

# ANALYSIS OF COGNITIVE ASSESSMENT INSTRUMENT IN INDONESIA INDEPENDENT CURRICULUM

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## ABSTRACT

The curriculum is an important component that must be considered in organizing education. Curriculum adjustments are carried out to meet all forms of skills and challenges that are present and are expected to be able to lead education in a better direction. Recently, the Minister of Education in Indonesia released an independent curriculum applied to Education in Indonesia. Some schools have implemented an independent curriculum, but some other schools have not implemented it. This research was motivated by the implementation of an independent curriculum. One of the schools that have implemented an independent curriculum is SMK Negeri 1 Kudus. This study aims to analyze the cognitive assessment instrument of the independent curriculum of the Office governance automation expertise program of SMK Negeri 1 Kudus. This research uses qualitative methods with an analytical approach. The source of data in this study is primary data. The data collection techniques used in this study were interviews, questionnaires, and documentation. The data analysis method in this study consists of data collection activities, data reduction, data presentation, and conclusion. The independent curriculum has focused on developing students' mindsets by honing students' higher-order thinking skills (HOTS). In learning, a student's HOTS can be honed and measured through cognitive assessment. The results of the study, based on the indicators of cognitive assessment of the independent curriculum, teachers of the Office governance automation expertise program of SMK Negeri 1 Kudus have not been optimal in making cognitive assessment instruments for the independent curriculum. The importance of knowing the suitability of the curriculum with the learning process carried out by teachers in schools is so that what is the goal of education is achieved effectively and efficiently as a provision for students to be able to face the challenges of the times.

Keywords: Cognitive Assessment, *independent curriculum*, *Office Administration*, *Vocational High School*.

## 1. INTRODUCTION

Education is one of the tools for creating quality human resources through practice and learning processes. Education should be held with high quality. Education that is held with high quality will have great opportunities in creating high-quality human resources. The key dimensions of educational practice refer to the 21<sup>st</sup>-century learning model that organizes collaborative learning, the use of information technology as a tool for knowledge construction and shared construction, critical and creative thinking, and authentic problem solving (Chai, et al. 2015).

Schools are required to be able to prepare students to enter the 21<sup>st</sup> century. Teaching and learning activities in schools must be directed at fulfilling the skills demanded by the 21<sup>st</sup> century. The learning process becomes unlimited and learning resources become more dynamic because of developments that occurred in the 21<sup>st</sup>-century. Therefore, everything the skills demanded and the challenges that arise in the 21<sup>st</sup>-century must be able to be answered by the world of education. Therefore, education must develop

educational programs in a more planned manner through the curriculum that will be taught to students.

The curriculum is everything that will be learned by students to achieve a certain goal. Curriculum adjustments are made to meet all kinds of skills and challenges that are present. Curriculum challenges are very complex in responding to the demands of the 21<sup>st</sup> century. Appropriate changes to the curriculum are made to answer these demands and challenges. Staying on track with the vision, mission, and goals of national education is the real challenge. Therefore, a curriculum that is internally and externally capable of responding to the needs of the 21<sup>st</sup> century is needed. Thinking skills are one of the life skills that need to be developed through the educational process because they can determine the success of a person's life (Fajari, et al. 2020). One of the 21<sup>st</sup>-century skills that must be emphasized in the learning process in schools is critical thinking skills, which are part of the Higher Order Thinking Skills (HOTS) (Kocak, et al, 2021). The ability to solve problems is one of the HOTS skills, which has an important role in the 21<sup>st</sup>-century skills.

Currently, the government through an independent curriculum is starting to answer the challenges of the 21<sup>st</sup> century. SMK Negeri 1 Kudus SMK Negeri 1 Kudus is one of the best schools out of 1,588 vocational schools in Central Java (BPS, 2020). In addition, SMK Negeri 1 Kudus is a school that has implemented an independent curriculum. For this title, SMK Negeri 1 Kudus should have improved quality in all aspects, both the learning process and service. In the current learning process, SMK Negeri 1 Kudus uses the independent learning curriculum. In its application, the independent learning curriculum develops learning evaluation forms and models that are by the demands of Education 4.0. This development was carried out to achieve and improve HOTS, innovative learning, student product innovation, and collaborative relationships between teachers and students.

The independent curriculum focusses on developing students' mindsets by honing students' abilities to think at a higher order or Higher Order Thinking Skill (HOTS). One way that teachers can do in developing students' high-level thinking patterns is by organizing a learning process that directs students to high-order thinking. One way that can be done by the teacher is by giving HOTS-based questions.

