




Development and psychometric validation of an emotional intelligence scale for elementary school students in Samarinda, Indonesia

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ABSTRACT

This study developed and evaluated an emotional intelligence scale for elementary school students using a quantitative design. We purposively sampled 206 students in grades 4–6 from Samarinda, Indonesia. To clarify, the process began with identifying emotional intelligence constructs, then formulating related indicators, and finally drafting initial scale items. Next, five experts reviewed the items to provide expert judgment. After incorporating feedback, we tested the instrument with the student participants. We assessed content validity with Aiken's V, measured construct validity with Confirmatory Factor Analysis (CFA), and evaluated reliability using Cronbach's Alpha. The model fit well (CFI = 0.936; TLI = 0.918; RMSEA = 0.069; SRMR = 0.068) and showed high reliability ($\alpha = 0.923$). These results show the scale is valid, reliable, and suitable for educational use in assessing emotional intelligence in elementary students

Keywords: emotional intelligence, instrument development, construct validity, reliability

1. Introduction

Emotional intelligence refers to the ability to perceive, understand, regulate, and express emotions adaptively in everyday contexts (Goleman, 1995; Mayer & Salovey, 1997). In elementary school students, emotional intelligence plays an important role in supporting the learning process, social interaction, and self-adjustment within the school environment (Eisenberg et al., 2000). Children at this stage begin to show more complex emotional development, but their ability to manage emotions continues to develop and is influenced by their environment (Papalia et al., 2009).

Research shows that emotional intelligence is associated with self-regulation, positive social relationships, and academic success (Goleman, 1995). Students with good emotional intelligence tend to be able to control negative emotions, show empathy, and interact adaptively with their social environment (Mayer & Salovey, 1997).

Despite extensive research on emotional intelligence, few instruments have been developed for Indonesian elementary students. Most available tools adapt measures for older groups, overlooking children's developmental needs. It is important to develop instruments with sufficient validity and reliability for elementary students.

Based on this, developing a valid and reliable emotional intelligence scale that suits elementary school students is necessary. This study formulates the construct by integrating the theories of Goleman (1995), Mayer and Salovey (1997), and Bar-On (1997). The scale will have four main dimensions: emotional self-awareness,

self-management, empathy and social awareness, and social skills and relationship management. Self-motivation is included in self-management due to its close relationship. This study aims to develop and test the content validity, construct validity, and reliability of emotional intelligence scales for elementary school students.

2. Method

Research Design

This study used a quantitative instrument development design. Specifically, it aimed to develop and evaluate the validity and reliability of the emotional intelligence scale for elementary school students. To achieve this, the instrument was based on theories of emotional intelligence by Goleman (1995), Mayer and Salovey (1997), and Bar-On (1997). These theories guided the determination of constructs, aspects, and indicators to be measured. The instrument development process included several stages: determining constructs, determining aspects and indicators, preparing initial items, conducting expert validation, and testing the instrument.

Research Subject

The participants were elementary school students in grades 4 to 6 at the developing stage of social and emotional development. The selection of subjects was based on the suitability of developmental characteristics with the measured construct of emotional intelligence.

Participants were recruited using purposive sampling. This technique was used with the consideration that the subjects met the established criteria, namely students studying in elementary schools in Samarinda City, specifically at SD Negeri 010 Samarinda and MI Ar-Raudhah, who were willing to serve as research respondents. The study involved 206 students, a number that met the analytical requirements for instrument development; in particular, it was suitable for construct validity testing using Confirmatory Factor Analysis (CFA).

Data Collection Methods

Data were collected using the emotional intelligence scale developed in this study, which was grounded in relevant theoretical literature. Specifically, the instrument was designed as a Likert scale with five response options, and each option was simplified to make it easier for elementary school students to understand.

Data collection was conducted online via Google Forms, with teachers or parents assisting to ensure respondents understood each statement. Before completing the form, respondents were given an explanation of the research purpose and instructions for completing the scale. Participation in this study was voluntary, and respondents' data were kept confidential.

