ORIGINAL

Assessing Student Resilience in Indonesia: Validating the Resilience at University Scale (RAUS) Using Rasch Analysis

Evaluación de la resiliencia estudiantil en Indonesia: Validación de la Escala de Resiliencia Universitaria (RAUS) mediante el análisis Rasch

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ABSTRACT

Introduction: this study aims to adapt and test the validity and reliability of the Resilience at University Scale (RAUS) in the Indonesian context, resulting in the ID-RAUS instrument to measure student resilience. Student resilience is a key factor in coping with challenges in higher edu-cation, especially amidst global crises, pandemics, and increasingly complex academic pres-sures.
Method: the study involved 1046 university students from 19 provinces in Indonesia. Participants were selected through invitations sent via WhatsApp, where they were asked to complete the instrument through a Google Form link. The Rasch model was used to evaluate the fit of each item on the ID-RAUS, assess measurement consistency, and ensure cultural appropri-ateness in the local context.
Results: the results showed that ID-RAUS met the standards of validity and reliability, with low measurement standard errors (SE = 0,05 logit). Rasch's analysis showed that the instrument had good internal consistency, with a Cronbach's Alpha value of 0,90 and an item reliability of 0,99. In addition, the analysis of Differential Item Functioning (DIF) revealed differences in responses between genders, university status, and provinces. In particular, male students showed higher resilience scores compared to female students (20 % vs. 14 %), and students from private universities showed slightly higher levels of resilience (15 %) compared to students from public universities (14 %). These results suggest that several items need to be adjusted to ensure fairness in the measurement between different demographic groups.
Conclusions: these findings confirm that ID-RAUS is a valid and reliable instrument for assessing stu-dent resilience in Indonesia. ID-RAUS provides valuable insights for designing educational policies and intervention programs tailored to cultural and demographic factors. Future re-search should examine convergent and discriminant validity and revise items that show DIF to ensure broader applicability.

Keywords: Resilience; University Students; Psychometric Validation; Rasch Model.

RESUMEN

Introducción: este estudio tiene como objetivo adaptar y probar la validez y fiabilidad de la Resilience at University Scale (RAUS) en el contexto indonesio, resultando en el instrumento ID-RAUS para medir la resiliencia estudiantil. La resiliencia estudiantil es un factor clave para enfren-tar los desafíos en la educación superior,

especialmente en medio de crisis globales, pande-mias y presiones académicas cada vez más complejas.

Método: el estudio involucró a 1046 estudiantes universitarios de 19 provincias en Indonesia. Los participantes fueron seleccionados a través de invitaciones enviadas por WhatsApp, en las que se les pidió completar el instrumento a través de un enlace de Google Form. Se utilizó el modelo Rasch para evaluar la adecuación de cada ítem del ID-RAUS, evaluar la consistencia de la medición y garantizar la adecuación cultural en el contexto local.

Resultados: los resultados mostraron que ID-RAUS cumplía con los estándares de validez y fiabilidad, con bajos errores de estándar de medición (SE = 0,05 logit). El análisis de Rasch mostró que el instrumento tenía buena consistencia interna, con un valor alfa de Cronbach de 0,90 y una fiabilidad de los elementos de 0,99. Además, el análisis del Funcionamiento Diferencial de Ítems (DIF) reveló diferencias en las respuestas entre géneros, estatus universitario y provincias. En particular, los estudiantes varones mostraron puntuaciones de resiliencia más altas en comparación con las mujeres (20 % frente a 14 %), y los estudiantes de universidades privadas mostraron niveles ligeramente superiores de resiliencia (15 %) en comparación con los estudiantes de universidades públicas (14 %). Estos resultados sugieren que varios ítems deben ajustarse para garantizar la equidad en la medición entre los distintos grupos demográficos.

Conclusiones: estos hallazgos confirman que el ID-RAUS es un instrumento válido y fiable para evaluar la resiliencia estudiantil en Indonesia. El ID-RAUS proporciona valiosas perspectivas para di-señar políticas educativas y programas de intervención adaptados a factores culturales y de-mográficos. Las futuras investigaciones deberían examinar la validez convergente y discri-minante y revisar los ítems que muestran DIF para asegurar una aplicabilidad más amplia.

Palabras clave: Resiliencia; Estudiantes Universitarios; Validación Psicométrica; Modelo Rasch.

INTRODUCTION

Student resilience is a key element in maintaining equitable access to and quality of education, especially amid global challenges such as economic crises, pandemics, and increasingly complex academic pressures.[1] In the context of higher education, students often face academic pressures, financial issues, social adaptation challenges, as well as emotional and psychological difficulties that affect their ability to complete their studies.[2,3,4] As a protective capacity, resilience helps students recover from adversity, manage stress, and remain focused on their academic goals.[5,6,7,8] Resilience also contributes significantly to academic achievement, well being and enabling students to remain focussed on academic goals despite being faced with stress.[9,10]

While global studies have highlighted the importance of resilience in higher education, understanding how cultural factors shape resilience is crucial for developing effective support systems. This is particularly relevant in collectivist societies such as Indonesia, where family connectedness and community support play a more central role in coping mechanisms compared to individualistic cultures.[11,12] Such cultural differences emphasize the importance of adapting resilience tools and strategies to reflect local values and practices.

