended methods suggested that there were between three and eight factors, which were systematically specified and inspected for conceptual and statistical fit. To be considered acceptable the factor structure had to have item loadings $>.30$ and no cross-loadings $>.30$ (Bandalos; Finney, 2010). Of the six models inspected, the pattern matrix for four factors seemed the most promising conceptually and analytically. While three or more items per factor are preferred, in multi-factorial models, it is possible in CFA to identify factors having just two items (Bollen, 1989).

The exploratory solution that had best conceptual fit to these constraints was then tested for fit using CFA; this approach is not truly confirmatory because the model was developed with the same data on which it is being tested. Thus, this is restrictive analysis because it forces items to load only on their conceptual factor and determines if the model fits the data (Anderson; Gerbing, 1998). Inspection of modification indices identified items that did not have simple structure (i.e., they were attracted to other factors or items outside their own factor). All modelling was done in AMOS (IBM, 2017) using MLE estimation, which is defensible given that the item response scales with five or more ordinal options are known to give good approximation to continuous scales (Finney; Distefano, 2006).

Determination of the quality of a model rests on how well the simplified model (i.e., no cross-loadings between items and other items or factors) corresponds to the data. Multiple fit indices are reported, but it is noted that some indices are not resistant to model complexity and sample size (Fan; Sivo, 2007). Specifically, the chi-square test is overly sensitive to models with large degrees of freedom; hence, a statistically non-significant χ^2/df ratio indicates acceptable fit (Wheaton *et al.* 1977). Additionally, the comparative fit index (CFI) is favourable

toward simple models (i.e., three or fewer factors), and the root mean square error of approximation (RMSEA) is favourable towards complex models (i.e., more than three factors). In contrast, the gamma hat and standardised root mean residual (SRMR) indices are stable across model variation. Models do not need to be rejected if $\chi^2/df < 3.80$, gamma hat and CFI $> .90$, and RMSEA and SRMR $< .08$. The closer the indices are to unity or zero respectively, the better the model. When multiple admissible models are compared, differences of > 10 in the Akaike Information Criterion (AIC) indicate that the model with the small values is to be preferred (Burnham; Anderson, 2004).

RESULTS

The four factors from this relatively small sample of Portuguese faculty were (a) assessment is for improvement, (b) the reliable quality of assessment, (c) assessment indicates the quality of institutions, and (d) teachers do not use assessment. However, three items had cross-loadings $> .30$ (i.e., ir4, rel3, sa2), three items had loadings $< .30$ on all factors (i.e., ir2, si1, ir3), and five items had loadings $< .45$ (i.e., ti3, sa3, sa1, dia2, sq3).

After removing these items, 15 out of 27 administered items were retained in four factors (Figure 1), with good model fit values ($\chi^2=181.34$; $df=98$; $\chi^2/df=1.85$, $p=.17$; CFI=.873; gamma hat=.948; RMSEA=.068 (90%CI=.052-.083); SRMR=.069; AIC=257.348). To aid interpretation, four items that had negative loadings on their factors (i.e., ir6, ti1, ir1, and ig1) were reverse scored. The inverse meaning to these items has been inserted in red in Appendix A to guide interpretation.

Factor inter-correlations (Table 2) were reasonably low. However, the Improvement and Assessment Quality factors had a moderately strong inverse relationship to Reject Assessment Use. This inverse relationship indicates that using assessment for those two purposes was not rejected or irrelevant, which seems logically coherent. In contrast, institutional quality was weakly and inversely correlated with irrelevance, indicating a more ambivalent attitude about using student assessment to evaluate institutional quality. Scale estimates of reliability were not strong, but this should not dominate interpretation since the overall model shows good fit and only five items had loadings $< .50$ on their factor. Mean scores based on average of item responses loading on each factor show large differences between all scales except between Improvement and Assessment Quality.

