

Examining the Validity and Reliability of the Home Literacy Environment Questionnaire among Preschoolers in Sabah context

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Abstract

The Home Learning Environment is a critical determinant of children's developmental outcomes, yet its validation and application in the context of Sabah, Malaysia, remain underexplored. This study addresses this gap by validating the Home Literacy Environment Questionnaire (HLEQ). The validation process included expert review for content validity, data collection from 255 parents of preschool children in Penampang, Sabah. Data analysis includes reliability, exploratory factor analysis, and confirmatory factor analysis. Findings indicate that the HLEQ demonstrates strong reliability and validity among respondents in Sabah, thereby confirming its suitability for assessing the home literacy environment of preschoolers. This research enhances understanding of home literacy environment assessment in early childhood and underscores the importance of validating assessment tools, with implications for shaping early childhood education policies and interventions in the region.

Keywords : *Home literacy environment, Preschooler, Validity, Reliability*

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Introduction

Preschool education in Malaysia is highly important in fostering all-around development for young children. Preschools are the foundation for a child's primary education and contribute significantly to physical, intellectual, emotional, and social growth (Fong et al., 2025; Shin & Idang, 2025; Shin et al., 2025a; Liu & Ompok, 2025; Ompok & Teo, 2021).

The home literacy environment is a multifaceted interactive experience crucial for emergent literacy acquisition, encompassing various factors such as parental practices, beliefs, and attitudes towards children's learning (Schmitt et al., 2011). While the home learning environment, including literacy and numeracy dimensions, has been extensively explored in Western contexts, there is a notable dearth of research in Asian homes, characterized by diverse socio-cultural and linguistic backgrounds.

The home literacy environment significantly influences early literacy development, particularly in supporting children's reading skills (Ompok, 2021). Literacy activities at home, particularly book reading, are positively associated with language and literacy outcomes for kindergarten and early primary-grade children, demonstrating cultural variations in the importance of a broadly-defined home literacy environment (Schmitt et al., 2011). The home literacy environment is not solely associated with academic achievement but also predicts future employment, emphasizing its enduring impact beyond early education (Doig & Ompok, 2001; Shin et al., 2025b). Despite considerable progress in understanding the mechanisms influencing the literacy environment, the majority of advances have been made in the literacy domain, particularly during the preschool years, shaping the foundation for subsequent reading success (Qinghua & Ompok, 2022a; Qinghua, & Ompok, 2022b; Amran Shah et al., 2023).

Literature Review

The Home Literacy Environment Questionnaire (HLEQ) (Umek et al., 2005) is a parent-reported instrument designed to evaluate various aspects of the home literacy environment. Comprising 33 items, parents indicate their level of agreement with child-parent activities using a Likert scale ranging from 1 to 6 (1-2 = never or rarely, 3-4 = frequently, 5-6 = very

frequently or always). The scale encompasses five components: stimulation for language use and explanation, reading books, visiting the library and puppet theater, engaging in joint activities and conversation, interactive reading, and stimulation of the zone of proximal development. To accommodate differences in language expression and unique Chinese characteristics, four questions underwent revisions. These questions were scored using a 5-point Likert scale, with responses ranging from “1 (never)” to “5 (always).” This questionnaire has been utilized in studies involving Chinese children with typical hearing levels and those with intellectual disabilities (Wang et al., 2022), demonstrating robust reliability and validity. Altun (2019) conducted a rigorous investigation in Turkey involving 203 preschoolers and their parents, meticulously examining the internal consistency of the HLEQ. The findings revealed a noteworthy Cronbach's alpha value of .89, underscoring the questionnaire's robust internal reliability. Furthermore, Schmitt et al. (2011) embarked on a longitudinal assessment in the USA involving 29 children aged 4 to 5 years, meticulously tracking the internal consistency of the HLEQ at multiple time points. Their analysis unveiled Cronbach's alpha values of .86, .796, and .81 across different assessment periods, reinforcing the questionnaire's stability over time. Seçim and Gonen (2022) embarked on a comprehensive investigation involving 556 parents of children aged 3 to 6 years, evaluating the overall reliability of the HLEQ. Their scrutiny revealed an impressive Cronbach alpha coefficient of 0.92, attesting to the questionnaire's robust internal consistency. Similarly, Kotrla Topić et al. (2020) conducted an examination of the HLEQ's reliability among 97 Croatian preschool children aged 6–7 years. Their analysis yielded an overall Cronbach alpha value of 0.83, further validating the questionnaire's reliability in diverse cultural contexts. In a distinct cultural setting, Wang et al. (2022) rigorously examined the reliability of the HLEQ among 112 Chinese children aged 2 to 13 years and revealed a remarkably high Cronbach alpha value of 0.98, reaffirming the questionnaire's reliability across different age groups. Carroll et al., (2019) conducted a meticulous assessment among 55 preschoolers in the UK, rigorously scrutinizing the internal consistency of the HLEQ. Their meticulous analysis unveiled a Cronbach alpha value of 0.94, indicating robust reliability within the British preschool context. In conclusion, The Home Literacy Environment Questionnaire (HLEQ) has been extensively employed in research studies across various countries, including the UK (Carroll et al., 2019), China (Wang et al., 2022), Turkey (Altun, 2019) and the USA (Schmitt et al., 2011), to assess the home literacy environment and its impact on children's language

and literacy development. These findings show variability in the instrument's performance across different cultural and sample contexts, underscoring the importance of conducting context-specific validation, such as in Sabah to ensure that the HLEQ operates reliably within the local population.

