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Development of Critical Thinking Ability Assessment Instruments Students (Study on Material Economic Growth and Development of Students in High School)

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Abstract:
The study aims to determine: (1) Knowing the instrument development of students' critical thinking skills on the material of economic growth and development of SMAN 1 and SMAN 2 Kalianda; (2) Find the steps of developing critical thinking assessment instruments economic growth and development of SMAN 1 and SMAN 2 Kalianda; (3) Knowing of developed instrument has met the criteria of validity and reliability. This research used research and development (R&D) using a development design from Borg and Gall. The subjects of this study were students of class XI IPS 1,2,3 SMAN 1 Kalianda and students of class XI IPS 1,2,3 XI IPA 1,2 SMAN 2 Kalianda. For the the first trials students of class XI IIS 2 SMAN 2 Kalianda with 32 students and final field test of the 236 students. Product uses 30 items assesment for the first trials and then 25 items assessment for the final field test. The analysis technique used the KMO (Kaiser Meyer Olkin) test. The results of the study show: (1) From the 30 questions developed, 25 valid and reliable items were obtained from the first trial; (2) Standardization the instrument using the KMO the 6 elements of interpretation, analysis, evaluation, conclusions and explanations. So, data is valid and reliable because the KMO and MSA TEST values are > 0.5.
Keywords: Instrument Development, Critical Thingking Assesment, Economic growth and development.

Background

Education is an important sector in the progress of a country. The current education cannot be separated from the guidelines that have been made. The guidelines for the world of education in question are the curriculum. The curriculum is the foundation of the learning process. The curriculum runs according to the developments and demands of the times. Currently the curriculum is used according to the needs of the 21st century.

According to (Krull, 2003) presented by Hilda Taba that the curriculum is a learning agenda that is detailed accurately with the words "a plan for learning." One of the important aspects in the curriculum is assessment or evaluation. In this curriculum, it is expected that the output of students can have a competitive advantage (Koulaidis & Dimopoulos, 2003), one of which is the ability to think critically in solving a problem. The ability to think critically is also said to be an expected goal in the current curriculum.

Critical thinking is a very important essential ability (Kaddoura, 2013). The ability to think critically has a very broad scope. It is expected to have good knowledge, so that they can criticize various existing phenomena. This ability is very important for every individual, especially students, because critical thinking can be used as an effort to solve problems and as a consideration for a correct decision.

Making a decision is very impactful to move on, so it is very important for students to have this ability. The importance of critical thinking skills must continue to be developed, especially students in high school, because high school is the last step for students to be guided by teachers who are expected to be ready to enter the world of lectures which are required to have this critical thinking ability.

The reality in KBM is that sometimes educators are still not fully able to train students' critical thinking skills. According to (Susanto, 2013) critical thinking skills need to be developed in students because through critical thinking skills, students can more easily understand concepts, be sensitive to problems that occur so they can understand and solve problems. Without critical thinking in the learning process, memorization will be the main resource in learning activities. Students will quickly forget what they are learning and will rarely be able to provide strong ideas (Paul, 2005).

Factors that affect critical thinking skills include many things such as, the students themselves, students' initial knowledge and experience, students' interest in lessons, learning resources, and teachers who teach. So, the need for cooperation between students and teachers to be able to optimize critical abilities (Prameswari et al., 2018).

Based on the results of distance learning that has now been carried out by SMA Negeri 1 Kalianda and SMA Negeri 2 Kalianda, it shows that these schools use the 2013 curriculum. One of the goals of this curriculum is to improve students' mindsets to become more critical (Kemendikbud, 2014).

The results of interviews that have been conducted by researchers to teachers show that the assessment instrument used has not fully measured students' critical thinking skills. This can be seen from the evaluation questions given that are not fully oriented to develop students' critical thinking skills, so students are not trained to develop their critical thinking skills. This resulted in low critical thinking skills of students. Students have difficulty analyzing existing information, most students tend to only accept what is conveyed or written in books, and are passive in asking questions and answering questions from problems posed by the teacher, as well as expressing ideas or ideas for solving problems

In order to improve students' critical thinking skills, an Assessment Instrument is needed that can train and familiarize students in critical thinking, so that students are accustomed to practicing critical thinking in solving problems. The assessment instrument must be able to measure students' abilities objectively and can be used as an evaluation tool, namely students can know their limits (Mulyono, 2008).

In making assessment instruments, teachers are still not able to fully measure students' critical thinking skills, there are still educators who only make questions without looking at the characteristics of the assessment instrument. Sometimes the teacher only takes questions that are already on the internet without making a grid, after that the teacher immediately tests and takes 3 answers from students, without seeing whether or not the assessment instrument is appropriate to use.

There are still teachers in making assessment instruments that are used not yet fully able to measure students' critical thinking skills, this can be seen from the assessment instruments given by teachers to students to evaluate students' abilities that still focus on the level of knowledge (C1), understanding (C2) and application (C3), so that students are only used to working on assessment instruments in the category of low-level thinking. According to Bloom's taxonomy,

this can have an impact on students' lack of ability to solve existing problems using critical thinking skills when given questions with levels of analysis (C4), synthesis (C5), and creation (C6).

Not only the problems mentioned above, after an interview was conducted with one of the economics teachers at SMA Negeri 1 Kalianda and SMA Negeri 2 Kalianda, it showed that in online learning, teachers are still not fully able to apply varied learning models, teachers tend to use direct delivery methods, questions and answers, and lectures followed by assignments, as a result students are only motivated or centered on the information that has been given by the teacher. This is also in accordance with the daily test scores obtained by almost 65% of students with scores below 66. The following table shows the results of students' critical thinking skills at SMA Negeri 1 Kalianda:

Table 1 Distribution of Critical Thinking Ability Results of SMAN 1 Kalianda Students:

No	Element	Average percentage of correct answers Ability Domain					
		C1	C2	C3	C4	C5	C6
1	Learning Output	80%	78%	70%	60%	55%	50%
2	KKM	66	66	66	66	66	66

Source: Processed by researchers, 2021

Table 2 Distribution of Critical Thinking Ability Results of SMAN 2 Kalianda Students

No	Element	Average percentage of correct answers Ability Domain					
		C1	C2	C3	C4	C5	C6
1	Learning Output	80%	75%	68%	62%	53%	50%
2	KKM	66	66	66	66	66	66

Source: Processed by researchers, 2021

Based on the data above, it can be seen that students' ability to solve problems in the realm of abilities c4, c5 and c6 is still low when compared to student learning outcomes in c1, c2 and c3. So it can be concluded that the closer to c6 the students' ability to work on the questions is getting lower or only a few students are working on the questions. There are even students who state that economics is one of the most difficult subjects to understand well. This happens because it is caused by the lack of training in students' critical thinking skills in solving a problem that occurs in detail accompanied by language that is easy to understand. And students need critical thinking assessment instruments with creative problem solving models to support economic learning.

Several previous studies that examine critical thinking skills include research conducted

by I Wayan Redhana and Liliasari (Redhana, 2008) which states that learning critical thinking which is learning high-level thinking skills provides opportunities for students to practice a number of thinking skills, especially critical thinking skills. . Another research conducted by (Sugiyono, 2017) states that learning outcomes show that if students have low critical thinking skills, it will have an impact on learning outcomes obtained and creative thinking skills are needed to be able to improve student learning outcomes.

Research conducted by (Chukwuyenum, 2013) which confirms that in the learning process should apply and hone critical thinking skills. Therefore, students are expected to have this ability, because this will be able to shape students' abilities (Changwong, 2018). As stated by Livingston (1997) in (Tuncer, 2017) one of the characteristics of higher order thinking is a process that involves active control during the cognitive process. Thinking skills are grouped into basic thinking skills and higher order thinking skills. According to (P. and Costa, 1985).

It is explained by (Suparno, 2018) that critical thinking ability (KBK) is very important to be developed because it creates a conscious and controlled basis for rational, reflective, and responsible decision making with all its potential. Revealed by (Rohayati, 2017) that however, there is one aspect that must be avoided by proficient critical thinkers. As stated by (Mahdavi, 2014) one of the signs of higher order thinking is the process that links active observation during the ongoing cognitive process.

The characteristics of critical thinking according to (Critchley, 2011) are divided into two things, namely, first, learning how to ask, the right time to ask, and what to ask. skilled at conceptualizing, implementing, analyzing, synthesizing, and correcting the news sought from, or obtained by, observing experiences, images, reasoning relationships, or as a reference for beliefs and behavior (Yazar Soyadı, 2015) reflective views that are truly acceptable by the mind can easily be focused on determining what is right to believe or do (Ennis, 1995).

So, the purpose of this study is to (1) find out the instruments for developing students' critical thinking skills on the material for economic growth and development of SMAN 1 and SMAN 2 Kalianda; (2) Finding steps to develop critical thinking assessment instruments for economic growth and development at SMAN 1 and SMAN 2 Kalianda; (3) Knowing the developed instrument has met the criteria of validity and reliability/

THEORETICAL FRAMEWORK

Critical thinking is a high-order thinking process, because when making decisions or drawing conclusions using controls active, namely reasonable, reflective, responsible, and skillful thinking. Like as stated by Livingston (1997) in (Tuncer, 2017) one of the characteristics of higher order thinking is a process that involves active control over cognitive process takes place.

Thinking skills are grouped into skills basic thinking and higher order thinking skills. According to (P. and Costa, 1985) which includes basic thinking skills include qualification, classification, variable relationship, transformation, and relationship cause and effect. While complex thinking skills include problems solving, decision making, critical thinking and creative thinking. Explained by (Suparno, 2018) that the ability to think critically (KBK) is very important to develop because it creates a foundation conscious and controlled in making decisions rationally, reflectively, and be responsible with all its potential.

Bloom's Taxonomy explains that high order thinking skills is the level of higher order thinking ability which lies at the level of analyze (C4), evaluate (C5), and create (C6). Bloom states that there are two levels of students' mathematical thinking, namely low order thinking and high order thinking.

Assessment is “Evaluation is a systematic process determining the extent to which instructional objectives are achieved by pupils". Based on the sentence conveyed by M Ngalim Purwanto that assessment means a way to be able to combine explanation and draw conclusions

based on the news. According to PP No. 19 of 2005 concerning National Education Standards, Article 1 (17) Assessment explains that the way to collect and processing information so that it can be measured as a form of achievement or student learning outcomes (Government, 2005).

Instrument development is something that needs attention in the world of education. Instrument development is one of the Activities to develop a systematic theoretical imaginary, then need to be carried out in stages and lead to methods that determined by experts in creating and perfecting a standard instruments. The essence of the development of an instrument the need for superior theories in order to underlie the phenomenon to be measured, so that the instrument made is relevant.

METHOD

This research uses research and development (R&D) research. This research was conducted to develop an assessment instrument on the material of economic growth and development at SMAN 1 Kalianda and SMAN 2 Kalianda in order to improve the ability of students to think critically. The development procedure used in this study refers to the Borg and Gall development model. The procedures carried out by the researcher are:

1. Identification of problems
2. Instrument development planning
3. Designing an instrument grid
4. Theoretical Testing by expert examiners
5. Instrument Design Revision
6. Revision
7. Small Scale Trial
8. Test validity and reliability with Excel
9. Revision
10. Final field test
11. Instrument Standardization
12. Instrument Development Valid and Reliable

The subjects of this study were students of class XI IPS 1,2,3 SMAN 1 Kalianda and class XI IPS 1,2,3 XI IPA 1,2 SMAN 2 Kalianda. For the first trial, the students of class XI IIS 2 SMAN 2 Kalianda were 32 students and the final test was 236 students. The product uses 30 assessment items for the first trial and then 25 assessment items for the final field test. Standardization of the instrument using factor analysis technique with KMO test (Kaiser Meyer Olkin) using SPSS software.

RESULTS AND DISCUSSION

The research data are the results of validation tests by experts, the results of small-scale trials, the results of the final field test, and the results of standardizing instruments with factor analysis of each instrument element.

Validation Test Results by Experts

From the expert validators, there are several inputs regarding the instruments that have been developed by researchers, namely looking back at the questions contained in each indicator,

avoiding items that are still memory, understanding and applications contained in items no. 1, 2, 3, 5 , 7, and 8. After being checked by the validators, as many as 30 questions were declared eligible to be tested on a limited test.

Small-Scale Trial Results

The results of this limited trial obtained data that from 30 items there were 25 valid questions and 5 invalid questions. each item is declared valid when r count is greater than r table (r count > r table). The number of respondents in this limited trial were 32 students and if we look at the R Product Moment table, we get an r table of 0.349 and the significance value is less than 0.05. So for items no 9, 12, 13 24 and 26 were declared invalid and the researcher took 25 valid questions for further reliability testing. The results of this limited trial, it was found that the instrument tested was reliable. That is, Cronbach's Alpha value of 0.757 > 0.6 then the data is declared reliable.

Final field test

The results of this field test found that all tested items were valid (25 items were valid), because the r count of each item was more than 0.127 (> 0.127) and the significance value was less than 0.05. Then after the item has been declared valid, then a reliability test is carried out using Ms. Excel with Cronbach's Alpha is declared reliable when Cronbachi's Alpha value is more than 0.6 (Cronbachi Alpha > 0.6). The results of this field test, it was found that the instrument tested was reliable, because the reliability value was 0.826 > 0.6.

Instrument Standardization

From the results of the KMO test for the 5 elements of critical thinking skills, the results of the KMO TEST> 0.5 so all data is accepted. Here's the explanation:

1. Factor Analysis on Interpretation

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.693
Bartlett's Test of Sphericity	Approx. Chi-Square	179.739
	df	28
	Sig.	.000

KMO 0.693 > 0.5 and P Value Bartlett's Test 0.000 < 0.05 then it can be concluded that there is an intercorrelation between indicators in the construct of INTERPRETATION.

MSA Results for each Instrument Item			
X1	0,685	X5	0,714
X2	0,615	X6	0,724
X3	0,74	X7	0,755
X4	0,653	X8	0, 672

So, it can be concluded that the MSA value is internally valid, because the results of all items in the MSA > 0.5. The results obtained are All Communal Extraction values> 0.5 then convergently valid.

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2. Factor Analysis on Analysis

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.634
Bartlett's Test of Sphericity	Approx. Chi-Square	50.400
	df	10
	Sig.	.000

KMO 0.634 > 0.5 and P Value Bartlett's Test 0.000 < 0.05, it can be concluded that there is an intercorrelation between indicators in the ANALYSIS construct

MSA Results for each Instrument Item	
x10	0,613
x11	0,625
x14	0,698
x15	0,64
x16	0,643

So, it can be concluded that the MSA value is internally valid, because the results of all items in the MSA > 0.5. The results obtained are All Communal Extraction values> 0.5 then convergently valid.

3. Factor Analysis on Evaluation

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.598
Bartlett's Test of Sphericity	Approx. Chi-Square	95.744
	df	15
	Sig.	.000

KMO 0.598 > 0.5 and P Value Bartlett's Test 0.000 < 0.05, it can be concluded that there is an intercorrelation between indicators in the EVALUATION construct.

MSA Results for each Instrument Item			
x17	0,608	x20	0,555
x18	0,469	x21	0,56
x19	0,646	x22	0,638

So, it can be concluded that the MSA value is internally valid, because the results of all items in MSA are > 0.5 except for X18. Communal Extraction value > 0.5 means that it is convergently valid, except for item 18, the value of Community Extraction < 0.5 means that it is not convergently valid.