HOTS Higher Order Thinking Skills (HOTS) or a higher order thinking skill is a mental activity that is involved in the process of thinking and exploring complex, creative, and reflective experiences that are carried out consciously to achieve goals, namely acquiring knowledge which includes the level of analytical thinking, synthesis, and evaluative (Rofiah, et al. 2013). HOTS as a multidimensional cognitive construction, implies inductive and

deductive reasoning, as well as creative processes, interacting in different phases of the problem-solving process (Linn, 2000).

An intellectual process of conceptualizing, applying, synthesizing, and/or evaluating information obtained from observation, experience, reflection, thinking, or communication as a basis for believing and acting becomes the focus of HOTS (Özkahraman & Yıldırım, 2011). Critical thinking which is a HOTS component is an important element that must be achieved in implementing the learning curriculum (Barell, 2003). Guidance to develop HOTS for students requires changes or transformations in education through the design and implementation of educational curricula and policies (Siegel, 2010).

Automation of public relations governance and protocol is one of the subjects that needs attention because it has a broad scope. In implementing public relations and protocol activities, several problems will likely occur, such as in building relationships with internal and external parties and implementing protocol activities. In this case, public relations, s, and protocol activities are static and often intersect with various parties who have different characters. There are still many problems that are closely related to public relations and protocol and are very likely to occur in the world of work. The introduction of problems related to public relations and protocol can be done during the learning process through a HOTS-based learning process. Through the HOTS-based learning process, students will get used to thinking critically, such as analyze, evaluate, and create to find solutions to existing problems. Introduction to problems and finding solutions to a problem can be trained through the learning process including the habit of giving HOTS-based questions. This needs to be known and studied by office governance automation SMK Negeri 1 Kudus students from an early age. office governance automation in SMK Negeri 1 Kudus graduates is expected to be very ready and competent in carrying out their duties, especially in the fields of public relations and protocol.

Therefore, HOTS-based learning and the provision of HOTS-based questions need to be implemented in the PR and protocol governance automation subject. Introduction to problems and finding solutions to a problem can be trained through the learning process including the habit of giving HOTS-based questions. This needs to be known and studied by office governance automation in SMK Negeri 1 Kudus students from an early age. Office governance automation in SMK Negeri 1 Kudus graduates are expected to be very ready and competent in carrying out their duties, especially in the fields of public relations and protocol. Therefore, HOTS-based learning and the provision of HOTS-based questions need to be implemented in the PR and protocol governance automation subject. Introduction to problems and finding solutions to a problem can be trained through the learning process including the habit of giving HOTS-based questions. This needs to be known and studied by office governance automation in SMK Negeri 1 Kudus students from an early age. office governance automation in SMK Negeri 1 Kudus graduates is expected to be very ready and competent in carrying out their duties, especially in the fields of public relations and protocol. Therefore, HOTS-based learning and the provision of HOTS-based questions need to be implemented in the PR and protocol governance automation subject.

So far, the teachers of class XI office governance automation SMK Negeri 1 Kudus have given HOTS-based questions to students of class XI office governance automation SMK Negeri 1 Kudus. However, a fact was found, that the composition of HOTS-

based questions made and given by teachers was still lower than LOTS-based questions. If the accumulated percentage of HOTS-based questions (C4, C5, C6) is 39% and LOTS-based questions (C1, C2, C3) are 61%. This shows the lack of giving HOTS-based questions so that students are less able to develop students high-level thinking patterns.

Based on the interviews conducted with the teacher, it was found that the teacher in making HOTS questions had provided a stimulus to students in the hope that it would make it easier for students to understand and answer questions. In addition, students also experience various obstacles. In this case, differences in results were found between the data obtained from teachers and students.

From the description above, the researcher is interested in examining more deeply related cognitive assessment instruments in response to the initial findings of the data and to bridge the existing debate. For this reason, the researcher took the title "Analysis of Cognitive Assessment Instruments in the Independent Curriculum for Public Relations and Protocol Subjects at SMK Negeri 1 Kudus".

## **2. LITERATURE REVIEW**

### **2.1 Independent Curriculum**

Characteristics of the independent curriculum are: development of soft skills and character: Development of soft skills and character through a project to strengthen the profile of Pancasila students, focus on essential material: Focus on essential, relevant, and in-depth material so that there is sufficient time to build students' creativity and innovation in achieving basic competencies such as literacy and numeracy, and flexible Learning: The flexibility for teachers to carry out learning that is by the stages of achievement and development of each student and make arrangements with local context and content.

The excellence of the Independent Curriculum, are: simpler and more profound: Focus on essential material and develop students' competencies in their phases. Learning becomes deeper, meaningful, unhurried, and fun, more independence: Independence for students means that there is no specialization program in high school, students choose subjects according to their interests, talents, and aspirations. Freedom for Teachers, that is, teachers teach according to the stages of achievement and development of students. And independence for schools means that schools have the authority to develop and manage curricula and learning by the characteristics of educational units and students, and more relevant and interactive: Learning through project activities (project-based learning) provides wider opportunities for students to actively explore actual issues such as environmental, health, and other issues to support the development of character and competency in Pancasila Student Profiles that are relevant to life students everyday

### **2.2 Definition of Cognitive Assessment Instruments**

Kararina (2020) states that an instrument is a tool that meets academic requirements so that it can be used as a tool to measure a measuring object or collect data about a variable. An instrument is a tool that can be used to measure the level of competency achievement. Meanwhile, according to Al-Tabany (2017), assessment is an assessment activity that occurs in the teaching and learning process and is carried out systematically and continuously. Malawi & Maruti (2016: 2) assessment activities carried out during the course to see whether the efforts made through teaching have

reached the goal or not. The assessment of cognitive aspects is more emphasized in understanding teaching subjects, namely in the form of theories in the material.

According to Bloom's taxonomy, broadly speaking the objectives, processes, and learning plans are classified into three domains, are: the cognitive realm is containing behaviours that emphasize intellect and thinking ability, the affective domain is contains behaviours that emphasize feelings and emotional aspects, and the psychomotor domain is contains behaviours that emphasize aspects of motor skills/limb movements.

During its development, Bloom's taxonomy on the cognitive domain was revised by Anderson & Krathwohl (2001). In their revision, Anderson and Krathwohl divide cognition into two different dimensions, namely: knowledge dimension, in the knowledge dimension, is classified into four levels ranging from concrete knowledge to abstract knowledge, are factual, conceptual, procedural, and metacognitive and Cognitive process dimension, in the cognitive process dimension, is classified into six levels from low-order thinking to high-order thinking, namely: remembering, understanding, applying, analyze, evaluate, and create or being creative.

Below is a comparison table of Bloom's taxonomy before and after revision:

**Table 1. Comparison of Bloom's Taxonomy Before and After Revision**

| Cognitive level | Bloom's Taxonomy Before Revision | Bloom's Taxonomy After Revision |
|-----------------|----------------------------------|---------------------------------|
| C1              | Knowledge                        | Remember                        |
| C2              | understanding                    | Understand                      |
| C3              | Application                      | apply                           |
| C4              | Analysis                         |                                 |
| C5              | Synthesis                        | Evaluate                        |
| C6              | Evaluation                       | Create/Create                   |

(Source: Anderson & Krathwohl, 2001)

Cognitive learning outcomes are changes in behaviours that occur in the cognitive area. The learning process that involves cognitive includes activities from receiving external stimuli by sensory, storing, and processing in the brain into information to recalling information when needed to solve problems. Therefore, in Purwanto (2014) learning involves the brain, and changes in behaviours as a result also occur in the brain in the form of a certain ability by the brain to solve a problem at hand. So, the cognitive assessment instrument is a tool that can be used to measure the level of achievement of student competence in cognitive aspects.

### 2.3 HOTS Cognitive Assessment Instrument

Lestari (2021) Assessment is an important component in implementing Education. Assessment instruments are a set of tools used in activities to collect data and collect information by something that has been measured, aiming to determine the level of competence achieved in the form of test instruments or non-test instruments.

In the opinion of Triantono (2014), states that an assessment instrument is a tool that can be used to measure the level of competency achievement in the form of tests or non-tests, and the techniques used are inseparable from an instrument used to collect progress data student, both related to the learning process and learning outcomes by the competencies of interest

The assessment instrument is made as a measuring tool that must be by the material presented and can meet the expected aspects of the assessment. Gathering information from several studies there are three formats of assessment instruments: choose an answer (multiple choice questions, matching questions), generating (questions with short answers, essays, and performance), and explain (give reasons for a choice or answer to a question).

Formulating material that will be used as material or basic questions according to the expected behaviours is something that must be considered in writing HOTS-based cognitive assessment instruments. There are steps in preparing a HOTS-based cognitive assessment instrument. The following is explained by Widana and the Ministry of Education and Culture (Fanani, 2018) the steps for preparing a HOTS-based cognitive assessment instrument: analyze the basic competencies that can be made into HOTS questions, compile a grid of questions, choose an interesting and contextual stimulus, write the question items according to the question grid, and create scoring guidelines (rubrics) or answer keys.

From the description of the opinion above, it can be synthesized that the first thing to do in preparing HOTS questions is to determine the basic competencies which, if possible, can be made into HOTS questions, then proceed with compiling the grid, then write questions and assessment guidelines and answer keys.

The development of a HOTS-based cognitive assessment instrument requires various criteria, both in terms of the form of the questions and the content of the subject matter. The written questions are always given a basic question (stimulus) in the form of sources/reading material, such as: reading text, paragraphs, cases, pictures, graphs, photos, formulas, tables, lists of words/symbols, examples, maps, films, or sounds. recorded. According to Devi (2012: 9), there are eleven provisions in making HOTS-based cognitive assessment instruments, as follows: focus on questions, analyze arguments, consider trustworthy, considers observation reports, comparing conclusions, define conclusions, consider induction ability, evaluate, defining the concept, defining assumptions, describe.

The indicators used in the HOTS-based cognitive assessment instrument are the cognitive revision bloom taxonomy, are: 1) analyze, there are main processes in the analysis dimension, including differentiating, organizing, and attributing. 2) valuate the main process in the evaluating dimension, namely checking and criticizing. Creating: there are 3 things in the process dimension of creating, namely producing, planning, and producing.

## 1. METHODS

This study uses a descriptive qualitative method which is intended to describe the cognitive assessment instrument of the independent curriculum in the public relations subject of the office governance automation SMK Negeri 1 Kudus using an analytical approach. The types of data used are primary data (questionnaires and interviews) and secondary data (documents). Data collection techniques used in this study were interviews, questionnaires, and documentation. The method of data analysis in this study consisted of data collection activities, data reduction, data presentation, and drawing conclusions.

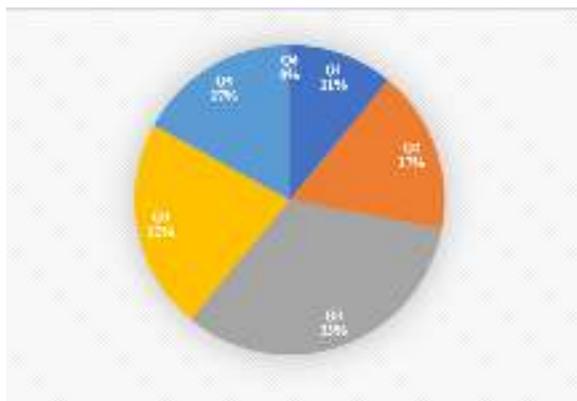
### 3. RESULTS & DISCUSSION

#### 3.1 Characteristics of Learners

The characteristics of students can be interpreted as the overall pattern of behaviour or abilities possessed by students because of nature and the environment, thus determining their activities in achieving their goals or goals. Ardhana in Budiningsih (2017) student characteristics are one of the variables in learning design which is usually defined as the experiential background ossessed by students including other aspects that exist in them such as general abilities, expectations of learning, and characteristics - physical and emotional characteristics of students that have an impact on learning effectiveness. The characteristics of students that teachers need to understand include ethnicity, culture, social status, interests, cognitive development, early abilities, learning styles, motivation, emotional development, social development, moral and spiritual development, and motor development.

A teacher must know and understand each characteristic of students. This will make it easier for teachers to determine the right model and method for delivering lessons to students. If the teacher has conveyed it in the right way, students will be able to follow and understand the lesson conveyed by the teacher. The attitude of teachers who are willing to understand the characteristics of students has a broad positive impact. Teachers can contribute to the formation and development of students' thinking skills. This makes it easier for teachers to make assessment instruments or questions that can be adapted to the characteristics of students.

SMK Negeri 1 Kudus has implemented an independent curriculum that emphasizes the development of students' higher-order thinking skills. One way that can be done to support the development of students' higher-order thinking skills is by giving HOTS-based questions. Mr / Mrs teachers have accustomed students to working on HOTS-based questions without putting aside LOTS-based questions. Therefore, the questions are made in a very varied way, namely questions based on LOTS and HOTS. The questionnaire given to 8 office governance automation's teachers at SMK Negeri 1 Kudus showed that the percentage of questions based on LOTS and HOTS was different for each.



