Available online at: http://jurnal.ustjogja.ac.id/index.php/wd

Wiyata Dharma: Jurnal Penelitian dan Evaluasi Pendidikan
10 (2), 2022, 128-140

Development of instruments for measuring critical attitudes of junior high school students

Ratna Dynawati [1, a] *, Ari Setiawan [1, b], Bounmy Phalychan [2, c]

[1] Universitas Sarjanawiyata Tamansiswa. Jl. Kusumanegara No.157, Yogyakarta, 55165, Indonesia.
[2] Champasak University. Salakeow Dongchong Road, Champasack Province, Lao People's Democratic Republic
[a] ratnadynawati@gmail.com; [b] ari.setiawan@ustjogja.ac.id; [c] bounmyphalychan@gmail.com
* Corresponding Author.

Received: 15 December 2022; Revised: 4 January 2023; Accepted: 6 January 2023

Abstract: The goals of this study were: (1) to find out how teachers evaluate the critical attitudes of junior high school students toward information on social media; (2) to find out how a proper and standardized instrument for measuring the critical attitudes of junior high school students toward information on social media is made; and (3) to find out the criticality value of junior high school students after being measured using a valid and reliable instrument. This research is a type of research and development (R&D), and it uses the ten steps of Djemari Mardapi's affective instrument development procedure. The following conclusions can be made based on the study results: (1) Teachers haven't been using proper and standard tools to measure students' critical attitudes so far. (2) The critical attitude instrument for junior high school students was made by putting together a hypothetical model with five indicators, having an expert validate it, giving it a readability test, and doing a lot of testing with 48 valid instruments (MSA > 0.5) with a reliability of 0.800 and a lot of testing with 38 valid instruments (MSA > 0.5) with a reliability of 0.813. (3) The results of measuring the critical attitudes of 32 students at Sentolo 4 Junior High School (SMP Negeri 4 Sentolo) obtained the following results: very high critical attitude values of 15.63%, high critical attitude values of 28.13%, low critical attitude values of 37.50%, and very low critical attitude values of 18.75%. These tests show that most junior high school students are still not very critical.
Keywords: Instrument Development, Measurement, Critical Attitude, Social Media Information.

How to Cite: Dynawati, R., Setiawan, A., & Phalychan, B. (2022). Development of instruments for measuring critical attitudes of junior high school students. *Wiyata Dharma: Jurnal Penelitian Dan Evaluasi Pendidikan*, *10*(2), 128-140. https://doi.org/10.30738/wd.v10i2.13724

PENDAHULUAN

To deal with problems in the digital age, we need education in the emotional domain, especially education in character, at a time when social media and digital technology make it easy to get information and spread it quickly. You need to think critically about the information you find on social media so that you don't make a mistake about how true it is.

It's still fresh in my mind how viral the fake news (hoax) spread by a Depok resident in West Java about Babi Ngepet, a pig demon for wealth in the legend of Indonesian society. The impact this untrue news has created chaos in the community and made people suspicious of one another (Thohirin, 2021). People who do not use critical thinking accept viral information that has not been verified and believe it to be true. This country's rules, norms, and culture are easily changed by something that goes "viral." Hoaxes are more likely to spread in public spaces, which can cause divisions in society if people don't think critically about what they hear (Ningrum, 2019).

Junior high school students (aged 13–17) are the fourth-ranked social media users in Indonesia, with a percentage of 11.5% (Erikson, 2010; Kemp, 2022). The theory of personality development says that adolescence is when people try to figure out who they are. So, this needs extra attention. During this developmental period, adolescents experience a period of transition (puberty). Biologically, adolescents are adults, but psychologically, they are not yet mentally stable; they are vulnerable to external influences. They need the environment and the help of more mature people to filter and manage information and become a constructive influence on them. The roles of parents at home and educators at school are required to guide properly and direct teenagers in their use of digital media, particularly social media.

Teens' lack of digital literacy makes it hard for them to use technology as a source of information (Putri et al., 2022; Rahmawan et al., 2018; Techataweewan & Prasertsin, 2018). They also need help and direction from teachers. In general, teenagers use the internet more to communicate and socialize (Kurniawati et al., 2020; Waleleng & Himpong, 2022) than using it as a source of information. Indonesian youth have not been able to utilize information technology optimally.

The role of educators in schools is very necessary for cultivating students' attitudes, especially critical ones. According to Buchari (2018), education in schools is necessary for cultivating students' attitudes, especially critical ones. According to Buchari (2018), there are four main roles of educators in the teaching and learning process: (1) demonstrator; (2) mediator; (3) facilitator; and (4) evaluator. Related to the teacher's role as an evaluator, a critical attitude in responding to information on social media is not only developed in the learning process but must also be supported by a test tool that is integrated with learning and can reflect the extent to which students have a critical attitude. Teachers are required to be able to develop a test kit in the form of a valid and reliable measurement instrument so that it can be used as a tool to measure what is actually being measured, a tool that can be trusted, consistent, and stable.

So far, the government has been trying to build character education, but in reality, learning in schools places more emphasis on the cognitive domain. "Assessment of attitude learning outcomes gets less attention from the teacher. Teachers make decisions based solely on their knowledge (Sudjana, 2010).

Teachers still have trouble making rubrics, which are tools for judging students' attitudes. Teachers still have trouble judging students' attitudes. Most of the time, teachers still just use small notes to measure students' attitudes. They don't use special tools like observation sheets, self-assessment sheets, or even peer-to-peer assessment sheets. Even though there are still limited table formats that teachers must fill in, there are no specific criteria in the table format (Mulyana et al., 2016). Teachers' difficulties in developing attitude measurement instruments are due to a lack of outreach and teacher training regarding the preparation of valid and reliable instruments (Tenriawaru & Jumarniati, 2016). This is the reason why the assessment of the affective domain has received less attention from teachers in schools.

