

INSTRUMENT DEVELOPMENT TO MEASURE INTELLECTUAL CHARACTER OF INDONESIA JUNIOR HIGH SCHOOLS (center, bold, 16pt)

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ABSTRACT (10 PT)

This study aims to find quality constructs and instrument items to measure the intellectual character of junior high school students in Indonesia. This type of research is a test development research adapted from Oriodo & Dallo-Antonio (1999). The procedure for test development goes through two stages, namely the instrument planning and the measurement stage. The study population was high school students of West Java Province and Yogyakarta Province. The sample is students at eight junior high schools selected based on the level of accreditation consisting of 992 students. The research instrument is a questionnaire. Data analysis used factor analysis (confirmatory factor analysis). The results of the development of intellectual character instruments obtained five constructs or indicators, namely curios, open-mindedness, intellectual courage, intellectual thoroughness, and attentiveness. Only 20 items are valid from five indicators of intellectual character. From the results of the analysis of the validity of the CFA, constructs or indicators of the instrument for measuring intellectual character in junior high school students have been tested based on validity and reliability. The results of the CFA analysis show that the five indicators of intellectual character are valid, reliable, and meet the criteria for the fit of the model, that is, Chi-square, p-value, RSMEA, GFI, NFI, CFI, IFI, NNFI, and RFI.

1. INTRODUCTION (10 PT)

There are various problems in Indonesia regarding the nation's moral character. In 2017, the Indonesian Education Monitoring Network (JPPI) conducted a Right to Education Index (RTEI) research to measure the fulfillment of the right to education in various countries. The study results stated that the quality of education in Indonesia is still below Ethiopia and the Philippines. This study has five indicators measured by JPPI, including governance, availability, accessibility, acceptability, and adaptability. Of the five indicators measured, Indonesia ranks 7th with the highest score of 77%. Of the five indicators, the three things score is still low, one of which is not yet child-friendly (acceptability). The school environment is not yet child-friendly. It seems that there is still violence, sexual harassment, still being the subject of the media, kidnapping children in schools, and so on, so it needs to be a common concern so that violence in schools does not happen again. In addition to violent violence, there are problems with student absenteeism, dropouts, and student achievement, so there is an essential need for character education [1]. In addition, there are several student problems regarding poor health status, overweight, crime, violence, teenage pregnancy, and tobacco and alcohol abuse[2]. Thus the problems that occur regarding the character of the nation's children.

Seeing these problems, education in Indonesia still has problems that require solutions to achieve the desired goals. There are problems concerning the nation's character, making Indonesia a character crisis. A character crisis is not a new insight [3], but there is a need for character formation that directs and strengthens students' personalities. The intellectual character can be a solution to this problem. Intellectual character is related to intellectual virtue values, so intellectual character education is an effort made gradually to instill habits so that children always think, behave and behave based on intellectual virtue values. So, the goal of intellectual character education will be achieved if students' attitudes and behavior are based on intellectual values, namely the values of curiosity, open thinking, attention, intellectual accuracy, and intellectual thoroughness [4]. However, these intellectual values have not yet been formed in the student's personality.

Intellectual character education includes emphasizing intellectual virtues. The intellectual virtues that stand out are the qualities of curiosity, open-mindedness, and intellectual humility. The critical role of primary and secondary education is how their graduates have an intellectual character. Even more challenging, monitoring students they are taught various subjects to help students become more curious, open-minded, attentive, intellectually careful, intellectually conscientious, and the like. One's character influences thinking reasoning, and perception, such as actions, thoughts, attitudes, choices, feelings, and the like. The role of intellectual character education is suitable for educational goals and practices, namely shaping thinking and learning for the world of education.

The formation of intellectual character has been carried out, but the report on the implementation of character education is not following reality. Assessments carried out in the field have not measured the behavior or character of students [1]. Character-based learning has also been carried out in schools, although not called

character education [5]. Character education carried out in schools is going quite well, but most teachers only use interviews to assess behavior according to target values [6]. The values instilled by teachers through examples in junior high schools such as courtesy, discipline, responsibility, tolerance, honesty, and concern for students and others have not run optimally [7]. Character building has also been carried out in Madrasah Tsanawiyah by inculcating religious character values and national character, but it has not run optimally [8]. Although character education has been applied in the 2013 curriculum, the results have not been maximized [9]. Various problems that arise in the field require character building and implementation reports. In shaping the intellectual character of junior high school students measured, namely; curiosity, open-mindedness, intellectual courage, intellectual humility, intellectual thoroughness, and attention [4].