Resilience is profoundly shaped by cultural contexts, with significant differences between individualistic and collectivist societies.[13] In Indonesia, a collectivist culture emphasizes family and community as central pillars of student resilience.[11,12] While resilience in higher education has been extensively studied globally, limited research has examined how these cultural factors influence resilience in Indonesian university students, highlighting a critical gap in the literature.[12,14,15] Addressing this gap is essential for developing effective, culturally tailored interventions to support student resilience.

In addition to RAUS, several other resilience measures have been widely applied, such as the Connor-Davidson Resilience Scale (CD-RISC),[16] the Brief Resilience Scale,[17] and the Academic Resilience Scale (ARS-30).[18] While these instruments provide valuable insights, most were designed in Western or individualistic contexts and may not fully capture the collectivist values that characterize Indonesian students' coping strategies. For example, CD-RISC emphasizes personal competence and individual stress management, whereas ARS-30 focuses more on academic persistence. In contrast, RAUS was specifically developed to measure resilience in the university context, making it more relevant for higher education students. However, its validation in collectivist settings remains limited. This underscores the importance of culturally adapting RAUS to the Indonesian context, while also examining how it compares with other resilience measures to ensure comprehensive construct representation. Thus, validating RAUS in Indonesia provides a unique contribution by offering a resilience measure that is not only context-specific to higher education, but also sensitive to collectivist cultural values.

This study examines resilience within Indonesia's collectivist cultural context, emphasizing the critical role of social support and family connectedness in shaping student resilience.[12] While resilience is often viewed as a universal capacity, coping mechanisms vary significantly across cultural settings.[13] Instruments like the Resilience at University Scale (RAUS), initially developed in individualistic contexts, must be adapted to reflect Indonesian cultural values, where community and familial ties play a central role in resilience development.

This study aims to adapt and validate the Resilience at University Scale (RAUS) for the Indonesian context, utilizing the rasch model as outlined by Bond et al.[19]. This approach ensures a robust cross-cultural analysis and provides actionable insights for developing culturally relevant interventions to support student resilience in Indonesia. The Rasch model was chosen for its ability to provide objective and consistent Item Response Theory (IRT)-based analyses, thus enabling more accurate cross-cultural analyses.[19,20] The Rasch model provides the advantage of evaluating the overall structure of the instrument, including item and respondent reliability, and inter-item fit.[20,21] By applying Rasch analysis in instrument validation,[22,23,24,25,26,27] this study offers an in-depth view of university students' resilience in the diverse cultural context of Indonesia. The findings of this study are expected to inform culturally relevant intervention programs and support systems aimed at enhancing student resilience in Indonesian higher education.

METHOD
Participant
This research is a survey conducted in Indonesia to measure student resilience. This research was carried out in 19 provinces in Indonesia, involving 1,046 students from public and private universities. Data collection was carried out through an online survey using Google Form which was shared through WhatsApp, a widely used platform among Indonesian students, allowing for a wide reach and quick response. This research was carried out with voluntary participation, and the respondents' personal information was kept confidential throughout the research process. The inclusion criteria in this study are active students who are enrolled in public or private universities in Indonesia in 2024, willing to participate voluntarily, and can access and fill out instruments through Google Form. Meanwhile, the exclusion criteria include students who can't access Google Forms, don't give consent to participate, or who have participated in similar research at the same time. A more detailed demographic of respondents can be seen in table 1.

Instrument
The instrument used in this study was the Resilience at University Scale (RAUS) developed by Turner et al.[6,28], which is a modification of the Resilience at Work Scale (RAW Scale) by Winwood et al.[29] This instrument was developed in response to the lack of resilience measures specifically designed to assess resilience in university students. RAUS consists of 20 items intended to measure students' ability to adapt to and recover from academic stress in the university context. Each item is rated on a 7-point Likert scale, ranging from "Strongly Disagree" to "Strongly Agree". The Resilience at University construct comprises seven key dimensions that reflect critical aspects of student resilience: (1) Living Authentically, Knowing and holding onto personal values, deploying your strengths and having a good level of emotional awareness and regulation. (2) Finding your Calling, Alignment of personal core values with university program of study. Sense of belonging and purpose that comes from a good core value fit with studies. (3) Maintaining Perspective, Reframing setbacks in a positive light, minimising negative thoughts. Proactive and optimistic, seeking opportunities to set yourself up for success. (4) Managing Stress, Work-life balance, self-care, time management, time for activities outside of university studies. (5) Interacting Cooperatively, seeking feedback, advice and support and providing mutual support to others. (6) Staying Healthy, maintaining physical fitness and eating a healthy diet. And (7) Building Networks, Personal and study-based networks for practical help, advice, perspective, emotional support and debriefing.
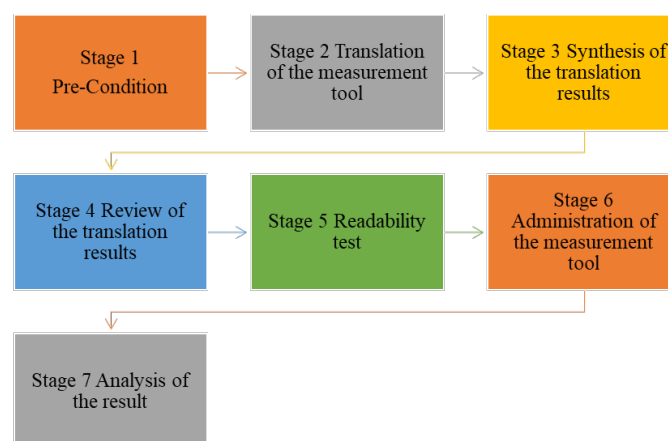
Procedure

