Measuring Students' Curiosity Character Using Confirmatory Factor Analysis

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Abstract: This study aims to test proving the scale of measuring the character of students' curiosity using confirmatory factor analysis. This study uses a quantitative approach. The sample used was 325 randomly selected participants. The variable examined in this study is the character of curiosity. The curiosity variable is focused on elementary school students. In this study, this variable was measured by four indicators and 16 measuring items. The four indicators include: paying attention, taking notes, asking questions, and comparing. Data collection was carried out by distributing curiosity questionnaires to participants. The data analysis technique used was confirmatory factor analysis. The reliability analysis used was the composite score reliability analysis. The results of the study concluded that the constituent indicators of the latent variables of students' curiosity show that all loading factor values have a significant effect on the latent variables in the first-order confirmatory factor analysis (CFA). Meanwhile, in the second-order CFA, the variable of curiosity, the biggest contribution was the indicators compare. This student curiosity assessment model has fulfilled the goodness of fit aspect of the model and has been reliable based on construct reliability. This study recommends a scale measuring elementary school students' curiosity.

Keywords: *Students, curiosity, confirmatory factor analysis.*

Introduction

The challenge to a new generation of citizens is the basis that a nation's character can be developed and reshaped by a country in an effort to protect the new generation (Kennedy et al., 2013). Through today's globalization, community transformation is very important in efforts to strengthen the nation's character (Arfani & Nakaya, 2020). Character education is one of the focuses of the Indonesian government and has become one of the interesting things in Indonesia (Arifin et al., 2017; Atmajawati & Hening, 2018; Suyatno et al., 2019). This is the focus as an effort to anticipate social changes that can bring changes to human character (Hidayati et al., 2020). In practice, the emphasis on character education is focused on primary and secondary education. However, assuming the formation of behavior and character will be effective in childhood so that on the basis of that thinking the government focuses on the cultivation of character education at the level of basic education (Setianingsih et al., 2020).

Character education in Indonesia is carried out integrated with other subjects. Thus, character education is not only the responsibility of school teachers but also the shared responsibility of all components of education. Character education in Indonesia with various cultural and religious backgrounds is very important and urgent. In this case, education not only serves to instill values based on certain cultures but also universal human values. The diverse cultural wealth is seen as a vehicle for learning to respect differences in values, views, and behavior in relationships. As such, it will shape the character of students who are sensitive to differences, caring, empathy, and participation in shared interests. These values form the basis of mutual understanding in living together in diversity. Thus, students are equipped with the values of living together in peace not only as a form of co-existence but rather on pro-existence. Education must be able to stop increasing the values of silence, ignorance, inequality, prejudice, injustice and ignorance transferred to inclusive values, caring and sharing, equality, fairness, and sympathy (Setianingsih et al., 2020).

One of the national character values emphasized by the government in Indonesia is curiosity. This curiosity is a character value that must be instilled since the level of primary education. In the learning process students are

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expected to have high curiosity (Silmi & Kusmarni, 2017). Students' curiosity about the material taught by the teacher or learned by themselves can cause far more knowledge than students who are silent and just waiting for the teacher's explanation (Salirawati, 2012). Curiosity is an aspect of intrinsic motivation that has a big influence on improving student learning (Pluck & Johnson, 2011). Even curiosity has more potential to influence educational achievement compared to the children's intelligence variable (Friedman, 2006). Through high curiosity, an individual will involve a variety of higher cognitive processes such as evaluating or creating (Wu et al., 2013).

The phenomenon felt so far is the measurement of variables. Likewise, the instruments used to carry out these measurements are also rarely found. The main problem that is often discussed by teachers in schools is difficult to find. Indicators measure the variable values of these characters. Especially in the variable of curiosity, teachers are still having trouble determining the measuring instrument and measuring scale to find out information related to the curiosity level of their students. This is very important because the teacher is the most influential actor in the implementation of education, including educational evaluation (Tjabolo & Herwin, 2020; Malkab et al., 2015). Previously, it has been described the value of the character of curiosity is very important for students in elementary school. The sense of curiosity is a strong predictor of student learning outcomes (Gurning & Siregar, 2017), while the variable of curiosity has a close relationship with academic performance (Abakpa et al., 2018). However, the consideration is not yet clear to the teacher regarding the indicators used to measure student curiosity. In addition, it still reduces the measurement tools and scales that are developed systematically and methodologically that can be used to measure curiosity.

