Local Knowledge, Global Impact: Developing Local Wisdom Scale for Nature Preservation

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Abstract :

Objective : This study aims to develop a comprehensive Local Wisdom Scale based on in-depth interviews, utilizing the Rasch model to ensure the scale's validity and reliability. This study aims to identify and categorize the key components of local wisdom as articulated by community members, while also exploring how contextual factors, such as geographic location.

Method : The measurement tool used consists of 29 items reflecting local wisdom values, which were obtained from in-depth interviews with residents in three tourist villages in Yogyakarta. Following this, a coding process was conducted. The data analysis employed for the validity and reliability tests in this study utilizes the Rasch model approach. The Rasch model is employed to obtain well-fitting items for the questionnaire. This analysis is conducted using Winsteps software.

Findings : The output from the Winsteps program indicates that 14 items align with the Rasch model, with mean Outfit MNSQ values of approximately 0.89 for persons and 0.97 for items. Additionally, the Outfit ZSTD values for persons and items are approximately 0.01 and 0.27, respectively. The reliability of the instrument, expressed in terms of Cronbach's alpha, is 0.93. The analysis revealled that no items indicated as having potentially bias on location.

Limitations: The limitations of data collection locations which only reflect the local wisdom of a small portion of the population

Future Research: In future studies, it is important to consider Differential Item Functioning (DIF) beyond just location (rural and urban). Other variables, such as gender, should also be taken into account for DIF testing.

Key words : Local wisdom, scale, Rasch model, nature preservation

INTRODUCTION

The concept of local wisdom has gained increasing attention in recent years as a means of preserving and promoting the unique cultural, social, and environmental practices of diverse communities around the world. Local wisdom encompasses the accumulated knowledge, beliefs, and practices that have been passed down through generations within a particular locale, and which often serve to enhance the sustainability and resilience of local communities (Hartini et al. 2018). Local wisdom plays a crucial role in shaping the identity and cultural heritage of communities. It encompasses the values, beliefs, and practices that have been passed down through generations, reflecting the unique experiences and knowledge of a particular group (Andari et al. 2020; Surtikanti et al. 2017). Local wisdom embodies the values, beliefs, and practices that have been cultivated over generations within specific communities. As globalization and modernization continue to influence cultural landscapes, there is a risk that these traditional practices may become marginalized or lost (Budiningsih et al. 2022).

Despite its significance, there is often a lack of systematic tools to measure and evaluate local wisdom effectively (Lestari et al. 2024). This gap necessitates the development of a reliable and valid measurement scale that can capture the nuances of local wisdom. Building a Local Wisdom Scale is essential for several reasons that underscore the importance of local wisdom in contemporary society. Developing a measurement instrument for local wisdom helps to preserve these cultural assets, ensuring that they remain relevant and accessible for future generations. By building a Local Wisdom Scale, we can identify and validate these practices, highlighting their relevance in addressing modern issues, thereby reinforcing the importance of integrating local knowledge into broader societal frameworks.

Utilizing the Rasch model in the development of the Local Wisdom Scale ensures methodological rigor and validity in the measurement process. The Rasch model allows for a nuanced analysis of the items (Gaborieau et al. 2021), ensuring that they accurately reflect the constructs of local wisdom. This approach not only enhances the reliability of the scale but also facilitates the identification of any potential biases, thereby improving the overall quality of the instrument (Baghaei 2012; Gaborieau et al. 2021).

The increasing use of Rasch model analysis is due to its ability to allow researchers to examine items according to a model-based framework grounded in the assumptions of the Rasch model, enabling accurate estimation of true scores, reducing bias, and facilitating a more detailed and specific view of the difficulty levels of existing items. This, in turn, enables researchers to gain more information about the measurement process. (Mallinckrodt et al. 2016; Rusch et al. 2017). The Rasch model is a data analysis method developed by George Rasch (Brandt et al. 2015; Rusch et al. 2017). Initially, it was used primarily in educational contexts, but it has since been developed and applied in various scientific research areas (Hagquist et al. 2009). The Rasch model's unique feature is its independence from the characteristics of the data collected in full, thereby producing more objective measurements. This is analogous to establishing anchors related to higher (more difficult) or lower (easier) standards concerning an individual's ability and the items.