Figure 1. Adaptation Prosess of Resilience at University Scale (RAUS)

The process of adapting and translating the measurement instrument began with the preparatory phase and continued through to the stage of data analysis. This process comprised seven sequential steps: (1) Pre-Condition, (2) translation of the measurement instrument, (3) synthesis of translation results, (4) expert review of the translation, (5) readability testing, (6) administration of the measurement instrument, and (7) analysis of results. Each stage was designed to ensure that the translated instrument possessed adequate linguistic and cultural validity prior to its administration to the target population. The adaptation procedure followed the International Test Commission (ITC) Guidelines for Large-Scale Assessments in Culturally and Linguistically Diverse Populations.[30] Figure 1 presents a schematic representation of the adaptation process.

The adaptation process of the Resilience at University Scale (RAUS) into Indonesian was carried out through a series of systematic stages to ensure validity, reliability, and cultural relevance. The first stage (Pre-Condition) began with the researcher submitting a formal request to Turner, the original developer of RAUS, to obtain permission for adaptation, which was granted on March 6, 2023, via email correspondence, thereby ensuring compliance with research ethics and intellectual property rights. Following this approval, the second stage involved translating the original English version into Indonesian by two certified translators recognized by the Indonesian Ministry of Education, a step intended to secure semantic accuracy, technical precision, and contextual appropriateness within Indonesian culture. To reconcile potential discrepancies, the third stage focused on synthesizing both translations into a unified version, which was then back-translated into English to verify semantic equivalence and conceptual consistency with the original instrument. Building upon this foundation, the fourth stage entailed a critical review by an expert panel in educational psychology and higher education counseling, ensuring linguistic clarity, cultural relevance, and theoretical alignment with the construct of academic resilience. After receiving expert input, the fifth stage tested the readability of the translated version with five students from Universitas Indraprasta PGRI Jakarta, resulting in the adjustment of the response scale from the original 7-point Likert to a 5-point scale. This modification was made to improve comprehension, reduce confusion from excessive response options, and align with cultural familiarity, while preserving the construct's conceptual integrity. With these refinements, the sixth stage involved administering the finalized Indonesian version of RAUS to participants who met the research criteria, accompanied by inclusion of the instrument in the appendices and supplementary materials. Finally, the seventh stage evaluated the psychometric quality of the adapted RAUS using the Rasch model, although convergent and discriminant validity were not examined in this study—a limitation that was explicitly acknowledged and discussed in the findings.

Data Analysis

The data in this study were analysed using the Rasch model according to the procedure of Boone et al.[31] Rasch measurement or Rasch analysis, first introduced by George Rasch in 1960, refers to Item Response Theory (IRT) that evaluates the relationship between item characteristics and participant ability.[32] In contrast to Classical Test Theory (CTT), which has sample dependence and non-linear properties, Rasch Analysis produces more consistent and linear measurements and allows estimation beyond a certain score range.[33,34,35] Rasch analysis also orders items hierarchically and provides fit statistics to evaluate the representation of overall group characteristics and the consistency of each response with the group.[36]

Rasch analysis has several advantages, such as providing linear measurements with consistent intervals, precise estimation, identification of inappropriate or outlier items or respondents, handling missing data, and generating independent parameters that allow repeatability of results.[20,37,38] This analysis converts ordinal responses from a rating scale into a linear measure, expressed in "Logit" (Log-Odds Units), which measures the difference between individual ability and item difficulty.[39,40] In addition, Rasch Analysis provides diagnostic insights that can improve the quality of measurement instruments, thus making it a useful method for ID-RAUS analysis.[41]

This study used Winsteps software version 5.1.5, along with its manual, to evaluate the fit of the data to the Rasch model.[20,31,42] The analysis began with (1) an overall fit test to examine the conformity of the data to the Rasch model, using Infit and Outfit Mean Square (MNSQ) statistics, with the ideal range of 0,5–1,5 indicating acceptable response patterns. (2) Reliability and separation indices were then assessed, where internal consistency reliability values above 0,70 were considered adequate, and separation indices above 1,5 logits demonstrated the instrument's ability to differentiate varying levels of resilience. (3) Unidimensionality was tested through Principal Component Analysis (PCA) of residuals to confirm that the instrument measured a single primary construct—resilience—thereby reinforcing its structural validity. (4) A Wright map was employed to visualize the distribution of respondent abilities alongside item difficulty, ensuring balanced measurement coverage across the spectrum of abilities. (5) Finally, Differential Item Functioning (DIF) analysis was conducted to detect potential item bias across demographic subgroups such as gender, university type, and province.