Based on the problems above, it is necessary to have intellectual character education in schools. It is needed to measure intellectual character to see the implementation of intellectual character education in schools, which will provide an overview of the embedded intellectual values in students. So we need a standard measurement instrument in the report on the implementation of intellectual character education in schools which is essential in shaping the character of junior high school students. Measurement through standard instruments (valid and reliable) can guide schools to instill intellectual character values and evaluate the success of these actions

Character is behavior, nature, or character that forms a person's personality. Good character is the experience of correct behavior [10]. Changes in behavior are proper if they can be accepted and judged by others. Character determines how a person behaves in his environment by complying with applicable regulations to achieve the desired goal. So character is a character or trait that forms a person's personality, judging by his background. According to Baehr (2017), a review of the philosophical and psychological literature on character and virtue at the end of the 20th century shows that one's moral character and citizenship are constructs of one's character, which are dimensions of one's character. But recently, philosophers, psychologists, educators, and others have added to this dimension of character and virtue. There are two additional dimensions of personality character, namely performance character and intellectual character [4]. So it can be concluded that the dimensions of a person's character consist of moral character, citizenship character, performance character, and intellectual character.

The character cannot be taught straightforwardly, but the character is a way of life [11]. Character education is more than instilling good habits than teaching what is good and wrong so that students understand, can feel, and are willing to do good [12]. Effective character education tends to include: professional development; students' interactive pedagogical strategies; explicit focus on character/ethics; hands-on training of social and emotional competence; character modeling; parallel classroom/behavioral management strategies; and community services and learning services [13]. Intellectual characters such as curiosity, open-mindedness, attention, intellectual thoroughness, intellectual courage, and intellectual honesty Education has a role in growing intellectual [14]. Character skills are not innate but can be learned, practiced, and taught [15].

Intellectual character is the disposition to act, think and feel in pursuing and transmitting truth, knowledge, and understanding. One of the intellectual effects is seen in academic learning [4]. The concept of intellectual character is related to sound and productive thinking, in contrast to intelligence which is seen as a set of capacities or even a skill. The concept of intellectual character recognizes the role of attitudes and influences on cognition and is essential for developing these behavioral patterns. Intellectual character is not only formed but also motivates intellectual behavior. Intellectual behavior can be characterized by: (1) a passion for clarity, truth, and accuracy; (2) enthusiasm to explore the unknown; (3) sympathy for opposing views; (4) enthusiasm for seeking information and evidence; (5) reluctant to contradict, careless, and inconsistent; (6) have courage; (7) side with the truth; (8) humble; (9) have personal integrity; (10) persevering; (11) is fair and (12) always has a reason. This will be an indication of intellectual character.

2. RESEARCH METHOD (10 PT)

Research measuring intellectual character in this research is development research conducted by adopting the theory of Oriundo-Antonio (1984) This study focuses on constructing or developing a suitable measurement instrument to measure intellectual character values in junior high school students. The procedure in this study adopted the steps of instrument development by Oriundo-Antonio (1984) namely the design of the test and the second stage, namely the measurement stage. The test design begins in several steps, including setting test objectives, preparing specification tables, compiling test items and rubrics, assembling instruments, reviewing instruments by experts through FGDs, improving instruments, testing instruments, and analyzing test results. At the measurement stage, several steps must be taken, including the school's determination, the implementation of the measurement stage, and the analysis of the measurement results. The measurement stage is carried out after the instrument testing activity; the school's determination is based on the average value of the 2019 National Examination. The measurement is carried out in the Sleman Regency, Yogyakarta Province, and West Sumatra. Based on national exam scores, school selection will be grouped into high school, middle school,

and low school. The school was determined by using a stratified cluster random sampling technique. There are eight schools designated as the place for instrument measurement activities. The selection of junior high schools is expected to represent the characteristics of students in the high, medium, and low ability categories. Schools are used as samples for measurement activities.

