Macrothink Institute™

Journal of Public Administration and Governance
ISSN 2161-7104
2024, Vol. 14, No. 2S

Resilience Scale Among Primary School Teachers: Exploratory Factor Analysis (EFA)

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Received: Dec. 6, 2024 Accepted: Jan. 12, 2025 Online published: Jan. 20, 2025

doi:10.5296/jpag.v14i2S.22596 URL: https://doi.org/10.5296/jpag.v14i2S.22596

Abstract

The resilience scale is an important measurement tool in assessing the ability of teachers to face a variety of pressures and challenges in the teaching profession. The measurement of this scale can help in identifying the strengths and weaknesses of teachers as well as being able to plan the right intervention to improve the quality of teaching and subsequently be able to preserve the well-being of teachers. This study aims to validate the resilience instrument from the *Winwood Workplace Resilience Scale* instrument (2013). A total of 100 primary school teachers from the state of Perak were involved in this study. This study uses Exploratory Factor Analysis (EFA) and is analyzed using SPSS software. EFA results show that there is strong internal reliability between the constructs $\alpha = 0.926$. The EFA results also show that the Kaiser-Meyer-Olkin (KMO) Value ($0.863 > 0.6$) confirms that there is sufficient correlation between the item constructs, supported by a significant Bartlett's Test (Chi-Square 920.135, $p < 0.05$). Two factors can collectively explain 61.595 % of the total variance. The instrument

has also been rotated into two components with Eigenvalues greater than 1. Of the 20 items in the instrument, 7 items (2, 8, 9, 10, 11, 12, 17) had to be dropped because they show a weighting factor that is less than 0.6. In conclusion, the EFA findings show that the items in this instrument can measure the resilience construct among teachers in Malaysian primary schools.

Keywords: Exploratory Factor Analysis, Resilience, Malaysian teachers.

1. Introduction

The Winwood Resilience Scale (WRS), also known as the Resilience at Work Scale (RAW), is a psychometric tool designed to measure resilience in workplace settings. Developed by Winwood et al., (2013) the scale comprises 20 items that assess seven domains of resilience: Living Authentically, Finding Your Calling, Maintaining Perspective, Managing Stress, Interacting Cooperatively, Staying Healthy, and Building Networks (Connelly et al., 2023). The importance of validating this scale within the Malaysian teacher context is underscored by the unique challenges faced by educators in Malaysia, including high levels of occupational stress, burnout, and the need for effective coping strategies to enhance their professional performance (Hameed et al., 2022).

Validation of the WRS in the Malaysian educational context is crucial for several reasons. First, the scale has demonstrated satisfactory psychometric properties in various settings, indicating its reliability and validity as a measure of resilience (Walpita & Arambepola, 2022). By adapting and validating the WRS for Malaysian teachers, researchers can ensure that the scale accurately reflects the cultural and contextual nuances of the Malaysian educational environment, which may differ significantly from those in Western contexts where the scale was originally developed (Blaique et al., 2022). This cultural adaptation is essential for the scale to be a meaningful tool for assessing resilience among Malaysian educators. Furthermore, the validation of the WRS can provide insights into the resilience levels of Malaysian teachers, which is vital for developing targeted interventions to enhance their well-being and performance. Studies have shown that higher resilience is associated with better work performance and reduced burnout among professionals (Bui et al., 2023). By identifying the resilience levels of teachers, educational institutions can implement support programs that foster resilience, ultimately leading to improved job satisfaction and retention rates among educators (Malik, 2023).

Resilience among teachers has emerged as a critical area of research, particularly in the context of the challenges posed by modern educational environments. The Winwood Resilience Scale (WRS), developed to measure resilience at work, provides a structured approach to understanding how teachers can effectively cope with stressors and maintain their well-being. The scale encompasses various dimensions of resilience, including living authentically, managing stress, and building networks, which are essential for teachers facing the multifaceted pressures of their profession. Research indicates that teachers, especially those in disadvantaged urban communities, experience unique challenges that can impact their emotional resilience. Factors such as high-stakes accountability measures and insufficient resources can exacerbate stress, leading to burnout and attrition (Day & Hong,

2016). However, resilience can act as a protective factor, enabling teachers to navigate these challenges effectively. Studies have shown that teachers who possess higher levels of resilience are more likely to remain committed to their profession and exhibit greater job satisfaction (Arnup & Bowles, 2016). This highlights the importance of fostering resilience through supportive school environments and professional development opportunities.

