

On the development and initial validation of the Brazilian Lecturer Self-Efficacy Scale (BLSES)

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Abstract

This article describes the development and validation of the Brazilian Lecturer Self-Efficacy Scale (BLSES). The BLSES is a self-report questionnaire assessing four dimensions of Brazilian lecturers' self-efficacy: teaching self-efficacy, research self-efficacy, extension self-efficacy and management self-efficacy. Following the online distribution and return of 1709 usable 44-item questionnaires, construct validity was studied through exploratory and confirmatory factor analyses using a randomised split sample approach. Exploratory analysis of the first split (n=854 responses) revealed a 30-item four-factor structure subsequently confirmed in the second split (N=855). A hierarchical model with a second-order factor underlying the four first-order factors was also tested and found acceptable. The psychometric characteristics of the BLSES justify the use of this questionnaire in future research.

Keywords: Lecturer self-efficacy, Brazil, BLES, Higher Education, teaching, research, management, extension.

Introduction

Since the 1990s, the role of the universities in Brazil has changed to cover not only better educating and training undergraduate and postgraduate students but also to develop research and to internationalise the knowledge produced to provide solutions to social issues. In many ways, the universities have also become businesses, having to prove their value to justify the investments received. Accordingly, the role of the lecturer has also changed: having to deal with management and extension activities at the same time and with an increased

number of tasks, less administrative support, growing numbers of students and lack of financial support. In this context, the self-efficacy beliefs of professional academics' ability to perform all those tasks can be affected which, in turn, has the potential to influence their actions (positively or negatively).

The self-efficacy construct originates from Bandura's Social Cognitive Theory and reported to be related to how much effort people put in their tasks, to perseverance when facing challenges and in the settlement of personal goals. These actions are defined by Bandura (1997) as reflecting the "beliefs in one's capabilities to organise and execute the courses of action required to produce given attainments" (p.3) and must be analysed in whichever context they occur. In Higher Education, various domains of self-efficacy had been researched in the last 30 years, like teaching self-efficacy and research self-efficacy, and these have proved to be related to many positive outcomes including protecting lecturers against burnout (Cao, Postareff, Lindblom, & Toom, 2018), in the motivation to teach (Bailey, 1999), in research (Bailey, 1999; Reyes-Cruz & Perales-Escudero, 2016), in job satisfaction (Ismayilova & Klassen, 2019) and in organizational citizenship (Paramasivam, 2015). Self-efficacy beliefs can also influence the pedagogical practices of lecturers (Cao, Postareff, Lindblom, & Toom, 2018; Escobar, Morales, & Klimenko, 2018).

Even considering the importance of self-efficacy beliefs, given the possibility of managers using them to guide professional development and training provision and to make investment decisions and budget allocations (Sharp, Hemmings, Kay, & Callinan, 2013), there is still much confusion about measurement that needs clarification and improvement (Matos, Sharp & laochite, under review). The aim of this study is therefore to present the process of development and validation of the Brazilian Lecturer Self-Efficacy Scale (BLSES) which represents an attempt to address some of the issues raised as well as to identify lecturers' self-efficacy beliefs in Brazilian universities. The final stage of development and validation was carried out at the Lincoln Higher Education Research Institute while the first author was a visiting researcher between November 2019 and April 2020.

While there are international questionnaires available to measure lecturer self-efficacy that could potentially be useful (Vera, Salanova, & Martín-del-Río, 2011), there was a need to construct an instrument specifically for use within the sphere of Brazilian Higher Education. This was supported by the fact that questionnaires used in Brazilian studies (Bernardini, 2017; Bernardini & Murgo, 2017; Leonardo, Murgo, & Sena, 2019; Lira, 2017; Rocha, 2009) only explored the self-efficacy dimension of teaching which seems insufficient given the complex roles of lecturers today,

including their engagement with research, management and administration and other work-related activities (Matos, Sharp & Iaochite, under review).

Brazilian lecturer self-efficacy beliefs are defined here as the judgments that lecturers make about their ability to teach, research, carry out management activities and complete extension tasks at a level of quality appropriate to their institution's needs. A four-factor model was therefore most desirable from the outset, which was tested in the construction and validation of the research instrument as follows:

- Self-efficacy for teaching - judgment by the lecturer about his/her ability to teach and promote the effective learning of undergraduate and postgraduate students;
- Self-efficacy for research - judgment by the lecturer about his/her ability to deal with multiple aspects of research activity, including the construction and dissemination of new knowledge, the writing and publication of articles and the research guidance offered to undergraduate and postgraduate students;
- Self-efficacy for university management activities – the judgment by the lecturer about his/her ability to perform different activities related to university management, including participating in committees, leading departments and other administrative activities;
- Self-efficacy for extension activities – judgement by the lecturer about his/her ability to perform various university extension activities, including involvement in the community and guiding students on activities that make available the knowledge produced in useful ways to fix real problems.