4. Factor Analysis in Step 2 Evaluation (Without X18)

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.608
Bartlett's Test of Sphericity	Approx. Chi-Square	89.548
	Df	10
	Sig.	.000

KMO 0.608 > 0.5 and P Value Bartlett's Test 0.000 < 0.05, it can be concluded that there is an intercorrelation between indicators in the EVALUATION construct.

MSA Results for each Instrument Item	
x17	0,624
x19	0,622
x20	0,5
x21	0,559
x22	0,642

All MSA (ANTI IMAGE CORRELATION) values > 0.5 then all indicators are internally valid. Communal Extraction value > 0.5 then it is convergently valid.

5. Factor Analysis in Conclusion

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.584
Bartlett's Test of Sphericity	Approx. Chi-Square	24.594
	df	3
	Sig.	.000

KMO 0.584 > 0.5 and P Value Bartlett's Test 0.000 < 0.05, it can be concluded that there is an intercorrelation between indicators in the construct CONCLUSION

MSA Results for each Instrument Item	
x23	0,602
x25	0,572
x27	0,582

All MSA (ANTI IMAGE CORRELATION) values > 0.5 then all indicators are internally valid. All Communal Extraction values > 0.5 then are convergently valid.

6. Factor Analysis on Explanation

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.681
Bartlett's Test of Sphericity	Approx. Chi-Square	12.460
	df	3
	Sig.	.006

KMO 0.681 > 0.5, it can be concluded that there is an intercorrelation between indicators in the EXPLANATION construct.

MSA Results for each Instrument Item	
x28	0,687
x29	0,744
x30	0,784

All MSA (ANTI IMAGE CORRELATION) values > 0.5 then all indicators are internally valid. Most of the Communal Extraction values > 0.5 then it is convergently valid.

DISCUSSION

Based on studies from previous experts and researchers, it can be concluded that there is a correlation or relation between critical thinking skills and HOTS. Because these two things are the presence of assessment questions using the HOTS concept, it will train students' abilities in answering questions with a high level of thinking power. This is also reinforced by the notion that critical thinking skills are students' high-level thinking skills about how to examine an event, incident, problem, or problem in order to obtain an initial guess or essence as a rational procedure for collecting results about something that is believed and carried out clearly through aspects of interpretation, analysis, evaluation, conclusion and explanation.

CONCLUSIONS AND SUGGESTION

Based on the results of the discussion regarding the research and development of critical thingking assessment, the following conclusions can be drawn: (1) From the 30 questions that were developed, 25 items were carried out with limited trials and final field tests. Based on the validity test with Product Moment correlation, and reliability with Cronbach's Alpha, it was found that the 25 questions were valid and reliable; (2) Standardization of the instrument using the KMO test showed that the 6 elements of the existing instrument had internally valid results. Namely elements of interpretation, analysis, evaluation, conclusions and explanations because the KMO and MSA TEST values are > 0.5. So, it shows the data is valid and reliable in a construct.

Suggestions that can be given by researchers are: (1) Recommendations for schools, should be able to provide online facilities for students in order to improve student learning abilities; (2)Recommendations for educators, every educator should pay more attention to assessment instruments in the critical realm in order to improve students' critical thinking skills; (3) Recommendations for students, it is better to increase knowledge about critical thinking skills; (4)Recommendations for further researchers, should be able to focus more on indicators that can measure the variables studied, can research other economic learning materials, and can further develop the characteristics of assessment

instruments on materials that are easier to apply by students, for example: material employment

REFERENCES

Avvisati, F., Jacotin, G., & Vincent-Lancrin, S. (2014). Educating Higher Education Students for

Innovative Economies: What International Data Tell Us. *Tuning Journal for Higher Education*, *1*(1), 223.

Bloom. (1956). *Taksonomi Bloom (Ranah Kognitif, Afektif, dan Psikomotor) Serta Identifikasi Permasalahan Pendidikan di Indonesia*. *3*, 1–10.