The validation of the WRS in various educational contexts, including among teachers, is crucial for tailoring interventions that enhance resilience. For instance, research has demonstrated that resilience is positively correlated with job engagement and satisfaction, suggesting that interventions aimed at improving resilience can lead to better educational outcomes (Ibrahim, 2024). Furthermore, understanding the specific resilience factors that influence teachers' experiences can inform policies and practices that promote well-being and retention in the teaching workforce ("Teachers Take Charge of Their Resilience Through Self-Study", 2021). In the wake of the COVID-19 pandemic, the need for resilience among teachers has become even more pronounced. The pandemic has introduced unprecedented challenges, necessitating a reevaluation of how resilience is conceptualized and fostered within educational settings (McCauley & Cooperstock, 2022). Teachers have had to adapt to rapidly changing circumstances, often requiring them to draw upon their resilience to maintain effective teaching practices and support their students' learning (Sahoo, 2024).

In summary, the Winwood Resilience Scale serves as a valuable tool for assessing and enhancing resilience among teachers. It is not only necessary for ensuring the scale's relevance and accuracy but also for enhancing the overall well-being and effectiveness of educators in Malaysia. By validating this scale within diverse educational contexts, researchers and practitioners can better understand the dynamics of teacher resilience and implement strategies that support educators in overcoming challenges, ultimately leading to improved educational outcomes. As the educational landscape continues to evolve, understanding and fostering resilience among teachers will be pivotal in addressing the challenges they face.

2. Method

The design of this study was survey-based. Respondents must complete resilience questionnaires as part of the approach. Malaysian teachers represent the responders. A total of 100 teachers from the state of Perak are participating. The sample was selected using random sampling. The Malaysian version of the resilience questionnaire includes 20 items derived from Winwood, Colon, and McEwen's (2013) Resilience at Work Scale. A five-point Likert scale was utilized (1=strongly disagree, 2=disagree, 3=neither agree nor disagree, 4=agree, and 5=strongly agree). Respondents were asked to choose the Likert scale that most accurately reflected their current situation. Data was gathered through the use of a Google form. Before beginning the study, the researcher received approval from the Director of the Perak State Education Department and the EPRD of the Ministry of Education. The researcher employed the Google Forms platform to gather data this study. SPSS software was used for exploratory factor analysis (EFA) of the data. Exploratory factor analysis (EFA) looks for relationships between factors, extraction factors, and rotating factors.

In this study, data were analysed using EFA. The goal of EFA is to determine the number of items and structural components included in the created questionnaire. The component structure is based on the comments received from study participants. When developing, adapting, or translating an instrument into a different language, EFA should be performed (Zainudin et al. 2018). For this study, the researcher created a resilience instrument by adapting and altering previous research instrument statements. As a result, EFA must be performed due to variations in geography, language, and culture compared to the prior study population. According to Yong and Pearce (2013), EFA is performed to (i) reduce items that are somewhat ambiguous, maintaining the main items for each construct; (ii) identify items that have the same meaning and items that may be repeated but under different questions; (iii) identify items that can be summarized without affecting the meaning of the related construct; (iv) identify the correlation structure between related factors; and (v) determine the number of factors found in a construct.

Before beginning the factor analysis technique, the researcher must consider three steps: finding factor correlations, extracting factors, and rotating factors (Chua, 2014). Factor analysis is used when there is a correlation between items with varying correlation strengths. Items with a high correlation are combined into a single construct because they have the ability to measure the same notion. Similarly, items with poor correlations are assigned to various conceptions. When the recommended correlation coefficient value is 0.3 or above, factor analysis is allowed to continue (Pallant et al. 2020). To make sure the sample is adequate, the data should be examined before factor extraction. Bartlett's test of sphericity and Kaiser Mayer-Olkin (KMO) values were used to assess the quality of the sampling. According to Chua (2014) and Tabachnick (2007), KMO values should have a minimum value of 0.60 and range from 0 to 1. Item connections should be significant ($p=0.000$, $p<0.05$) for Bartlett's test of sphericity to evaluate if they are appropriate for EFA.