The results of the previous research, which became the background for conducting this research, were researched by Astuti (2022). The differences between the previous research and the research conducted by the researcher were: (1) in the previous study, the resulting instrument was an appropriate and standard critical reasoning attitude measurement instrument for use with class X students at SMK; whereas in the research, the instrument measurement was used with students at the junior high school level; (2) in the indicators used in the preparation of the items in the previous studies and the research. There are five indicators used in the development of instruments for measuring critical reasoning attitudes in class X students of Muhammadiyah Vocational Schools in Yogyakarta, namely: (1) understanding information; (2) collecting accurate or valid information; (3) analyzing information; (4) solving problems logically; and (5) making decisions. The results and discussion sections will explain the indicators used by researchers.

Based on how the situations were described and what has been learned in the past, it is important to come up with a way to test how critical junior high (SMP) students are of information they find on social media. This development research wants to find out how teachers judge the critical attitudes of junior high school students toward information on social media; how appropriate and standardized instruments are made to measure the critical attitudes of junior high school students toward information on social media; and what the criticality value of junior high school students is after being measured with valid and reliable instruments. This assessment tool is meant to be used to figure out the best ways to teach students to be critical in today's digital age. It is also meant to make junior high school students more critical about how they respond to information on social media.

METHODS

This research is a type of research and development (R&D). Research and development are research methods used to produce certain products and test the effectiveness of these products (Sugiyono, 2019). The product of this study is an instrument for measuring the critical attitude of junior high school students toward information on social media.

In this study, effective instruments were made using ten steps from Mardapi (2018). These steps were: (1) figuring out what the instruments would be used for; (2) writing the instruments; (3) figuring out how they would be scored; (4) reviewing the instruments; (5) running trials; (7) analyzing the

ISSN 2338-3372 (print), ISSN 2655-9269 (online)

instruments; (8) putting the instruments together; (9) taking measurements; and (10) figuring out what the measurement results mean.

Research on how junior high school (SMP) students develop critical thinking was done in 4 schools with a total of 672 students. These schools were Wates 1 State Junior High School (SMP N 1 Wates), Lendah 1 State Junior High School (SMP N 1 Lendah), Sentolo 3 State Junior High School (SMP N 3 Sentolo), and Sentolo 4 State Junior High School (SMP N 4 Sentolo). Not all of these subjects were used as research respondents. In the rather extensive test, a minimum of five times the number of items is required, and in the extensive test, different respondents are used with a larger number of respondents than in the rather large trial.

Trial or test designs for this study included: (1) readability trials with six students; (2) rather an extensive test with a minimum number of subjects or respondents five times the number of instrument items; and (3) an extensive test with more research subjects than the number of research subjects in a rather extensive test and research subjects who were different from the broad test subjects.

The validity test in this study includes content validity and construct validity. Content validity indicates that the content of the test is in accordance with the material to be measured or tested (Mardapi, 2018). The validity of this content is determined through a professional opinion (professional judgment or expert judgment), namely a panel of experts in the field of measurement. The validity determined by the expert was then tested using the Aiken formula to determine the suitability between the indicators and statement items and their validity with Formula 1.

$$V = \frac{\sum s}{(n(c-1))} \text{ (Azwar, 2015)} \quad \text{.....1)}$$

Information:
S = r – lo
lo = The lowest validity rating score
c = The highest validity rating score
r = Number given by the appraiser
n = Number of Experts

Construct validity refers to the extent to which a test measures the concept of a theory, which is the basis for preparing the test (Mardapi, 2018). Construct validity testing in this study uses factor analysis to ascertain whether certain points support the factors. This test produces a number of factors that can explain an indicator.

Factor analysis will yield both valid and invalid (failed) items. Statement items that meet validity are then calculated for reliability using the Cronbach alpha Formula 2.

$$r_{ii} = \left(\frac{k}{k-1}\right)\left(1 - \frac{\sum s_i^2}{s_t^2}\right) \text{(Djaali \& Muljono, 2008)} \quad \text{.....2)}$$

Information:
r_{ii} = instrument reliability
k = the number of questions or many questions
$\sum s_i^2$ = number of item variances
s_t^2 = total variance

Reliability indicates the extent to which the results of a measurement can be trusted. A measurement is reliable if relatively similar results are obtained for the same subject (Sappaile, 2007). The interpretation of the reliability level of an instrument, according to (Arikunto, 2015), is in Table 1.

Table 1. Interpretation of the value of r

The magnitude of r	Interpretation
Between 0.80 to 1.00	Very Strong
Between 0.60 to 0.80	Strong enough
Between 0.40 to 0.60	Strong
Between 0.20 to 0.40	Low
Between 0.00 to 0.20	Very Low

Meanwhile, according to Kaplan and Saccuzzo (2017); Widoyoko (2020), an instrument is said to be reliable if it has an alpha coefficient value of at least 0.7.

ISSN 2338-3372 (print), ISSN 2655-9269 (online)

RESULTS AND DISCUSSION

The first stage in the development of this effective instrument is to determine the specifications of the instrument. The instrument specification developed is a self-assessment instrument for junior high school students' critical attitudes (toward information on social media). The determination of instrument specifications was based on an environmental survey conducted by distributing questionnaires to 15 informatics teachers in the district of Kulon Progo. The results obtained show that only 13% (2 teachers) have made the critical attitude instrument for junior high school students, which is still simple (not proper and standard). Based on the results of the survey, the researcher finally decided to develop an instrument for measuring the critical attitude of junior high school students (towards information on social media), which is expected to be an example for informatics teachers in developing appropriate and standard attitude measurement instruments and in measuring attitudes for students at school.

After determining the instrument's specifications, the next stage is to write the instrument. Before writing the instrument, conceptual definitions and indicators of students' critical attitudes were first determined. Based on several expert opinions, the conceptual definition of students' critical attitude is a tendency to act, perceive, think, and feel distrustful or always questioning everything (Keraf & Dua, 2001), to be reflective (Ennis, 1987, 1993; Kennedy et al., 1991), and to be evaluative of information received (Rakhmat, 2013), always combining some information to build new information or knowledge that is useful for drawing conclusions. Based on this definition, indicators of the critical attitude of junior high school students towards information on social media are: (1) checking the credibility of information sources; (2) comparing various kinds of information to draw a correct conclusion (comparing); (3) combining some similar information to get the truth (integration); (4) looking for evidence or facts that support the truth of the information; and (5) not easily influenced by shared opinions and opinions about information (social proof).

A lattice of instruments, items of value, and factual statements are made based on the conceptual definitions and indicators that have been determined. Total statements from the grid on the hypothetical model produced 48 statement items consisting of 22 positive-negative valence statements and 24 positive-negative factual statements. The lattice of the instrument for measuring the critical attitude of junior high school students (toward information on social media) can be seen in Table 1.

Table 2. Lattice Instruments for Measuring Critical Attitudes for Junior High School Students

No.	Indicator	Valenci		factual		Question Number
		+	-	+	-	
1.	Check the credibility of information sources	2	2	4	4	1, 6, 11,16, 23, 28, 33, 38, 43, 45, 46, 48
2.	Comparing various kinds of information to draw the correct conclusion *(comparing)*	2	2	2	2	2, 7, 12, 17, 24, 29, 34, 39
3.	Combining some similar information to get a truth *(Integration)*	2	2	2	2	3, 8, 13, 18, 25, 30, 35, 40
4.	Looking for evidence/facts that support the truth of the information *(evaluating)*	3	3	3	3	4, 9, 14, 19, 21, 22, 26, 31, 36, 41, 44, 47
5.	not easily influenced by majority opinion and shared opinion about information *(Social Proof)*	2	2	2	2	5, 10, 15, 20, 27, 32, 37, 42

The third stage is to determine the scale of the instrument. The Likert scale was used in the development of the instrument to assess junior high school students' critical attitude toward social media information. The Likert scale uses ordinal sizes so that it can be sorted evenly and has ratings from very positive to very negative (Mawardi, 2019). In preparing the critical attitude measurement instrument, the answer choices were modified to use four answer choices to clear the respondents' attitudes or interests.

The fourth stage is to determine the scoring system. The scoring system used depends on the measurement scale used. The highest score for each positive statement item in developing the instrument for measuring the critical attitudes of junior high school students using the Likert scale was four, and the lowest was 1. It has the highest score for item 1 and the lowest score for item 4 for negative statements. In developing this instrument, Tables 3 and 4 show the scoring system used in the development of the instrument.

ISSN 2338-3372 (print), ISSN 2655-9269 (online)

Table 3. Forms of Positive and Negative Valenci Statements

Statement Form	Alternative Answers	Score
Positive	Strongly Agree (SS)	4
	Agree (S)	3
	Disagree (KS)	2
	Disagree (TS)	1
Negative	Strongly Agree (SS)	1
	Agree (S)	2
	Disagree (KS)	3
	Disagree (TS)	4

Tabel 4. Forms of Positive and Negative Factual Statements

Statement Form	Alternative Answers	Score
Positive	Strongly Agree (SS)	4
	Agree (S)	3
	Disagree (KS)	2
	Disagree (TS)	1
Negative	Strongly Agree (SS)	1
	Agree (S)	2
	Disagree (KS)	3
	Disagree (TS)	4

The fifth stage was to review the instruments. Five measurement experts reviewed the instruments, including a lecturer in Educational Research and Evaluation (PEP) at Universitas Sarjanawiyata Tamansiswa; (2) a lecturer in research methodology at Immanuel Christian University; (3) a lecturer in Informatics at Immanuel Christian University; (4) an Informatics teacher at SMP N 2 Kokap; and (5) an Indonesian language teacher at SMP N 4 Sentolo. The input that has been given by the expert then becomes material for revising the instrument. The researcher summarised the input and suggestions from the experts, including: (1) the topic of the instrument is adjusted to the daily life of students at school; (2) the sentences in the statement should not be too long and wordy; (3) use the term "social media" which can cover all platforms; (4) the statement is too normative; (5) do not make statements that lead respondents to answer options 4 or 1.

