Evaluating Measurement Model of Lecturer Self-Efficacy

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Abstract. The first aim of the present study was to examine the construct of lecturer self-efficacy. In so doing, the study sought to establish the extent to which the conceptualized self-efficacy measure reproduced the data. Second, the study evaluated the adequacy of the lecturer self-efficacy measure across lecturers’ gender. The data were collected from a self-reported questionnaire administered to 106 faculty members of a teacher training institution in Malaysia. The results of confirmatory factor analysis supported the adequacy of lecturer self-efficacy measure. Also, the measurement found to be applicable across gender.

\textsuperscript{1}Keywords: validity, self-efficacy, measurement model, CFA.

1. Introduction

Self-efficacy is a psychological construct grounded in social cognitive theory. Bandura [1] argues that self-efficacy is an individual’s believe on his or her own capability to organize and complete a course of actions required to accomplish a specific type of task. Self-efficacy is a strong predictor of motivation to perform and profound determinant of performances[2]. A strong sense of efficacy enhances one’s accomplishment and personal well-being in many ways. One’s self-efficacy predetermineshow he or she functions in the environment, copes with challenges, experiences personal and professional development, and adapts to changes [3].

Self-efficacy is context- and task-specific [4]. In this context the main task of the lecturers of higher educational institutions, can be divided into three areas(Figure 1), namely teaching, research and service which comprises of managing, consultation and mentoring [1,5,6]. Hemming and Kay [7] identified eight subscales of lecturers’ tasks: four research subscales (reporting and supervising research, conducting research, writing reviewing articles/books, and having a broad view of a research area) two teaching subscales (designing instruction and delivering lectures) and two service subscales.

![Figure 1: Lecturer Self-Efficacy (Source: Author)](image)

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Research in lecturer self-efficacy is still at its infancy [8], primarily focussed on the antecedents and outcomes of lecturer self-efficacy[1,6,9-11]. Evidently results of prior studies pointed out that lecturer self-efficacy, being amendable in nature, predisposes lecturers’ performance [9, 12, 13]. Despite its importance, not many attempts have been made to examine the construct of lecturer self-efficacy. With the exception of Hemmings and Kay’s [7] work, the validity and reliability of the construct are yet to be adequately established. Therefore, it is essential to address this concern to achieve a better understanding about lecturer self-efficacy.

The present study aimed to empirically test the probability of a three-common-factor structure of construct, lecturer self-efficacy. The study sought to establish the extent to which the conceptualized self-efficacy measure reproduced the data. Secondly, the study evaluated the adequacy of the lecturer self-efficacy measure across lecturers’ gender. The invariance analysis tested the moderating effect of gender, a lack of which enhances the usefulness of the measure.

2. Methodology

2.1. Sample

The study used a convenience sample of 106 lecturers from a teacher training institute. Just over half the sample, 63% were females and 37% were males. 86.8% of the respondents have masters’ degree, 7.5% respondents have PhD and the rest of the respondents have first degrees as the highest qualification. Although majority of the respondents have about 4 years of teaching experience, there are 16% of the respondents have more than 22 years of teaching experience.

2.2. Instrument

Lecturers’ self-efficacy (LSE) is adapted from an instrument developed by Hemmings and Kay [7]. The LSE has three sections. The first section is on demographic information of the respondents, which includes gender, years of teaching, highest educational level attained, department or faculty they currently serve and academic position. The second section has 80 items, representing three broad dimensions, namely research, teaching and services. These items are statements asking for the respondent’s level of confidence in performing the listed task on a graded scale between 0 and 6. In this 7-point scale, 0 represents ‘Not Confident at all’ and 6 represents ‘Very Confident’. The last section concerns the lecturers’ level of priority towards the three dimensions and the time they spend on each one of the dimensions.

A preliminary exploratory analysis of the data found that the average variance extracted (AVE) for the three factors ranged from .534 to .633; indicating that the instrument has adequate convergent validity [14]. The “shared variance” among the three factors was .103, .176, and .104. Thus, there is adequate evidence of the discriminant validity of the measure since AVEs of three components were higher than the squared variance.

3. Results

3.1 Adequacy of LSE Measurement Model

The hypothesised 3-factor measurement model was evaluated using confirmatory factor analysis with AMOS (version 16) to assess the factorial validity of the measurement model. The fit statistics showed that the model did not fit the data ($\chi^2/df = 2.51$; CFI = .702; RMSEA = .120). The results also suggest for a revision of the model since there were many cross-loaded indicators, some of which showed big error variances [15].
Figure 2 presents the revised 15-item three-factor measurement model analysed by performing CFA. This revised model was consistent with the data: $\chi^2(87) = 104.2$, $p = .101$; CFI = .987, RMSEA = .043. The direction and magnitude of the factor loading were substantial and statistically significant [15]. Table 1 shows the unstandardized loadings derived from the maximum likelihood (ML) and Bayesian estimation.