The following step is factor extraction, which removes particular elements and rearranges the remaining factors in a specific construct. The Total Variance Explained table displays the eigenvalues. According to the display, the biggest eigenvalue will be at the top of the table, signifying the initial factor. This component explains why it has caused the most variance shift in the dependent variable as a whole (Chua, 2014). According to Hair et al. (2019), sixty percent is the minimum figure for the amount of variance explained. Following Varimax rotation, the correlations between each factor and the items are displayed in a Rotated Component Matrix Table. As advised by (Hair, 2019), item removal was carried out when the factor loading value was less than 0.6. Furthermore, the investigator must verify the internal consistency of the just created instrument value, specifically the updated Cronbach's alpha value. A Cronbach's alpha value above 0.70 suggests that the item has strong internal validity, according to Hair et al. (Hair, 2019). constant and ought to be kept up.

3. Results

Three analyses are needed in the EFA Procedure to verify an instrument: KMO and Bartlett's Test, Total Variance Explained Analysis and Scree Plot Graph, and Component Matrix with Varimax Rotation (Rotated Component Matrix). The following are the outcomes of these

three analyses:

3.1 KMO and Bartlett's Test

Table 1 presents the Kaiser-Mayer-Olkin (KMO) test value, which is 0.863 Because it satisfies the minimal value of 0.6 suggested by Chua (2009), Tabachnick, and Fidell (2007), this number is regarded as good. The KMO number indicates that there is no significant multicollinearity issue with the data, making the items appropriate for factor analysis. Bartlett's Test results indicate that it is significant ($p=0.000$, $p<0.05$). According to Hair (2019), these findings show that there is enough connection between the items to establish factors, which permits additional component analysis. As a result, all of the study's items received usability scores and displayed significant and appropriate values, making the data suitable for exploratory factor analysis (EFA).

Table 1. The result of KMO and Barlett's test for Resilience instruments

Kaiser-Meyer-Olkin (KMO)	Measure of sampling adequacy	.863
Bartlett's test of sphericity	Approx. Chi-square sphericity	920.135
	df	91
	Sig.	.000

3.2 Total Variances Explained Analysis and Scree Plot Graph

The results of the variance explained for the resilience instrument are displayed in Table 2 below. Two of the components have eigenvalues larger than 1. The combined effect of both factors accounts for 61.59 percent of the variance changes total. The obtained total variance is greater than 60 percent. Factor 1 accounted for 53.23 percent of the variance while factor 2 accounted for 8.36 percent, based on the total of squared loadings during the extraction process. This demonstrates that the quantity of parts and objects is appropriate for field research.

Table 2. Total Variances Explain

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of variance	Cumulative %	Total	% of variance	Cumulative %
1	7.452	53.231	53.231	7.452	53.231	53.231
2	1.171	8.364	61.595	1.171	8.364	61.595

Note. Extraction method: principal component analysis

Two primary factors that are extracted into the resilience construct and correlate with the results in Table 2 are depicted in the scree plot graph in Figure 1 below.

