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Implementation of Higher-Order Thinking Skills in Elementary School Using Learning Model, Media, and Assessment

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ABSTRACT

The present learning process should be directed at higher-order thinking skills (HOTS). However, there are still many teachers in elementary schools who have not implemented hots learning as a whole, both in terms of learning models, media, and assessments, because there are no guidelines or modules related to the implementation of HOTS, especially at the elementary school level. This condition certainly requires an adaptation process that is not easy and also includes synthesizing, analyzing, reasoning, comprehending, applying, and evaluating. Therefore, this study aims to determine the implementation of HOTS in elementary schools, using learning models, media, and assessment. In this experiment, a narrative review was used with a database search and thematic analysis. The criteria used also emphasized the articles from various sources, such as national and international scientific journals, related topics, the last 5 years of publication within 2018-2022, and full-text pdf versions in ERIC and Mendeley. From this process, a total of 11 articles were subsequently analyzed. Based on the results, the following was obtained, (1) several learning models stimulated, trained, developed, and improved HOTS in elementary school students, using project and problem-based learning, STEM (Science, Technology, Engineering, and Mathematics), inquiry, problem determination and solution, concept construction and analysis, as well as RADEC (Read, Answer, Discuss, Explain, and Create). (2) Learning media capable of developing HOTS include question-based fun thinkers, Android-based word search educational games, and a related crossword puzzle. (3) HOTS assessments were carried out using the Two-Level Multiple Choices Test (TTMCT) instrument. This led to the establishment of the criteria for students' product evaluations, using formative and summative assessments, self, peer, and teacher-evaluation incorporation, as well as HOTS question development. From these results, teachers need to use various learning models, media, and assessments. Teacher should also initiate the aspects of higher-order thinking skills, including learning analysis, evaluation, and development.

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1. INTRODUCTION

The present era of global competition demands quality learning for students, to develop their skills, abilities, and talents as capital to confront challenges. Based on real information, some of student are often unable to relate their institutional learning outcomes with a real-life application (Usmaedi, 2017). This is because the educational processes in elementary schools emphasize pure skills without deep understanding (Hendriawan & Usmaedi, 2019). Additionally, the present learning conditions commonly only obey the students with low critical thinking skills, which passively obtain academic materials from the teacher (Sarwanto, Fajari, & Chumdari, 2021).

Optimizing the thinking skills of students is important in learning to solve real-world problems that often require higher attributes. For example, student should be able to think critically during decision-making processes. To conduct this, students need to reason logically, as well as reflect on and apply their prior knowledge to encountered problems. Critical thinking is also needed in problem-solving and decision-making processes (Sani, 2019). For example, students should be able to analyze problems and determine alternative solutions, apply problem-solving strategies, as well as evaluate the appropriate methods and resolutions used. This indicates that any encountered problem is easy to solve when they have adequate critical thinking patterns. Therefore, the introduction of HOTS (Higher Order Thinking Skills) learning is expected to answer national education problems, as well as improve an excellent and internationally competitive system. According to the recent Taxonomy version of Bloom Krathwohl, the thinking domain contained remembering (C1), understanding (C2), applying (C3), analyzing (C4), evaluating (C5), and creating (C6). In this case, HOTS learning only emphasized C-4 (Analysis), C-5 (Evaluation), and C-6 (Creation). These aspects need to be reflected in the approaches, models, strategies, and methods used by the teachers during the learning process.

Besides the implementation of HOTS when compiling questions in schools, its application in the learning methods/models and media is also observed. This explains that the development and utilization of various learning models, methods, materials, worksheets, and media are able to increase students' HOTS (Ichsan et al., 2019). The teaching model should also include thinking skills, examples, and application of thoughts, which need to be adapted to the requirements of students. In addition, an assessment model is observed, which requires the unfamiliarity of students with the questions or assignments provided. This shows that student have enough initial knowledge to use HOTS (Sofyan, 2019). However, it is not easily implemented in learning and assessment.