The scale consisted of several items designed to measure emotional intelligence in elementary school students. Each item was answered using a Likert scale ranging from 1 to 5, indicating the respondent's level of agreement with each statement.

After obtaining the data, it was then analysed to test the instrument's validity and reliability. Furthermore, this analysis aimed to determine the extent to which it accurately and consistently measures the constructs of emotional intelligence.

This study used both descriptive and inferential analysis. Specifically, descriptive analysis provided an overview of respondent characteristics, while inferential analysis tested construct validity using Confirmatory Factor Analysis (CFA) and reliability using Cronbach's Alpha.

The validity test in this study includes content validity and construct validity. Content validity was assessed using Aiken's V index, involving five experts in educational psychology and psychometrics. The analysis showed that Aiken's V value was in the valid range (≥ 0.80), indicating that each item corresponded to the construct being measured. Items with values below the criterion were revised or eliminated. To enhance the flow, consider introducing the purpose before stating the method: To evaluate whether the measurement model fit the empirical data, construct validity was assessed using Confirmatory Factor Analysis (CFA).

Reliability tests were conducted to assess the instrument's internal consistency. Specifically, reliability was assessed using Cronbach's alpha, which evaluates the consistency of items in measuring emotional intelligence constructs. Furthermore, an item reliability index (IRA) analysis was conducted to assess each item's contribution to the overall construct. As a result, the instrument demonstrated high reliability, making it a suitable measurement tool.

3. Result

The study's results showed that the instrument had good psychometric quality. The construct validity test using CFA showed a good fit model with CFI = 0.936, TLI = 0.918, RMSEA = 0.069, and SRMR = 0.068. All dimensions have a positive and significant relationship. These values indicate that the model met the goodness-of-fit criteria.

Table 1. Emotional Intelligence Aspect Test Results

Interdimensional Relationships	Estimate	Remarks
Emotional Self-Awareness – Self-Management	0.517	Significant
Emotional Self-Awareness – Empathy & Social Awareness	0.723	Significant
Emotional Self-Awareness – Social Skills & Relationship Management	0.878	Significant
Self-Management – Empathy & Social Awareness	0.527	Significant
Self-Management – Social Skills & Relationship Management	0.668	Significant
Empathy & Social Awareness – Social Skills & Relationship Management	0.962	Significant

Based on the Estimates table in the analysis of construct covariances, all relationships between dimensions have positive, significant estimates. The relatively large standardised estimate values indicate that each dimension is strongly interrelated in forming the construct of emotional intelligence, and all relationships are statistically significant. The strongest relationship was found between Empathy, Social Awareness, and Relationship Management skills. These findings suggest that the ability to understand others' emotions is strongly related to students' success in establishing adaptive social relationships. Thus, the research hypothesis that emotional intelligence predicts self-regulation in elementary school students is supported.

Table 2. Emotional Intelligence Aspect Selection Results

Factor	Indicator	Estimate	SE	Z	Stand. Estimate
Case. Emotional Self	KDE9	0.471	0.0594	7.93	0.582
	KDE10	0.574	0.0692	8.29	0.609
	KDE11	0.515	0.0600	8.59	0.636
Self-Management	PD11	0.695	0.0675	10.30	0.659
	PD12	0.887	0.0534	16.60	0.919
	PD13	0.851	0.0519	16.41	0.913
EMPATI and KESD. SOCIAL	EKS12	0.503	0.0681	7.39	0.534
	EKS13	0.532	0.0592	8.98	0.618
	EKS14	0.653	0.0524	12.47	0.821
Ket. Social and Mnj. Hub	KSMH3	0.557	0.0670	8.32	0.561
	KSMH6	0.577	0.0461	12.53	0.771
	KSMH10	0.510	0.0639	7.97	0.544
	KSMH12	0.532	0.0627	8.49	0.568
	KSMH15	0.487	0.0594	8.21	0.552

The table above shows the emotional intelligence measurement model, which has four key underlying (latent) psychological abilities or traits, called constructs: Emotional Self-Awareness (KEDE), Self-Management (PED), Empathy and Social Awareness (EdKS), and Social Skills and Relationship Management (KSdMH). Each construct is represented by several observed indicators, which are specific, measurable behaviors or responses. KEDE uses the observed indicators KDE9, KDE10, and KDE11. PED is measured by PD11, PD12, and PD13. EdKS is reflected by EKS12, EKS13, and EKS14. KSdMH is measured by KSMH3, KSMH6, KSMH10, KSMH12, and KSMH15.