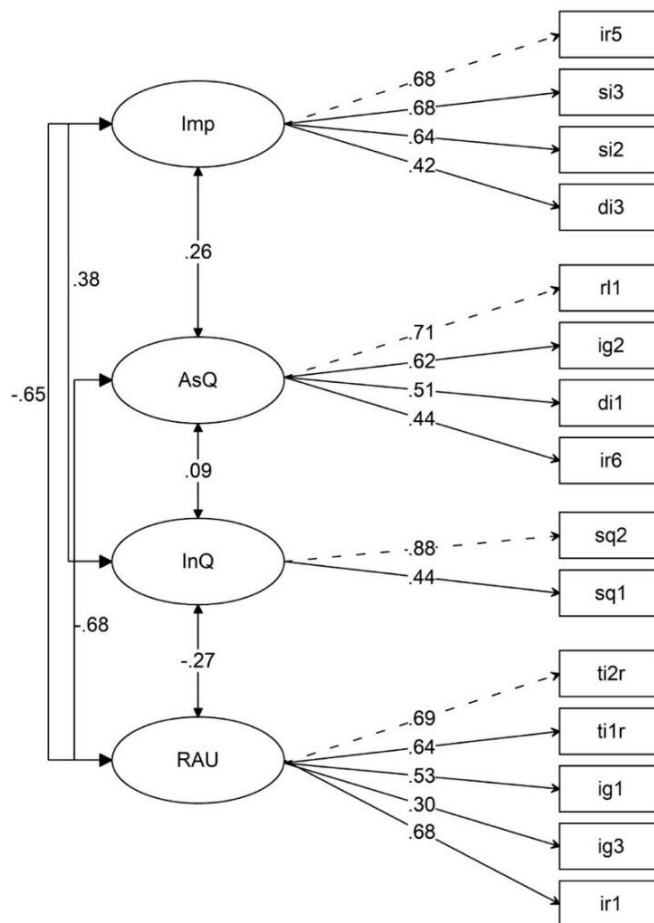
Table 2 - TCoA Portugal Higher Education Factor Inter-Correlations and Reliability Estimates

Factors	I	II	III	IV
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I. Improvement	(.70)			
II. Assessment Quality	.26***	(.67)		
III. Institutional Quality	.38***	.09	(.56)	
IV. Reject Assessment Use	-.65***	-.68***	-.27***	(.72)
Raw Mean (SD)	3.95 (0.49)	4.04 (0.51)	3.39 (0.82)	1.73 (0.47)
Effect Size (Cohen's <i>d</i> absolute value)				
II. Assessment Quality	0.21			
III. Institutional Quality	0.83	0.98		
IV. Reject Assessment Use	3.74	4.03	1.66	

Note. Values on diagonal are McDonald's ω scale reliability estimate values; Cohen's *d* in bold = large effects; ***= $p < .001$.

Figure 1 - Schematic Factor Structure of Portuguese Faculty Conceptions of Assessment



Note. Imp=Improvement; AsQ=Assessment Quality; InQ=Institutional Quality; RAU=Reject Assessment Use; all values are standardised; dashed line indicates seed path.

To examine strength of endorsement for each scale, Bartlett factor scores ($M=0, SD=1$) were computed separately for each factor. These scores estimate more accurately the weighted

value of each item on the latent factor that predicts it (Distefano *et al.*, 2009). Table 3 shows the mean factor score by key demographic characteristic.

Table 3 - TCoA Portugal Higher Education Factor Bartlett Scores by Demographic Characteristic

Demographic characteristics	n	Factors			
		I	II	III	IV
University					
A	36	0.49	0.06	0.32	-0.10
B	34	-0.02	0.20	-0.06	-0.10
C	60	-0.19	-0.11	-0.01	0.34
D	36	-0.32	-0.14	-0.16	-0.15
E	19	0.30	0.16	-0.16	-0.43
Gender					
Male	74	0.10	-0.05	-0.05	0.11
Female	87	-0.07	0.06	0.00	-0.09
Field of knowledge					
Medical and Health Sciences	21	-.06	.11	.18	.03
Exact Sciences	16	.68	.09	.24	-.08
Engineering and Technology	50	-.43	-.16	-.23	.31
Social Sciences	77	.14	.03	-.01	-.15
Humanities	21	.05	.10	.22	-.15
Professional category					
Full Professor	10	0.73	0.47	-0.05	-0.24
Associate Professor with aggregation/qualification	11	-0.21	-0.29	-0.77	-0.18
Associate Professor	15	-0.44	-0.38	-0.35	0.08
Assistant Professor with aggregation/qualification	8	0.63	0.25	0.15	-0.31
Assistant Professor	117	0.02	0.07	0.08	0.05
Lecturer	12	0.20	-0.23	0.53	-0.25
Other	12	-0.66	-0.30	-0.18	0.26
Teaching experience					
Between 1 and 5 years	17	-0.38	-0.26	-0.31	-0.01
Between 6 and 14 years	37	-0.11	-0.13	0.27	-0.02
Between 15 and 25 years	78	0.02	0.14	-0.09	0.05
More than 25 years	53	0.16	-0.04	0.04	-0.05

Note. Factor I=Improve; II=Assessment Quality; III=Institution Quality; IV= Reject Assessment Use

Multiple analysis of variance (MANOVA) of Bartlett mean scores was conducted with main effects for university, sex, professional category, scientific field, and years of experience and all two-way interactions for these five predictors. Given the small sample sizes in each group, the observed power was below the conventional $1-\beta=.80$ for all analyses except for two predictors. To avoid Type II errors of not finding a real association when it is present, only these two effects for which there is sufficient power are reported. There was a statistically significant effect for the interaction between University and Professional category (Wilks'

$\lambda_{(24)}=.493$, $p=.01$, $1-\beta=.98$, Partial $\eta^2=.16$, Cohen's $f^2=.23$) and the main effect of University (Wilks' $\lambda_{(16)}=.644$, $p=.03$, $1-\beta=.83$, Partial $\eta^2=.10$, Cohen's $f^2=.12$). These represent medium and small effects respectively, but the overall message is that the four conceptions of assessment have reasonably similar means across the contributing demographic characteristics of participants.