Ethical clearance

This research was conducted by paying attention to the applicable research ethical principles. Before

participating, all respondents were given clear information about the objectives of the study, the procedures to be undertaken, and the potential benefits and risks of this study. Participation in the study was voluntary, and respondents were asked to provide written consent through a separate consent form. In addition, respondents' privacy rights are strictly guarded, where the data obtained will be analyzed anonymously and no personal data will be shared with third parties. The researcher ensured that every step of the research, from data collection to information storage, was carried out in accordance with applicable ethical guidelines, and respondents could resign at any time without any consequences.

RESULTS
Respondent Demographic
The detailed respondent demographics are described in table 1.

Table 1. Respondent demographics						
	Demographics	Frequency	%	Reabilities	F Test	Prob>F
Gender	Women	866	83	0,90	8,79	0,0035
	Male	180	17	0,90		
University Status	State University	380	36	0,91	2,81	0,0901
	Private University	666	64	0,90		
Province	Aceh	21	2	0,87	2,77	0,0001
	Banten	62	6	0,84		
	Bengkulu	86	8	0,87		
	Gorontalo	12	1	0,92		
	Jakarta	178	18	0,89		
	Jambi	5	1	0,67		
	West Java	210	19	0,89		
	Central Java	51	5	0,92		
	East Java	40	4	0,92		
	West Kalimantan	4	1	0,94		
	Central Kalimantan	8	1	0,85		
	Lampung	19	2	0,89		
	Maluku	15	1	0,81		
	Nusa Tenggara Timur (NTT)	65	6	0,91		
	Riau	31	3	0,95		
	Southeast Sulawesi	10	1	0,77		
	West Sumatra	42	4	0,91		
	South Sumatra	94	9	0,90		
	North Sumatra	87	8	0,93		
Total		1046	100			

Summary statistics of the Rasch measurement model
The results of this study illustrate the accuracy of the items as well as respondent data based on the ideal measurement model. The ideal fit is within the MNSQ OUTFIT range of 0,5 to 1,5 logits.[20,41] From the analyses conducted, the Indonesian version of the university resilience scale consisting of 20 items obtained an average logit of 0,99, indicating that the items were overall suitable for measurement.

The reliability of the scale was evaluated using two statistics, namely the person separation index and Cronbach's alpha[43] Reliability was measured in three aspects, namely (1) item reliability, (2) respondent reliability, and (3) interaction reliability between respondents and items. The results related to reliability and the index of distinctiveness can be seen in table 2.

Table 2. Summary Statistics of Items and People (I=20 N=1046)			
	Reliability	**Separation Index**	**Cronbach alpha**
People	0,89	2,89	0,90
Item	0,99	12,61	

Note: the measures in this table use logit, which measures the difference between the ability of the respondent (for the respondent) or the difficulty of the item (for the item). A higher logit value indicates a higher ability or a more difficult item.

Table 2 explains that the person reliability index value reaches 0,89 which indicates that the instrument has a good level of consistency in distinguishing the ability of respondents. In addition, the item reliability of 0,99 indicates that the items on the instrument have a very high consistency in measuring the intended construct. The item distinctiveness index of 2,89 indicates that the instrument is able to categorise respondents into three groups based on their ability level. Meanwhile, the very high item distinctiveness index of 12,61 indicates that the items are able to clearly distinguish between different levels of difficulty. Furthermore, the Cronbach's Alpha value of 0,90 confirms that the instrument has excellent internal reliability. Overall, these findings indicate that the instrument has high validity and reliability in measuring respondents' abilities.

Unidimensionalty
Principal component analysis (PCA) was conducted to look at the ability of the scale to accurately measure the intended construct. PCA analysis uses two parameters, the first of which is the total raw variance in the observations (at least 40 %)[44] and the second is the total unexplained raw variance (minimum 15 %). Further details of the standardised residual variance analysis are presented in table 3.

Table 3. Standardised Residual Variance		
	Observed	**Expected**
Raw variance explained by the measure	40,5 %	40,4 %
Unexplained variance in 1st contrast	5,5 %	9,3 %
Unexplained variance in 2nd contrast	5,0 %	8,4 %
Unexplained variance in 3rd contrast	4,9 %	8,2 %
Unexplained variance in 4th contrast	4,1 %	6,8 %
Unexplained variance in 5th contrasts	3,7 %	6,2 %

Table 3 explains that the principal component analysis (PCA) results of the ID-RAUS instrument reached 40,5 %, meeting the minimum criteria (>40 %). This indicates that the items in the ID-RAUS scale are quite representative and able to measure the resilience construct well. In addition, the results of the unexplained variance are less than the maximum value criterion (15 %). This indicates that the ID-RAUS scale items are independent and not highly correlated with each other. In other words, the ID-RAUS scale has good validity in measuring resilience and a solid item structure, so it can be used as a reliable instrument.