Despite the widespread international use of the HLEQ from the previous findings, the questionnaire has not yet been validated in Malaysia. Given the cultural, linguistic, and educational differences in the Malaysian context, particularly in Sabah, it is unclear whether the HLEQ reliably captures the home literacy environment for preschoolers in this region. Validating the HLEQ locally is therefore essential to ensure that the instrument is culturally and linguistically appropriate, accurate, and useful for research and policy development in early childhood education. This study aims to fill this gap by investigating the reliability and validity of the HLEQ among preschoolers in Sabah, providing a foundation for assessing home literacy practices and informing interventions to support early literacy development.

Research Method

This study employed a quantitative, cross-sectional survey design to examine the reliability and validity of the Home Literacy Environment Questionnaire (HLEQ) among preschoolers in Sabah. The study design was selected to collect standardized data from a relatively large sample of respondents, enabling robust psychometric analyses including reliability assessment, exploratory factor analysis (EFA), and confirmatory factor analysis (CFA) (Liang et al., 2025; Zhao & Shin, 2025; Yang et al., 2025).

Procedure

Ethical approval for the study was obtained from the relevant institutional review board. Prior to data collection, a meeting was held with the Chinese preschool principal to discuss the questionnaire administration procedure. Participants in the study were informed about the study's purpose and how the results were used. They also have the right to refuse or withdraw from the study at any time. Efforts were made to minimize interference to school activities. A letter for parents with an online questionnaire link was given to class

teachers through the principal. Then the teachers distributed it to parents of preschoolers who were required to complete it within one week. The study was conducted in Tadika Chung Hwa Penampang. The preschool is one of the largest Chinese preschools in Sabah in terms of student enrollment, which facilitated the collection of a sufficiently large sample for the validation analysis. The school adopts a bilingual instructional approach using both Chinese and English, while also incorporating elements of Chinese and Malaysian cultural practices in its educational activities. This multicultural learning environment makes the preschool a meaningful context for examining home literacy environments among Chinese preschool children in Sabah. All items were set as mandatory, requiring participants to respond to each question before proceeding, thereby reducing the likelihood of missing data.

First, the original English version was translated into Malay by a bilingual expert fluent in both languages and familiar with early childhood education terminology. Next, a second independent bilingual translator performed a back-translation from Malay to English to check for consistency and equivalence of meaning. Any discrepancies between the original and back-translated versions were discussed and resolved by the research team in consultation with the expert panel. To ensure cultural and language appropriateness of the HLEQ, several adaptation steps were taken by researchers. These included back-to-back translation and expert panel review to ensure the questionnaire was culturally relevant and easily understood by families in Sabah. The expert panels hold a postgraduate degree with extensive experience in parenting and literacy assessment. Their expertise ensured that the questionnaire items were culturally relevant, age-appropriate, and aligned with good practices in early childhood literacy.

Participants

This study was conducted in Tadika Chung Hwa Penampang, Sabah. All parents of 4 to 6 years old preschool children in the participating school were invited to fill the online questionnaire distributed through the school administration. A total of 255 mothers of Chinese preschoolers residing in Penampang participated in the study. The participants were selected because they represent the target population for whom the questionnaire is intended to be used, make the sample suitable for the validation analysis.

Data analysis

Data analysis was conducted using SPSS. First, internal consistency reliability of the instrument was examined using Cronbach's alpha coefficient. A Cronbach's alpha value of 0.70 or above was considered acceptable for reliability. Next, Exploratory Factor Analysis (EFA) was performed to explore the underlying factor structure of the questionnaire. The suitability of the data for factor analysis was assessed using the Kaiser–Meyer–Olkin (KMO) measure and Bartlett's test of sphericity. Principal component analysis with varimax rotation was employed to extract the factor structure, and factors with eigenvalues greater than 1 were retained. Finally, Confirmatory Factor Analysis (CFA) was conducted using AMOS to validate the factor structure identified in the EFA. Model fit was evaluated using several goodness-of-fit indices, including the chi-square statistic (χ^2/df), Comparative Fit Index (CFI), Tucker–Lewis Index (TLI), and Root Mean Square Error of Approximation (RMSEA). Acceptable model fit was determined based on commonly recommended thresholds.

Findings

This study utilized item analysis, reliability assessment, and construct validity testing to analyze the instrument.