Qualitative data analysis techniques are carried out for meaning by analyzing data from the validation results from experts (experts) and users of measurement instruments (students), and practitioners who have provided helpful input for the improvement of measurement instruments and their completeness. This analysis is carried out mainly to determine indicators, see the suitability of items with indicators, explain information on instrument items, and explain the analysis and measurement results. The next data analysis is CFA data analysis (confirmatory factor analysis) to see whether the construct or indicator of curios, open-mindedness, intellectual courage, intellectual humility, intellectual thoroughness, attentiveness is a valid and reliable indicator construct.

3. RESULTS AND ANALYSIS (10 PT)

3.1 Instrument Quality

The results of the study include the quality of developing intellectual character instruments for junior high school students in the provinces of Yogyakarta and West Sumatra. The instrument was developed as a tool to photograph the intellectual traits embedded in junior high school students. Intellectual character instruments for junior high school students are developed through the steps of compiling character instruments through theoretical exploration from various articles and books. The table will show the results of theoretical exploration in printed form. The blueprint in Table 1 will be the basis for the development of the next intellectual character instrument.

Table 1. Blueprint

Character Intellectual Indicators	Sub of Indicators	No Item	Number of Item
Curios	Students are passionate about getting clarity, truth, and accuracy Students are excited to explore the unknown	1, 2, 3, dan 4	4 Items
Open-mindedness	Students sympathize with opposing views (want to contradict) Students think consistently and productively	5, 6, 7, 8, dan 9	5 Items
Intellectual courage	Students dare to express ideas even though they are different from others. Students are brave and able to question ideas	10, 11, 12, dan 13	4 Items
Intellectual Humilty	Students have good qualities in seeking knowledge, such as not being arrogant Students don't feel better than others	14, 15, 16, dan 17	4 Items
Intellectual Thoroughness	careful student Students are careful in doing assignments Diligent student	18, 19, 20, 21, 22, dan 23	6 Items
Attenteveness	Students focus on learning Students listen to the teacher's explanation well	24, 25, and 26	3 Items

Experts and students of the educational measurement the doctoral program validates the intellectual character instrument in content from Table 1. Five experts and students of the educational measurement program gave suggestions or revisions. Table 2 shows the modification results from expert and doctoral students.

Table 2. Experts and Students Suggestions

Validated Componen	Experts Suggestions
Instrument Construct	<ul style="list-style-type: none"> • Congruence between virtues or intellectual traits with the conceptual definition of intellectual character. • The suitability of operational definitions with students' intellectual character basic concepts
Blueprint	<ul style="list-style-type: none"> • Determination of intellectual virtues or intellectual character traits that will be used as indicators. • Intellectual virtues or intellectual character traits are adjusted to the sub-indicators • Sub Indicators use more measurable verbs • The Intellectual Humanity indicator should be discarded because it is not an intellectual character
Items	<ul style="list-style-type: none"> • Intellectual courage item is enough. • Each indicator and sub-indicator consists of at least two items because two items are enough to represent the indicator • several items were revised and replaced. So that there were 26 items produced through the theory exploration, only 20 items were used.

Expert and doctoral student suggestion becoming the basis revision and only using 20 items for getting information about the students' intellectual character of junior high schools.

3.2 Small-Scall Trial Results

The instrument's quality can be improved by testing the intellectual character instrument for junior high school students. The implementation of the pilot activity was first carried out at a junior high school in the Sleman district of Yogyakarta with as many as 200 students. Then it was checked whether 200 samples had met the requirements with the Kaiser-Meyer-Olkin Measure of Sampling Adequacy (KMO) value of 0.873 ($KMO > 0.5$) and Bartlett's Test of Sphericity of 0.00 ($\alpha < 0.05$). The result shows that 200 students can respond to the intellectual character instrument. Thus the test results can be used as the basis for further analysis. The instrument's validity analysis uses CFA Second-Order analysis to see whether the items consisting of 20 items from 5 indicators are empirically valid. Tables 3 and 4 presents the results of the second-order CFA analysis.