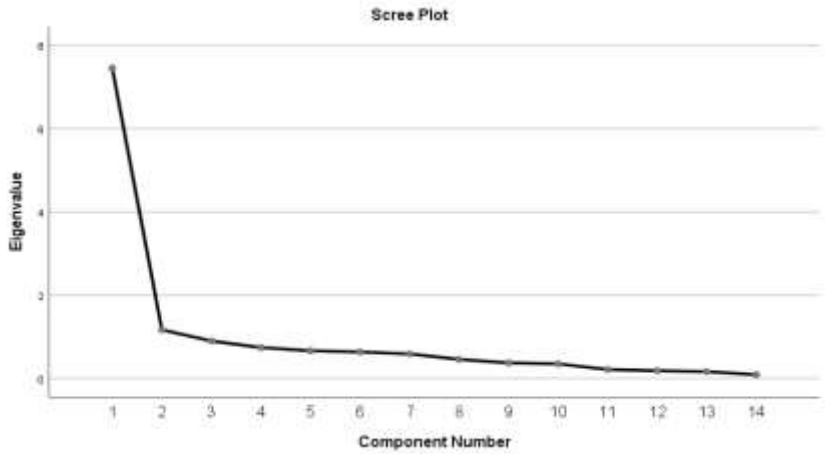

Figure 1. Scree Plot graph for resilient construct

3.3 Rotated Component Matrix with Varimax Rotation

Following the determination of the total number of factors, the researcher examines each item's factor loading to ascertain which factor the items are related to and whether to omit them from the study. The Rotated Component Matrix is used to demonstrate the association between items and their factors following varimax rotation. Because the current study had 100 participants, items having a factor loading of less than 0.60 were excluded from the analysis. Items from this build are classified into two categories. The results showed that three items with factor loadings ranging from 0.668 to 0.894 were found in the second factor, whereas ten items with factor loadings ranging from 0.645 to 0.802 were found in the first factor. There were seven items (C2, C8, C9, C10, C11, C12. C17) that were taken out of this construct. The results of factor loading are displayed for each item in Table 3.

Table 3. Factor and Factor Loading

No	Result of Factor Loading Items	1	2
Factor 1: Authentic perseverance			
C1	I have important core values that I hold fast to in my work life *(Saya mempunyai prinsip yang saya pegang dalam pekerjaan saya.)*	.645	
C3	I know my personal strengths and I use them regularly in my work *(Saya tahu kekuatan diri saya dan selalu menggunakannya dalam pekerjaan.)*	.666	
C4	The work that I do helps to fulfill my sense of purpose in life *(Kerja yang saya lakukan sesuai dengan tujuan hidup saya.)*	.674	
C5	My workplace is somewhere where I feel that I belong *(Saya rasa diterima di tempat kerja saya.)*	.663	
C6	The work that I do fits well with my personal values and beliefs *(Kerja saya selaras dengan nilai dan kepercayaan saya.)*	.802	
C7	Generally, I appreciate what I have in my work environment *(Secara umumnya, saya menghargai apa yang saya ada dalam*	.699	

No	Items	Result of Factor Loading 1	2
	persekitaran pekerjaan saya.)		
C13	I have developed some reliable ways to deal with the personal stress of challenging events at work. *(Saya mempunyai cara untuk menangani tekanan disebabkan oleh keadaan yang mencabar di tempat kerja.)*	.667	
C14	I am careful to ensure that my work does not dominate my personal life *(Saya berhati-hati dalam memastikan agar kerja saya tidak mendominasi kan kehidupan peribadi saya.)*	.736	
C15	I often ask for feedback so that I can improve my work performance *(Saya selalu mendapatkan maklum balas supaya saya dapat meningkatkan prestasi kerja saya.)*	.694	
C16	I believe in giving help to my work colleagues, as well as asking for it *(Saya tidak ada masalah untuk menolong dan meminta pertolongan daripada orang lain.)*	.771	
Factor 2: Supportive wellbeing			
C18	I am careful about eating well and healthily. *(Saya menjaga agar pemakanan saya baik dan menyihatkan.)*		.668
C19	I have friends at work whom I can rely on to support me when I need it. *(Saya mempunyai rakan sekerja yang boleh diharapkan untuk memberi sokongan apabila diperlukan.)*		.875
C20	I have a strong and reliable network of supportive colleagues at work. *(Saya mempunyai satu jaringan rakan sekerja yang memberi sokongan kepada saya di tempat kerja.)*		.894

Two factors and the items they are related to are verified in the present study. The Resilience framework is then used to title each factor. Authentic perseverance is the first factor, and supporting wellbeing is the second. In addition, by disclosing the Cronbach alpha value, researchers evaluate the validity of the scale. The scale is suitable for use in teacher resilience research, as evidenced by the current dataset's strong Cronbach alpha of 0.926, according to the results. Table 4 below, displays Cronbach's alpha values for the entire resilient construct after the EFA process.

Table 4. Cronbach's alpha coefficient for the entire factor after exploratory factor analysis (EFA)

Factor	Number of items	Alpha value
Factor 1: Authentic perseverance	10	.919
Factor 2: Supportive wellbeing	3	.823
Overall Resilient Factor	13	.926

Cronbach's Alpha value >0.7 indicates that the construct of the research instrument has a high construct value (Hair et al., 2014).