According to the table, all indicators for each aspect make a significant contribution to their respective constructs, as indicated by the high Z values and $p < .001$. The emotional self-awareness aspect, represented by the KDE9, KDE10, and KDE11 indicators, has standardised estimates in the moderate-to-strong range, indicating a consistent ability to recognise and understand one's own emotions. The self-management aspect shows the most dominant contribution, particularly through the PD11, PD12, and PD13 indicators, which have

high standardised estimates and reflect the individual's ability to effectively control and direct emotions. Furthermore, the aspects of empathy and social awareness, as measured by the EKS12, EKS13, and EKS14 indicators, showed significant contributions, with moderate to high strength, reflecting the individual's ability to understand others' feelings and social conditions. Meanwhile, the social skills and relationship management (KSMH) aspects, represented by the indicators KSMH3, KSMH6, KSMH10, KSMH12, and KSMH15, also showed meaningful standardised estimates in the medium to high category, confirming that the ability to establish social interactions, communicate effectively, and maintain interpersonal relationships is an important part of the formation of emotional intelligence. Overall, these results show that all four aspects of emotional intelligence exhibit good construct validity and are suitable for measurement.

The following is a Blueprint table of EI instruments after the validity test by 5 raters

Table 2. Blueprint of the Emotional Intelligence Scale After Validity Test

No	Aspects	Indicator	Favorabel	Unfavorabel	Quantity
1	Emotional Self-Awareness	Recognizing your own thoughts and behaviors	1, 3	4, 5	4
		Can make decisions	6, 9, 10	-	3
		Sensitive to feelings	12, 14, 15	11	4
		Able to distinguish emotions	20	16, 18	3
		Able to take the right steps	25	23	2
2	Self-Management	Recognize one's strengths and weaknesses	28, 29, 30	-	3
		Ability to regulate emotions	31, 35	33, 34	4
		Motivate yourself	39, 40	36, 37	4
		Stay focused on goals	43	44, 45	3
		Leads to positive energy	46, 47	49, 50	4
3	Recognizing the emotions of others (empathy)	Empathy and Social Awareness	51, 53	54	3
		Understanding the needs of others	57, 58	59, 60	4
		Self-determination	61, 62, 63	-	3
		Building trusting relationships	67, 68, 69	-	3
		Ability to read social situations	75	-	1
4	Social Skills and Relationship Management	Communicate well	77, 78,	79, 80	4
		Maintain harmonious relationships	81, 82	84, 85	4
		Conflict resolution	86		1
		Mutual respect	91, 92	94, 95	4
		Good cooperation in groups	96, 97, 98	100	4
Total			41	24	65

Based on the analysis of the Emotional Intelligence Scale Blueprint, the instruments developed include four main dimensions: emotional self-awareness, self-management, empathy and social awareness, and social skills and relationship management. These four dimensions are structured around a number of indicators, designed with reference to the theories of emotional intelligence proposed by Salovey and Mayer (1990) and Goleman (1995). In their development, a combination of favourable and unfavourable items is used to maintain balance and reduce bias in respondents' assessments.

The results of the validity test indicate that most items on this scale accurately and consistently measure the intended construct. However, some items have a low correlation or do not fully reflect the intended indicator. Therefore, several items are considered unsuitable for use and need to be removed or revised because they do not accurately reflect certain aspects of emotional intelligence. This may be due to unclear wording or overlapping meanings with other indicators.