Item analysis

Item analysis aims to examine whether the questionnaire items demonstrate good discrimination and homogeneity (Ompok et al., 2021; Ompok et al., 2018). Discrimination assesses whether the questionnaire items differentiate between individuals of varying abilities. Typically, the critical ratio (CR) method is employed to investigate differences in item scores between high and low scorers. The total scores are computed and ranked by percentile (27%), with independent sample t-tests analyzing significant statistical differences between high and low scorers for each item. A CR value ≥ 3 ($P < 0.05$) indicates good discrimination, whereas lower values suggest poor discrimination, warranting consideration

for item deletion. Homogeneity testing involves Pearson correlation and communality testing. Pearson correlation and corrected item-total correlation (CITC) values ≥ 0.4 indicate high item homogeneity, while values below suggest low homogeneity, prompting item removal. Communalities, factor loadings, and Cronbach's alpha values after item deletion are also examined, with values meeting or exceeding specific criteria indicating good homogeneity. If the Cronbach's α value after item deletion is less than or equal to the scale's α value, communalities are greater than or equal to 0.2, and factor loadings are greater than or equal to 0.45, and all three indicators meet or exceed the standard range, then it indicates that the items exhibit good homogeneity (Wu, 2010). Table 1 presents the Home Literacy Environment Questionnaire of Item Analysis.

Table 1. *Home Literacy Environment Questionnaire of Item Analysis*

Item	Critical ration	Correlation		Homogeneity test			The number of failed indicators	Remarks
	(CR)	r	CITC	Cronbach's α if Item Deleted	Communalities	Factor loading		
HLE1	10.861***	0.678**	0.650	0.944	0.625	0.711	0	reserve
HLE2	7.189***	0.583**	0.551	0.945	0.569	0.722	0	reserve
HLE3	8.686***	0.621**	0.591	0.944	0.577	0.700	0	reserve
HLE4	8.138***	0.615**	0.584	0.944	0.594	0.704	0	reserve
HLE5	7.173***	0.572**	0.539	0.945	0.591	0.720	0	reserve
HLE6	7.042***	0.572**	0.541	0.945	0.553	0.714	0	reserve
HLE7	7.297***	0.593**	0.563	0.945	0.559	0.703	0	reserve
HLE8	8.602***	0.663**	0.635	0.944	0.612	0.703	0	reserve
HLE9	8.043***	0.601**	0.570	0.945	0.606	0.733	0	reserve
HLE10	7.202***	0.549**	0.514	0.945	0.561	0.729	0	reserve
HLE11	7.202***	0.583**	0.550	0.945	0.574	0.721	0	reserve
HLE12	11.945***	0.603**	0.570	0.944	0.631	0.747	0	reserve
HLE13	12.331***	0.638**	0.606	0.944	0.603	0.681	0	reserve
HLE14	12.895***	0.657**	0.625	0.944	0.629	0.719	0	reserve
HLE15	11.228***	0.609**	0.575	0.944	0.651	0.766	0	reserve
HLE16	10.595***	0.609**	0.573	0.944	0.679	0.792	0	reserve
HLE17	12.572***	0.659**	0.627	0.944	0.686	0.761	0	reserve
HLE18	11.427***	0.591**	0.554	0.945	0.688	0.786	0	reserve
HLE19	12.659***	0.628**	0.593	0.944	0.627	0.735	0	reserve
HLE20	11.882***	0.628**	0.593	0.944	0.681	0.746	0	reserve
HLE21	10.788***	0.554**	0.520	0.945	0.639	0.749	0	reserve

Table 1. *Home Literacy Environment Questionnaire of Item Analysis* (continued)

Item	Critical ration	Correlation		Homogeneity test			The number of failed indicators	Remarks
	(CR)	r	CITC	Cronbach's α if Item Deleted	Communalities	Factor loading		
HLE22	12.857***	0.577**	0.540	0.945	0.663	0.76	0	reserve
HLE23	10.336***	0.557**	0.521	0.945	0.675	0.776	0	reserve
HLE24	11.133***	0.580**	0.545	0.945	0.593	0.687	0	reserve
HLE25	11.457***	0.623**	0.591	0.944	0.591	0.656	0	reserve
HLE26	9.626***	0.592**	0.557	0.945	0.743	0.757	0	reserve
HLE27	9.113***	0.559**	0.521	0.945	0.732	0.77	0	reserve
HLE28	14.372***	0.668**	0.636	0.944	0.759	0.705	0	reserve
HLE29	8.245***	0.609**	0.578	0.944	0.722	0.772	0	reserve
HLE30	10.208***	0.648**	0.618	0.944	0.616	0.643	0	reserve
HLE31	7.950***	0.605**	0.572	0.944	0.693	0.752	0	reserve
HLE32	8.028***	0.594**	0.563	0.945	0.662	0.724	0	reserve
HLE33	8.096***	0.586**	0.555	0.945	0.651	0.716	0	reserve
Judgment criterion	CR ≥ 3	≥ 0.4		≤ 0.946	≥ 0.2	≥ 0.45	-	-

Note: 0.946 represents the internal consistency Cronbach's α coefficient of the Home Literacy Environment Questionnaire scale; *** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$.