Based on these problems, measuring the character of curiosity is very important. To make these measurements, of course, a valid and reliable measuring instrument and scale are needed. Confirmatory factor analysis is part of the structural equation model used to study measurement models and identify the relationship between dimensions, indicators, and items of observation (Brown & Moore, 2012; Harrington, 2009). The advantage of this measurement method is that we can find out the relationship between the latent variable and the observed variable in more detail (Amalia, 2019). In this study, the research developed a scale to measure the character of students' curiosity in elementary schools using confirmatory factor analysis.

Method

Research Goal

This study uses a quantitative approach to describe the character measurement model of students' curiosity using confirmatory factor analysis. This factor analysis method is carried out in order to prove and verify a number of factors underlying the research variables.

Sample and Data Collection

The research sample was obtained from seven elementary schools which were the research locations and the places where participant data were collected. Model fit in factor analysis is influenced by the adequacy of the sample used (Yadama & Pandey, 1995). Therefore, it requires consideration in the use of sample adequacy. The use of participants who are more than 100 or five times the number of items analyzed can be done as an effort to obtain valid data in factor analysis (MacCallum et al., 1999; O'Rourke & Hatcher, 2013). The sample size used should be at least 100 (Kline, 2014; Hair et al., 2014). Another view is that the sample size of 50 is very bad, 100 is bad, 200 is fair, 300 is good, 500 is very good, and 1000 or more is excellent (Comrey & Lee, 2013). Based on these views, the sample size used in this study was 325 participants. The sample size has been assessed as meeting the adequacy of the sample to obtain valid data and a fit model.

The variable examined in this study is the character of curiosity. The curiosity variable is focused on elementary school students. In this study, this variable was measured by four indicators and 16 measuring items. The four indicators include; paying attention, taking notes, asking questions, and comparing. Each indicator is measured by four items. Table 1 below describes the distribution of indicators and measurement items.

Table 1. The Distribution of Indicators and Items

Indicators	Measurement Items	Code
Pay attention	Students pay attention when the teacher explains the material	A1
	Students pay attention to other students who express opinions in group discussions	A2
	Students pay attention to other students who make presentations in front of the class	A3
	Students pay attention to each assignment given from the teacher	A4
Take notes	Students record any material given by the teacher	B1
	Students record any new information they get from friends	B2
	Students have complete notebooks on the subject matter	B3
	Students record information from the school noticeboard	B4

Table 1. Continued

Indicators	Measurement Items	Code
Asking	Students show an effort to understand the subject matter by asking the teacher	C1
	Students ask questions when discovering new terms from media (print, electronic and social)	C2
	Students ask questions for each group discussion activity	C3
	The student asks other students if they hear something they have not known before	C4
Comparing	Students compare the new information obtained with previously known information	D1
	Students use various sources (books etc.) to understand the subject matter	D2
	Students compare teachers' opinions with other teachers about a topic	D3
	Students compare students' opinions with other students about a topic	D4

Data collection was carried out by distributing curiosity questionnaires to participants. Data were obtained from 325 participants who filled out the survey. The curiosity questionnaire used is in accordance with the construct of the research variable, which consists of 16 measurement items from four groups of indicators. To classify the level of response, a measurement scale is used. The scales used in the questionnaire are; always, often, rarely, and never.

Analyzing of Data

The data analysis technique used was confirmatory factor analysis. For data analysis, this study uses LISREL 8.80 software. In the confirmatory factor analysis, there are latent variables and indicator variables. Latent variables are variables that cannot be formed and constructed directly, while indicator variables are variables that can be observed and measured directly (Nasir et al., 2015; Sappaile, 2006). The analytical measurement model is built using the following equation (Nasir et al., 2015).