Rating Scale diagnostics
Rating scale analysis is used to evaluate respondents' ability to distinguish categories in a rating scale.[20] The response can produce a sequence of values that corresponds to the probability distribution of the modelled category.[45] Table 2 displays the logit values for each answer alternative, ranging from the lowest logit value associated with the lowest scoring option to the highest logit value associated with the highest scoring option. This allows respondents to analyse the differences between the ID-RAUS answer alternatives.

Table 4. Item threshold and response format fit index (I = 20, N = 1046)					
Category	**Andrich threshold**	**Observed average**	**Number Observed (%)**	**Infit**	**Clothing**
Strongly Disagree	None	-0,92	0	0,94	0,94
Disagree	-4,14	0,13	54	1,00	1,00
Neutral	-1,29	1,10	34	1,01	1,01
Agreed.	1,6	2,18	48	0,98	0,98
Strongly Agree	4,17	3,68	13	1,01	1,01

Andrich's threshold observation rate shows a monotonous change for each option, starting at NONE then moving from negative logits to positive logits with an increase of 4,17 logits. This ensures that the answer options provided are accurate and do not confuse test takers. To provide a better understanding of how the category probability curve model maps the answer choices, relevant information can be seen in table 4.

Item size, fit index, and precision measurement
The results of statistical measurements for ID-RAUS which include item measurements, namely the level of item fit to produce measurement productivity (Infit and Outfit MNSQ), the level of measurement accuracy produced (SE Measure) and item discrimination (Pt Measure Corr) are presented in table 5.

Item	Total Score	Measuring	Model S.E	Infit MNSQ	ZSTD	MNSQ Clothing	ZSTD	Pt. Measure Kor.
9	3364	1,33	0,05	1,27	5,74	1,26	5,68	0,55
20	3423	1,18	0,05	0,99	-0,13	1,00	-0,01	0,61
8	3516	0,94	0,05	1,13	2,89	1,12	2,75	0,55
15	3556	0,83	0,05	0,94	-1,38	0,96	-0,88	0,58
3	3703	0,45	0,05	0,95	-1,21	0,97	-0,80	0,61
17	3750	0,32	0,05	0,94	-1,45	0,97	-0,79	0,60
13	3776	0,25	0,05	0,80	-5,04	0,79	-5,19	0,64
18	3818	0,14	0,05	1,07	1,55	1,07	1,70	0,58
10	3821	0,09	0,05	1,53	9,90	1,51	9,90	0,55
19	3906	-0,10	0,05	1,29	6,20	1,31	6,50	0,52
12	3908	-0,11	0,05	0,81	-4,69	0,80	-4,86	0,62
2	3928	-0,16	0,05	1,09	1,94	1,10	2,27	0,49
5	3934	-0,18	0,05	0,84	-3,81	0,85	-3,63	0,64
7	3945	-0,21	0,05	0,78	-5,46	0,79	-5,27	0,59
6	3979	-0,30	0,05	0,76	-5,95	0,76	-5,81	0,64
1	4089	-0,62	0,05	1,04	0,82	1,04	0,91	0,56
11	4196	-0,93	0,05	0,76	-5,39	0,76	-5,57	0,62
4	4203	-0,95	0,05	0,99	0,09	0,99	-0,21	0,57
16	4215	-0,98	0,05	0,90	-2,20	0,90	-2,23	0,56
14	4216	-0,99	0,05	1,00	-0,15	1,00	-0,07	0,52

Table 5. Item Measurement Summary (I=20, N=1046)

Table 5 shows that item 9, "Things that happen during my studies never disturb my mind for a long time", had the highest level of difficulty for all respondents, meaning that this item was the most difficult to agree with. In contrast, item 6, "I try to keep my personal life not only around my studies", had the lowest level of difficulty, making it the easiest item for participants to agree with. All items on the ID-RAUS instrument showed MNSQ Outfit values between 0,5 and 1,5, confirming that the data fit the model criteria.

In addition, the column labelled "SE Measure" refers to the "standard error of measurement," which corresponds to the estimation error for each item. The SE Measure criterion for this instrument is in the range of <0,5 logits. The SE Measure results in table 5 show a value of 0,05 logits, indicating that the item matches are reliable and solid in expressing measurement precision on the ID-RAUS instrument. In addition, Pt Measures Corr values do not show negative values and all values on ID-RAUS are within acceptable criteria, namely 0,32 < X < 0,80.[46] This indicates that the ID-RAUS instrument is effective in measuring the intended construct.

Person size and wrigth map
Person size was examined to determine students' resilience ability. Table 6 presents the results of the Rasch analysis, which illustrates the highest and lowest responses by participant group of the 1046 people who participated in the study.