Table 1: Summary of Loadings of the ML Estimation and Bayesian Estimation

<table>
<thead>
<tr>
<th>Construct</th>
<th>Item</th>
<th>Measure</th>
<th>ML</th>
<th>Bayesian</th>
</tr>
</thead>
<tbody>
<tr>
<td>Research</td>
<td>r3</td>
<td>Reviewing literature for research project</td>
<td>1.00</td>
<td>1.00</td>
</tr>
<tr>
<td></td>
<td>r5</td>
<td>Designing research</td>
<td>1.08</td>
<td>1.09</td>
</tr>
<tr>
<td></td>
<td>r6</td>
<td>Conducting your pilot study</td>
<td>1.10</td>
<td>1.11</td>
</tr>
<tr>
<td></td>
<td>r10</td>
<td>Analysing research results</td>
<td>0.77</td>
<td>0.78</td>
</tr>
<tr>
<td></td>
<td>r16</td>
<td>Preparing conference papers</td>
<td>1.19</td>
<td>1.20</td>
</tr>
<tr>
<td>Teaching</td>
<td>t33</td>
<td>Delivering lecturers</td>
<td>1.22</td>
<td>1.24</td>
</tr>
<tr>
<td></td>
<td>t42</td>
<td>Consulting with students</td>
<td>1.00</td>
<td>1.00</td>
</tr>
<tr>
<td></td>
<td>t44</td>
<td>Setting exams</td>
<td>1.21</td>
<td>1.24</td>
</tr>
<tr>
<td></td>
<td>t45</td>
<td>Preparing assignments</td>
<td>1.20</td>
<td>1.22</td>
</tr>
<tr>
<td></td>
<td>t46</td>
<td>Marking assignments</td>
<td>1.04</td>
<td>1.09</td>
</tr>
<tr>
<td></td>
<td>t54</td>
<td>Coordinating subjects</td>
<td>1.22</td>
<td>1.06</td>
</tr>
<tr>
<td>Service</td>
<td>s69</td>
<td>Organising courses</td>
<td>1.00</td>
<td>1.00</td>
</tr>
<tr>
<td></td>
<td>s71</td>
<td>Consulting professionally</td>
<td>1.00</td>
<td>1.03</td>
</tr>
<tr>
<td></td>
<td>s78</td>
<td>Serving an editorial board</td>
<td>1.12</td>
<td>1.16</td>
</tr>
<tr>
<td></td>
<td>s79</td>
<td>Reporting on a colleague for tenure or promotion</td>
<td>1.11</td>
<td>1.15</td>
</tr>
</tbody>
</table>

3.2 Invariance of LSE Measure

The measurement model was further tested for gender-invariant through a three-stage multigroup analysis. First, a simultaneous analysis on both the male and femalesamples was conducted, without constraining the loadings; the results derived a baseline chi-square value. Next, all loadings were constrained to be equal for the male and female groups. The analysis of this constrained model of LSE
produced another chi-square value, which was finally tested against the baseline value for statistically significant differences.

The invariance test across the male and female groups resulted in a statistically insignificant change in the chi-square value, $\chi^2(12) = 23.86, p > .001$. Simply said, the difference in the chi-square values between the unrestricted model and the constrained model did not produce a poorer-fit model [15]. The loadings did not vary significantly across gender. It is justifiable then to conclude that gender did not interact with the underlying traits to influence the staff members’ responses to the indicators of lecturer efficacy; hence, gender is not a moderating variable.

### 4. Discussion and Conclusion

This study has evaluated the construct lecturer self-efficacy. The findings reaffirmed that the LSE is a valid and reliable multidimensional construct, which consist of teaching, research and service [7, 16]. The teaching dimension is been represented by seven indicators related to teaching–delivering lecturer, preparing tutorials, consulting with students, setting exams, preparing assignments, marking assignment and coordinating subject. The research dimension is represented by five indicators, which are reviewing the literature, designing research, conducting pilot study, analysing results and preparing conference paper. The service dimension is represented by four indicators, namely, organising course, consulting professionally, serving editorial board, and reporting on colleague tenure.

This study has implications for educational practices, especially in assessing lecturers’ causal judgment of their ability to successfully teach, do research, and involve in services. Results of such assessment would enable the human resource managers and institutional leaders to strategize, design, and implement intervention that would enhance their lecturers’ competencies.

Since this is one of the early attempts to establish the psychometric properties of lecturer self-efficacy, the study is restricted in terms of its generalizability. The study was conducted in a teacher training institute, involving a small sample size. Thus, further research is required to validate the instrument with lecturers from other higher educational institution, and with a bigger sample which would allow generalising the findings. Also, future studies may examine on the relationship between lecturers’ self-efficacy and preference, time allocation and performance in teaching, research and services.

### 5. References:


