

A Validation Study on Teacher Educators' Psychological Safety Scale

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Abstract: The main purpose of this study was to validate the psychological safety scale for teacher educators into Myanmar version. In this study, a total of 1040 teacher educators were participated as a sample and the required sample was selected by using simple random sampling technique. As the research instrument, Psychological Safety Scale (PSS) that was developed by O'Donovan et al., (2020), Individual Psychological Safety Scale (IPSS) that was developed by Liang et al., (2012), Psychological Safety Scale (PSS) that was developed by Li & Yan (2009) and Psychological Safety Inventory (PSI) that was developed by Edmondson (1999) were used. In Study 1, 500 teacher educators were selected from three Universities of Education and eighteen Education Degree Colleges in Myanmar for exploratory factor analysis (EFA) and in Study 2, another 540 teacher educators were selected from three Universities of Education and eighteen Education Degree Colleges in Myanmar for confirmatory factor analysis (CFA). Psychological Safety Scale consisted of 35 items. According to the results of Study 1, there are no items which have low communality value (less than 0.2) and low factor loading value (less than 0.4). Therefore, 35 items were retained in the instrument. Then, the results of the exploratory factor analysis showed that Psychological Safety Scale consisted of 35 items with three factors. Then, the confirmatory factor analysis in Study 2 demonstrated 30 items with three factors of Psychological Safety Scale to measure psychological safety of teacher educators. Moreover, convergent validity was achieved for Psychological Safety Scale and discriminant validity was also accepted between the constructs based on the results of construct validity analysis. Finally, Psychological Safety Scale included 30 items with three subscales in the context of Myanmar. Thus, Psychological Safety Scale demonstrated sufficient evidence of the psychometric properties and it was a reliable and valid instrument for measuring teacher educators' psychological safety according to Myanmar context. Moreover, it can be used as valuable instrument for Myanmar teacher educators regarding different backgrounds of Myanmar based on the adaptation and validation processes. Therefore, Psychological Safety Scale can serve as an effective instrument to assess teacher educators' psychological safety based on the psychometric properties of the scale.

Keywords: Psychological safety, Exploratory factor analysis, Confirmatory factor analysis, Teacher educators.

1. Introduction

To build a modern and developed nation which is in line with the era, it depends on its quality of education. It is crucial prerequisite to nation building because the more people enlightened the more they would contribute effectively to the

nation. In Myanmar, it is widely regarded that the success of education depends on teacher education. If a nation wants quality education, it must have qualified teacher educators. In the contemporary educational society, teacher educators are essential members. The role of a teacher educators in Myanmar education goes beyond traditional classroom instruction. They engage in various professional practices to support student teachers' growth, such as modeling effective teaching, providing feedback on student teachers' performance. In Myanmar, the significance of teacher educators is further amplified by the ongoing transformation within the national education system. Teacher educators nature student teachers to become responsible, proficient and effective teachers. Moreover, Myanmar teacher educators have to teach and supervise student teachers, do research and participate in institutional activities. In this process, inter-personal risks are unavoidable. In addressing these challenges, the social support system within the workplace plays a pivotal role in mitigating the adverse effects of such conflicts (Almahri & Wahab, 2023).

Working in organizations is not always easy, different people show great variation in their effectivity and performance output (Hackman, 1990). In any organizations, there are organizational uncertainty and interpersonal risk. According to the uncertainty management theory, teacher needs to deal with various aspects of uncertainty and interpersonal risk in the work environment (Ran et al., 2015). Uncertainty experience influences individual's cognition, emotion and behavior, even restricts to the individual's self-consciousness. Uncertainty and interpersonal risk experience is weary. Psychological safety that interpersonal risk-taking is safe at work, has been identified as a fundamental cognitive state that supports the process of learning, organizational transformation and engagement (Edmondson, 1999).

Being the team members in educational organization, teacher educators must have the trust that their ideas, suggestions for taking risks, or amending an original plan would not be met with criticism or punishment by the team or principal (Detert & Burris, 2007). They need to have the feeling that they can openly and freely interaction with colleagues who engage in constructive feedback and mutual assistance. They also need to feel safe to take interpersonal risks, voice opinions, and share ideas in their workplace. This feeling of safety in work teams is

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known as psychological safety (Bowerman, 2023).

Psychological safety refers to individuals' shared beliefs about the safety of interpersonal risk-taking in the workplace. A psychologically safe work environment enables teacher educators to feel safe at work in order to teach, learn, engage institutional activities and contribute in a rapidly changing world, as well as to achieve good job performance (Edmondson & Lei, 2014).

Under conditions of psychological safety, teacher educators can share experiences and perceptions about profession with each other through efficient interpersonal communication. Since organizational functions are based on the effective relationship between individuals and groups, relationships within organizations develop through communication. In addition, a psychologically safe work environment promotes team and individual learning (Newman *et al.*, 2017).

For an educational program to be successful, a network of factors related to the teachers, learners, school environment and organization should be considered. Ministry of Education is now implementing the activities to promote teacher education with the direction of the National Education Law. Teacher education in Myanmar is delivered through three types of institutions and twenty-five Education Degree Colleges. The presence or absence of psychological safety within these institutions and colleges determines whether an educator feels empowered to innovate and seek support or feels constrained by traditional hierarchical structures.

The concept of psychological safety has originally been proposed by Kahn (1990). Later, it was popularized and defined by Edmondson (2014) as a common belief among members of a community that it is safe for group members to take interpersonal risks. According to the Edmondson's psychological safety theory, psychological safety concerns the removal of fear from human interactions. In such a context, people feel included, belonged, and safe to learn, contribute, and challenge the current condition without fear. According to Edmondson, psychological safety is crucial for the functioning of so-called high-performance teams, especially in today's competitive market. Psychological safety does not mean creating an environment free of conflict or disagreement. Teaching is a high-demand, complex job. High-demand, complex workplaces can decrease the mental well-being of teacher educators leading to detachment, burnout, and high teacher educators' turnover. Complex organization where teacher educators are held to high standards and expectations can produce innovation and increased performance when psychological safety is established. The more complex a job is, the more psychological safety predicts high performance (Edmondson, 2014).

Psychologically safe environment will allow the teacher educators to feel secure in speaking up and not worry about consequences, thus, directly affecting the educational organization performance and teaching learning processes. When teacher educators fear the consequences of taking interpersonal risks, such as negative evaluations, and parental pushback, innovation cannot thrive, and mental well-being can be affected (Edmondson, 2014). In addition to limiting

innovation, a lack of psychological safety leads to negative impacts on teacher educators' mental health well-being and productivity, such as stress, burnout, and turnover (Gallo, 2023).

The society must have some kind of assurance that its professional people are faithfully executing the weighty ethical obligation which their advanced training has trust upon them. Ordinarily, the guarantee of professional integrity is to be found in the professional's disinterested dedication to the welfare of his public. The professional must dispense his expert services primarily for the benefit of others. His own personal advancement and material comfort must be unequivocally subordinated to the public he serves (Dr Khin Zaw, 2001).

To do so, teacher educators should have psychologically safe environment. High standards and high psychological safety work environments are regarded as high-performance zones. When teachers experience burnout due to prolonged functioning in a highly stressful work environment, they decrease in the mental well-being and productivity. This is due to the fact that teachers fall into the high complexity and low psychological safety zone (Vyver *et al.*, 2020). Maintaining psychological safety, particularly in fields that require creativity and problem-solving, such as healthcare and teaching, is crucial to an organization's success. Therefore, psychological safety plays a significant role in workplace effectiveness, productivity, engagement, innovation, cohesiveness, and cooperation (Newman *et al.*, 2017).

Nowadays, psychological safety has become an existing topic with enormous implications for many areas. Moreover, psychological safety of teacher educators is considered as an urgent need. Therefore, psychological safety was the focus of the current research, as an attempt to gain insight into psychological safety and how it is established. The main purpose of the study is to validate teacher educators' psychological safety scale for teacher educators into Myanmar version. The result from this validation study may further help the Myanmar administrators and researchers to investigate the teacher educators' psychological safety in their work.

2. Methodology

The research design for this study was descriptive research design and a simple random sampling technique was used to select the participants. Before data collection, the expert review and pilot study were carried out to get content validity and face validity. After modifying the survey questionnaires, the actual data collection was done and analyzed these data by using SPSS software. The participants for this study were selected from seven regions and five states, Yangon Region, Mandalay Region, Sagaing Region, Ayeyawaddy Region, Bago Region, Magway Region, Tanintharyi Region, Shan State, Mon State, Kayah State, Kayah State and Chin State were selected. The total of 1040 teacher educators from three education universities and eighteen education colleges participated in the study. As the research instrument, Psychological Safety Scale (PSS) that was developed by O'Donovan *et al.*, (2020), Individual Psychological Safety Scale (IPSS) that was developed by Liang *et al.*, (2012), Psychological Safety Scale

(PSS) that was developed by Li & Yan (2009) and Psychological Safety Inventory (PSI) that was developed by Edmondson (1999) were used. In Study 1, 500 teacher educators were selected from three Universities of Education and eighteen Education Degree Colleges in Myanmar for exploratory factor analysis (EFA) and in Study 2, another 540 teacher educators were selected from three Universities of Education and eighteen Education Degree Colleges in Myanmar for confirmatory factor analysis (CFA).

3. Results and Discussion

In phase 1, exploratory factor analysis was conducted for psychological safety with 500 teacher educators selected from eight Education Degree Colleges and two universities of Education participated as a sample..

A. Exploratory Factor Analysis for Psychological Safety Scale

The factor analysis program generates a number of tables depending on which options have been chosen. The 35 items were factor analyzed using principal components analysis with varimax rotation.

Table 1

KMO and Bartlett's test of psychological safety scale			
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.941	
Bartlett's Test of Sphericity	Approx. Chi-Square	7334.318	
	df	448	
	Sig.	.000	

First, the Kaiser – Meyer – Olkin (KMO) measure of Sampling Adequacy is a measure of whether or not the distribution of value is adequate for conducting EFA. A value of less than .5 indicates the sample is inadequate and ideally the value should be greater than .7 or above. In this case, the value is KMO = .941, which means the sample size is sufficient.

Second, the Bartlett's Test of Sphericity describes the data has an adequate number of correlations between the variables for factor analysis. In this case, a significance value is less than .05. Thus, the data has the enough correlations between variables and continues to accept factor analysis.

The Total Variance Explained table shows how the variance is divided among the 35 possible factors.

Initial Eigenvalues: The Eigen value for a given factor measures the variance in all the variables which is accounted for by that factor. If a factor has a low Eigen value, then it is contributing little to the explanation of variances in the variables and may be ignored as redundant as compared to more important factors. Perhaps the most frequently used extraction approach is the root greater than one criterion. In the current state, the first three columns list all of the factors that can be found within the data set. These results indicate that there are 3 Eigenvalues greater than 1 so that it can be said that the test instrument contains 3 factors. Within these factors, the instrument can account for 47.487% of the measurement variance.

The % of Variance column tells that how much of the variance in the dataset can be explained by each factor. The first three factors account for relatively large proportions of the

variance compared to the latter factors. The final set of columns gives the Eigenvalues of the extracted factor after rotation has taken place. In this case, the three factors' solution explained a total of 47.487% of the variance, with Factor 1 contributing 19.395%, Factor 2 contributing 33.883%, and Factor 3 contributing 47.487% respectively.

Throughout this analysis, items with initial values of less than 0.2 and without loading were discarded. After doing several steps, the communalities of all items were all above 0.2 and factor loadings of all items were above 0.4, it indicated that the relation between each item and other items was satisfactory. Given these overall indicators, factor analysis was conducted with 35 items.

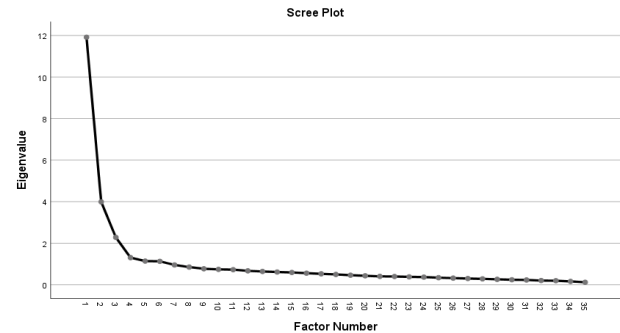


Fig. 1. Scree plot of psychological safety scale

Table 2

Factor loadings for teacher educators' psychological safety scale

Items	Components		
	Group Psychological Safety	Organizational Psychological Safety	Individual Psychological Safety
Item 2	.491		
Item 4	.513		
Item 5	.620		
Item 7	.577		
Item 8	.582		
Item 9	.637		
Item 10	.553		
Item 11	.597		
Item 12	.745		
Item 13	.675		
Item 14	.649		
Item 15	.578		
Item 16	.677		
Item 17	.493		
Item 18	.602		
Item 19	.471		
Item 20	.549		
Item 22		.699	
Item 23		.648	
Item 24		.505	
Item 25		.536	
Item 26		.507	
Item 27		.456	
Item 29		.610	
Item 30		.637	
Item 31		.740	
Item 32		.569	
Item 1			.677
Item 3			.590
Item 6			.687
Item 21			.651
Item 28			.631
Item 33			.625
Item 34			.618
Item 35			.641

Table 3
Final model fit indices of psychological safety scale

Chi-square	p-value	Df	CMIN/DF	CFI	NFI	GFI	AGFI	RMSEA
3733.1	<.001	396	2.15	.93	.91	.92	.93	.03

Communality: Communality is the extent to which an item correlates with all other items. The higher the communality, the better the correlation. Communalities in the above table indicate that all extraction values vary .262 to .758. Hence the role of communality in this study should be considered for accepting to proceed final results of factor analysis.