Indicator = λ construct + error

$$x = \lambda \xi + \delta$$

where:

x : vectors for indicator variables
ξ : exogenous latent variables
λ : loading factor
δ : error

To make an interpretation, the indicator is said to have meaning in measuring the latent variable if it has a factor loading coefficient that is not less than 0.4 (Mulaik, 2020; Prudon, 2015; Williams et al., 2010). Another domain of analysis is reliability analysis. The reliability analysis used was the composite score reliability analysis. The formula for obtaining the construct reliability coefficient is as follows (Margono, 2013).

$$\omega = \frac{\left(\sum_{i=1}^{i} \lambda_i\right)^2}{\left(\sum_{i=1}^{i} \lambda_i\right)^2 + \left(\sum_{i=1}^{i} 1 - \lambda_i^2\right)}$$

where

ω : Reliability coefficient
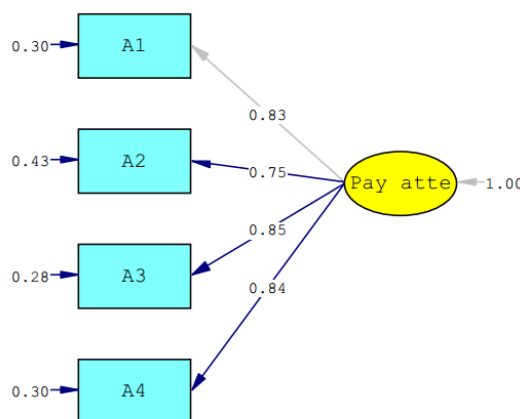
λ_i : Standardized loading factor

The criteria used in the reliability analysis of this composite score is that a variable is declared reliable if it has a reliability coefficient of more than 0.8 (Nájera Catalán & Gordon, 2020). To test and prove the suitability or identity between the empirical data and the theoretical model that was designed, the goodness of fit model was tested. To decide the suitability of the model, this study uses the following model fit indicators (Tungkunanan, 2020).

Table 2. Goodness of Fit Model Testing Indicators

Goodness of Fit Index	Cutt of Value
p-value	> 0.05
RMSEA	< 0.08
GFI	≥ 0.9
AGFI	≥ 0.9
Chi-Square (x^2)	Expected low (x^2 < 2df)

Findings/Results

The results of this study are described based on the curiosity variable constructs that have been formulated previously. This construct includes four indicators, among others; pay attention, take notes, ask questions, and compare. The results of the analysis of the four indicators are described based on their measuring items as well as proving the goodness of fit model for each construct. The first test is carried out on the paying attention indicator. This indicator consists of four measuring items, namely: (A1) Students pay attention when the teacher explains the material. (A2) Students pay attention to other students who express opinions in group discussions. (A3) Students pay attention to other students who make presentations in front of the class. (A4) Students pay attention to each assignment given by the teacher. The results of the confirmatory factor analysis are presented in Figure 1 below.

Chi-Square=1.41, df=2, P-value=0.49531, RMSEA=0.000

Figure 1. The Standardized Estimate Value of Pay Attention Indicator

Based on the results of the confirmatory factor analysis, it can be explained that through the factor loading coefficient, the results of the analysis show that the four measuring items have fulfilled the significance test with a coefficient of more than 0.4. From the four measuring items, information is obtained that the measuring item (A3) provides the largest contribution to the students' curiosity variable.
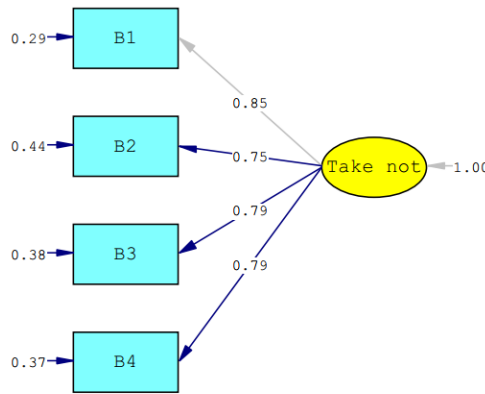
Another thing that becomes the unit of analysis is the goodness of fit model test results. The analysis result shows that the p-value coefficient is 0.495 more than 0.05, the RMSEA coefficient is 0.00 less than 0.08, the GFI coefficient is 1.0 more than 0.9, the AGFI coefficient is 0.99 more than 0.9, and the Chi-Square coefficient is 1.41 less than 2df. This shows that all the goodness of fit index has been fulfilled. For this reason, the theoretical model of measurement for indicators of attention is fit with empirical data. The next result that can be presented in this indicator is the construct reliability. The following is a summary of the results of construct reliability analysis for attention indicator.