Table 5. Aiken Validation Calculation Results

Item Number	V *Aiken*	Information	Item Number	V *Aiken*	Information
Point 1	1	Valid	Item 25	0.86667	Valid
Item 2	0.86667	Valid	Item 26	0.86667	Valid
Item 3	0.86667	Valid	Item 27	0.86667	Valid
Item 4	0.8	Valid	Item 28	0.86667	Valid
Item 5	0.93333	Valid	Item 29	0.93333	Valid
Item 6	1	Valid	Item 30	0.93333	Valid
Item 7	0.86667	Valid	Item 31	0.8	Valid
Item 8	0.93333	Valid	Item 32	0.93333	Valid
Item 9	0.86667	Valid	Item 33	0.93333	Valid
Item 10	0.86667	Valid	Item 34	0.93333	Valid
Item 11	0.86667	Valid	Item 35	0.93333	Valid
Item 12	0.86667	Valid	Item 36	0.86667	Valid
Item 13	0.86667	Valid	Item 37	0.86667	Valid
Item 14	0.86667	Valid	Item 38	0.86667	Valid
Item 15	0.86667	Valid	Item 39	0.93333	Valid
Item 16	0.86667	Valid	Item 40	1	Valid
Item 17	0.86667	Valid	Item 41	0.93333	Valid
Item 18	1	Valid	Item 42	0.86667	Valid
Item 19	0.86667	Valid	Item 43	1	Valid
Item 20	0.8	Valid	Item 44	0.86667	Valid
Item 21	0.93333	Valid	Item 45	0.86667	Valid
Item 22	0.86667	Valid	Item 46	0.86667	Valid
Item 23	0.86667	Valid	Item 47	1	Valid
Item 24	0.86667	Valid	Item 48	0.8	Valid
Average V Aiken: 0.856					

ISSN 2338-3372 (print), ISSN 2655-9269 (online)

The validity that experts have determined is then tested using the Aiken formula to determine the suitability between the indicators and statement items and their validity. The results of the calculation of the Aiken formula are shown in table 5. The Aiken formula in Table 5 shows that 48 statement items are in the valid category, as evidenced by the highest Aiken index result of 1, the lowest Aiken index of 0.8, the average Aiken index of 0.856, and the Aiken index result for each item of > 0.67.

The sixth stage is to conduct trials (empirical trials). There were three stages of empirical trials conducted, namely: (1) readability trials (limited trials); (2) rather large trials, and 3) extensive trials. The readability test was carried out on six students with varying levels of intelligence. This is done so that students of all abilities and intelligence levels can understand the instrument. In the readability test, students are expected to be able to: (1) write down words they don't understand (difficult words); (2) write down words they don't understand; and (3) look at whether the instructions for doing the work can be understood properly. The results of the readability test can be summarized in Table 6.

Table 6. Readability Test Results

No	Readability Test	Results
1.	Tough words	*Gadget*, *bullying*, access, *subscribe*r, confirm, cursory
2.	Statement item numbers that are difficult to understand	7, 9, 13, 14, 19, 23, 25, 35, 42, 43, 48
3.	Instructions for working on the instrument can be understood well (Yes/No)	Six students answered Yes
4.	Feedback and suggestions	In the word PPDB (item no 43) so that it is equipped with its extension, No. 25: added the word "in" before the word "internet"

The readability test results, which came in the form of suggestions and comments from the six students, were then used to make changes (revisions) before using the instrument for measuring the critical attitudes of junior high school students in the rather extensive and extensive test.

After the expert validator and readability tests were completed, a rather extensive test involving 264 students from four schools as research subjects was carried out. Following that, an extensive test was performed to determine whether the level of reliability was the same between the rather extensive and extensive tests, as well as to improve the items on the instrument. Extensive tests were implemented on 300 research subjects, which differed from the typical rather extensive test. Instrumental analysis of rather extensive test results was carried out in stage 7.

The seventh stage is instrument analysis. The analysis used to determine to construct validity is exploratory factor analysis (EFA), which functions to identify the relationship between indicator variables in constructing a construct and to find out whether the statement items are able to measure what is to be measured according to a predetermined conceptual definition. There are four important steps in conducting factor analysis: (1) feasibility analysis; (2) extraction; (3) rotation; and (4) naming factors.

The procedure carried out in a rather extensive trial is to test the feasibility of the analysis to see if the assumptions are fulfilled as a condition for factor analysis to be carried out (Purwanto, 2014). The criteria for data that can be used for factor analysis are determined by two things, namely the Kaiser-Meyer-Olkin (KMO) sampling adequacy coefficient and Bartlett's sphericity. The purpose of the KMO sampling adequacy test is to determine the adequacy of the sample being analyzed, and the purpose of the Bartlett test is to determine the normality of the data to be analyzed. The adequacy of the sample to be analyzed was determined by the KMO value > 0.05, while the normality of the data was determined by Bartlett's sphericity test > 0.05. The KMO values and Bartlett's sphericity test results from the rather extensive test are summarized in Table 7.

Table 7. Rather Extensive Test Results

Analysis of the	KMO	*Bartlett's Test of Sphericity*
1	0.780	0.00
2	0.787	0.00
3	0.789	0.00
4	0.787	0.00
5	0.786	0.00
6	0.785	0.00
7	0.785	0.00
Reliability		0.800

ISSN 2338-3372 (print), ISSN 2655-9269 (online)

Table 8. Extensive Trial Results

Analysis of the	KMO	*Bartlett's Test of Sphericity*
1	0.754	0.00
2	0.760	0.00
3	0.762	0.00
4	0.764	0.00
5	0.764	0.00
Reliability		0.813