Several other indicators that can be observed from this analysis include infit and outfit statistics, person-item reliability, person-item separation, point measure correlation, logit measurement results, Wright maps, ranking scales, and ICC graphs[1] (Bond et al. 2020). The logit scale generated in Rasch model analysis is derived from the natural logarithm of the odds ratio, and it is transformed into a scale that reflects the pattern of responses. Additionally, the scale produced is dependent on the response pattern, allowing the Rasch model to provide more independent measurement results (Sumintono 2014). The Rasch model offers a robust framework for constructing measurement

[1] ICC is a graphic that illustrates item difficulty and the abilities of individuals, providing insights into the underlying structure of the test items and the respondents' capabilities.

scales, allowing researchers to assess the validity and reliability of the items used in the scale (Rusch et al. 2017; Smith et al. 2008).

Currently, there is a lack of research focused on developing instruments especially for local wisdom using the Rasch model. Furthermore, this study aims to develop a comprehensive Local Wisdom Scale based on in-depth interviews, utilizing the Rasch model to ensure the scale's validity and reliability. This study aims to identify and categorize the key components of local wisdom as articulated by community members, while also exploring how contextual factors, such as geographic location. This research endeavor will contribute significantly to the understanding and appreciation of local wisdom, ultimately fostering its integration into various aspects of society.

II. CONTENT

2.1. Method

Respondents

In this study, the sample consisted of 118 individuals, including lecturers and students from the tourism department, tourism practitioners, and residents of tourist villages living both in villages and cities. The sampling technique used was simple random sampling. In simple random sampling, each individual has an equal chance of being selected as a sample. The advantages of this technique include high internal and external validity and ease of data analysis. However, the disadvantages include the need for a sampling framework and a large budget (Ashley et al. 2013). Despite this, in Rasch analysis, the need for a large sample size is not as stringent (Surya et al. 2022).

According to Smith et al. (2008), in Rasch analysis with polytomous data, a sample size of at least 50 can be considered sufficient to provide information regarding the calibration of items within ±1 logit and a 95% confidence level. However, if the sample size increases, the analysis will become even better. In the study by Smith et al. (2008), assuming the Rasch model for polytomous data, it was found that respondents with fewer than 50 showed many misfits in the item analysis compared to 100 respondents, and further, involving more than 100 respondents up to over 200 would make the measurement more robust with better precision.

Research Instrument

The measuring instrument used consists of 29 items that reflect local wisdom values, obtained from in-depth interviews with residents in three tourist villages in Yogyakarta, namely Pancoh, Widosari, and Sri Mulyo, as well as from various related literature. After that, the coding process was carried out. The items derived from the in-depth interviews were subsequently distributed to 118 respondents for completion. This group comprised tourism practitioners, lecturers and students in the field of tourism, as well as residents living in the tourist villages.