Table 3. Construct Reliability for Attention Indicator

Items	λ_i	λ_i^2	$1 - \lambda_i^2$	ω
A1	0.83	0.69	0.31	0.89
A2	0.76	0.58	0.42	
A3	0.84	0.71	0.29	
A4	0.84	0.71	0.29	
Σ	3.27		1.31	

Based on the results of the analysis, the omega coefficient was 0.89. If referring to the criteria used, which is more than 0.80 (Nájera Catalán & Gordon, 2020), it can be concluded that the measurement model for attention indicator is reliable.

The second test is carried out on the take notes indicator. This indicator consists of four measuring items, namely: (B1) Students record any material given by the teacher. (B2) Students record any new information they get from friends. (B3) Students have complete notebooks on the subject matter. (B4) Students record information from the school noticeboard. The results of the confirmatory factor analysis for this indicator are presented in Figure 2 below.

Chi-Square=3.20, df=2, P-value=0.20223, RMSEA=0.050

Figure 2. The Standardized Estimate Value of Take Notes Indicator

Based on the results of the confirmatory factor analysis, it can be explained that, through the factor loading coefficient, the results of the analysis show that the four measuring items have fulfilled the significance test with a coefficient of more than 0.4. From the four measuring items, information was obtained that the measuring item (B1) made the largest contribution to the students' curiosity variable.
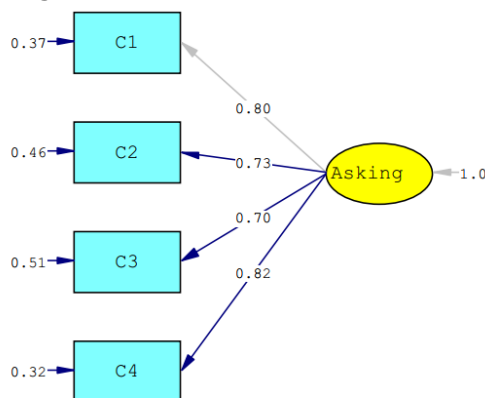
Another thing that becomes the unit of analysis is the goodness of fit model test results. The analysis result shows that the p-value coefficient is 0.202 more than 0.05, the RMSEA coefficient is 0.05 less than 0.08, the GFI coefficient is 0.99 more than 0.90, the AGFI coefficient is 0.97 more than 0.90, and the Chi-Square coefficient is 3.20 less than 2df. This shows that all the goodness of fit index has been fulfilled. For this reason, the theoretical measurement model for the take notes indicator is fit with empirical data. Another component being tested is the construct reliability. The following are the results of construct reliability testing for the take notes indicator.

Table 4. Construct Reliability for Take Notes Indicator

Items	λ_i	λ_i^2	$1 - \lambda_i^2$	ω
B1	0.85	0.72	0.28	0.87
B2	0.74	0.55	0.45	
B3	0.79	0.62	0.38	
B4	0.80	0.64	0.36	
Σ	3.18		1.47	

Based on the results of the analysis, the omega coefficient was 0.87. If referring to the criteria used, which is more than 0.80 (Nájera Catalán & Gordon, 2020),the construct reliability for the take notes indicator has been fulfilled.