**Image 1. Composition of HOTS questions made by the teacher.**

From the diagram, if the accumulated percentage of HOTS questions (Q4, Q5, Q6) is 39% and LOTS questions (Q1, Q2, Q3) is 61%. The results of interviews with the teacher, that the teacher gave a stimulus to each question, especially HOTS-based

questions. These findings are reinforced by the results of the student questionnaire. 70 students acknowledged that the teacher did provide a stimulus to the HOTS-based questions. The teacher provides a stimulus to the problem because students have different understanding characteristics, so the stimulus hopes to help each student understand and answer questions.

Even though Mr. / Mrs. Teacher has provided a stimulus. However, students still experience various obstacles. Based on the student questionnaire, the findings of the obstacles experienced by students were obtained, including: less focus, complicated questions to understand, long Read, not mastering the material, difficult to compose an answer.



**Image 2. Obstacles Experienced by Students in Solving HOTS Questions**

For the most part, the obstacles experienced by students come from the internal factors of the students themselves. However, what had a big influence and a high percentage of answers came from external factors, namely 38% of 70 students said that the questions were complicated to understand. This is because the question sentences are less understandable, the stimulus has nothing to do with the problem, and the questions do not lead to the desired purpose. This statement was validated by the teacher's questionnaire, that one of the obstacles experienced by the teacher in making HOTS-based questions was that it was difficult to choose words or sentences that were easy for students to understand. Selection of operational verbs and constructing sentences is an obstacle that is often faced by teachers, so questions are difficult to understand (complicated).

From this explanation accompanied by data obtained from the results of teacher interviews and teacher and student questionnaires, especially students found various obstacles experienced. These various obstacles are proof that the independent curriculum cognitive assessment instrument in the public relations subject of office governance automation in SMK Negeri 1 Kudus has not fully adapted to the characteristics of students.

#### 3.2 Assessment Plan

An assessment plan is a procedural framework that will be used as a reference for conducting an assessment. The assessment plan is important and must be considered by the teacher before assessing students so that the assessment objectives can be achieved optimally. Therefore, cognitive assessment instruments must pay attention to the following points:

- a. Set assessment goals.

The purpose of the assessment is to measure students' mastery in identifying social functions, text structures, and linguistic elements of several spoken and written descriptive texts by giving and asking for information related to descriptions of people,

animals, and objects, very short and simple, according to the context of their use.

b. Determine the form of assessment.

Selection of the form of assessment by considering the suitability of the basic competencies to be assessed.

c. Choose an assessment technique.

The selected assessment technique must be presented in the Learning Implementation Plan.

d. Lay out the grid.

The grid is a format, containing the criteria for the questions to be prepared covering the basic competencies to be measured, the scope of the material, the material, the question indicators, the number of questions, the level, and the form of the questions. The preparation of the grid is done to ensure that the items represent what should be measured proportionally. Factual, conceptual, and procedural knowledge with low to high-level thinking skills will be adequately represented.

e. Compose questions.

Preparation of items based on the grid and the rules for compiling questions.

f. Develop scoring guidelines.

The answer key is provided for the preparation of multiple-choice questions, filling in, matching, and short answers. The description questions are provided with answer keys/criteria.

The things that have been described above were used by the researcher as an indicator of the assessment plan in analyze the cognitive assessment instrument in the public relations subject of the office governance automation expertise program. The data collection process was carried out through interviews, questionnaires, and documentation. The results of the analysis of the assessment plan on the cognitive assessment instrument in the public relations subject of the office governance automation expertise program at SMK Negeri 1 Kudus are as follows:

a. Set assessment goals.

The teacher has determined the purpose of the assessment and the determination of the purpose of the assessment based on the learning objectives contained in the lesson plan.

b. Determine the form of assessment.

The forms of assessment used by teachers vary and have been adapted to the basic competencies to be assessed. Some forms of assessment commonly used by teachers are tests, observations, and assignments.

c. Choose an assessment technique.

Teachers have included assessment techniques in Learning Implementation Plan. The determination of the assessment technique is adjusted to the mastery of knowledge competence. Several assessment techniques are commonly used by teachers, namely using written test techniques, oral tests, and assignments according to the competencies being assessed.

d. Lay out the grid.

Teachers often forget the arrangement of the grid. Teachers often do not pay attention to the important role of the grid. The grid has an important role for the teacher, namely facilitating in determining the scope of the material, question indicators, and levels, and making the form of questions. The preparation of the grid is done to ensure that the items represent what should be measured proportionally. Grids also have an important role for students, namely helping students in developing low-level and high-level thinking skills, because the questions made by the teacher are adequately or proportionally represented.

e. Compose questions.