Table 3. Appropriateness of the Intellectual Character Measurement Model

Goodness of fit index	Criteria	Achieved Value	Conclusion
Chi square	< 2df	193,62 (df=165)	Good
Significansi (p-value)	> 0,05	0,06316	Good
RSMEA	< 0,08	0,030	Good
Goodness of fit Index (GFI)	> 0,90	0,91	Good
Normed Fit Index (NFI)	> 0,90	0,92	Good
Comparative Fit Index (CFI)	> 0,90	0,99	Good
Incremental Fit Index (IFI)	> 0,90	0,99	Good
Non-Normed Fit Index (NNFI)	> 0,90	0,98	Good
Relative Fit Index (RFI)	> 0,90	0,91	Good

Table 3 describes the results of model fit based on measurement standards. The results show that the intellectual character measurement model has met the model fit standard. Next, check the results of the instrument validation in Table 4.

Table 4. Item Characteristics of Intellectual Character

Indicators	Items	SLF	Conclusion
Curious	1	0.51	Valid
	2	0.39	Valid
	3	0.54	Valid
	4	0.50	Valid
	5	0.59	Valid
Open-mindedness	6	0.49	Valid
	7	0.39	Valid
	8	0.58	Valid
	9	0.55	Valid
Intellectual Courage	10	0.33	Valid
	11	0.35	Valid
Intellectual Thoroughness	12	0.59	Valid
	13	0.66	Valid
	14	0.60	Valid
	15	0.56	Valid
	16	0.64	Valid
	17	0.45	Valid
Attentive	18	0.43	Valid
	19	0.67	Valid
	20	0.50	Valid

Based on the measurement results using the Second-order CFA, the instrument items that have been developed have a standardized loading factor (SLF) > 0.3, so it can be concluded that the instrument items are declared valid. Valid items can be the basis for continuing the measurement to a larger scale so that the construct validity of the intellectual character measurement instrument can be known empirically. Instrument Reliability estimation used the Alpha formula. The Cronbach alpha reliability coefficient of the instrument in this study was analyzed using SPSS 22.0 for windows. Calculating instrument reliability from the measurement model through SPSS software is 0.876. After obtaining the results of a valid and reliable instrument item analysis, a broad-scale test can be carried out to see if the five indicators are accurate if used on a larger scale than the limited scale.

3.3 Large-Scale Trials

Large-scale trials to see whether Curious, Open-mindedness, Intellectual Courage, Intellectual Thoroughness, Attentive are valid and reliable indicators in measuring the intellectual character of junior high school students. Tables 5, 6 and 7 show Results of CFA First Order analysis of intellectual character variables.

Table 5. Fit Model Results of Intellectual Character Variable

Goodness of fit index	Criteria	Achieved Value	Conclusion
Chi square	< 2df	4.34 (df=5)	Good
Significansi (p-value)	> 0,05	0,50106	Good
RSMEA	< 0,08	0,000	Good
Goodness of fit Index (GFI)	> 0,90	1,00	Good
Normed Fit Index (NFI)	> 0,90	1,00	Good
Comparative Fit Index (CFI)	> 0,90	1,00	Good
Incremental Fit Index (IFI)	> 0,90	1,00	Good
Non-Normed Fit Index (NNFI)	> 0,90	1,00	Good
Relative Fit Index (RFI)	> 0,90	1,00	Good

Table 5 shows that all standard fit models have been met. The next task is to interpret whether the Curious, Open-mindedness, Intellectual Courage, Intellectual Thoroughness, Attentive indicators are valid indicators for forming intellectual character variables. Table 6 presents the results of the construct validity analysis as follows:

Table 6. Construct Validity Result of Intellectual Character Variable

Intellectual character indicator	SLF	T-Value	Decicion
<i>Curios</i>	0.84	30.35	Valid
<i>Open-mindedness</i>	0.83	29.65	Valid
<i>Intellectual courage</i>	0.75	25.50	Valid
<i>Intellectual Thoroughness</i>	0.85	30.67	Valid
<i>Attenteveness</i>	0.79	27.38	Valid

The measurement of the instrument construct from the theoretical study and FGD resulted in $SLF > 0.3$. These results indicate that the Curious, Open-mindedness, Intellectual Courage, Intellectual Thoroughness, Attentive indicators are valid indicators. Next, find the reliability of the construct through the SLF value and the measurement error that occurs in the measurement of the intellectual character variable.