Table 1. Local Wisdom Instruments from the results of in-depth interviews

Items	Research instruments
LW1	In our village, there are unwritten rules that apply within the community.
LW2	I believe that the unwritten rules within the community regarding the preservation of the environment must be enforced.
LW3	The community in our village has a list of prohibitions against activities that are harmful to the environment.
LW4	The community in our village has several local customary laws specific to the protection and management of water resources, flora, and fauna.
LW5	Individuals who damage the environment should be given social sanctions.
LW6	Individuals who damage the environment should be given administrative sanctions.
LW7	I believe that there are rules to preserve the environment that has been passed down through generations.
LW8	I believe that violating the rules to protect the natural environment will have negative consequences.
LW9	There are many things that must not be violated.
LW10	I believe in the myth about environmental protection in my village.
LW11	I believe in the legendary story about environmental protection in my village.
LW12	In our village, rituals to pay respect to the natural environment are conducted regularly/scheduled.
LW13	I believe that the regular rituals conducted will prevent disasters/damage to the environment.
LW14	I believe that the rituals conducted in my village have an impact on the preservation/protection of the environment.
LW15	Some traditional rituals are considered very special and important for the way of life of the community in the past.
LW16	The tradition of environmental preservation is inherited and serves as a guide for behavior and activities within the community.
LW17	I understand the meaning of the ritual of paying respect to the natural environment.
LW18	I believe that the rituals in our village have the meaning of honoring and protecting the environment.
LW19	I understand the protocol of the ritual of paying respect to the natural environment.
LW20	I believe that the protocol of the ritual of paying respect to the natural environment in my village is correct.
LW21	The village leaders support efforts to protect the natural environment.
LW22	The village leaders support communities that protect the natural environment.
LW23	The community in my village voluntarily supports the implementation of rituals to pay respect to the natural environment (rivers, forests, lakes, etc.).
LW24	My village has funds allocated for environmental protection efforts.
LW25	We strive to protect the natural environment in accordance with our beliefs.
LW26	I believe that the community in my village strives to protect the natural environment in accordance with their beliefs.
LW27	It is very important for the community to preserve their water resources to ensure that they always have enough clean water for drinking and other activities.
LW28	I believe that the community in our village protects the natural environment from the destructive actions of outsiders.
LW29	The community establishes a system for protecting forests and wildlife by planting trees.

Source : indeepth interview, July 2023 – May 2024

The measurement of the local wisdom items was conducted using a Likert scale ranging from 1, which indicates "strongly disagree," to 5, which indicates "strongly agree." Therefore, prior to commencing the analysis, the researcher will assume that all items are favorable, with the intention of reversing the scores for any unfavorable items. The validity test will be conducted using the Rasch Model method to assess :

1) Unidimensionality: determining whether the test instrument possesses a single dimension. An unidimensional instrument indicates that each item within the instrument measures the same aspect of the variable being assessed (Hamzah et al. 2019),

2) Calibration and Item Estimation Ability: This process involves assessing the quality of each item within the instrument based on its ability to differentiate respondents with varying levels of ability. High-quality items will possess strong estimation capabilities and effectively distinguish between respondents (Hamzah et al. 2019),

3) Wright Map Analysis determining whether the instrument can effectively differentiate between respondents with varying levels of ability (Bond et al. 2020; Brandt et al. 2015; Mallinckrodt et al. 2016),

4) Item Analysis: This involves assessing the quality of each item within the instrument based on its ability to effectively differentiate respondents. High-quality items will have an Outfit Mean Square (MNSQ) value close to 1 and a Z-standard (ZSTD) value close to 0.5 (Bond et al. 2020; Brandt et al. 2015; Mallinckrodt et al. 2016),

5) Participant Ability Analysis: This involves assessing respondents' abilities in relation to the test instrument. A well-designed instrument will effectively differentiate between respondents with varying levels of ability (Brandt et al. 2015; Hamzah et al. 2019),

6) Instrument Analysis: This involves evaluating the overall quality of the instrument based on its ability to provide accurate information regarding respondents' abilities. (Brandt et al. 2015; Hamzah et al. 2019).

7) Reliability Testing: This will also be conducted using the Rasch Model method to determine whether each dimension exhibits consistency in measurement

Data Analysis Technique

The data analysis employed for the validity and reliability tests in this study utilizes the Rasch model approach. The analysis will focus on the infit-outfit mean square values to assess the accuracy of the data obtained by the model, person-item reliability to identify potential outliers or respondents who do not fit the model, logit measurement results to evaluate the difficulty level of the items, and the Wright map to examine the relationship between persons and items, using Winstep version 5.2.2. (Rusch et al. 2017)(Yasin et al. 2018). Additionally, Differential Item Functioning (DIF) analysis will be conducted to examine potential bias in the items based (Gaborieau et al. 2021; Hagquist et al. 2009) on location differences (rural and urban). According to Bond et al. (2020), the assumption of dimensionality in Rasch analysis is unidimensional (Surya et al. 2022). Therefore, in this study, dimensionality analysis will be conducted simultaneously on the 29 items of local wisdom.