Development of the questionnaire

The construction of the questionnaire was guided by Bandura (1997; 2006) as well as by the research literature and existing papers about self-efficacy questionnaires development (Ambiel & Noronha, 2011; Sharp, Hemmings, Kay, & Callinan, 2013; Vera et al., 2011).

After a systematic review of the literature on university teaching in Brazil, an initial 59 item questionnaire was constructed. This was then submitted to a group of expert lecturers who acted as judges, analysing the semantic and theoretical coherence of items ensuring content validity. Nine university professors then participated to help clarify the proposed items and the completion instructions. A total of 15 items were subsequently eliminated because these were considered weak or did not present an adequate level of challenge. The 44-item questionnaire was then circulated adopting

a 5-point Likert Scale, ranging from 1 = “I believe that I cannot achieve this at all” to 5 = “I believe I can achieve this completely”.

Subjects and procedures

Ethical approval for the research was obtained from the Institute of Biosciences-IB of UNESP. The participants gave informed consent with participation remaining entirely voluntary. The inclusion criterion for participants was to be a teacher in Higher Education in public and private universities in Brazil. A non-probabilistic convenience sample was used (Cozby, 2003).

The questionnaire was distributed online between October 2019 and January 2020. The link was disclosed in different forms: at the first by sending invitations to the Human Resources centres of all 199 universities across Brazil. The link was also disseminated using social media networks (Facebook and YouTube), as well as on the page of the first author’s research group. Later, the instrument was sent directly to lecturers by email. In total, 1721 completed questionnaires were returned. Of these, 1709 were completed fully and in a usable state.

Results

In order to undertake both exploratory (EFA) and confirmatory factor analysis (CFA) from the single ‘mail shot’ available (using SPSS v.25 and AMOS v.25 respectively), the 1709 usable responses were randomly split into two halves (n=854 and n=855). Following conventional procedures (Field, 2009), and at the pre-screening stage, the following criteria was used to identify potentially vulnerable or weak questionnaire items: low variance, extreme skewness and/kurtosis (i.e. greater than +/- .900), poor inter-item correlations (i.e. <.300), and low communalities (i.e. <.300). This resulted in the initial elimination of 6 items. EFA progressed using Principal Axis Factoring with Direct Oblimin rotation. Determining the number of factors selected made use of the scree plot, consideration of eigenvalues (i.e. greater than 1.0) and total variance explained. Considering these criteria, the results suggested retaining between four and six factors. After further inspection and conducting successive EFAs, a four-factor solution was eventually retained with a total 30 items explaining 54.0% of the variance (Table 1). The internal reliability of the four factors was established using Cronbach’s alpha (α =.85 teaching, α =.87 research, α =.85 management, α =.86 extension). Overall, the 30-item scale had an acceptable reliability of .93 (George & Mallery, 2003). Scale and subscale statistics are presented as shown (Table 2).

Table 1 EFA: Retained items and factor loadings (n=854)

Items	Factor 1 Teaching	Factor 2 Research	Factor 3 Management	Factor 4 Extension
Manage the classroom during group activities with adequate feedback for all	.642			
Regularly self-assess my role as a lecturer during and after class	.627			
Plan lessons using different methodologies to promote learning	.624			
Motivate unconcerned students to learn what I am teaching	.606			
Maintain student attention in class most of the time	.576			
Provide extra-class support for students who have difficulty learning course content	.541			
Deal with students who do not comply with the demands of the discipline	.530			
Teaching lessons using digital technologies to promote active student learning	.504			
Develop different types of assessments with different levels of challenges for students	.474			
Meet with students to answer questions even when I have other demands to deal with	.470			
Submit academic articles to approved journals (Brazilian metrics, impact factors)		.770		
Submit research projects to secure funding from agencies (state and federal)		.770		
Guide postgraduate students in the preparation and development of their dissertations (M and D)		.718		
Guide and supervise undergraduate and graduate students in writing scientific papers		.679		
Coordinate research groups with professionals from different institutions		.599		
Acting as a peer reviewer and complying with the deadlines established by the editorial team		.467		
Keeping up to date with knowledge production in my area		.402		
Performing administrative functions at the university (coordination, leadership, advising, among others)			.741	
Deal with institutional bureaucracy beyond my teaching, research and extension activities			.627	
Perform administrative activities in parallel with teaching, research and extension activities			.617	
Actively participate in department / academic unit decisions			.575	
Actively collaborate in the evaluation of rules, regulations, curricula and other institutional documents			.564	
Participate in new teacher selection boards when I have other duties to fulfil			.425	
Represent the institution at events and activities when requested			.410	
Manage interpersonal conflicts, whether with lecturers and/or administrative staff			.378	
Coordinate university extension projects in my area				.833
Involve the external community in university extension activities				.698
Evaluate university extension projects in my area				.659
Submit funding requests for extension programs and projects				.648
Disseminate the results of my extension actions in specialized journals				.543