Naming Factor: After knowing the many measurable factors on the instrument, then do the naming factor by looking at the factor loading. The items contained in group psychological safety are 17 items: 2, 4, 5, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, and 20. The variables that load most strongly onto organizational psychological safety are 10 items: 22, 23, 24, 25, 26, 27, 29, 30, 31, and 32. Individual psychological safety contains 8 items: 1, 3, 6, 21, 28, 33, 34, and 35 respectively.

B. Confirmatory Factor Analysis on Psychological Safety Scale

Confirmatory factor analysis (CFA) is a multivariate statistical procedure that is used to test how well the measured variables represent the number of constructs. In order to confirm the factor structure of the Psychological Safety Scale, confirmatory factor analysis was conducted with Study 2. In Study 2, consisted of 540 teacher educators selected from ten Education Degree Colleges and one university of Education participated as a sample. The purpose of Study 2 was to cross-validate the results obtained from Study 1. Confirmatory factor analysis (IBM AMOS version 24) with maximum likelihood estimation was performed to test the stability of the constructs in the 35-item Psychological Safety Scale. Several model fits indices were inspected to examine the measures of overall model fit.

In order to achieve model fit, the RMSEA with a value less than 0.05 is an indication of a good fit, while values between 0.05 and 0.08 can still be accepted. Meanwhile, CFI, NFI, GFI and AGFI should be more than 0.80 to be considered as an acceptable fit (Sharma et al., 2005). For the CMIN/DF, the value should not exceed 3 (Schumacker & Lomax, 2004). The analysis showed that the CMIN/DF was 3.817, which slightly exceed 3. The value of RMSEA is 0.062, which falls between 0.05 and 0.08. But, the value of CFI, NFI, GFI and AGFI did not reach adequate value; the data is not fit to the model. Therefore, the model was respecified. Hooper, Coughlan and Mullen (2008) expressed that it is good to remove the items with low R^2 values (less than 0.2) from the analysis to improve a better model fit. In the present analysis, five items that R^2 values were less than 0.2 were removed from the study in order to achieve model fit. Therefore, Psychological Safety Scale included 30 items. After that the CMIN/DF was 2.897, which did not exceed 3. The value of RMSEA is 0.055, which falls between 0.05 and 0.08. But, the value of CFI, NFI, GFI and AGFI did not reach adequate value; the data is not fit to the model. Therefore, the model was respecified. According to Anderson (2009), another way of improving model fit is through the correlation of error terms. The correlated error

terms showed that there is additional information in the data that has not exploited in the current model (as cited in Hair et al., 2011). In the present study, six error terms were correlated. After the correlated error terms, the analysis was run to get a perfect model fit. The final model (total 30 items with 3 factors) had reached the acceptable level of all fit indices. The overall model fit statistics of the analysis including the modification indices for final model were comparatively reported in Table 3.

According to the results of Table 4.10, the values of CFI, NFI, GFI and AGFI were higher than 0.9 and the model fit is acceptable. It has been suggested that RMSEA values less than 0.05 are good, values between 0.05 and 0.08 are acceptable, values between 0.08 and 0.1 are marginal and values greater than 0.1 are poor. Therefore, the RMSEA value of 0.032 in this sample indicates a good fit to the model (Fabrigar et al., 1999). If the CMIN/DF value is <3, it indicates an acceptable fit (Kline, 1998). If the CMIN /DF value is <5, it indicates a reasonable fit and similarly, CMIN /DF value does not exceed 3, the data fit to the model (as cited in Al-Mamary & Shamsuddin, 2015). In this study, CMIN /DF value does not exceed 3. Therefore, the model fit of indices for the Psychological Safety Scale with 30 items was acceptable for the measurement psychological safety of teacher educators. The confirmatory factor analysis of psychological safety scale was expressed in Figure 2.