The teacher in making questions is still not optimal. There is no standard grid to be used as a reference and has not referred to the rules for compiling questions. One of them is the selection of words and sentences that are used are still not able to provide understanding to students. In the preparation of questions in the independent curriculum, teachers still did not pay attention to the percentage of HOTS and LOTS questions. Teachers are still dominantly using LOTS-based questions. Meanwhile, in the independent curriculum the emphasis is on making HOTS-based questions.

f. Develop scoring guidelines.

There are already guidelines for scoring on multiple-choice questions, short answers, and matchmaking. However, there is no scoring guide sheet for description questions or long entries, which is related to the absence of answer criteria accompanied by points or grades.

From the results of the analysis of the cognitive assessment instruments that the researchers obtained through interviews, questionnaires, and documents in public relations subjects with indicators of assessment plans, researchers found a fact, that teachers had not fully paid attention to assessment plans. Teachers tend to focus on making questions, which are often obtained (copy-pasted) from textbooks, the internet, and reference books used during learning.

#### 4. CONCLUSION

The results of the analysis with the 2 indicators above, it can be concluded that the teacher in making cognitive assessment instruments for the independent curriculum has not been maximized and has not paid attention to the characteristics of students and assessment plans. This is because there are components that are not fulfilled and carried out by the teacher, causing problems.

#### 5. REFERENCES

- Al-Tabany, T. B. (2017). *Mendesain Model Pembelajaran Inovatif, Progresif, Dan Kontesual*. Jakarta: Prenada Media.
- Anderson, & Krathwohl. (2001). *A Taxonomy for Learning, Teaching, and Assessing*. New York: Addison Wesley, Longman.
- Barell, J. (2003). *Developing More Curious Minds*. Alexandria: Association for Supervision and Curriculum Development.
- Chai, C. S., Deng, F., Tsai, P. S., Koh, J. L., & Tsai, C. C. (2015). Assessing Multidimensional Students' Perceptions of Twenty-First-Century Learning Practices. *Asia-Pacific Education Review*, 16(3), 389–398.
- Fajari, L. W., Sarwanto, S., & Chumdari, C. (2020). The effect of problem-based learning multimedia and picture media on students' critical-thinking skills viewed from learning motivation and learning styles in elementary school. *Ilköğretim Online*, 1797 – 1811
- Fanani, M. Z. (2018). Startegi Pengembangan Soal Hogher Order Thinking Skill (HOTS) Dalam Kurikulum 2013.

*Edudeena: Journal of Islamic Religious Education*, 2(1), 57-76.

- Karerina, N. (2020). Pengaruh Instrumen Penilaian Kognitif Berbasis HOTS (Higher Order Thinking Skill) Terhadap Keterampilan Pemecahan Masalah Peserta Didik Pada Mata Pelajaran PPKn Di SMA Negeri 1 Pagelaran Tahun Pelajaran 2020/2021. *Journal of Social Science Education*, 1(1), 69-76.
- Kocak, Ö., Çoban, M., Aydin, A., & Çakman, N. (2021). The Mediating Role of Critical Thinking and Cooperativity in the 21st Century Skills of Higher Education Students. *Thinking Skills and Creativity*, 42.
- Lestari, T. U. (2021). Pengembangan Taksonomi dan Instrumen Penilaian Higher Order Thinking Skill untuk Pembelajaran Suhu dan Kalor di SMA/MA.
- Linn, M. C. (2000). Designing the knowledge integration environment. *International Journal of Science Education*, 22(8), 781-796.
- Malawi, I., & Maruti, E. S. (2016). *Evaluasi Pendidikan*. Magetan: CV. AE Media Grafika.
- Rofiah, E., Aminah, N. S., & Ekawati, E. Y. (2013). Penyusunan Instrumen Tes Kemampuan Berpikir Tingkat Tinggi Fisika pada Peserta Didik SMP. *Jurnal Pendidikan Fisika*, 17-21.
- Özkahraman, Ş., & Yıldırım, B. (2011). An Overview of Critical Thinking in Nursing and Education. *American International Journal of Contemporary Research*, 1(2), 190-196.
- Purwanto. (2014). *Evaluasi Hasil Belajar*. Yogyakarta: Pustaka Belajar.
- Siegel, H. (2010). Critical thinking. *International Encyclopedia of Education*, 6, 141–145.