Changwong, K. (2018). *Critical thinking skill development : Analysis of a new learning management model for Thai high schools*. *11*, 37–48. https://doi.org/10.14254/2071-8330.2018/11-2/3

Chukwuyenum, A. N. (2013). Impact of Critical thinking on Performance in Mathematics among Senior Secondary School Students in Lagos State. *IOSR Journal of Research & Method in Education (IOSRJRME)*, *3*(5), 18–25. https://doi.org/10.9790/7388-0351825

Critchley, B. (2011). Critical Thinking in Business Education. *Investigations in University Teaching and Learning*, *7*(1995), 5–15.

Duron, R., Limbach, B., & Waugh, W. (2006). Critical thinking framework for any discipline. *International Journal of Teaching and Learning in Higher Education*, *17*(2), 160–166.

Ennis. (1995). Critical Thinking. In *Prentice Hall*. https://doi.org/10.4000/mefra.3428

Fuad, N. M., Zubaidah, S., Mahanal, S., & Suarsini, E. (2017). Improving junior high schools' critical thinking skills based on test three different models of learning. *International Journal of Instruction*, *10*(1), 101–116.

Kaddoura, M. (2013). Think Pair Share : A teaching Learning Strategy to Enhance Students ' Critical Thinking. *Education Research Quarterly*, *36*(4), 3–24.

Kemendikbud. (2014). Implementasi Kurikulum 2013 Konsep dan Penerapan. *Kementrian Pendidikan Dan Kebudayaan*, 1–162.

Koulaidis, V., & Dimopoulos, C. (2003). An Analysis of the Discursive Transitions across Different Modalities of the Pedagogic Discourse. *International Journal of Learning*, *10*, 1–13.

Krull, E. (2003). Hilda taba (1902–1967). *Prospects*, *33*(4), 481–491.

Mahdavi, M. (2014). An Overview : Metacognition in Education. *International Journal of Multidisciplinary and Current Research*, *2*(June), 529–535. http://ijmcr.com/wp-content/uploads/2014/05/Paper5529-535.pdf

Paul, R. and L. E. (2005). *The Miniature Guide to Critical Thinking Concepts and Tools.(Online)*. www.criticalthinking.org

Redhana, W. (2008). Program Pembelajaran Keterampilan Berpikir. *Forum Kependidikan*, *27*(2), 103–112.

Rohayati, D. (2017). *Students' Critical Thinking in Writing an English Exposition Text (A Case Study in a Private University in West Java)*. *82*(Conaplin 9), 228–232. https://doi.org/10.2991/conaplin-16.2017.50

Permendikbud. (2015). PERATURAN MENTERI PENDIDIKAN DAN KEBUDAYAAN REPUBLIK INDONESIA NOMOR 52 TAHUN 2016 TENTANG RINCIAN. *Journal of Chemical Information and Modeling*, *53*(9), 1689–1699.

Prameswari, S. W., Suharno, S., & Sarwanto, S. (2018). Inculcate Critical Thinking Skills in Primary Schools. *Social, Humanities, and Educational Studies (SHEs): Conference Series*, *1*(1), 742–750. https://doi.org/10.20961/shes.v1i1.23648

Sugiyono. (2017). *Metode Penelitian Kuantitatif, Kualitatif, dan R&D*. Alfabeta.

Suparno, S. (2018). Development of E-Book Multimedia Model to Increase Critical Thinking of Senior High School Students. *Dinamika Pendidikan*, *12*(2), 196–206. https://doi.org/10.15294/dp.v12i2.13567

Susanto, A. (2013). *Teori Belajar dan Pembelajaran di Sekolah Dasar Kencana Prenada Media Group*. Kencana Prenada Media Group.

Tuncer, M. (2017). Effect of Metacognitive Awareness on Achievement in Foreign Language Learning. *Istanbul Ticaret Universitesi Sosyal Bilimler Dergisi*, *16*(31), 297–310.

Yazar Soyadı, B. B. (2015). Creative and Critical Thinking Skills in Problem-based Learning Environments. *Journal of Gifted Education and Creativity*, *2*(2), 71–71. https://doi.org/10.18200/jgedc.2015214253