Table 7. Construct Reliability of Intellectual Character Variable

Intellectual character indicator	SLF	T-Value	Construct Reliability	Decicion
Curios	0.84	0.29	0.94	Reliable
Open-mindedness	0.83	0.31		
Intellectual courage	0.75	0.44		
Intellectual Thoroughness	0.85	0.28		
Attenteveness (perhatian)	0.79	0.38		

The results of the calculation of the construct reliability of the instrument in Table 7 produce a reliability coefficient of 0.880. These results indicate that the instrument's construct reliability of intellectual character variables is excellent for getting accurate information in the field.

The preparation of this instrument was carried out to measure students' intellectual character to get a picture of the intellectual properties of junior high school students. The activity of preparing this instrument starts from the stages of setting goals, identifying behavior, compiling test specifications, constructing initial item patterns, reviewing items, conducting small-scale trials, large-scale tests, determining statistics from item scores, designing and conducting reliability and validity tests, and stages the last is to develop guidelines for administration, scoring, interpretation of test scores. These stages are carried out systematically so that an instrument is obtained that is used as a tool for measuring the intellectual character of junior high school students.

The stage above that needs to be considered is the instrument grid. The instrument grid is the beginning of the development of measurable indicators in test items. Each test item developed can describe the latent to be measured. For an item to have the ability to pronounce Latin correctly, it is necessary to have feasible indicators to be proven in construct validity. Putro (2017) explain that the conceptual construct of an instrument can be arranged based on relevant studies. The instrument construct can be found on the dominant factor that affects a particular variable and has been proven empirically [18]

This research refers to research White & Warfa (2011), Thomas (1991), Baehr (2017) concludes that intellectual character is a product which is interpreted as the intellectual character of students who have intellectual traits that can be measured through curiosity, open thinking, intellectual courage, intellectual thoroughness, and attention. The results of this study indicate that intellectual character can measure intellectual traits. This finding follows the findings made by Baehr in 2017, so the results of this study are proven empirically.

The instrument of intellectual character has been valid and reliable by analyzing experts and students of the doctoral program in educational measurement. Valid and reliable instruments can provide information with a high degree of accuracy [21], [22]. The quality of the instrument determines the success of the data collection process [23]. Quality instruments can determine policies to positively impact the work environment [24]. Valid and reliable instruments are a strong basis in determining the success of an educational program that runs for a certain time [25] [26]. The great instrument will provide comprehensive information about the advantages or disadvantages of educational programs [27][28]. Instruments that have met the validity and reliability criteria will answer information about ongoing programs [29] [30]. The instrument validated in terms of content and constructs provides meaningful information to stakeholders about the program being led.

4. CONCLUSION (10 PT)


The instrument construction has been empirically tested to obtain a fit model, seen from the following indicators. The value of the loading factor instrument of the students' intellectual character shows the loading factor value > 0.30 and the p -value > 0.05 . Thus, it can be seen that the Chi-square value = 193.62, with df 165, p -value = 0.06316 (> 0.05) and the Root Mean Square Error of Approximation (RSMEA) of 0.030 (< 0.08). All three have met the model fit criteria based on the cut of the goodness of fit (GOF) index. Goodness of Fit Index (GFI) value of 0.91, Normed Fit Index (NFI) of 0.92, Comparative Fit Index (CFI) of 0.99, Incremental Fit Index (IFI) of 0.99, Non-Normed Fit Index (NNFI) of 0.98, Relative Fit Index (RFI) of 0.91. The instrument for measuring students' intellectual character consists of 20 items representing the dimensions of the student's intellectual character. The quality of the resulting assessment instrument is based on validity and reliability. Based on the test results, the instrument was proven to be valid and reliable. Instrument validity is seen from content validation and constructs validation. At the same time, reliability is seen from the value of the Cronbach Alfa coefficient and the reliability construct, which shows that the instrument is reliable or consistent in measuring the intellectual character of junior high school students.

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