4. Discussion and Recommendation

The aim of this study is to test and validate a Malaysian version of the resilience teachers scale that can be utilized by teachers throughout all school in Malaysian teacher context. Therefore, EFA was carried out. The exploration of resilience among teachers is increasingly recognized as vital for enhancing educational outcomes and teacher well-being. The Winwood Resilience Scale (WRS) serves as a robust tool for assessing resilience in educational contexts, particularly among teachers who face significant occupational stressors. Recent studies employing Exploratory Factor Analysis (EFA) have provided insights into the dimensional structure of the WRS and its applicability in the teacher context.

It is widely acknowledged by researchers that in order to determine whether the dimensions of the items have changed from previous studies, EFA procedures should be carried out for each construction during the validation phase (Al-Khamaiseh et al., 2020; Ghazali et al., 2020; Goretzko et al., 2019). If there are variances between the current study and earlier research in terms of the topic of study, cultural differences, socioeconomic demographic, and time interval, the item's dimension may vary. This implies that the dimensions acquired in earlier research might not be preserved, particularly if the current experiments are carried out in a different environment (Zainudin, 2012; Krendl and Pescosolido, 2020). The determined factor loading in the EFA analysis of the current study, which comprised 100 teachers from Perak State, was more than 0.6, as reported by Roover and Vermunt (2019). The EFA for this study is compatible with the KMO value of 0.60, which is a minimum value for an acceptable factor analysis and indicates that there is no severe multicollinearity problem with the data (Zainudin et al. 2018). According to Bandalos' (2021) recommendation, KMO levels near 1.0 can produce unique and reliable components from one another. Bartlett's test of sphericity uses a significant value (sig<0.05) to suggest sufficient correlation between variables for further testing. The recognized Eigen value of ≥1.0 determines the number of variables that represent the dimensions of a construct that is measured and regarded relevant (Ledesma et al., 2021; Vermunt et al., 2019).

The researcher in this study validated The Winwood Resilience Scale (WRS) within the Malaysian teacher context. Based on the EFA results, these twenty items were found to be divided into two factors. EFA is a statistical technique that helps identify the underlying relationships between measured variables, thereby enhancing the reliability and validity of the scale. In the context of the WRS, EFA has been instrumental in determining the factor structure that best represents the resilience constructs relevant to teachers. For instance, a study adapting the WRS for use in secondary schools revealed a six-factor model that aligns closely with the original seven-factor structure proposed by Winwood et al. This adaptation underscores the importance of contextualizing resilience measures to reflect the specific challenges faced by educators Turner et al. (2020). Moreover, the psychometric properties of the WRS, as evidenced by EFA, have shown satisfactory internal consistency, with Cronbach's alpha values typically exceeding the acceptable threshold of 0.70 which is 0.926

for this study. This reliability is crucial for ensuring that the scale can be confidently used in various educational research contexts. The validation of the WRS through EFA also aligns with broader findings in resilience literature, which emphasize the need for reliable and valid measures to assess resilience across different populations (Windle et al., 2011).

These findings are significant as they confirm the scale's applicability in educational settings, where teachers face unique challenges that can impact their emotional and professional well-being. The identification of these factors through EFA underscores the multidimensional nature of resilience in the teaching profession. Specifically, the results suggest that teachers who excel in managing stress and maintaining a positive perspective are likely to exhibit higher levels of resilience. This aligns with existing literature that emphasizes the importance of emotional regulation and social support in enhancing resilience among educators (Ner et al., 2023; Amat et al., 2014). Furthermore, the strong internal consistency of the WRS, as indicated by high Cronbach's alpha values, reinforces its reliability as a measurement tool in this context (Windle et al., 2011). Given these findings, it is crucial to consider practical recommendations for educational stakeholders. First, professional development programs should incorporate training that focuses on enhancing the identified resilience dimensions. Workshops and seminars that teach stress management techniques, promote positive thinking, and encourage the development of supportive networks can significantly bolster teachers' resilience (Pangallo et al., 2015; Walpita & Arambepola, 2020). Additionally, schools should foster a supportive environment that encourages collaboration among teachers, thereby facilitating the sharing of experiences and coping strategies (West et al., 2019).