The item analysis results of the Home Literacy Environment Questionnaire with 33 items are presented in Table 2. In terms of discriminant validity, the critical ratio (CR) for each item exceeds 3 ($P < 0.05$), indicating good discriminant validity for all items. Regarding the correlation indicators, both the correlation coefficients (r values) and Corrected Item-Total Correlation (CITC) values for each item are above 0.4, suggesting good item correlation. In the homogeneity test, the communalities for all items are above 0.2, and the factor loading values are all greater than 0.45. Additionally, after removing items, the Cronbach's α coefficient remains below the scale reliability coefficient of 0.946, indicating good homogeneity for all items. In conclusion, the discriminant validity and homogeneity of the items in the Home Literacy Environment Questionnaire have passed the tests, and no item deletion is required.

Reliability Analysis

According to Ompok and Teo (2021), Cronbach's α values $\geq .70$, those would be

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Table 2. *Home Literacy Environment Questionnaire of Reliability Analysis*

variable	Item	Corrected Item-Total Correlation (CITC)	Cronbach's α if Item Deleted	Cronbach's α of variable	Number of Item	Cronbach's α of Entirety
HL1	HLE1	0.732	0.916	0.924	11	0.946
	HLE2	0.690	0.918			
	HLE3	0.690	0.918			
	HLE4	0.696	0.917			
	HLE5	0.689	0.918			
	HLE6	0.679	0.918			
	HLE7	0.684	0.918			
	HLE8	0.714	0.916			
	HLE9	0.698	0.917			
	HLE10	0.679	0.918			
	HLE11	0.691	0.917			
HL2	HLE12	0.720	0.908	0.918	8	
	HLE13	0.685	0.911			
	HLE14	0.716	0.909			
	HLE15	0.724	0.908			
	HLE16	0.758	0.905			
	HLE17	0.757	0.905			
	HLE18	0.742	0.907			
	HLE19	0.725	0.908			
HL3	HLE20	0.731	0.854	0.882	6	
	HLE21	0.686	0.862			
	HLE22	0.710	0.858			
	HLE23	0.704	0.859			
	HLE24	0.651	0.868			
	HLE25	0.667	0.865			
HL4	HLE26	0.690	0.772	0.833	3	
	HLE27	0.669	0.792			
	HLE28	0.722	0.740			
HL5	HLE29	0.735	0.834	0.871	5	
	HLE30	0.660	0.853			
	HLE31	0.726	0.836			
	HLE32	0.691	0.845			
	HLE33	0.672	0.849			

interpreted as indicating acceptable or good internal consistency. The reliability analysis results of the HLEQ are presented in Table 2. The overall Cronbach's α coefficient for the entire questionnaire is 0.946, indicating high overall reliability. Within the subscales, the HL1 dimension consists of 11 items, with a Cronbach's α coefficient of 0.924. The CITC values for the items range from 0.679 to 0.732, all of which exceed 0.4. After removing items, the Cronbach's α coefficients remain below 0.924, indicating good reliability for the HL1 dimension. Similarly, the HL2 dimension comprises 8 items, with a Cronbach's α coefficient of 0.918. The CITC values range from 0.685 to 0.758, all exceeding 0.4, and the Cronbach's α coefficients after item removal remain below 0.918, indicating good reliability for the HL2 dimension. The HL3 dimension consists of 6 items, with a Cronbach's α coefficient of 0.882. The CITC values range from 0.651 to 0.731, all exceeding 0.4, and the Cronbach's α coefficients after item removal remain below 0.882, indicating good reliability for the HL3 dimension. The HL4 dimension comprises 3 items, with a Cronbach's α coefficient of 0.833. The CITC values range from 0.669 to 0.722, all exceeding 0.4, and the Cronbach's α coefficients after item removal remain below 0.833, indicating good reliability for the HL4 dimension. Finally, the HL5 dimension consists of 5 items, with a Cronbach's α coefficient of 0.871. The CITC values range from 0.660 to 0.735, all exceeding 0.4, and the Cronbach's α coefficients after item removal remain below 0.871, indicating good reliability for the HL5 dimension. In summary, both the overall Home Literacy Environment Questionnaire and its subscales demonstrate good reliability.

Validity Analysis

Validity analysis involves assessing the structural integrity of questionnaire data to ensure that the measurement scale structure accurately reflects the effectiveness of questionnaire items. In this study, the structural validity of the questionnaire was tested through exploratory factor analysis (EFA) and confirmatory factor analysis (CFA), focusing on dimensionality, convergent validity, and discriminant validity.

EFA is a method used to synthesize variables with complex interrelationships into a few core factors. When assessing questionnaire validity, it is necessary to first conduct a factor analysis fit test, typically involving the Kaiser-Meyer-Olkin (KMO) measure and Bartlett's test of sphericity (Kaiser, 1974; Bartlett, 1950). A higher KMO value indicates greater

suitability for factor analysis, with KMO values ≥ 0.6 generally considered acceptable (Hair et al., 2010). Additionally, Bartlett's test of sphericity yields a significance value (sig) ≤ 0.05 , indicating independence among variables (Field, 2018).