Table 9. Total Variances Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of variance	Cumulative %	Total	% of variance	Cumulative %	Total	% of variance	Cumulative %
1	6,326	16,647	16,647	6,326	16,647	16,647	4,975	13,091	13,091
2	4,442	11,691	28,338	4,442	11,691	28,338	3,202	8,425	21,516
3	1,849	4,867	33,204	1,849	4,867	33,204	2,055	5,408	26,925
4	1,770	4,659	37,864	1,770	4,659	37,864	1,755	4,619	31,544
5	1,619	4,260	42,124	1,619	4,260	42,124	1,755	4,617	36,161
6	1,561	4,109	46,232	1,561	4,109	46,232	1,743	4,588	40,749
7	1,370	3,606	49,838	1,370	3,606	49,838	1,736	4,569	45,318
8	1,291	3,398	53,236	1,291	3,398	53,236	1,661	4,370	49,688
9	1,203	3,167	56,403	1,203	3,167	56,403	1,654	4,352	54,040
10	1,139	2,998	59,401	1,139	2,998	59,401	1,631	4,293	58,333
11	1,037	2,729	62,131	1,037	2,729	62,131	1,443	3,798	62,131
12	0,971	2,556	64,687						
13	0,878	2,310	66,997						
14	0,867	2,282	69,278						
15	0,853	2,244	71,522						
16	0,767	2,019	73,542						
17	0,752	1,980	75,522						
18	0,731	1,923	77,445						
19	0,666	1,752	79,197						
20	0,627	1,650	80,847						
21	0,625	1,644	82,491						
22	0,583	1,535	84,026						
23	0,560	1,473	85,499						
24	0,543	1,429	86,928						
25	0,518	1,363	88,291						
26	0,495	1,303	89,595						
27	0,465	1,223	90,817						
28	0,449	1,183	92,000						
29	0,421	1,107	93,107						
30	0,379	0,999	94,105						
31	0,358	0,943	95,048						
32	0,343	0,903	95,951						
33	0,330	0,869	96,820						
34	0,295	0,776	97,595						
35	0,275	0,723	98,319						
36	0,249	0,655	98,973						
37	0,213	0,561	99,534						
38	0,177	0,466	100,000						

Extraction Method: Principal Component Analysis.

The number of instrument items tested in the rather extensive test totaled 48 items. In each analysis, in addition to checking the output results from KMO and Bartlett's sphericity test, the measure of sampling adequacy (MSA) and Communalities was also checked. MSA values and commonalities are the basis for reducing instrument items so that a valid instrument item will be obtained. The reduced items

ISSN 2338-3372 (print), ISSN 2655-9269 (online)

are instrument items that have an MSA value of < 0.5. The reduction of instrument items is made one by one for each item in order to achieve a higher reliability value. In developing the instrument for the critical attitude of junior high school students, seven analyses were carried out to reduce six statement items, and the final results of the rather extensive trial obtained 42 valid statements and had a reliability value (Cronbach's alpha) of 0.800. The results of the extensive trials are summarized in Table 8.

The number of instrument items tested in the extensive test totaled 42 instruments. In the extensive test, analysis was performed five times to reduce the four items with an MSA of 0.5. The final result of the extensive trial was the collection of 38 valid statements with a reliability value (Cronbach's Alpha) of 0.813.

Table 10. Rotated Component Matrix [a] First

	Component										
	1	2	3	4	5	6	7	8	9	10	11
FP2.1	0,811										
FP1.1	0,696								0,390		
FP5.1	0,694										
FP4.3	0,669										
FP3.2	0,642										
VP2.1	0,609										
FP5.2	0,527							0,505			
FP2.2	0,523			0,411							
VP4.1	0,502					0,385					
VP1.1	0,468							0,374			
VN2.2		0,710									
VN2.1		0,695								0,314	
VN1.2		0,685									
VN4.1		0,668					0,441				
VN3.2		0,588									
VN5.1		0,553		-0,389							
FN1.1			0,683								
FN4.3			0,664								
FN4.1			0,545					-0,462			
FN5.1				0,581							
FP3.1	0,362			0,507				0,315			
FP4.2	0,319		-0,350	0,447							
VP3.1	0,367			0,433							
FP1.3					0,832						
FP1.2					0,685						
VP5.2						0,766					
VP5.1						0,758					
VN5.2							0,686				
VN4.3		0,329					0,679				
VP4.2							0,374	0,354			
VP1.2	0,329							0,656			
FN2.2									0,628		
FP4.1	0,304								0,566		
VP2.2	0,411					0,319			0,448		
FN1.3										0,798	
FN4.2			0,382							0,542	
FN3.1											0,749
VP4.3	0,409										0,420

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.
a. Rotation converged in 19 iterations.

The extraction process was carried out after obtaining 38 items of valid and reliable junior high school students' critical attitude statements. Extraction is the process of obtaining fewer factors from a large number of items and variables and factor contributions from the entire item, also called total variance explained (Purwanto, 2014). In developing the instrument for measuring the critical attitude of

ISSN 2338-3372 (print), ISSN 2655-9269 (online)

junior high school students, a factor extraction method using the principal component analysis method was used. The extracted data is shown in Table 9.

The data in Table 9 can be interpreted as follows: the items in the table are arranged in the order in which they contribute to the overall quality of the items. Item 1 contributed 16.65% of the total items; item 2 contributed 11.70% of the total items; item 3 contributed 4.87% of the total items, and so on. Item 38 only contributed 0.47% of the total grain. Of the 38 items tested, they can actually be summarized into 11 factors because several items measure the same dimensions. According to Marascuilo and Levin (Purwanto, 2014), the maintained factors are those with eigenvalues above 1.00. Eigenvalues are a measure of a specific value derived from the variance of the items that can be used to construct a factor. A factor is intended to summarize items that have the same dimensions. The 11 factors contribute a total of 62.13% to the overall quality of the instrument.