Table 3. CFA Analysis Results

Test for Exact Fit		
x ²	df	p
142	71	<,001

Fit Measures					
CFI	TLI	SRMR	RMSEA	RMSEA 90% CI	
				Lower	Upper
0.936	0.918	0.0686	0.0698	0.0530	0.0864

A Chi-square value (χ^2) of 142 was obtained with 71 degrees of freedom (df) and $p < 0.001$. This does not meet the exact fit criteria, which is common in SEM due to the Chi-square test's sensitivity to sample size. However, model feasibility relies on multiple goodness-of-fit indices. The Comparative Fit Index (CFI) is 0.936 and the Tucker-Lewis Index (TLI) is 0.918, both exceeding the 0.90 criterion, indicating good fit. The Standardized Root Mean Square Residual (SRMR) is 0.0686, below the 0.08 threshold, and the Root Mean Square Error of Approximation (RMSEA) is 0.0698 with a 90% confidence interval of 0.0530 to 0.0864, both indicating acceptable fit. Overall, these indices show that the tested model is suitable for further analysis.

Table 4. Reliability Analysis Results With Cronbach's alpha

Scale Reliability Statistics			
	Mean	SD	Cronbach's α
scale	3.96	0.422	0.923

Item Reliability Statistics				
	Mean	SD	Item-rest correlation	If item dropped Cronbach's α
KDE1	4.03	1.050	0.3654	0.922
KDE2	3.30	1.244	0.2649	0.923
KDE3	3.60	1.159	0.2034	0.923
KDE4	3.30	1.244	0.2649	0.923
KDE5	4.03	1.033	0.3434	0.922
KDE6	3.49	1.229	0.3507	0.922
KDE7	3.91	1.129	0.3580	0.922
KDE8	4.52	0.859	0.3299	0.922
KDE9	4.30	0.811	0.4802	0.921
KDE10	4.36	0.946	0.4603	0.921
KDE11	4.36	0.813	0.4881	0.921
KDE12	3.53	1.155	0.2153	0.923
KDE13	3.63	1.222	0.3800	0.922
KDE14	3.79	1.087	0.2424	0.923
KDE15	3.83	1.052	0.2669	0.923
KDE16	3.78	1.196	0.2499	0.923
PD1	4.17	0.940	0.5192	0.921
PD2	3.86	1.281	0.2148	0.923

Item Reliability Statistics

	Mean	SD	Item-rest correlation	If item dropped
				Cronbach's α
PD3	4.37	0.938	0.3632	0.922
PD4	3.49	1.180	0.2257	0.923
PD5	3.47	1.030	0.3399	0.922
PD6	3.73	1.187	0.2103	0.923
PD7	3.54	1.137	0.3399	0.922
PD8	3.48	1.081	0.4079	0.922
PD9	4.21	1.097	0.4592	0.921
PD10	3.23	1.066	0.3246	0.922
PD11	3.88	1.057	0.5624	0.921
PD12	4.26	0.967	0.5299	0.921
PD13	4.30	0.935	0.5409	0.921
PD14	3.59	1.026	0.4465	0.921
PD15	3.94	1.060	0.4655	0.921
PD16	3.67	1.017	0.4835	0.921
PD17	3.76	0.997	0.4135	0.922
PD18	3.51	1.125	0.3907	0.922
EKS1	4.58	0.856	0.4603	0.921
EKS2	3.58	1.036	0.2666	0.923
EXX3	3.66	0.999	0.2027	0.923
EXS4	2.92	1.215	0.0425	0.925
EKS5	4.03	0.923	0.4907	0.921
EXX6	4.08	0.941	0.3897	0.922
EXS7	4.56	0.786	0.3987	0.922
EKS8	4.33	1.077	0.3253	0.922
EKS9	4.20	1.207	0.3854	0.922
EXX10	3.48	1.138	0.2777	0.923
EKS11	4.08	0.936	0.3160	0.922
EKS12	4.13	0.944	0.4712	0.921
EKS13	4.32	0.863	0.4518	0.921
EKS14	4.42	0.797	0.6444	0.921
KSMH1	3.85	1.245	0.4619	0.921
KSMH2	4.43	0.785	0.5202	0.921
KSMH3	4.01	0.995	0.5649	0.921