Following the fit test, common factors are extracted using the principal component method (initial eigenvalues > 1), with cumulative contribution rates $> 50\%$, and variable communalities ≥ 0.2 . These criteria indicate a better explanation of the original variable information by the extracted common factors. Subsequently, maximum variance rotation is typically applied to the common factors to achieve a rotated component matrix. This facilitates clearer judgment of dimensionality rationality: (a) Factor loading coefficients of items ≥ 0.45 and items with similar characteristics are grouped under the same principal component for naming and explanation; (b) A common factor should contain at least three or more item variables to adequately explain its meaning; (c) Each item should not have multiple loadings on different factors to ensure clarity and consistency. Meeting these conditions suggests reasonable dimensionality and indicates good questionnaire validity.

Exploratory Factor Analysis (EFA)

In the factor adequacy test results of the Home Literacy Environment Questionnaire, the KMO value is 0.941, and the approximate chi-square value in Bartlett's sphericity test is 4915.425 with 528 degrees of freedom and a significance level (sig) of <0.001 , indicating that the data of the scale are suitable for factor analysis. Table 3 presents the Home Literacy Environment Questionnaire of Factor fit test.

Table 3. *Home Literacy Environment Questionnaire of Factor fit test*

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		0.941
Approx. Chi-Square		4915.425
Bartlett's Test of Sphericity	df	528
	Sig.	<0.001

The questionnaire data were subjected to principal component analysis, yielding 5 principal components with initial eigenvalues > 1 . The cumulative variance contribution rate

Table 4. *Home Literacy Environment Questionnaire of Exploratory Factor Analysis*

Item	Component					Extraction
	1	2	3	4	5	
HLE1	0.711					0.625
HLE2	0.722					0.569
HLE3	0.700					0.577
HLE4	0.704					0.594
HLE5	0.720					0.591
HLE6	0.714					0.553
HLE7	0.703					0.559
HLE8	0.703					0.612
HLE9	0.733					0.606
HLE10	0.729					0.561
HLE11	0.721					0.574
HLE12		0.747				0.631
HLE13		0.681				0.603
HLE14		0.719				0.629
HLE15		0.766				0.651
HLE16		0.792				0.679
HLE17		0.761				0.686
HLE18		0.786				0.688
HLE19		0.735				0.627
HLE20			0.746			0.681
HLE21			0.749			0.639
HLE22			0.760			0.663
HLE23			0.776			0.675
HLE24			0.687			0.593
HLE25			0.656			0.591
HLE26					0.757	0.743
HLE27					0.770	0.732
HLE28					0.705	0.759
HLE29				0.772		0.722
HLE30				0.643		0.616
HLE31				0.752		0.693
HLE32				0.724		0.662
HLE33				0.716		0.651
Initial eigenvalue	12.176	3.464	2.307	1.774	1.315	-
% of Variance	19.326	16.079	11.933	9.942	6.464	-
Cumulative %			63.744			-

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.
Rotation converged in 6 iterations.

of the extracted five principal components is 63.744%, indicating a good level of explanation. The communalities of each item are all above 0.2, indicating that the five principal components explain the original questionnaire well. Based on the factor loading coefficients after rotation, it is observed that for Principal Component 1, with an eigenvalue of 12.176, items with factor loadings >0.45 and no multiple loadings include HLE1-HLE11, consistent with the items encompassed by the pre-defined dimension HL1. Similarly, for Principal Component 2, with an eigenvalue of 3.464, items with factor loadings >0.45 and no multiple loadings include HLE12-HLE19, aligning with the items within the pre-defined dimension HL2. Principal Component 3, with an eigenvalue of 2.307, contains items with factor loadings >0.45 and no multiple loadings, including HLE20-HLE25, consistent with the items within the pre-defined dimension HL3. Likewise, Principal Component 4, with an eigenvalue of 1.774, comprises items with factor loadings >0.45 and no multiple loadings, including HLE29-HLE33, matching the items within the pre-defined dimension HL5. Finally, Principal Component 5, with an eigenvalue of 1.315, encompasses items with factor loadings >0.45 and no multiple loadings, including HLE26-HLE28, consistent with the items within the pre-defined dimension HL4. In summary, the exploratory factor analysis results of the Home Literacy Environment Questionnaire align with the pre-defined dimensions of the questionnaire. Table 4 presents the Home Literacy Environment Questionnaire of Exploratory Factor Analysis.

Confirmatory Factor Analysis (CFA)

Following the dimensional delineation through exploratory factor analysis (EFA), confirmatory factor analysis (CFA) was further employed to assess the convergent validity, construct reliability, and discriminant validity of the questionnaire. Prior to constructing the confirmatory factor model, model fit assessment was conducted, with the model fit indices presented in Table 5. After confirming the model fit, the convergent validity and discriminant validity between items and dimensional variables were examined. Convergent validity was primarily assessed through factor loading coefficients and the Average Variance Extracted (AVE) values of the variables. A higher AVE indicates lower relative measurement error, and variables are considered to have good convergent validity when $AVE > 0.5$ and factor

loading coefficients >0.5 (Hair et al., 2010). Construct reliability (CR) evaluates the structural reliability of the data, with a CR value greater than 0.7 indicating good construct reliability. Discriminant validity was evaluated by comparing the square root of AVE with the correlations between variables. If the square root of AVE is greater than the correlations between variables, it indicates good discriminant validity between variables. Figure 1 presents the Home Literacy Environment Questionnaire of Confirmatory Factor Analysis.