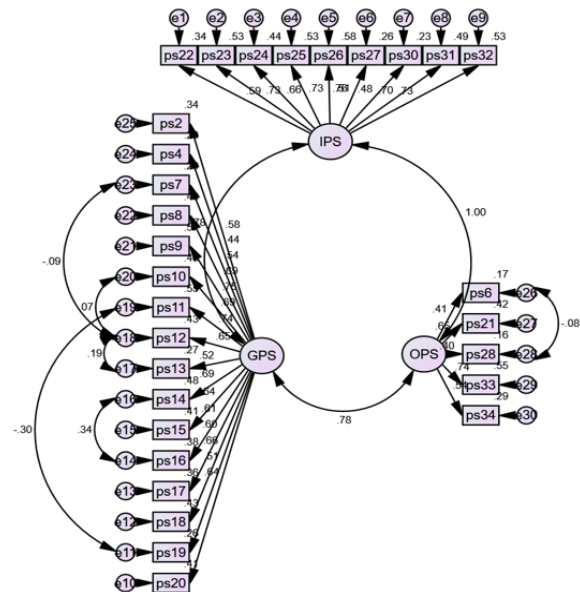


Fig. 2. The final model fit for psychological safety scale
*Note: GPS = Group Psychological Safety, IPS = Individual Psychological Safety, OPS = Organizational Psychological Safety

Then, the evaluated fit indices were calculated. These indices involved the unstandardized estimates (b), standard errors (S.E), critical ratio (C.R) and standardized estimates (β). At the significant level of 0.05, the magnitude of C.R is higher than 1.96, it could be considered as significant (as cited in Arbuckle, 2012).

Table 4
Average Variance Extracted (AVE) and Composite Reliability (CR) of the psychological safety scale

Factors	Number of Items	CR	AVE
Group Psychological Safety	16	0.911	0.44
Individual Psychological Safety	9	0.872	0.40
Organizational Psychological Safety	5	0.716	0.32

Table 5
Square root of AVE with correlations of latent factors of the psychological safety scale

Factors	Group Psychological Safety	Individual Psychological Safety	Organizational Psychological Safety
Group Psychological Safety	<i>0.66</i>		
Individual Psychological Safety	0.52	<i>0.63</i>	
Organizational Psychological Safety	0.41	0.46	<i>0.57</i>

Note: The diagonal numbers in italic are the square root of AVE values.

Table 6
Number of items and reliability coefficients in each subscales of the psychological safety scale

Variables	Number of Items	Cronbach's Alpha
Group Psychological Safety	16	.905
Individual Psychological Safety	9	.866
Organizational Psychological Safety	5	.656
Psychological Safety (Overall)	30	.923

C. Convergent Validity of the Psychological Safety Scale

Convergent validity is also an evidence to test construct validity. To establish convergent validity, factor loadings of the indicator variables, composite reliability (CR) and average variance extracted (AVE) were used. AVE and CR values were computed by the formula using Microsoft Excel. Table 4 showed the results of average variance extracted (AVE) and composite reliability (CR) of the psychological safety scale.

According to Table 4, although AVE values of psychological safety were lower than 0.5, CR values were above 0.7 so that convergent validity was achieved for this construct. So, Psychological Safety Scale was assumed that it was a valid instrument to measure the psychological safety of teacher educators.

D. Discriminant Validity of the Psychological Safety Scale

Discriminant validity was used to show that the construct is actually differing from one another empirically. Discriminant validity was evaluated with square root of AVE with correlations of latent constructs.

According to Table 5, all the square root of AVE values was greater than 0.5 and these values were greater than all the inter-latent factor correlations for all factors in the relevant rows and columns. According to Fornell and Larcker (1981), the square root of AVE should be above 0.5. Then, according to Hair et al. (2011), square root of AVE values was greater than the inter-latent factor correlations (Hamid et al., 2017). Thus, the results of the discriminant validity of psychological safety were congruent with Fornell and Larcker (1981) and Hair et al. (2011). Overall, discriminant validity can be accepted for the measurement model and the discriminant validity between the constructs.

According to Table 6, the reliability coefficient of each subscale ranges from 0.656 to .905. The reliability coefficient of Psychological Safety (Overall) is 0.923. Reliability coefficients above 0.89 are generally considered as excellent, 0.80-0.89 was good and 0.7-0.79 was adequate (Sekaran & Bougie, 2013). According to Zaffar (2021), a general accepted rule is that Cronbach's alpha of 0.6-0.7 indicates an acceptable

level of reliability and 0.8 or greater a very good level. So, the reliability coefficients value for psychological safety (overall) and group psychological safety subscale were excellent, individual psychological safety subscale was good and organizational psychological safety was acceptable.

4. Conclusion

This study tried to validate psychological safety for teacher educators into Myanmar version. with 35 items. The researcher analyzed the items by calculating Exploratory Factor Analysis and Confirmatory Factor Analysis. After running, 30 items were finally left in Psychological Safety Scale. According to the results, Psychological Safety Scale was a reliable and valid instrument for measuring teacher educators' psychological safety according to Myanmar context. Therefore, education administrators, policymakers, and researchers in Myanmar can reliably utilize this scale, which will greatly contribute to fostering a healthy psychological safety environment within educational departments and universities.

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