The third test is carried out on the asking indicator. This indicator consists of four measuring items, namely: (C1) Students show an effort to understand the subject matter by asking the teacher. (C2) Students ask questions when discovering new terms from media (print, electronic and social). (C3) Students ask questions for each group discussion activity. (C4) The student asks other students if they hear something they have not known before. The results of the confirmatory factor analysis are presented in Figure 3 below.

Chi-Square=4.37, df=2, P-value=0.11251, RMSEA=0.071

Figure 3. The Standardized Estimate Value of Asking Indicator

Based on the results of the confirmatory factor analysis, it can be explained that, through the factor loading coefficient, the results of the analysis show that the four measuring items have fulfilled the significance test with a coefficient of more than 0.4. From the four measuring items, information was obtained that the measuring item (C4) made the largest contribution to the students' curiosity variable.

Another thing that becomes the unit of analysis is the goodness of fit model test results. The analysis results show that the p-value coefficient is 0.112 more than 0.05, the RMSEA coefficient is 0.07 less than 0.08, the GFI coefficient is 0.99 more than 0.9, and the AGFI coefficient is 0.95 more than 0.9. In this case, the Chi-Square coefficient is 4,3 more than 2df. However, on the consideration that several other criteria have met the fit indicator, the researcher concludes that this model is fit. For this reason, the theoretical model of measurement for the asking indicator is fit with empirical data. The results of construct reliability testing are presented as follows.

Table 5. Construct Reliability for Asking Indicator

Items	λ_i	λ_i^2	$1 - \lambda_i^2$	ω
C1	0.76	0.58	0.42	0,87
C2	0.74	0.55	0.45	
C3	0.71	0.50	0.50	
C4	0.84	0.71	0.29	
Σ	3.05		1.37	

Based on the results of the analysis, the omega coefficient was 0.87. If referring to the criteria used, which is more than 0.80 (Nájera Catalán & Gordon, 2020), it can be concluded that the measurement model for asking indicator is reliable.

The fourth test is carried out on the comparing indicator. This indicator consists of four measuring items, namely: (D1) Students compare the new information obtained with previously known information. (D2) Students use various sources (books etc.) to understand the subject matter. (D3) Students compare teachers' opinions with other teachers about a topic. (D4) Students compare students' opinions with other students about a topic. The results of the confirmatory factor analysis are presented in Figure 4 below.
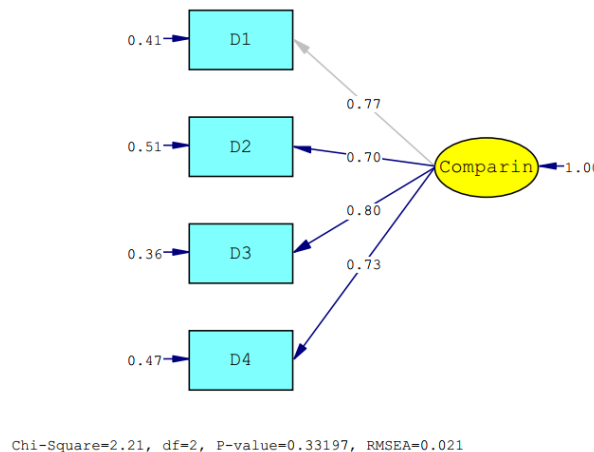

Chi-Square=2.21, df=2, P-value=0.33197, RMSEA=0.021

Figure 4. The Standardized Estimate Value of Comparing Indicator

Based on the results of the confirmatory factor analysis, it can be explained that, through the factor loading coefficient, the results of the analysis show that the four measuring items have fulfilled the significance test with a coefficient of more than 0.4. From the four measuring items, information was obtained that the measuring item (D3) made the largest contribution to the students' curiosity variable.

Another thing that becomes the unit of analysis is the goodness of fit model test results. The results of the analysis show that the p-value coefficient is 0.331 more than 0.05, the RMSEA coefficient is 0.021 less than 0.08, the GFI coefficient is 1.00 more than 0.9, the AGFI coefficient is 0.98 more than 0.9, and the Chi-Square coefficient is 2.21 less than 2df. This shows that all the goodness of fit index has been fulfilled. For this reason, the theoretical model of measurement for comparing indicators is fit with empirical data. The results of construct reliability testing are presented as follows.