Yayuk's research proves that teachers must be able to master concepts and strategies to apply HOTS learning (Yayuk, Deviana, & Sulistyani, 2019). Students also experience difficulties in formulating correlated indicators to become assessment instruments (Hanifah, 2019). As is the case with Yuliandri's research, HOTS has not been widely developed and used in accordance with the revised Bloom's Taxonomy, which prioritizes the formulation of test questions in elementary schools. This subsequently caused the use of low-level thinking tests or LOTS, indicating that the HOTS-based questions regarding the revision of Bloom's taxonomy need to be developed in elementary schools (Yuliandini, Hamdu, & Respati, 2019). Therefore, this study aims to determine the implementation of higher-order thinking skills (HOTS) in elementary schools, using learning models, media, and assessments of various references. Several studies that have been conducted only discuss one of the models, media, or assessments but have not synergistically explained HOTS learning models, media, and assessments.

2. METHODS

This study uses a Narrative Review approach, which aims to analyze and synthesize existing knowledge related to certain topics to find gaps for research to be carried out. The type of data used in this research is secondary data in the form of scientific articles from various sources obtained through Eric and Mendeley which are tied to the research theme. Data collection techniques in this study used

technical documentation, where the collection of journal documents was not limited by space and time. The steps of this research are as follows:

a. Defining the aim of the review and specifying the type of evidence (facts and evidence). This showed that the review aimed to determine the implementation of higher-order thinking skills (HOTS) in elementary schools, using learning models, media, and assessment. According to the acquired evidence, specific models, media, and assessments stimulated and developed HOTS.
b. Determining a literature search strategy, publication year, and the language used. These were only limited to journal articles or conference proceedings, online or offline access methods, and others. This study subsequently involved the articles published from 2018 to 2022, which were in Indonesian and English versions, as well as digitally accessed through Eric and Mendeley. In this case, the keywords employed in the search for secondary data were higher-order thinking skills (HOTS), elementary school, methods, media, and assessment. Based on the results, a total of 71 articles matched the study theme in a period of 2018-2022. This was accompanied by the performance of a screening process, which did not include proceedings and devotional articles, leading to the acquisition of 26 articles. These articles were subsequently re-selected based on eligibility with the criteria of national and international scientific journals, relevance to the study topic, and a 5-year publication period of 2018-2022. This performance caused the acquisition of 11 articles, which were then used for revision.
c. Determining the type of method used in the reviewed articles. This emphasized the use of various models, such as literature review, development research, as well as qualitative and quantitative techniques.
d. Combining the results (grouping) to obtain the intended interpretation (evidence synthesis). This showed that the articles following previously set objectives and evidence were grouped for output analysis. In this case, various previous reports were then synthesized (evidence synthesis).
e. Establishing results, regarding the conclusion of the context of grouping reviews. This proved that the synthesized previous reports were concluded as answers to study questions.

3. FINDINGS AND DISCUSSION

Based on the results of searching articles in Eric and Mendeley, 11 journal articles were found about how to implement HOTS in elementary schools in terms of learning models, media, and assessment, as presented in Table 1.

Table 1. HOTS Implementation in Elementary School

No	Title	Method	HOTS Implementation in Elementary School		
			Model	Media	Assessment
1	Development of a Two-Tier Multiple Choice Test to Assess Indonesian Elementary Students' Higher-Order Thinking Skills (Rintayati, Lukitasari, & Syawaludin, 2020)	Research and development with questionnaires, tests, and interviews, as data collection techniques.	-	-	Using the Two-Level Multiple Choices Test (TTMCT) instrument to measure higher-order thinking skills in the concept of force, motion, and energy in elementary schools.