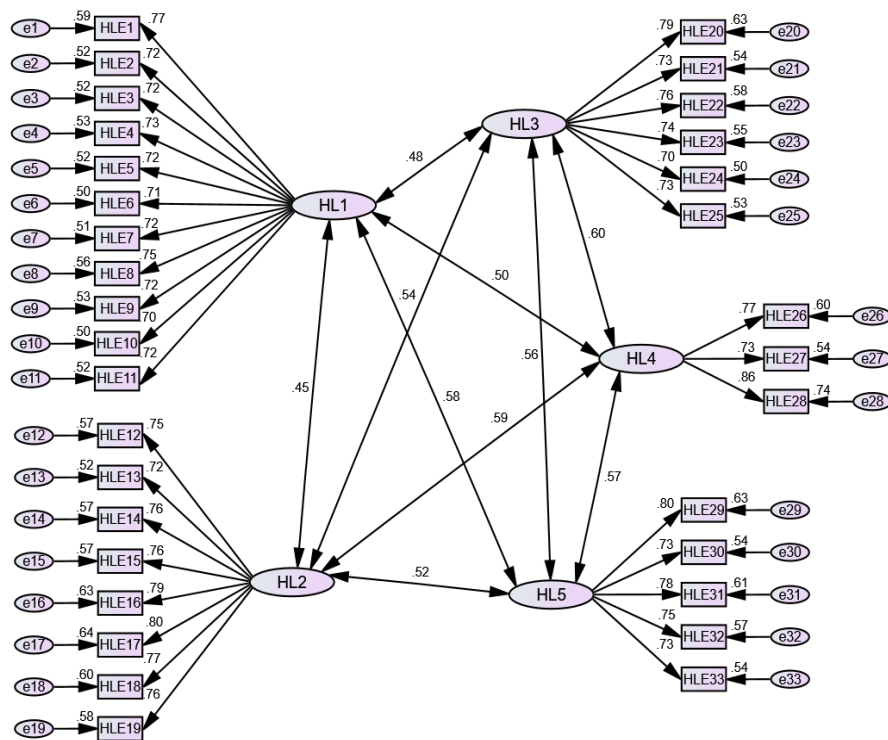


Figure 1. Home Literacy Environment Questionnaire of Confirmatory Factor Analysis

The fit indices of the confirmatory factor analysis model for the Home Literacy Environment Questionnaire are presented in Table 5. In terms of absolute fit indices, the RMSEA value is 0.031, and the SRMR value is 0.044, both of which are <0.05 . Concerning parsimony fit indices, the CMIN/DF value is 1.248, falling within the acceptable range of 1-3. Additionally, in terms of incremental fit indices, the IFI, TLI, and CFI values are all above 0.9. All fit indices indicate that the model fits well within the acceptable range, demonstrating

that the confirmatory factor analysis model of the Home Literacy Environment Questionnaire has passed the test of fit. Table 5 presents the Home Literacy Environment Questionnaire of Model fitting results.

Table 5. *Home Literacy Environment Questionnaire of Model Fitting Results*

Evaluating indicator	Measured value	Adaptation standard	Compliance with standards
RMSEA	0.031	<0.05	Coincidence result
SRMR	0.044	<0.05	Coincidence result
CMIN/DF(NC)	1.248	1<NC<3	Coincidence result
IFI	0.974		Coincidence result
TLI	0.972	>0.9	Coincidence result
CFI	0.974		Coincidence result

CMIN=605.292;DF=485;P<0.001

The results of the convergent validity and composite reliability of the Home Literacy Environment Questionnaire are presented in Table 6. The average variance extracted (AVE) and composite reliability (CR) values for the five variables are as follows: HL1 (AVE=0.526, CR=0.924), HL2 (AVE=0.585, CR=0.919), HL3 (AVE=0.556, CR=0.882), HL4 (AVE=0.625, CR=0.833), and HL5 (AVE=0.577, CR=0.872). The AVE values for all five variables and the standardized factor loading coefficients of the items are all >0.5, and the CR values are all >0.7. These results indicate that the variables of the Home Literacy Environment Questionnaire exhibit good convergent validity and composite reliability. Table 6 presents the Home Literacy Environment Questionnaire of Convergent Validity and Construct Reliability.

The discriminant validity results of the scale are shown in Table 15. The $\sqrt{AVE}$ values for HL1 dimension, HL2 dimension, HL3 dimension, HL4 dimension, and HL5 dimension are 0.725, 0.765, 0.746, 0.791, and 0.760, respectively. The values for each variable are greater than the correlation coefficients among them, indicating good discriminant validity of the HLEQ. Table 7 presents the Home Literacy Environment Questionnaire of Discriminant Validity.