Moreover, further research is warranted to explore the impact of resilience on teaching effectiveness and student outcomes. Longitudinal studies could provide insights into how resilience evolves over time and its correlation with job satisfaction and retention rates among teachers (Rahman et al., 2021). Additionally, qualitative research could complement the quantitative findings by exploring teachers' lived experiences of resilience, thereby enriching the understanding of this construct in the educational context (Marzi et al., 2019; Rahman et al., 2021). In conclusion, the EFA results for the Winwood Resilience Scale within the teacher context not only validate the scale's factor structure but also highlight the critical dimensions of resilience that can be targeted for intervention. By implementing strategies that enhance these resilience factors, educational institutions can support teachers in navigating the complexities of their roles, ultimately leading to improved educational outcomes.

In conclusion, the application of EFA to the Winwood Resilience Scale within the teacher context has provided valuable insights into the scale's factor structure and psychometric properties. These findings underscore the importance of resilience in education and highlight the need for tailored interventions that foster resilience among teachers. As educational environments continue to evolve, understanding and measuring resilience through validated scales like the WRS will be essential for supporting teacher well-being and enhancing educational outcomes.

5. Conclusion

The findings of this study show that the instruments of resilience (The Winwood Resilience

Scale at Work) in Malay Language are valid and reliable in measuring resilience among teachers in Malaysia. All items in these scales can be used for future studies in measuring the resilience of Malaysian teachers in other states of Malaysia or throughout Malaysia. To improve the effectiveness of the instrument, future studies can focus on several important aspects. First, the development and validation of the instrument needs to be done by refining and revalidating the existing resilience instruments, as well as adding new items that are more suitable to the daily reality of the teacher's life. In conclusion, the EFA results affirm that the WRS is a robust instrument for measuring resilience in the teacher context. The identified factors not only reflect the complexities of resilience but also highlight areas for potential intervention. Educational institutions should consider integrating resilience training into professional development programs to enhance teachers' coping strategies and overall well-being. Future research should continue to explore the relationship between resilience and various educational outcomes, thereby contributing to a deeper understanding of how resilience can be cultivated within the teaching profession.

6. Implications and Limitation

The findings of the study show that only two factors emerged from the Exploratory Factor Analysis (EFA) for this resilience instrument in the teaching profession. In this regard, several important implications need to be considered. First, resilience is often considered a multidimensional concept involving aspects of mental strength, emotions, social relationships, and problem-solving strategies. Two factors may not be sufficient to represent the entire dimension of resilience through this instrument and therefore the researcher suggests that the instrument be improved by adding items related to resilience before conducting CFA for studies that related to teacher resilience. In addition, the number of factors that emerge may be influenced by the validity of the instrument used. If the questionnaire is not comprehensively designed, it may fail to capture all important dimensions of resilience. Therefore, a review of the questionnaire content or the use of other instruments that are more accurate in terms of resilience should be carried out to ensure that all aspects of resilience are well represented.

These two factors may provide a brief overview of resilience in the teaching profession, but they are not comprehensive. Therefore, further research is needed, such as Confirmatory Factor Analysis (CFA), which can help determine whether this two-factor model truly reflects the overall resilience in the teaching profession. In addition, qualitative analysis can be used to understand the dimensions of resilience that may not be explained through EFA. Adaptation to local contexts, such as culture and pressures in the teaching profession, also needs to be considered to ensure the relevance of the study in the future. Overall, although the two factors provide an initial overview of resilience, further and additional research is needed to ensure that it truly reflects the overall concept of resilience in the teaching profession. Further research is important and needs to be conducted to increase the reliability and effectiveness of the research findings. The limitation of this study is that it was carried out by using a Google form and solely used a quantitative design. The disadvantages of using Google Forms are that the study sample may answer the questionnaire in an unethical manner.

Acknowledgements

The researchers would like to express their gratitude to everyone who participated in the study, particularly the responders (teachers) from Malaysia's Ministry of Education, who participated and cooperated fully throughout the procedure.

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References

Al-Khamaiseh, Z., Halim, B. B. A., Afthanorhan, A., & Alqahtani, A. H. (2020). Exploring and developing items measuring situational leadership II (SLII). *Humanities & Social Sciences Reviews*, *8*(2), 579–588. https://doi.org/10.18510/hssr.2020.8266.