Item Reliability Statistics				
	Mean	SD	Item-rest correlation	If item dropped
				Cronbach's α
KSMH4	4.15	0.915	0.4269	0.922
KSMH5	4.02	1.097	0.4862	0.921
KSMH6	4.53	0.750	0.6354	0.921
KSMH7	4.15	1.194	0.3051	0.923
KSMH8	2.98	1.203	0.1074	0.924
KSMH9	4.24	0.961	0.4590	0.921
KSMH10	4.01	0.940	0.4962	0.921
KSMH11	4.77	0.571	0.4781	0.922
KSMH12	4.29	0.938	0.5480	0.921
KSMH13	4.25	0.943	0.4513	0.921
KSMH14	4.17	1.043	0.4677	0.921
KSMH15	4.34	0.884	0.5463	0.921
KSMH16	4.36	0.894	0.5608	0.921
KSMH17	4.51	0.697	0.5772	0.921

Based on the reliability analysis, the instrument demonstrated that its factor structure aligned with the theory of emotional intelligence. The Cronbach's Alpha value for the scale was 0.923, which is well above the minimum reliability criterion (≥ 0.70). The average scale score was 3.96 with a standard deviation of 0.422, indicating excellent internal consistency. Overall, the instrument meets the criteria for validity and reliability as a psychological measurement tool.

At the item level, the Item Reliability Statistics show that item-rest correlation values for KDE, PD, EKS, and KSMH items are generally in the fair-to-high range, with most above 0.30. This indicates that each item has an adequate correlation with the total scale score. Although some items have relatively low item-total correlation values (e.g., close to or slightly below 0.30), Cronbach's Alpha if an item is deleted remains in the range of 0.921–0.925, so removing these items does not significantly increase reliability.

Overall, these results indicate that all items contribute positively to the instrument's internal consistency. Thus, the developed instrument is reliable, has high measurement stability, and is appropriate for assessing emotional intelligence in research because it produces consistent, reliable data.

4. Discussion

The study's results showed that the developed emotional intelligence scale had good psychometric properties, indicating that the model met the criteria for goodness-of-fit. The goodness-of-fit value in the CFA analysis indicates that the constructed model aligns with the empirical data and meets the feasibility criteria for psychological instrument development. The high reliability value indicates that the instrument has good internal consistency in measuring emotional intelligence constructs. This means that each item on the scale is interrelated and consistently measures the same construct.

These findings are consistent with the research of Schutte et al. (2009), which showed that emotional intelligence instruments developed on the basis of clear theoretical constructs tend to exhibit high internal reliability. Additionally, the use of CFA analysis in this study supports previous findings that construct validity is a crucial aspect in the development of psychological instruments. The elimination of some items during validation underscores the importance of the item selection process in instrument development. Items that do not meet validity criteria are removed to improve the overall quality of the measuring instrument.

Theoretically, this research contributes to the development of psychological instruments, particularly for measuring emotional intelligence in children. In practice, this instrument can be used by teachers and schools to assess emotional intelligence as a basis for developing educational programs and fostering student character.

Instruments specifically developed to match the cultural and developmental characteristics of elementary school children in Indonesia enable more relevant and accurate measurement of emotional intelligence.

This study has several limitations. Using self-reports with children may introduce response bias, as children may not fully understand some items. Online data collection also prevented full supervision during instrument completion. Future studies should conduct test-retest procedures to assess instrument stability over time.

The emotional intelligence scale for elementary students in Samarinda City is a valid and reliable psychological tool. It is based on the emotional intelligence theories of Goleman (1995), Mayer and Salovey (1997), and Bar-On (1997), covering emotional self-awareness, self-management, empathy, social awareness, social skills, and relationship management.

The results of the construct validity test using Confirmatory Factor Analysis (CFA) showed good model fit (CFI = 0.936; TLI = 0.918; RMSEA = 0.069; SRMR = 0.068). This indicates that the instrument adequately represents the construct of emotional intelligence. The reliability test yielded a Cronbach's Alpha of 0.923, indicating very high internal consistency. Therefore, the developed emotional intelligence scale is suitable for assessing elementary school students' emotional intelligence for both research and educational practice.

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