Table 11. Loading Factor Value in Rotated Component Matrix [a]

Factor	Items/Indicators	Factor Load
1	FP2.1	0.811
	FP1.1	0.696
	FP5.1	0.694
	FP4.3	0.669
	FP3.2	0.642
	VP2.1	0.609
	FP5.2	0.527
	FP2.2	0.523
	VP4.1	0.502
	VP1.1	0.468
2	VN2.2	0.710
	VN2.1	0.695
	VN1.2	0.685
	VN4.1	0.668
	VN3.2	0.588
	VN5.1	0.553
3	FN1.1	0.683
	FN4.3	0.664
	FN4.1	0.545
4	FN5.1	0.581
	FP3.1	0.507
	FP4.2	0.447
	VP3.1	0.433
5	FP1.3	0.832
	FP1.2	0.685
6	VP5.2	0.766
	VP5.1	0.758
7	VN5.2	0.686
	VN4.3	0.679
	VP4.2	0.374
8	VP1.2	0.656
9	FN2.2	0.628
	FP4.1	0.566
	VP2.2	0.448
10	FN1.3	0.798
	FN4.2	0.542
11	FN3.1	0.749
	VP4.3	0.420

Rotation is done after the extraction process. This process will lead to a clearer view of grouping and the magnitude of the item's contribution to the factors. Items will become part of the factor if they contribute factor loadings of at least 0.30, according to Kerlinger's (Purwanto, 2014) contribution to the factors. Items will become part of the factor if they contribute factor loadings of at least 0.30, according to Kerlinger (Kerlinger, 2006; Purwanto, 2014). Table 10 is the result of the orthogonal rotation process

ISSN 2338-3372 (print), ISSN 2655-9269 (online)

with the maximum variance method. From the presentation of the rotation results in Table 10, the items are grouped into factors, and the amount of their contribution is as shown in Table 11.

Stage eight is assembling the instrument. After testing the validity and reliability of the instrument, the next step is to correct the items that do not meet the requirements. Then the instrument was reassembled. This assembled instrument is then called the "final product," which is ready to be used to assess the critical attitude of junior high school (SMP) students.

The ninth stage is carrying out measurements. The valid and reliable instrument for measuring the critical attitude of junior high school students (the final model) was then used to measure the critical attitude of class VIII C students at Sentolo 4 State Junior High School (SMP Negeri 4 Sentolo), with a total of 32 students.

The tenth stage is interpreting the measurement results. The data obtained from measurements taken on class VIII C students of SMP Negeri 4 Sentolo were then analyzed using a descriptive method and continued with categorization. The results obtained are in the form of a measurement result score, as shown in Table 12:

Table 12. Measurement Result Score

Respondent No	Student Score	Respondent No	Student Score
1.	90	17.	91
2.	90	18.	89
3.	106	19.	89
4.	108	20.	100
5.	95	21.	106
6.	97	22.	100
7.	118	23.	98
8.	97	24.	87
9.	92	25.	104
10.	86	26.	111
11.	104	27.	107
12.	95	28.	96
13.	89	29.	97
14.	99	30.	111
15.	94	31.	84
16.	99	32.	99

The obtained measurement result scores will then be classified into four categories based on the classification of assessment results (Mardapi, 2018). The measurement results determined that the average score of all students in one class is 97.75 and the standard deviation of all students in one class is 8.20. From the calculation of the average score and standard deviation (SD), a categorization of the critical attitudes of junior high school students is then made, as shown in Table 10.

Table 13. Categorization of Critical Attitudes of Class VIII C Students of SMP Negeri 4 Sentolo

No.	Student Score	Attitude Category
1.	$X \geq 105.95$	Very positive/very high
2.	$105.95 > X \geq 97.75$	High/positive
3.	$97.75 > X \geq 89.55$	Negative/low
4.	$X < 89.55$	Very negative/low

Information:
X: score achieved by students

The critical attitude category is divided into four: very positive or very high, positive or high, negative or low, and very negative or very low. The category of critical attitude achievement achieved by students is then described for each attitude achievement. A description of the achievement of junior high school students critical attitudes (toward information on social media) is summarized in Table 14.

The results of measuring the critical attitude of junior high school students (toward information on social media) in class VII C of Sentolo 4 Junior High School (SMP Negeri 4 Sentolo) are divided into four categories: very high, high, low, and very low. Based on Tables 12 and 13, the results of measuring the critical attitude of junior high school students are summarized in Table 15.

ISSN 2338-3372 (print), ISSN 2655-9269 (online)

Table 14. Description of Achievement of Students' Critical Attitudes

Rated aspect	Attitude Achievement	Description
Components of junior high school students' critical attitudes: Checking the credibility of information sources; comparing some diverse information *(comparing)*; combining some similar information *(Integration);* looking for evidence/facts; not easily influenced by shared opinions and opinions about information *(Social Proof).*	Very high	Students always apply a critical attitude when responding to information on social media.
	Tall	Students often apply a critical attitude when responding to information on social media.
	Low	Students rarely apply a critical attitude when responding to information on social media.
	Very low	Students never apply a critical attitude when responding to information on social media.

Table 15. Percentage of Critical Attitudes of Middle School Students

No	Category	Total Students	Percentage
1.	Very high	5	15.63%
2.	Tall	9	28.13%
3.	Low	12	37.50%
4.	Very low	6	18.75%

A clearer description of the results in Table 12 can be seen in Figure 1: Graph of the Critical Attitudes of Grade VIII Students (toward information on social media) (SMP Negeri 4 Sentolo) as follows:

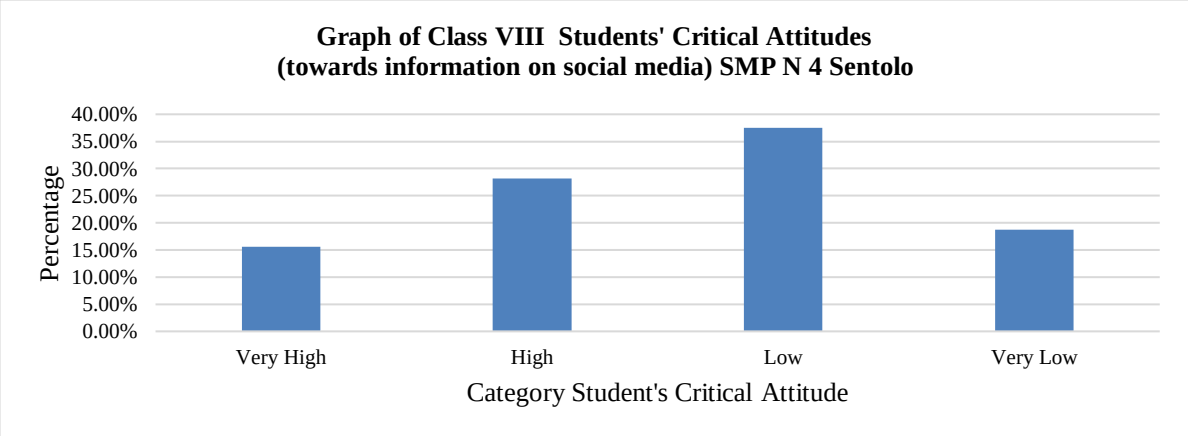

Figure 1. Graph of Critical Attitudes of Class VIII Students of Sentolo 4 Junior High School (SMP N 4 Sentolo)

The Figure 1 shows that the critical attitude of Sentolo 4 Junior High School (SMPN 4 Sentolo) students towards information on social media is divided into four categories, namely: very high (15.63%), high (28.13%), low (37.50%), and very low (18.75%). Based on these results, it's safe to say that students are still not very critical.

Students' attitudes have various categories that several factors can influence. These factors are different for each individual when it comes to forming a critical attitude within them. Some of the factors that affect an individual's critical attitude include how the person sees or understands the problem, the situation that the person is experiencing, the external situation that is being faced, the person's experiences, and how intelligent the person is (Sobur, 2003). Meanwhile, Hassoubah (2008) says that a person's personality and cultural background can affect a person's efforts to think critically about a problem in life. Apart from these two things, emotional conditions also influence critical thinking. Critical thinking can see the benefits of other ways of thinking, and this can affect emotional stability.

In the era of the industrial revolution 4.0, where information flows swiftly, students as users of social media are expected to verify the information they receive by not relying solely on one-sided information and having to check and recheck the information they get, filter it, and then compare it with other sources. Other sources of information (Rianto, 2016): Students will gain a complete picture of the truth of information if they open their minds to other sources on social media from various points of view.

ISSN 2338-3372 (print), ISSN 2655-9269 (online)

CONCLUSION

Based on the results of research on the development of instruments for measuring the critical attitude of junior high school students (towards information on social media), it can be concluded that: First, the assessment of students' critical attitudes towards information on social media has not been carried out by many teachers. Most teachers conduct general attitude assessments. Teachers who have carried out critical attitude assessments only use simple critical attitude measurement instruments that are not yet feasible and standardized. Therefore, we need an instrument to measure the critical attitude of junior high school students (towards information on social media) that is valid and reliable.

Second, an appropriate and standard instrument for measuring junior high school students' critical attitudes (toward information on social media) is based on: constructing a hypothetical model with five indicators, namely: (1) checking the credibility of information sources; (2) comparing some information to draw a conclusion (comparing); (3) combining some similar information to get the truth (integration); (4) looking for evidence or facts that support the truth of the information; and (5) not easily influenced by the opinions and opinions of the majority about information (social proof).

Valid instruments have been tested based on their analysis and validation. Five experts carried out validation of the 48 instrument items, and several revisions were made based on expert input. The revised instrument was then used to test the readability of six students. The readability test results became the basis for revising the 48 instrument items. The instrument that has been corrected based on validator input and the results of the readability test is then used to conduct a rather extensive test that reduces 6 statement items and produces 42 valid and reliable statement items. The instrument is valid and reliable with an MSA value of > 0.5 and very high reliability with a Cronbach's alpha of 0.800. A broad test was carried out to see the consistency of the level of reliability (reliability) between rather extensive trials and extensive trials, as well as to sharpen the instrument items, which reduced 4 statement items and produced 38 valid and reliable statement items. The instrument is valid and reliable with an MSA value of > 0.5 and very high reliability with a Cronbach's alpha value of 0.813.

Third, the criticality value of junior high school students (towards information on social media) in Sentolo 4 Junior High School class VIII C students after being measured using a valid and reliable critical attitude measurement instrument reveals four critical attitude categories, namely: very high 15.63%, high 28.5%, 13%, low 37.50%, and very low 18.75%. The results show that the value of the critical attitude of Class VIII C students at Sentolo 4 Public Middle School is still low and that learning strategies and methods that can improve students' critical attitude (towards information on social media) are needed.

REFERENCES

Arikunto, S. (2015). *Dasar-dasar evaluasi pendidikan* (Revisi). Bumi Aksara.

Astuti, N. D. (2022). *Instrumen pengukuran sikap bernalar kritis pada peserta didik kelas X SMK*. Universitas Sarjanawiyata Tamansiswa.

Azwar, S. (2015). *Reliabilitas dan validitas*. Pustaka Pelajar.

Buchari, A. (2018). Peran guru dalam pengelolaan pembelajaran. *Jurnal Ilmiah Iqra'*, *12*(2), 106. https://doi.org/10.30984/jii.v12i2.897

Djaali, D., & Muljono, P. (2008). *Pengukuran dalam bidang pendidikan*. Grasindo.