Amat, S., Subhan, M., Jaafar, W. M. W., Mahmud, Z., & Johari, K. S. K. (2014). Evaluation and psychometric status of the brief resilience scale in a sample of Malaysian international students. *Asian Social Science, 10*(18). https://doi.org/10.5539/ass.v10n18p240

Arnup, J., & Bowles, T. (2016). Should I stay or should I go? Resilience as a protective factor for teachers' intention to leave the teaching profession. *Australian Journal of Education*, *60*(3), 229-244. https://doi.org/10.1177/0004944116667620

Bandalos, D. L. (2021). Item meaning and order as causes of correlated residuals in confirmatory factor analysis. *Structural Equation Modeling: A Multidisciplinary Journal*, *28*(6), 903-913. https://doi.org/10.1080/10705511.2021.1916395.

Blaique, L., Ismail, H. N., & Aldabbas, H. (2023). Organizational learning, resilience and psychological empowerment as antecedents of work engagement during COVID-19. *International Journal of Productivity and Performance Management*, *72*(6), 1584-1607. https://doi.org/10.1108/ijppm-04-2021-0197

Bui, M. V., McInnes, E., Ennis, G., & Foster, K. (2023). Resilience and mental health nursing: An integrative review of updated evidence. *International Journal of Mental Health Nursing*, *32*(4), 1055-1071. https://doi.org/10.1111/inm.13132

Chua, Y. P. (2014). *Ujian regresi, analisis faktor dan analisis SEM*. McGraw-Hill Education (Malaysia).

Chua, Y. P. (2009). Research methods and statistics book 4: Univariate and multivariate tests. *Shah Alam, Malaysia: McGraw-Hill Education*.

Connelly, D. M., Snobelen, N., Garnett, A., Guitar, N., Flores-Sandoval, C., Sinha, S., ... & Smith-Carrier, T. (2023). Report on fraying resilience among the Ontario Registered Practical

Nurse Workforce in long-term care homes during COVID-19. *Nursing Open*, *10*(7), 4359-4372. https://doi.org/10.1002/nop2.1678

Day, C., & Hong, J. (2016). Influences on the capacities for emotional resilience of teachers in schools serving disadvantaged urban communities: Challenges of living on the edge. *Teaching and Teacher education*, *59*, 115-125. https://doi.org/10.1016/j.tate.2016.05.015

Ghazali, N. H. C. M., Abdullah, N., Zaini, S. H., & Hamzah, M. (2020). Student teachers' conception of feedback within an assessment for learning environment: Link to pupil aspiration. *Jurnal Cakrawala Pendidikan*, *39*(1), 54-64. https://doi.org/10.21831/cp.v39i1.25483.

Goretzko, D., Pham, T. T. H., & Bühner, M. (2021). Exploratory factor analysis: Current use, methodological developments and recommendations for good practice. *Current psychology*, *40*, 3510-3521. https://doi.org/10.1007/s12144-019-00300-2.

Hair, Joseph F., William C. Black, Barry J. Babin, and Rolph E. Anderson (2019). *Multivariate Data Analysis. 8th ed*. Boston: Cengage.

Hair, J. F., Black, W. C., Babin, B. J., Anderson, R. E., (2010). *Multivariate Data Analysis (7 ed.)*. Upper Saddle River, NJ, USA: Prentice-Hall, Inc

Hameed, M., Hameed, R., & Hussain, G. (2022). Occupational Stress Resilience among University Teachers. *Global Sociological Review*, VII(II), 101-112. https://doi.org/10.31703/gsr.2022(vii-ii).11

Ibrahim, B. A., & Hussein, S. M. (2024). Relationship between resilience at work, work engagement and job satisfaction among engineers: a cross-sectional study. *BMC Public Health*, *24*(1), 1077. https://doi.org/10.1186/s12889-024-18507-9

Krendl, A. C., & Pescosolido, B. A. (2020). Countries and cultural differences in the stigma of mental illness: the east–west divide. *Journal of Cross-Cultural Psychology*, *51*(2), 149-167. https://doi.org/10.1177/0022022119901297

Ledesma, R. D., Ferrando, P. J., Trógolo, M. A., Poó, F. M., Tosi, J. D., & Castro, C. (2021). Exploratory factor analysis in transportation research: Current practices and recommendations. *Transportation research part F: traffic psychology and behaviour*, *78*, 340-352. https://doi.org/10.1016/j.trf.2021.02.021.