Table 6. Construct Reliability for Comparing Indicator

Items	λ_i	λ_i^2	$1 - \lambda_i^2$	ω
D1	0.77	0.59	0.41	0,83
D2	0.72	0.52	0.48	
D3	0.78	0.61	0.39	
D4	0.73	0.53	0.47	
Σ		3	1.75	

The analysis results show that the omega coefficient was 0.83. If referring to the criteria used, which is more than 0.80 (Nájera Catalán & Gordon, 2020),the construct reliability for the comparing indicator has been fulfilled.

Based on the results of the analysis of the four indicators, information is obtained that the four indicators are significant and meet the goodness of fit model. The next analysis performed was the overall analysis using the second-order method of confirmatory factor analysis. This is done to determine the contribution of all indicators to the students' curiosity variable. The results of the second-order analysis are presented in Figure 5 below.
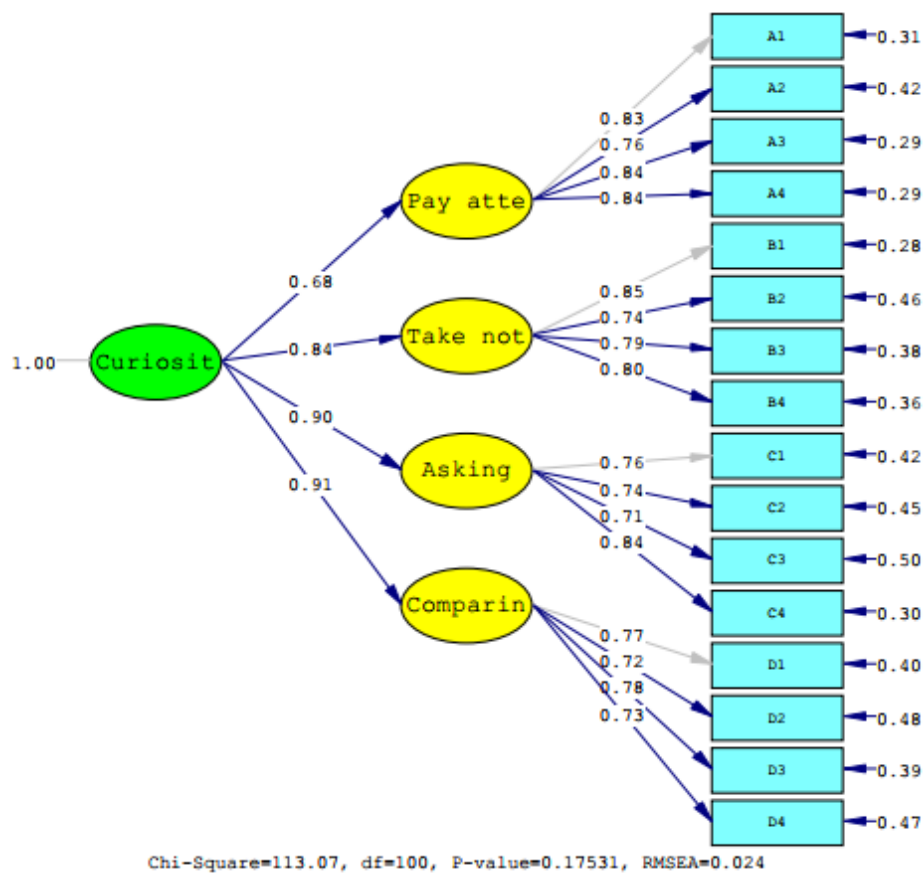

Chi-Square=113.07, df=100, P-value=0.17531, RMSEA=0.024

Figure 5. The Results of The Second Order Analysis

The results of the second-order analysis showed that the four indicators were significant to the students' curiosity variable. This is evidenced by the factor loading coefficient which is more than 0.4 overall. Of the four existing indicators, it appears that the comparison indicator is the indicator that provides the greatest contribution to the students' curiosity variable with a factor loading coefficient of 0.91, and the pay attention indicator is the indicator that provides the smallest contribution with a factor loading coefficient of 0.68.