2.2. Findings

In the unidimensionality test, it was found that 29 items of local wisdom yielded unidimensionality with an Eigenvalue percentage of 54.55%, which is above the 40% threshold. According to Yasin et al. (2018), a dimensionality test value exceeding 40% indicates the alignment of the items with the intended dimensional construct. These 29 items effectively measure what they are intended to measure, and a higher percentage value signifies a reduction in the noise that may disrupt the infit-outfit statistics of the items (Bond et al. 2020). The infit-outfit analysis of the respondents indicates that the majority of respondents have fit values that conform to the Rasch modeling.

The reliability of this measurement tool is rated as satisfactory, with an item reliability score of 0.97. In terms of person reliability, it has a score range of 0.89 to 0.92, indicating that both item and person reliability demonstrate values above the recommended threshold (x < 0.7). According to Hamzah et al. (2019) and Hagel (2014), this suggests that the sample used is sufficiently large for analysis and indicates a high likelihood that individuals/items measured with high ability indeed possess high ability, and conversely, individuals/items with low ability exhibit low ability. A Cronbach's Alpha of 0.93 indicates that the 29 items have a very high internal consistency.

The separation index indicates the distribution of items or individuals on the logit scale in the Wright map. A higher person separation value signifies that the instrument has a high sensitivity to differentiate between individuals with low or high ability, while a higher item separation indicates greater diversity among the sample of respondent (Gaborieau et al. 2021; Surya et al. 2022; Yasin et al. 2018). A person separation index considered good in Rasch modeling is above 3. This value indicates that the instrument has good measurement quality and can effectively identify groups of respondents (Gaborieau et al. 2021; Surya et al. 2022; Yasin et al. 2018). The person separation index for the 29 items ranges from 2.90 to 3.31, indicating that the items within the dimension of local wisdom has a level of separation and is very effective in distinguishing between respondents with different abilities. Person separation index untuk 29 item berkisar antara 2,90 sampai dengan 3,31, hal ini menunjukkan bahwa item dalam dimensi kearifan lokal mempunyai tingkat pemisahan dan sangat efektif dalam membedakan responden yang memiliki kemampuan berbeda. The item separation index for the 29 questions falls within the range of 5.38 to 5.64, demonstrating that the instrument. are **sufficiently varied** to discriminate among the diversity of the sample. This suggests that the instrument possesses good quality in measuring respondents' abilities.

Table 2. General Analysis of 29 Local Wisdom Items

Dimension	**Item Reliability**	**Person Reliability**	**Dimensionality**	**Separation Item Index**	**Separation Person Index**
Local Wisdom	0,97	0,89 – 0,92	54,55%	5,38 – 5,64	2,90 – 3,31

In the validity analysis of the rating scale for each item, inconsistencies were found between the scale values of 3 and 4 in the Andrich threshold and category measure. This indicates that there is an irregular change in respondents' decision-making from one rating to the next, which is not consistent with the assumptions of the Rasch model. This suggests that respondents are unable to effectively distinguish between scales 3 and 4. The inconsistency between these two scales indicates that the instrument may have issues in measuring the intended variable, necessitating modifications or adjustments to enhance its measurement quality, such as potentially eliminating scale 3. The assumption is that individuals with lower ability should have a high probability of selecting rating scale 1, and this probability will decrease as the ability of others with higher capability increases. Conversely, the same applies to rating scale 5 (Bond et al. 2020).

The point measure correlation values range from 0.29 to 0.70, with no negative values observed. Generally, a Pt. Measure Corr value above 0.3 is considered acceptable, while a value above 0.85 is regarded as excellent (Gaborieau et al. 2021). The data analysis revealed that six items—LW1, LW6, LW8, LW27, LW2, and LW5—had Pt. Measure Corr values below 0.30. These values indicate that the instrument is not effective in adequately measuring the intended variable; therefore, these six items were excluded from the analysis.