Table 6. *Home Literacy Environment Questionnaire of Convergent Validity and Construct Reliability*

variable	Item	Factor scores (Standardized)	AVE	CR
HL1	HLE1	0.770	0.526	0.924
	HLE2	0.719		
	HLE3	0.721		
	HLE4	0.731		
	HLE5	0.718		
	HLE6	0.706		
	HLE7	0.715		
	HLE8	0.750		
	HLE9	0.725		
	HLE10	0.704		
	HLE11	0.718		
	HLE12	0.754		
	HLE13	0.724		
	HLE14	0.758		
HL2	HLE15	0.757	0.585	0.919
	HLE16	0.792		
	HLE17	0.800		
	HLE18	0.773		
	HLE19	0.760		
	HLE20	0.794		
	HLE21	0.734		
	HLE22	0.763		
HL3	HLE23	0.743	0.556	0.882
	HLE24	0.704		
	HLE25	0.731		
	HLE26	0.772		
HL4	HLE27	0.734	0.625	0.833
	HLE28	0.861		
	HLE29	0.795		
HL5	HLE30	0.733	0.577	0.872
	HLE31	0.779		
	HLE32	0.754		
	HLE33	0.734		

Table 7. *Home Literacy Environment Questionnaire of Discriminant Validity*

variable	HL1	HL2	HL3	HL4	HL5
HL1	0.725				
HL2	0.454***	0.765			
HL3	0.475***	0.536***	0.746		
HL4	0.505***	0.589***	0.603***	0.791	
HL5	0.584***	0.520***	0.558***	0.568***	0.760

Discussion and Conclusion

This study runs parallel to previous international research that has validated the HLEQ and demonstrated its strong reliability across diverse cultural contexts, such as studies by Altun (2019), Urska et al. (2011), Schmitt et al. (2011), and Seçim, & Gonen (2019). The Cronbach's α coefficient for the entire questionnaire suggests strong overall reliability among 255 parents of preschoolers. Following item analysis, reliability analysis and validity testing, both scales demonstrated high internal consistency in their data results. There was high convergence between items and dimensions, and discriminant validity among variables was also confirmed through testing. Collectively, these findings provide strong empirical support for the robustness of the HLEQ, positioning the present study as a contextual extension of established validation efforts within the Sabah setting.

Implications of the Study

The significance of this study lies in its potential to fill the existing research gap, particularly regarding the assessment of the home literacy environment in the Sabah region. By validating the reliability and validity of the Home Literacy Environment Questionnaire (HLEQ), this study provides a scientific basis for understanding and improving literacy practices within the home environment. The findings also have practical implications for early childhood education. The HLEQ can serve as a diagnostic tool to inform targeted literacy interventions and aimed at strengthening home-based literacy practices. Educators and policymakers may use the instrument to identify areas where families require additional support and to design programs that promote effective collaboration between schools and

families. Such efforts may contribute to creating more supportive home environments for children's early literacy and language development. Furthermore, the findings will help educators and parents recognize the role of the home literacy environment in early childhood development, enabling them to take appropriate actions to create a conducive environment for the development of children's literacy and language skills.

Limitation and Future Study

Mothers are often the primary caregivers and play a central role in children's early literacy experiences; thus, the HLEQ relies heavily on mothers. Several potential biases and limitations may exist, such as overreporting the frequency or quality of literacy-related activities. Single-informant bias may limit the comprehensiveness of the data. Besides, cultural and contextual interpretation bias may arise if questionnaire items are interpreted differently based on cultural practices. This is especially relevant in Sabah, where linguistic and cultural diversity may influence how literacy practices are understood and reported. Future research should incorporate multiple informants, mixed-method approaches, or direct observational measures to enhance the validity and reliability in understanding the home literacy environment across diverse contexts.

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APPENDIX

Home Literacy Environment Questionnaire

Instructions to Participants:

Please have **either the mother or the father** complete this questionnaire. Each parent should fill it out **only once**. Your responses will provide valuable information about your child's home literacy environment.

Please circle the number which best corresponds to your level of agreement with the following statements using the following scale.

1-5 = never to always

No.	Items					
1.	I complete and expand my child's speech (e.g., "The boy is crying." with "Yes, the boy is crying because he hurt himself.") <i>Saya melengkapkan dan mengembangkan ucapan anak saya (contohnya, "Budak itu menangis" dengan "Ya, budak lelaki itu menangis kerana dia menyakiti dirinya sendiri.")</i>	1	2	3	4	5
2.	When I talk to my child, I use grammatically correct sentences. <i>Apabila saya bercakap dengan anak saya, saya menggunakan ayat yang betul dari segi tata bahasa.</i>	1	2	3	4	5
3.	I talk to my child about how he/she has spent his/her day. <i>Saya bercakap dengan anak saya tentang bagaimana dia telah menghabiskan masanya.</i>	1	2	3	4	5
4.	I answer my child's questions and offer explanations, even if he/she repeats his/her question many times. <i>Saya menjawab soalan anak saya dan memberikan penjelasan, walaupun dia mengulangi soalnya berkali-kali.</i>	1	2	3	4	5
5.	I try to explain things that I believe my child understands. <i>Saya cuba menerangkan perkara yang saya percaya anak saya faham.</i>	1	2	3	4	5
6.	I praise my child when I notice progress in his/her speech. <i>Saya memuji anak saya apabila saya melihat kemajuan dalam pertuturannya.</i>	1	2	3	4	5
7.	I encourage my child to talk to peers and adults. <i>Saya menggalakkan anak saya bercakap dengan rakan sebaya dan orang dewasa.</i>	1	2	3	4	5
8.	If I do not understand my child, I ask him/her to repeat or explain his/her utterance. <i>Sekiranya saya tidak memahami anak saya, saya meminta dia mengulangi atau menjelaskan ucapannya.</i>	1	2	3	4	5