Furthermore, figure 2 illustrates the approach used by ID-RAUS to assess students' resilience abilities. A comparative analysis was conducted between the distribution pattern of survey participants depicted on Wright's map and the distribution of survey items derived from Rasch analysis. In addition, figure 2 illustrates the methodology used by ID-RAUS to evaluate students' resilience abilities. The Rasch analysis illustrates a comparison of the respondent distribution pattern depicted on the Wright map. This is possible because

respondents and items are represented by the same unit, and the logit is the same interval unit; not only individuals can be compared to each other, but also to each other.[31]

Person Entry Number	Total Score	Measuring	Model S.E	Infit MNSQ	ZSTD	MNSQ Clothing	ZSTD	Pt. Measure Kor.
1261	99	7,34	1,03	1,03	0,33	0,90	0,30	0,11
1492	99	7,34	1,03	1,01	0,32	0,80	0,21	0,15
1926	99	7,34	1,03	1,07	0,38	1,35	0,66	-0,03
529	98	6,57	0,75	2,04	1,54	1,22	0,52	0,28
1450	97	6,10	0,64	1,72	1,44	1,39	0,78	0,28
-								
1729	54	-0,80	0,36	0,95	-0,07	0,96	-0,04	0,60
459	53	-0,94	0,36	1,31	1,02	1,30	1,00	0,27
1206	53	-0,94	0,36	0,66	-1,17	0,65	-1,18	0,50
1172	52	-1,07	0,37	0,70	-0,97	0,70	-1,00	0,48
1115	44	-2,17	0,38	0,77	-0,69	0,75	-0,76	0,50

Table 6. Person Summary (I=20, N=1046)

The Wright map shown in figure 2 presents the distribution of item difficulty levels along with the distribution of respondents' abilities. In the map, the left side illustrates the level of student resilience, while the right side shows the level of item difficulty. Students with low resilience are positioned at the bottom of the map (below 0,65 logits), while students with high resilience are at the top (above 3,17 logits). Most students fall within the range of 1 to 3 logits, indicating that the majority have a moderate level of resilience. On the right side of the map, the item difficulty distribution shows the distribution of items by difficulty. Items at the top (such as I20 and I9) are the most difficult to answer, while items at the bottom (such as I11, I14, and I16) are the easiest to answer.

In general, the map shows a good match between students' resilience ability levels and item difficulty. However, some items at the top of the map appear more difficult than the majority of students, suggesting that these items may reflect aspects of resilience that are more challenging for Indonesian students.
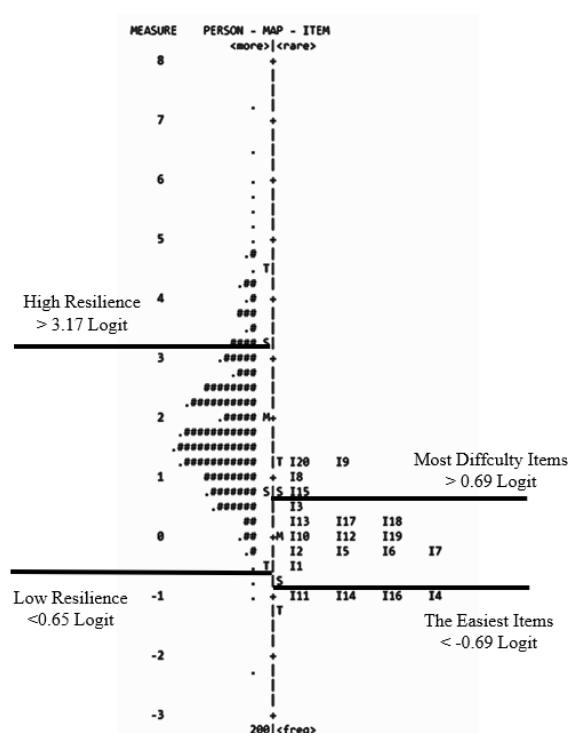
DIF Analysis

Figure 2. Wright Person-Item Rasch Map (n=1046) or ID-RAUS

Table 8 provides a description of the calibration of resilience items. The table presents a disaggregated analysis of item difficulty levels based on the dimensions measured. It can be observed that items pertaining to the dimensions of 'Building Networks' and 'Maintaining Perspective' exhibit elevated levels of difficulty. This is exemplified by item 20 within the 'Building Networks' dimension and items 8 and 9 within the 'Maintaining Perspective' dimension. This indicates that these aspects necessitate more sophisticated cognitive and emotional capabilities. Conversely, dimensions such as Interacting Cooperatively have items with low difficulty (item 16), indicating that these aspects are more readily mastered by individuals. Some other dimensions, such as Living Authentically and Finding Your Calling, have items with moderate to low difficulty, indicating that these dimensions are more easily achieved by the majority of respondents. Overall, figures 2 and 8 provide a comprehensive representation of the distribution of individual resilience, as well as the difficulty level of the items included in the resilience measurement.