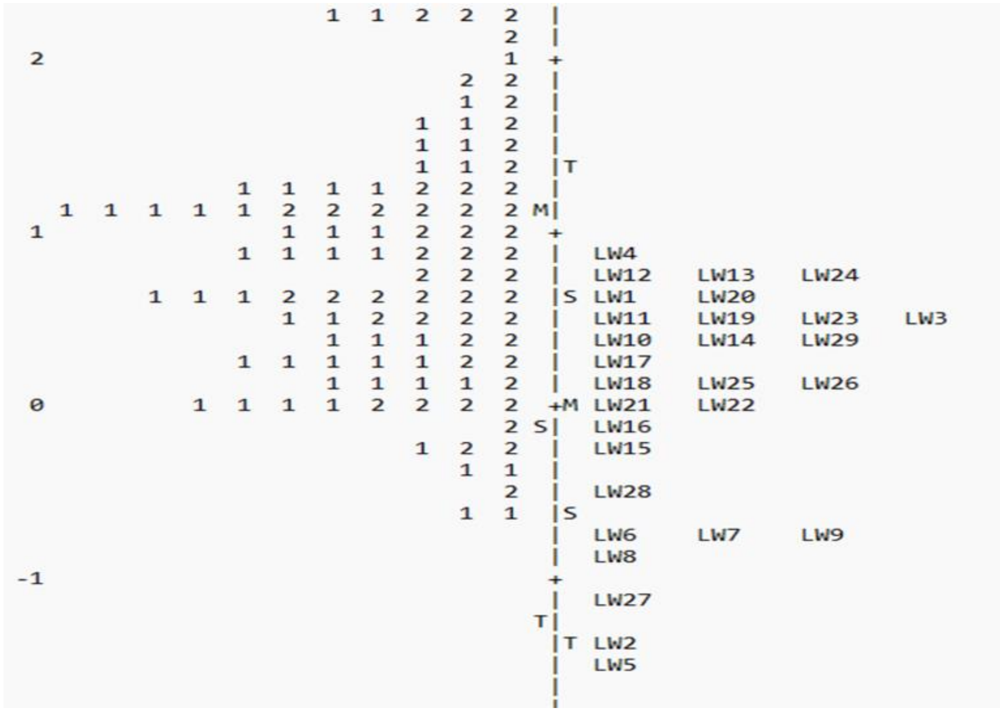
Based on the logit values, it was found that the item most difficult for respondents to agree with is item LW20, with a score of 0.70, while LW6 and LW27 are the easiest items for respondents to agree with, scoring 0.29 and 0.34, respectively. The infit-outfit mean square fit values, which align with the model, should fall within the range of 0.5 to 1.5 according to Bond et al**.** (2020). No items had an infit value below 0.5; however, there were five items with infit-outfit values greater than 1.5: LW1, LW3, LW4, LW12, and LW29. An outfit value exceeding 1.5 indicates that these items exhibit considerably greater variability than predicted by the model. This typically suggests the presence of outliers or unexpected responses, which may result from misunderstandings of the items by respondents or from the characteristics of the items themselves (Bond et al. 2020). Consequently, items LW1, LW3, LW4, LW12, and LW29 were excluded from the analysis.

Tabel 3. Item Measure Order.

Item	Measure	S.E. Measure	Infit MS	Outfit MS	PoiNt Measure corr
LW4	.88	.88	1.68	2.12	.47
LW12	.77	.77	1.61	1.98	.53
LW24	.70	.70	.99	1.24	.57
LW13	.69	.69	.83	.86	.65
LW20	.65	.65	.62	.58	.70
LW1	.60	.60	1.65	2.31	.37
LW19	.51	.51	.68	.64	.67
LW23	.49	.49	1.09	1.04	.62
LW3	.48	.48	1.42	1.83	.47
LW11	.45	.45	.73	.79	.62
LW14	.43	.43	.80	.78	.62
LW29	.41	.41	1.09	1.52	.53
LW10	.33	.33	.80	.79	.60
LW17	.21	.21	.83	.78	.59
LW18	.12	.12	.82	.81	.59
LW25	.09	.09	.96	.94	.57
LW26	.08	.08	.69	.72	.57
LW22	.01	.01	1.06	1.02	.55
LW21	-.06	-.06	.95	.95	.58
LW16	-.08	-.08	.78	.81	.56
LW15	-.20	-.20	.98	.93	.48
LW28	-.48	-.48	.98	.74	.50
LW7	-.73	-.73	.73	.69	.50
LW9	-.77	-.77	1.09	1.00	.40
LW6	-.81	-.81	1.16	1.32	.29
LW8	-.91	-.91	1.37	1.18	.39
LW27	-1.09	-1.09	.82	1.02	.34
LW2	-1.33	-1.33	.80	.81	.35
LW5	-1.46	-1.46	.79	.90	.36
MEAN			.99	1.07	