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9.	I answer my child's questions consistently. <i>Saya menjawab soalan anak saya secara konsisten.</i>	1	2	3	4	5
10.	I correct my child's use of the plural, and encourage him/her to use them correctly. <i>Saya membetulkan penggunaan jamak anak saya, dan menggalakkan dia menggunakannya dengan betul.</i>	1	2	3	4	5
11.	I correct my child's use of the past and the future tenses, and encourage him/her to use them correctly. <i>Saya membetulkan penggunaan kata kerja dengan frasa yang betul.</i>	1	2	3	4	5
12.	I read picture books with my child. <i>Saya membaca buku bergambar bersama anak saya.</i>	1	2	3	4	5
13.	I read to my child whenever he/she wants me to. <i>Saya membaca kepada anak saya bila-bila masa dia perlukan saya.</i>	1	2	3	4	5
14.	I go to the library with my child. <i>Saya pergi ke perpustakaan bersama anak saya</i>	1	2	3	4	5
15.	At the library, my child borrows the books that he/she wants. <i>Di perpustakaan, anak saya meminjam buku-buku yang dia mahu.</i>	1	2	3	4	5
16.	I go to the puppet theater or cinema with my child. <i>Saya pergi ke teater boneka atau pawagam bersama anak saya.</i>	1	2	3	4	5
17.	I talk to my child about the puppet show or the movie that he/she has seen. <i>Saya bercakap dengan anak saya mengenai rancangan boneka atau filem yang dia lihat.</i>	1	2	3	4	5
18.	I buy my child books or picture books as gifts. <i>Saya membelikan buku atau buku bergambar sebagai hadiah kepada anak saya.</i>	1	2	3	4	5
19.	I read books to my child. <i>Saya membaca buku kepada anak saya.</i>	1	2	3	4	5
20.	I encourage my child to narrate when looking at pictures. <i>Saya menggalakkan anak saya untuk menceritakan apabila melihat gambar.</i>	1	2	3	4	5
21.	When I play with my child, I name and describe different objects and toys. <i>Apabila saya bermain dengan anak saya, saya menamakan dan menerangkan objek serta mainan yang berbeza.</i>	1	2	3	4	5
22.	I play with my child at least half an hour a day. <i>Saya bermain dengan anak saya sekurang-kurangnya setengah jam sehari.</i>	1	2	3	4	5
23.	I watch TV with my child. <i>Saya menonton TV bersama anak saya.</i>	1	2	3	4	5

24.	I talk to my child about what he/she has seen on TV. <i>Saya bercakap dengan anak saya tentang apa yang dia lihat di TV.</i>	1	2	3	4	5
25.	I talk to my child about what he/she would like to do. <i>Saya bercakap dengan anak saya tentang apa yang dia mahu lakukan.</i>	1	2	3	4	5
26.	I allow my child to interrupt me and ask questions when I'm reading to him/her. <i>Saya membenarkan anak saya mengganggu saya dan bertanya soalan apabila saya membaca kepadanya.</i>	1	2	3	4	5
27.	I allow my child to create his/her own stories while I'm reading to him/her. <i>Saya membenarkan anak saya mencipta cerita sendiri semasa saya membaca kepadanya.</i>	1	2	3	4	5
28.	When reading to my child, I talk to him/her about the content of the book. <i>Apabila membaca kepada anak saya, saya bercakap dengannya mengenai kandungan buku itu.</i>	1	2	3	4	5
29.	I teach my child to count. <i>Saya mengajar anak saya untuk mengira.</i>	1	2	3	4	5
30.	I encourage my child to learn to read a few words (e.g. his/her name). <i>Saya menggalakkan anak saya belajar membaca beberapa perkataan (contohnya namanya).</i>	1	2	3	4	5
31.	I encourage my child to learn letters (e.g. I show his/her letters in books, I teach him/her the letters in his/her name). <i>Saya menggalakkan anak saya untuk belajar huruf (contohnya saya menunjukkan huruf dalam buku, saya mengajarnya huruf dalam namanya).</i>	1	2	3	4	5
32.	When talking to my child, I use long sentences (e.g. complete sentences and/or compound sentences). <i>Apabila bercakap dengan anak saya, saya menggunakan ayat yang panjang (contohnya ayat dan/atau kompaun lengkap ayat).</i>	1	2	3	4	5
33.	When talking to my child, I try to speak in a manner similar to his/hers (e.g. I call objects as he/she does, I use child-like speech). <i>Apabila bercakap dengan anak saya, saya cuba bercakap dengan cara yang serupa dengannya (contohnya saya memanggil objek menggunakan caranya, saya menggunakan ucapan seperti kanak-kanak).</i>	1	2	3	4	5