Table 8. Resilience Item Calibration			
Construct/Dimension	**Difficulty Level**		
	Difficult	**Medium**	**Easiest**
Living Authentically	-	1, 2, 3	-
Finding Your Calling	-	5, 6, 7	4
Maintaining Perspective	8, 9	10	-
Managing stress	-	12, 13	11,14
Interacting Cooperatively	15		16
Staying Healthy	-	17, 18	-
Building Networks	20	19	-

Table 9. Students Resilience to Demograhpy			
Demografis	**High LVP> +3,17**	**Medium +3,17> LVP> +0,65**	**Low LVP < +0,65**
Gender			
Laki-laki	36 (20 %)	128 (71 %)	16 (9 %)
Perempuan	121 (14 %)	632 (73 %)	113 (13 %)
University Status			
State University	55 (14 %)	270 (72 %)	55 (14 %)
Private University	102 (15 %)	490 (74 %)	74 (11 %)
Province			
Aceh	2 (10 %)	15 (71 %)	4 (19 %)
Banten	8 (12 %)	51 (76 %)	8 (12 %)
Bengkulu	9 (10 %)	68 (80 %)	9 (10 %)
Gorontalo	2 (16 %)	8 (67 %)	2 (16 %)
Jakarta	8 (5 %)	129 (82 %)	21 (13 %)
Jambi	0 (0 %)	5 (100 %)	0 (0 %)
Central Java	7 (14 %)	36 (71 %)	8 (15 %)
West Java	20 (9 %)	162 (75 %)	34 (16 %)
East Java	6 (15 %)	27 (68 %)	7 (17 %)
Central Kalimantan	1 (13 %)	7 (87 %)	0 (0 %)
West Kalimantan	2 (50 %)	2 (50 %)	0 (0 %)
Lampung	3 (16 %)	15 (79 %)	1 (5 %)
East Maluku	2 (13 %)	13 (87 %)	0 (0 %)
Nusa Tenggara Timur (NTT)	20 (31 %)	41 (63 %)	4 (6 %)
Riau	7 (23 %)	16 (52 %)	8 (25 %)
Southeast Sulawesi	1 (10 %)	9 (90 %)	0 (0 %)
West Sumatra	9 (21 %)	30 (71 %)	3 (7 %)
North Sumatra	16 (18 %)	58 (67 %)	13 (15 %)
South Sumatra	19 (20 %)	68 (72 %)	7 (8 %)

Furthermore, table 9 elucidates the relationship between student resilience and various demographic factors. In light of the aforementioned results, it can be posited that the majority of students, irrespective of demographic variables such as gender, university status, and provincial location, can be situated within the moderate resilience category. However, there are notable variations in the distribution of resilience across different demographic groups. With regard to gender, the proportion of males exhibiting high resilience was greater than that of females (20 % versus 14 %), whereas the reverse was true of the proportion of low resilience (13 % compared to 9 % for males and females, respectively). This indicates that women are more susceptible to exhibiting low resilience than men. With regard to university status, the majority of students from both public and private universities fall into the medium resilience category. Private university students have a slightly higher proportion of high resilience (15 %) compared to public university students (14 %).

Furthermore, the distribution of resilience levels by province varies. Student resilience levels show that provinces with high resilience levels, such as East Nusa Tenggara (NTT), South Sumatra, and Maluku, have a significant proportion of students with high resilience, at 31 %, 20 %, and 13 %, respectively. Most other provinces, such as West Java, Aceh, and Central Java, are also dominated by students in the medium resilience category, with proportions around 71–75 %. In contrast, the province with the lowest resilience level is Southeast Sulawesi, where the majority of students fall into the low resilience category. This province has a significantly higher proportion of students in the low category compared to other provinces.

DISCUSSION

The Resilience at University Scale (RAUS) which has been adapted to the Indonesian context (ID-RAUS) has been confirmed as a valid and reliable instrument to measure student resilience in higher education. Rasch analysis provides a more accurate picture of the psychometric evaluation of instruments and results in instruments that are more holistic and fulfil the requirements of precise measurement.[47,48,49] This study provided a robust psychometric evaluation, confirming that all items in ID-RAUS fit the measurement model with MNSQ Outfit estimates within the acceptable range (0,5 to 1,5 logits),[20,31] indicating that the instrument works consistently in measuring students' resilience. The low standard error of measurement (SE Measure) values further validates the precision of each item, establishing ID-RAUS as a reliable tool for accurately assessing resilience in Indonesian university students.

The findings indicate that most students fall within the medium resilience category, with notable demographic differences in resilience levels. Male students exhibited higher resilience scores compared to female students (20 % vs. 14 %), while females showed a higher proportion in the low resilience category (13 % vs. 9 %). These variations may reflect gendered social norms or coping mechanisms, aligning with studies highlighting differences in social expectations and support-seeking behaviors between genders.[11,50] Similarly, private university students show a slightly higher proportion of high resilience (15 %) than public university students (14 %), which may reflect differences in academic experiences, levels of social support, or environmental pressures.[51,52] At the provincial level, East Nusa Tenggara (NTT) and South Sumatera have significant proportions of students with high resilience (31 % and 20 %, respectively), whereas Southeast Sulawesi has the lowest resilience level, with most students in the low resilience category. These variations underscore the impact of cultural, social, and economic contexts on shaping student resilience, aligning with studies that emphasize the role of collectivistic values and regional disparities in coping mechanisms.[51,53,54]