Out of the 29 local wisdom items, 23 items met the FIT criteria, specifically LW2, LW20, LW5, LW7, LW8, LW9, LW10, LW11, LW13, LW14, LW15, LW16, LW17, LW18, LW19, LW21, LW22, LW23, LW24, LW25, LW26, LW27, and LW28.

Figure 1. Wright Map



The distribution of person-item interactions on the Wright map indicates that several items exhibit limited variability due to having similar ability levels: 1) LW12 = LW13 = LW24, 2) LW1 = LW20, 3) LW11 = LW18 = LW23 = LW3, 4) LW10 = LW14 = LW29, 5) LW18 = LW25 = LW26, 6) LW21 = LW22, and 7) LW6 = LW7 = LW9. Therefore, we will select one item from among those with similar ability levels, as items that are redundant (i.e., have similar ability levels) do not provide distinct information and may disrupt the consistency of the Rasch model.

In Rasch modeling, there are two types of fit that need to be considered: item fit and person fit. Item fit indicates the extent to which the response pattern to a particular item is consistent with the responses of others to different items. **Person fit** reflects the degree to which an individual's performance on the test is consistent across the items responded to by others. If an item does not conform to the Rasch model, it should be removed or modified to ensure that the model yields more accurate and consistent results (Bond et al. 2020; Rusch et al. 2017). Based on the analysis of the Wright map, the following items were selected from among the redundant items: LW24, LW20, LW23, LW10, LW25, LW21, and LW7.

Thus, there are 14 selected items that meet the FIT criteria and are not redundant :

LW24, LW20, LW23, LW10, LW25, LW21, LW7, LW17, LW16, LW15, LW28, LW27, LW2, LW5, and LW28.

DIFF (DIFferential Item Functioning)

Items in the instrument may be subject to bias. In this analysis, we seeks items that have the potential for bias based on location, selecting two location as a basis for differences in local wisdom: urban and rural. Items identified as potentially biased can be assessed based on their calculated chi-squared values, with a critical point of 3.84 or a statistical significance probability of <0.05 (significant) . (Rusch et al. 2017). The analysis revealled that no items indicated as having potentially bias on location.

Table 4. DIFF (DIFferential Item Functioning)

Item number	Name	Chi-Square value	Prob
1	LW1	0,0837	0,7723
2	LW2	0,0855	0,7700
3	LW3	0,5639	0,4527
4	LW4	0,0089	0,9246
5	LW5	0,0208	0,8852
6	LW6	1,6978	0,1926
7	LW7	1,6630	0,1972
8	LW8	0,0814	0,7754
9	LW9	0,2717	0,6022
10	LW10	1,0812	0,2984
11	LW11	1,0861	0,2973
12	LW12	2,5527	0,1101
13	LW13	0,0051	0,9430
14	LW14	0,3432	0,5580
15	LW15	1,1787	0,6725
16	LW16	0,5658	0,4519
17	LW17	0,1390	0,7092
18	LW18	0,1642	0,6853
19	LW19	0,5291	0,4670
20	LW20	0,0285	0,8660
21	LW21	3,5671	0,0598
22	LW22	1,9473	0,1629
23	LW23	0,4304	0,5118
24	LW24	0,9732	0,3239
25	LW25	1,0536	0,3047
26	LW26	0,0974	0,7549
27	LW27	0,7783	0,3777/
28	LW28	0,0361	0,8494
29	LW29	0,1753	0,6754

III. DISCUSSION AND CONCLUSION

3.1. Discusion

Among the 26 local wisdom items, the overall point measure correlation values are satisfactory, with scores above 0.3, except for item LW6, and none of the items have negative values. This indicates that the 25 items (excluding LW6) possess good discriminative power. This means that these items can effectively distinguish between respondents with high ability and those with low ability. Respondents with high ability tend to answer the items correctly, while respondents with low ability tend to answer incorrectly (Bond et al. 2020).