Ennis, R. H. (1987). *Critical thinking*. Pretice Hall, Inc.

Ennis, R. H. (1993). Critical thinking assessment. *Theory Into Practice*, *32*(3), 179–186. https://doi.org/10.1080/00405849309543594

Erikson, E. H. (2010). *Childhood and society*. WW Norton & Company.

Hassoubah, Z. I. (2008). *Developing creative and critical thinking skills : cara berpikir kreatif dan kritis.* Yayasan Nuansa Cendikia.

Kaplan, R. M., & Saccuzzo, D. P. (2017). *Psychological testing: Principles, applications, and issues.* Nelson Education.

Kemp, S. (2022). *Digital 2022: Indonesia*. Datareportal. https://datareportal.com/reports/digital-2022-indonesia

ISSN 2338-3372 (print), ISSN 2655-9269 (online)

Kennedy, M., Fisher, M. B., & Ennis, R. H. (1991). Critical thinking: Literature review and needed research. In L. Idol & B. F. Jones (Eds.), *Educational values and cognitive instruction: Implications for reform* (pp. 11–40). Lawrence Erlbaum.

Keraf, A. S., & Dua, M. (2001). *Ilmu pengetahuan sebuah tinjauan filosofis*. Kanisius.

Kerlinger, F. N. (2006). *Asas-asas penelitian behavioral* (trans. L.R). Gadjah Mada Universty Press.

Kurniawati, E., Al Siddiq, I. H., & Idris, I. (2020). E-commerce opportunities in the 4.0 era innovative entrepreneurship management development. *Polish Journal of Management Studies*, *21*(1), 199–210. https://doi.org/10.17512/pjms.2020.21.1.15

Mardapi, D. (2018). *Teknik penyusunan instrumen tes dan non-tes* (A. Setiawan (ed.)). Parama Publishing.

Mawardi, M. (2019). Rambu-rambu penyusunan skala sikap model Likert untuk mengukur sikap siswa. *Scholaria: Jurnal Pendidikan Dan Kebudayaan*, *9*(3), 292–304. https://doi.org/10.24246/j.js.2019.v9.i3.p292-304

Mulyana, E. H., Hamdu, G., & Nurzakiah F, F. (2016). Pengembangan penilaian sikap dengan menggunakan analisis video pelaksanaan pembelajaran berbasis konteks. *Seminar Nasional Pendidikan Sains*. https://jurnal.fkip.uns.ac.id/index.php/snps/article/view/9860

Ningrum, D. P. (2019). Pemanfaatan media sosial terhadap fenomena "Hoax" di kalangan remaja milenial (studi di SMAN 1, Kecamatan Pleret, Bantul, Yogyakarta). *Jurnal Ilmiah Padma Sri Kreshna*, *1*(1). https://doi.org/10.37631/psk.v1i1.35

Purwanto, N. (2014). *Evaluasi hasil belajar* (4th ed.). Pustaka Pelajar.

Putri, T. K. W., Wicaksono, Y. P., Li, Y., Trabelsi, O., & Elareshi, M. (2022). Efektivitas pembelajaran bahasa Indonesia berbasis media Youtube pada masa pembelajaran online. *Caraka: Jurnal Ilmu Kebahasaan, Kesastraan, Dan Pembelajarannya*, *9*(1), 1–18. https://doi.org/10.30738/caraka.v9i1.13514

Rahmawan, D., Mahameruaji, J. N., & Janitra, P. A. (2018). Potensi Youtube sebagai media edukasi bagi anak muda. *Edulib*, *8*(8). https://ejournal.upi.edu/index.php/edulib/article/view/11267

Rakhmat, J. (2013). *Psikologi komunikasi*. Remaja Rosdakarya.

Sappaile, B. I. (2007). Konsep instrumen penelitian pendidikan. *Jurnal Pendidikan Dan Kebudayaan*, *13*(66), 379–391. https://doi.org/10.24832/jpnk.v13i66.356

Sobur, A. (2003). *Psikologi umum*. Pustaka Setia.

Sudjana, N. (2010). *Penilaian hasil proses belajar mengajar*. PT Remaja Rosdakarya.

Sugiyono, S. (2019). *Metode penelitian pendidikan*. Alfabeta.

Techataweewan, W., & Prasertsin, U. (2018). Development of digital literacy indicators for Thai undergraduate students using mixed method research. *Kasetsart Journal of Social Sciences*, *39*(2). https://doi.org/10.1016/j.kjss.2017.07.001

Tenriawaru, A., & Jumarniati, J. (2016). Pengembangan instrumen sikap peserta didik pada mata pelajaran matematika. *Pedagogy: Jurnal Pendidikan Matematika*, *1*(1), 1–11. https://doi.org/10.30605/pedagogy.v1i1.400

Thohirin, T. (2021). *Sidang kasus babi ngepet Depok ungkap kronologi Adam bikin onar*. CNN Indonesia. https://www.cnnindonesia.com/nasional/20211102183401-20-715709/sidang-kasus-babi-ngepet-depok-ungkap-kronologi-adam-bikin-onar.

Waleleng, G. J., & Himpong, M. D. (2022). Sosialisasi pemanfaatan internet sehat dan aman pada anak remaja di Kelurahan Taas Kecamatan Tikala Kota Manado. *ACTA DIURNA KOMUNIKASI*, *4*(4). https://ejournal.unsrat.ac.id/index.php/actadiurnakomunikasi/article/view/43614

Widoyoko, E. P. (2020). *Teknik penyusunan instrumen penelitian*. Pustaka Pelajar.

ISSN 2338-3372 (print), ISSN 2655-9269 (online)