Malik, P. (2024). Individual-focused transformational leadership and change-oriented organizational citizenship behavior: mediating and moderating mechanisms of job crafting and employee resilience. *Journal of Organizational Effectiveness: People and Performance*, *11*(1), 90-113.https://doi.org/10.1108/joepp-05-2022-0120

Marzi, S., Mysiak, J., Essenfelder, A. H., Amadio, M., Giove, S., & Fekete, A. (2019).

Constructing a comprehensive disaster resilience index: The case of Italy. *PloS one*, *14*(9), e0221585. https://doi.org/10.1371/journal.pone.0221585

McCauley, E. J., & Cooperstock, A. (2022). Differential self-reported COVID-19 impacts among US secondary teachers by race/ethnicity. In *Frontiers in education* (Vol. 7, pp. 10-3389). https://doi.org/10.3389/feduc.2022.931234

Ner, N. T., Okyere, S. A., Abunyewah, M., Frimpong, L. K., & Kita, M. (2023). The resilience of a resettled flood-prone community: An application of the RABIT framework in pasig city, metro Manila. *Sustainability*, *15*(8), 6953.https://doi.org/10.3390/su15086953

Pallant, J. (2020). *SPSS survival manual: A step by step guide to data analysis using IBM SPSS*. Routledge.

Pangallo, A., Zibarras, L., Lewis, R., & Flaxman, P. (2015). Resilience through the lens of interactionism: a systematic review. *Psychological assessment*, *27*(1), 1. https://doi.org/10.1037/pas0000024

Rahman, M. A., Yusoff, M. S. B., Roslan, N. S., Mohammad, J. A. M., & Ahmad, A. (2021). Development and validation of the medical professionals resilience scale. *BMC health services research*, *21*, 1-9. https://doi.org/10.21203/rs.3.rs-154203/v1

Sahoo, R., Soe, H. H. K., & Sahoo, S. (2024). The impact of covid-19 pandemic and psychological resilience among undergraduate medical students. *Journal of Education Technology in Health Sciences*, 11(1), 21-27. https://doi.org/10.18231/j.jeths.2024.005

Tabachnick, B. G., Fidell, L. S., & Ullman, J. B. (2007*). Using multivariate statistics* (Vol. 5): Pearson Boston.

Turner, M., Bowen, P., Ryan, J., & Hayes, P. (2020). Development and validity of a resilience at secondary school scale. *Australian Journal of Education*, *64*(1), 40-53. https://doi.org/10.1177/0004944119895818

Walpita, Y. N., & Arambepola, C. (2022). Assessment of resilience levels among Sri Lankan nurses: Is there room for improvement?. *The International Journal of Health Planning and Management*, *37*(6), 3238-3249. https://doi.org/10.1002/hpm.3552

West, C. L., Dreeben, S. J., & Busing, K. (2021). The development of the widowhood resilience scale. *OMEGA-Journal of Death and Dying*, *83*(4), 958-975. https://doi.org/10.1177/0030222819873489

Windle, G., Bennett, K. M., & Noyes, J. (2011). A methodological review of resilience measurement scales. *Health and quality of life outcomes*, *9*, 1-18. https://doi.org/10.1186/1477-7525-9-8

Winwood, P. C., Colon, R., & McEwen, K. (2013). A practical measure of workplace

resilience: Developing the resilience at work scale. *Journal of occupational and environmental medicine*, *55*(10), 1205-1212.

Yong, A. G., & Pearce, S. (2013). A beginner's guide to factor analysis: Focusing on exploratory factor analysis. *Tutorials in quantitative methods for psychology*, *9*(2), 79-94.

Zainudin Awang, Siew Hui Lim, and Nur Fairuza Syahira Zainudin. (2018). *Pendekatan Mudah SEM* (Structural Equation Modeling). MPWS Rich Resources Sdn. Bhd

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