Another thing that is obtained is the results of the analysis of the overall goodness of fit model. The results of the analysis show that the p-value coefficient is 0.175 more than 0.05, the RMSEA coefficient is 0.024 less than 0.08, the GFI coefficient is 0.94 more than 0.90, the AGFI coefficient is 0.92 more than 0.90, and the Chi-Square coefficient is 113.07 less than 2df. This shows that all the goodness of fit index has been fulfilled. For this reason, the theoretical model of measurement for the overall model is fit with empirical data.

The next thing that becomes the unit of analysis is the construct reliability of the students' curiosity measurement model. This is done to determine the consistency of the curiosity measurement model. Based on the research data, the results of the construct reliability analysis can be described as follows.

Table 7. Result of Construct Reliability Analysis

Items	λ_i	λ_i^2	$1 - \lambda_i^2$	ω
A1	0.83	0.69	0.31	0.96
A2	0.76	0.58	0.42	
A3	0.84	0.71	0.29	
A4	0.84	0.71	0.29	
B1	0.85	0.72	0.28	
B2	0.74	0.55	0.45	
B3	0.79	0.62	0.38	
B4	0.80	0.64	0.36	
C1	0.76	0.58	0.42	
C2	0.74	0.55	0.45	
C3	0.71	0.50	0.50	
C4	0.84	0.71	0.29	
D1	0.77	0.59	0.41	
D2	0.72	0.52	0.48	
D3	0.78	0.61	0.39	
D4	0.73	0.53	0.47	
$\sum$	12.50		6.20	

Table 7 shows the results of the construct reliability analysis based on the overall indicator factor loading coefficient. Based on the results of the analysis, the omega coefficient was 0.96. If referring to the criteria used, which is more than 0.80 (Nájera Catalán & Gordon, 2020), it can be concluded that the measurement model for student curiosity is reliable.

Discussion

This study has tested and proven four indicators of measuring students' curiosity, namely paying attention, taking notes, asking, and comparing. The findings on the first indicator, namely paying attention to those represented by four measuring items, show that item A3 made the greatest contribution. This item is related to students pay attention to other students who make presentations in front of the class. This shows that students' efforts to pay attention to presentations in learning activities are a form of strong curiosity in students. Student curiosity is represented through students 'ability to learn, students' enthusiasm to investigate everything they want to know (Hopkins & Craig, 2015). This result shows that the effort to pay attention to an explanation or presentation is a form of student investigation to obtain the knowledge they want to have.

The findings on the second indicator, which is taking notes, show that of the four measuring items, item B1 is the item that makes the maximum contribution in measuring students' curiosity. The item is about students' record any material given by the teacher. Curiosity is an inner drive that is a person's desire and passion for knowing new things. Curiosity will encourage students to always be active in acting and responding to stimuli in every activity (Loewenstein, 1994). The willingness of students to record any material provided by the teacher is a form of their efforts in acting and responding to stimuli provided by the teacher in the form of the subject matter.

The third indicator, namely asking, shows that item C4 is the item that most contributes to measuring student curiosity. This item is related to the student asks other students if they hear something they have not known before. One of the most prominent things to measure curiosity is the desire and courage of students in asking questions (Raharja et al., 2018). Curiosity can be increased by asking questions (Karademir, 2019). Students can show their curiosity through questioning activities. The desire to always ask questions is a strong predictor of student curiosity that can emerge concretely. Curiosity can be shown by the desire to know, see, or experience which motivates individual behavior and directs him to find new information (Litman, 2005). Students' habits in asking questions are positive things that need to be developed by the teacher.