Table 2 Scale and subscale statistic for 30-Item BLSES (n=854)

	Number of items	Mean	SD	Skewness	Kurtosis	Item-Total Correlation	Alpha
Teaching	10	3.71	.65	-.301	-.263	.522 - .628	.853
Research	7	3.78	.79	-.465	-.295	.565 - .739	.872
Management	8	3.44	.78	-.181	-.380	.515 - .643	.852
Extension	5	3.33	.93	-.307	-.475	.620 - .735	.857
Overall	30	3.60	.62	-.170	-.296	.462 - .592	.933

Using the results from EFA, first and second order CFAs were then undertaken using the second split sample to test the structure and 'goodness-of-fit' of the four factor solution using the model fit indices chi-square/degrees of freedom (χ^2/df , 5.000 preferred), the Tucker-Lewis index (TLI >.900 preferred), the comparative fit index (CFI >.900 preferred) and root mean square error of approximation (RMSEA <.800 preferred) with particularly good outcomes (Table 3). With only minor modification in the form of 5 error covariances, model fit for both first and second order outcomes was considered good (Table 3), the second order CFA suggesting that the four first-order factors can also be thought of as specific components of a single general construct of Brazilian Lecturer Self-Efficacy rather than separate constructs that are simply correlated with one another. While use of the first order model is preferred for most purposes, the availability of a second order model may also be useful in specific analytical situations. Composite Reliability (CR) values for the CFA were determined as follows: CR=.85 teaching, CR=.86 research, CR=.82 management, CR=.80 extension. The Average Variance Extracted (AVE) values were also determined as follows: AVE=.35 teaching, AVE=.49 research, AVE=.42 management, AVE=.51 extension. Although some researchers suggest that the ideal value for AVE should lie above .500 (particularly in medicine, health care and science), lower values from social sciences studies involving a "first-time" model, and an initial model test that together should be viewed as largely "exploratory", are acceptable (Ping, 2009, p. 2).

Table 3 Confirmatory Factor Analysis: Model fit statistics (n=855)

	Model		
	4-Factors First-Order	4-Factors First-Order 5 Modification Indices	Second-Order 5 Modification Indices
χ^2	1661.88	1291.72	1303.51
Df	399	394	396
χ^2/df	4.165	3.278	3.292
TLI	.874	.909	.908
AGFI	.853	.882	.881
CFI	.884	.918	.917
RMSEA	.061	.052	.052
RMSEA 90% CI	.058, .064	.049, .055	.049, .055

χ^2 = chi-square; df=degrees of freedom; χ^2/df = minimum discrepancy divided by its degrees of freedom; TLI=Tucker-Lewis index; AGFI=adjusted goodness-of-fit; CFI=comparative fit index; RMSEA= root mean square error of approximation; RMSEA 90%CI= root mean square error of approximation 90% confidence interval; 4-Factors=Teaching, Research, Management and Extension Self-Efficacy; Second-order factor= Brazilian Lecturer Self-Efficacy; First-order factors: Teaching, Research, Management and Extension Self-Efficacy.

Conclusions, recommendations and limitations

The study of self-efficacy in Higher Education has been growing for many years due to the need to understand lecturer beliefs and their effects on practice. The literature also points to the influences that self-efficacy beliefs have on student's own self-efficacy beliefs (i.e. it is argued that lecturer self-efficacy can directly affect students' perceptions of their abilities to learn). Even so, much research about self-efficacy uses instruments that suffer with conceptual or practical issues. In Brazil, the only dimension of a lecturer's work explored until now is teaching, with a lack of knowledge about the other roles they perform within universities.

This paper reports the process of development and validation of a new Brazilian Lecturer Self-Efficacy Scale (BLSES). The 30-item, 4-factor questionnaire has good internal reliability presenting Cronbach's alpha values ranging from .85 to .87 and an overall reliability of .93 (George & Mallery, 2003). The CFA confirmed the EFA structure and also supported the existence of a second-order factor, with composite reliability ranging from .80 to .85. This way, the BLSES is a valid and reliable instrument, with both four factor first order and second order solutions being useful to research Brazilian Lecturers' self-efficacy.

In this sense, the present study makes a valuable contribution with a scale grounded in Social Cognitive Theory, with good reliability and validity that can be used by future

researchers. In possession of such instrument, other investigations can be developed to understand the relationship between lecturer self-efficacy and different psychological, contextual and social variables, as such health, job satisfaction and engagement, as well as about the relationship between lecturers' beliefs and practices in the different areas of operation. Also, as Escobar, Morales, & Klimenko (2018) have suggested, institutions could use scales such as BLSES to identify areas of fragility of their lecturers and then propose training focused on the skills needed. In short, the scale in development is a valuable tool in the study of Brazilian lecturers' self-efficacy beliefs.

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