The presence of DIF in multiple items suggests that certain statements may unintentionally favor specific groups of students, potentially undermining the fairness of the ID-RAUS. For example, items referencing physical fitness, social networking, or lifestyle may carry different cultural interpretations depending on gender, type of university, or regional background. These differences highlight the importance of ensuring that item wording is culturally sensitive, linguistically neutral, and contextually relevant.[55] Rather than discarding problematic items entirely, future adaptations should consider rephrasing or substituting them with alternatives that reflect resilience experiences shared across diverse groups of Indonesian students. Moreover, the limited representation of high-level resilience observed in the Wright Map underscores the need to enrich the instrument with items that capture advanced coping strategies, leadership in adversity, and sustained optimism.[16,56] Taken together, these implications point to the necessity of iterative revisions, pilot testing, and multi-group validation to ensure that the ID-RAUS provides an equitable and comprehensive measure of student resilience in higher education.

In the context of Indonesia's collectivistic culture, social support plays an important role in building student resilience.[57] This finding is relevant as Indonesian culture, which places a high priority on community support and togetherness, may make students more likely to rely on their social network in coping with academic stress.[12,57,58] Therefore, students who have greater access to social support, both from peers and campus networks, may show higher levels of resilience, as reflected in items assessing interpersonal relationships. Therefore, it is important to consider the cultural context when designing intervention programmes that aim to increase student resilience, especially by strengthening social support networks on campus.

In a global context, student resilience in higher education is also a concern in various countries, especially in the face of increasingly complex challenges in the 21st century. Research in Western countries shows that resilience is often associated with an individual's ability to cope with stress independently, in accordance with the values of strong individualism.[59,60] For example, research in the United States and Europe emphasises the importance of individualised skill development, such as stress management and emotion regulation, as key factors in student resilience.[61] This is in contrast to the collectivistic context in Indonesia, where social support from family and friends plays a major role in shaping resilience.[12,62] The COVID-19 pandemic revealed that gaps in access to psychosocial resources, especially in developing countries, impact students' resilience levels, while in developed countries, digital and community support help students cope with difficult situations.[63,64,65] Therefore, resilience approaches should be tailored to each country's social and economic conditions.

One of the important findings of this study was the identification of items of higher or lower difficulty based on student responses. For example, items relating to internal aspects of resilience, such as maintaining energy and overcoming negative thoughts, were perceived as more difficult by respondents. This suggests that for many students, the challenges of resilience may be more related to self-management and emotional control, rather than simply external support.[66,67,68] This has important implications for higher education institutions that need to design programmes that not only strengthen social support, but also develop self-management skills for university students.[68,69] By comparing this global context, the findings suggest that resilience intervention programmes at universities need to be tailored to the specific needs of students. For example, universities could develop social support-based mentoring programmes designed to foster student networks, especially for those with limited social access.[70] In addition, self-management skills training that helps students manage academic stress individually is also a priority to increase resilience in the face of high study pressure.[71]

This study has several limitations. The use of self-reported data may introduce biases, as students might overestimate or underestimate their resilience. In addition, the cross-sectional design prevents the examination of resilience development over time. While the ID-RAUS has demonstrated validity and reliability, further validation across diverse regions and institutions is still needed to ensure broader applicability. The ID-RAUS provides a robust tool for higher education institutions to assess student resilience and develop targeted interventions. Programs should address demographic variations, such as gender and regional disparities, while leveraging Indonesia's collectivist values. Specific initiatives may include strengthening self-management skills, enhancing social support networks, and offering stress management training. By considering cultural and demographic contexts, universities can create more effective strategies to support student resilience and academic success.

Future research should prioritize the refinement and further validation of ID-RAUS. Specifically, items with significant DIF should be revised through expert review and qualitative feedback from students to ensure linguistic clarity and cultural neutrality. Additional items targeting higher-order resilience—such as advanced self-regulation, leadership in adversity, or sustained optimism—should also be developed to broaden the construct coverage. Beyond Rasch modeling, future studies are encouraged to conduct convergent validity tests (e.g., correlating ID-RAUS with CD-RISC, ARS-30, or well-being scales) and discriminant validity tests (e.g., comparing Average Variance Extracted with inter-construct correlations). These steps will strengthen the psychometric robustness of ID-RAUS and ensure its applicability for resilience research and interventions in Indonesian higher education

CONCLUSIONS

This study successfully validated the Indonesian version of the Resilience at University Scale (ID-RAUS), confirming its reliability and cultural relevance in measuring student resilience within the Indonesian context. The Rasch model provided robust support for the scale's psychometric properties, ensuring its validity and reliability in assessing resilience among university students. The findings highlighted that the instrument is effective in distinguishing varying levels of student resilience, particularly across different provinces and demographic groups in Indonesia.

Moreover, the analysis revealed notable demographic variations in resilience levels, such as gender, university status, and geographical location. These findings underscore the importance of considering cultural and regional factors when designing educational interventions and support programs for students. The ID-RAUS provides valuable insights for policy makers and educators to tailor interventions that can enhance resilience in students, thereby improving their academic performance and overall well-being.

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CONFLICT OF INTEREST

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