DISCUSSION

How faculty conceive of the purposes and nature of assessment matters because they are actively involved in designing, administering, and interpreting student assessments for the courses and programmes they teach. Assessment integrates all the other dimensions of the training system, so it is extremely important to understand how the instructional actors look at assessment. Unsurprisingly, this small survey study of Portuguese public university faculty's conceptions of assessment found that the original statistical model for the Teacher Conceptions of Assessment inventory did not fit participant responses.

A revised 15-item model that was ecologically rational with Portuguese's student assessment system showed that four different purposes for assessment could be identified (i.e., improvement, quality of assessment, quality of institutions, and, teachers rejection of assessment). These conceptions are consistent with the formative function of assessment (Fernandes, 2011) in which teachers use it to guide and mentor learning (Hadji, 1994). This appears to be in line with a reflective and critical teacher perspective as suggested by Perrenoud (2002).

This study replicates many previous studies which have found that the New Zealand K-12 school teacher TCoA model could not be recovered. Nonetheless, a small number of items for improvement, irrelevance, and school quality in Brown's TCoA were found to group in this result. The significant differences between the Portuguese model and the original model of TCoA are consistent with the assumption that beliefs are influenced by cultural and social context.

The correlation results revealed a consistent rejection of assessment as irrelevance for the purposes of improvement and assessment quality, which seems to be a logically coherent relationship for faculty who use assessments to improve and evaluate student learning. The inter-correlation between improvement and assessment quality and a better articulation between assessment and teaching (Fernandes, 2011) may contribute to an effective improvement of student learning. It is necessary to recognise the role of faculty's assessment in the classroom, especially formative assessment, beyond the hegemony of the transmission paradigm (Estrela;

Nóvoa, 1993) and the primacy of classification and certification of students' learning. Understanding assessment of students as an issue "eminently pedagogical and didactic" (Fernandes, 2011, p.140), faculty still have a clear opportunity to change and improve their practices contributing to the integration of learning, assessment, and teaching dimensions (Fernandes, 2011).

The MANOVA results suggest that aspects of population, culture, and universities specificities seem to make little difference in how the four factors were endorsed. Future survey research will need to use larger samples to identify if background variables matter to these beliefs. Furthermore, the retention of just 15 items from the TCoA in reasonably different structures suggests that items need to be developed that fit Portuguese university education better. Qualitative and exploratory studies are needed in Portugal to ensure that any future survey research captures the nuances and subtleties of university contexts in Portugal.

CONCLUSION

This analysis of Portuguese faculty's conceptions of assessment provides an opportunity to understand higher education assessment practices and the way faculty apprehend social, political, and institutional changes (Pastore; Pentassuglia, 2016). In line with other studies carried out in the Iberian context (Brown; Remesal, 2012), a new set of items and factors are needed to understand the conceptions of assessment in Portugal. However, in line with Bologna intentions, Portuguese faculty seem to be taking a positive and constructive view of assessment as a tool for improved outcomes and have confidence in their evaluative practices.

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Appendix A. TCoA Portugal Higher Education Factors and Items

Code	Statement
Improvement	
ir5	26. Assessment that I do has a positive impact on teaching
si3	22. Assessment that I do helps students improve their learning
si2	13. Assessment that I do feeds back to students their learning needs
dia3	21. Assessment allow me to identify students' metacognitive competences .
Assessment Quality	
rel1	6. The results obtained from the assessment that I do are trustworthy
ig2	16. Assessment that I do is fair to students
dia1	3. Assessment that I do is a way to determine how much students have learned from teaching
ir6*	27. Assessment that I do is [not] an imprecise process
Institutional Quality	

- sq2 10. Assessment that I do is an accurate indicator of my **institution's quality**
- sq1 1. Assessment that I do provides information on **how well my institution is doing**

Reject Assessment Use

- ti2* 14. The results from the Assessment that I do **[not] modif[y] ongoing teaching** of students
- ir1* 7. Assessment that I do is **[not] congruent with my pedagogical beliefs**
- ti1* 5. Assessment that I do is **[not] integrated with teaching practice**
- ig1* 8. I do assessments and I **[do not] make use of the results**
- ig3 17. The results from the Assessment that I do are **pedagogically ignored/irrelevant**

Note. Standardised loadings from CFA; *=item reverse coded with inverse meaning inserted into text in red; words in bold indicate key idea of item.

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