The analysis using the Rasch model aims to provide a more equitable measurement at the interval level. The outfit and infit values represent the residuals between the model and the existing empirical data (Bond et al. 2020). A greater residual discrepancy will inevitably affect the construct validity. If the infit-outfit values are too closely aligned with the model (overfit), they will approach 0; conversely, if they are poorly aligned with the model (underfit), the values will diverge further from 1. All items in the questionnaire meet the accuracy standards suggested, except for items LW1, LW3, LW4, LW12, and LW29. Therefore, these items have been excluded (Sondergeld et al. 2014)The distribution of person-item interactions on the Wright map indicates that the items exhibit considerable variability, although there are some items with similar ability levels. The person separation index is in the range of 2.90 to 3.31. The separation index for the 29 local wisdom items falls within the range of 5.38 to 5.64, indicating that the instrument has good quality in measuring respondents' abilities

Regarding the analysis of person-item reliability, the existing person-item reliability values are satisfactory. According to Hamzah et al. (2019) and Sondergeld et al. (2014) , this indicates the consistency of both the respondents and the items themselves.

According to Baghaei (2012), analyzing data using the assumptions of the Rasch model separately for each dimension can lead to less accurate measurements compared to simultaneous analysis across all dimensions. Therefore, in this study, the measurement of the 26 local item questions was conducted simultaneously, and respondents who did not meet the infit-outfit analysis criteria—those with values greater than 1.5 or less than 0.5—were excluded. This approach was implemented to enhance measurement precision and reduce contamination that could with the validity analysis. The measurement of the local wisdom items was conducted using a Likert scale ranging from 1, which indicates "strongly disagree," to 5, which indicates "strongly agree." Therefore, prior to commencing the analysis, we will assume that all items are favorable, with the intention of reversing the scores for any unfavorable items.

3.2. Conclusion

Based on the validation process using the Rasch model, it can be concluded that 14 items related to local wisdom—LW24, LW20, LW23, LW10, LW25, LW21, LW7, LW17, LW16, LW15, LW28, LW27, LW2, LW5, and LW28—have met the criteria for alignment with the existing Rasch model. The outfit-infit mean square values for these 14 items range from 0.5 to 1.5. Items that experienced overfit, namely LW1, LW3, LW4, LW12, and LW29, can be categorized as contaminants that may undermine construct validity and have been excluded. Additionally, there are 13 items with limited variability in difficulty levels, some even having the same logit values, which have also been removed. This lack of variability negatively affects the instrument's efficiency in distinguishing individuals within a group with diverse abilities.

LW2, LW5, W7, W10, LW15, W16, LW17, LW20, LW21, W23, LW24, LW25, LW27, LW28

Novelty : Recognizing the critical importance of local wisdom, this study introduces a novel approach by developing a reliable and valid measurement scale that systematically captures its nuances, addressing the existing gap in effective evaluation tools and underscoring the relevance of local wisdom in contemporary society.

Theoretical Contribution : The theoretical contribution of the study lies in identifying 14 items that meet the Rasch model's standards, the study underscores the model's effectiveness in producing reliable and valid measures, thereby contributing to the development of psychometric tools that accurately reflect the complexities of local wisdom.

Limitation : the limitations of data collection locations which only reflect the local wisdom of a small portion of the population

Future research : Furthermore, in future similar studies, it is important to note that Differential Item Functioning (DIF) should not be limited to location (rural and urban) but can also consider other variables, such as gender, that may warrant DIF testing.

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