The last measuring indicator is comparing. This indicator shows that the D3 item is the item that most contributes to measuring student curiosity. The item is about students compare teachers' opinions with other teachers about a topic. The characteristics of a person who has a strong curiosity are not satisfied with just one information, someone will actively seek various sources of new things and new challenges and show an active seeking depth of knowledge and experience as a stimulus in himself (Kashdan et al., 2004). Curiosity is a form of someone's desire to cover or complete gaps in information and references related to the knowledge they want through various information (Rowson, 2012).

Based on the measurement point of view, the findings of this study indicate that all factor loading on each indicator has a value greater than 0.4. This shows that all items (16 items) in the measurement model of students' curiosity have significance in measuring their latent variables (Mulaik, 2010; Prudon, 2015). This means that all measuring items have met the validity of the construct. Construct validity indicates the extent to which the measured score represents the

measured psychological construct (Furr & Bacharach, 2013). In general, the measurement has represented a significant contribution of the latent variable (curiosity) to explain the variability in the indicators (Hoyle, 2004).

The next thing is in the aspect of model fit. The findings of this study indicate that all indicators of the goodness of fit model (p-value, RMSEA, GFI, AGFI) have been fulfilled. This shows that the measurement model of students' curiosity in this study is fit. These findings indicate that there is a discrepancy between the theoretical model and empirical findings (Tungkunanan, 2020). There was an agreement between the predicted theoretically derived correlations versus empirically found correlations (Furr & Bacharach, 2013). Moreover, it can be said that the observed and implied covariance matrices do not differ significantly (Hoyle, 2004).

The last characteristic which is the unit of analysis in this study is the construct reliability. The research findings indicate that the students' curiosity assessment model is reliable with a reliability coefficient of 0.96. A reliability index that exceeds 0.90 is a high-reliability index (Hinton, 2004). The high-reliability coefficient provides information that there are internal consistency and homogeneous variance between measurement items with one another (Widhiarso, 2009). It can be interpreted that even though the items are different from each other, they measure the same construct (Huck, 2007). Construct reliability is related to how good an empirical measure is (Nájera Catalán & Gordon, 2020). In addition, reliability can be used to show the overall measurement consistently even though it is done several times (Herwin & Mardapi, 2017; Otaya et al., 2020; Ziegler & Detje, 2013). Based on this, it can be explained that the curiosity assessment model in this study can be used to measure the curiosity construct consistently.

Conclusion

Based on the findings of this study, it can be concluded that the constituent indicators of the latent variables of students' curiosity show that all loading factor values have a significant effect on the latent variables in the first-order confirmatory factor analysis (CFA). The results of the first-order CFA latent variable pay attention to the largest contribution to the A3 measuring item, namely students pay attention to other students who make presentations in front of the class. In the take notes variable, the largest contribution to the measurement item B1, students record any material given by the teacher. In the variable asking, the biggest contribution is in item C4, namely the student asks other students if they hear something they have not known before. In the variable comparing the largest contribution was item D3, namely students compare teachers' opinions with other teachers about a topic. Meanwhile, in the second-order CFA, the variable of curiosity, the biggest contribution was the indicators compare. This student curiosity assessment model has fulfilled the goodness of fit aspect of the model and has been reliable based on construct reliability. Another implication in this study is that through this scale, the teacher can measure the curiosity of students and if applied continuously, the teacher can find out the development of the students' curiosity.

Recommendations

This study recommends a scale measuring elementary school students' curiosity. Curiosity is a very important aspect of student development. This is because curiosity can affect cognitive, affective, and psycho-motor students. Therefore, the measurement of curiosity is very important to be applied in schools as a form of monitoring student development. It is hoped that this measurement scale can be applied continuously in elementary schools.

Limitations

Basically, this research has been designed systematically and with full consideration so that it can be carried out according to the expected objectives. Including the selection of research samples, we have designed so that all grade levels ranging from low class (Class 1, 2, and 3) to high class (Class 4, 5, and 6) can be represented. However, in the implementation of this study, there were obstacles in collecting data in the field so that the portion of the high class was greater than the low class. This is a limitation in this study to be an evaluation of improvements in the future.

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