2	Implementation of STEM (science, technology, engineering, and mathematics) approach in learning the critical thinking skills of fifth-grade elementary school students in Lampung Province (Astuti, Efendi, & Utami, 2021)	A quasi-experimental design with experimental and non-experimental classes	Using the Science, Technology, Engineering, and Mathematics (STEM) approach in learning improved students' critical thinking skills	-	-
3	Effectiveness of the multidimensional curriculum model in developing higher-order thinking skills in elementary and secondary students (Vidergor, 2018)	A quantitative quasi-experimental group design was used to examine the impact of the Multidimensional Curriculum Model (MdCM) on the development of HOTS	• Inquiry • Problem determination and solution • Construction and analysis of the concept	-	• Building criteria for product evaluation with the student • Using formative and summative assessment • Incorporating self, peer, and teacher evaluation
4	Integration of HOTS-Based Questions on the Theme "The Beauty of Togetherness" through Fun Thinkers Learning Media for Grade IV Elementary School Students (Pranyani, Agustiana, & Simamora, 2021)	Research and Development by adapting the ADDIE model, namely analysis, design, development, implementation, and evaluation stages.	-	Developing media fun thinkers based on HOTS questions. These thinkers help students learn more effectively in practicing HOTS.	-
5	*Model Pembelajaran RADEC sebagai Alternatif dalam Meningkatkan Higher Order Thinking Skill pada Pembelajaran IPA di Sekolah Dasar: Systematic Review* (RADEC Learning Model as an Alternative in Improving Higher	Systematic reviews sourced from journal articles and conference proceedings, through Google Scholar.	The RADEC (Read, Answer, Discuss, Explain, and Create) learning model was an alternative to improve HOTS. This showed that analytical thinking skills strongly supported HOTS at the creating stage.	-	-

	Order Thinking Skills in Elementary Schools' Science Learning: Systematic Review) (Tulljanah & Amini, 2021)				
6	*Pengembangan Media Pembelajaran Permainan Edukatif Cari Kata Berbasis Android Untuk Menstimulasi Pembelajaran HOTS* (Development of the Media for Android-based Word Search Educational Games, to Stimulate HOTS Learning) (Gustina, 2021)	Research development with a 4D model (define, design, development, and disseminate)	-	Learning media for Android-Based Word Search Educational Games interestingly stimulated HOTS learning in the classroom.	-
7	*Penerapan Model Problem-Based Learning Untuk Menumbuhkembangkan Higher Order Thinking Skill Siswa Sekolah Dasar* (Application of Problem-Based Learning Model for Developing Higher Order Thinking Skills of Elementary School Students) (Rosidah, 2018)	Literature study	PBL learning model trained and developed HOTS, with students quantitatively and qualitatively obtaining direct experience and changing behavior (knowledge, skills, attitudes).	-	-
8	*Pengaruh Model Pembelajaran Carousel Feedback Terhadap Higher Order Thinking Skills (HOTS) Siswa Sekolah Dasar* (The Effect of the Carousel Feedback Learning Model on the Higher Order Thinking Skills (HOTS) of	Types of quantitative research with experimental design pseudo (quasi-experimental design)	The Carousel Feedback learning model affected HOTS due to using the comments to motivate the expressions of students' ideas on various academic activities. This led to the cultivation of higher-order thinking skills for them and	-	-

	Elementary School Students) (Julaifah & Haifaturrahmah, 2019)		promoted independent study.		
9	*Pengembangan soal High Order Thinking Skill untuk Meningkatkan Kemampuan Berpikir Tingkat Tinggi Matematika Siswa Sekolah Dasar* (Development of HOTS-based questions to Improve Higher Order Thinking Skills Elementary School Mathematics) (Rahayu, Suryana, & Pranata, 2020)	Design-Based Research (DBR) type, developing a test instrument that improved students' thinking skills in answering HOTS questions	-	-	Teachers developed their HOTS questions with the preparation stage, starting from the following, (i) Basic Competency analysis, (ii) Developing question grids, (iii) Selecting question stimuli, (iv) Writing questions, and (v) Scoring guidelines (rubrics) and answer keys.
10	Developing Strategies and Evaluation of HOTS-based Education on Thematic Learning in Elementary Schools (Andrean, 2021)	A qualitative and library study method	Several learning models are presently recommended to be applied by teachers in HOTS education, such as project and problem-based learning, problem-solving, and inquiry/discovery.	-	-
11	*Pengembangan Media Crossword Puzzle Berbasis HOTS pada Pembelajaran Tematik* (Development of HOTS-Based Crossword Puzzle Media in Thematic Learning) (Kusuma, 2021)	Development study with a 4-D model, namely definition, design, development, and dissemination	-	The use of HOTS-based crossword puzzle media improved academic outcomes, leading to the enhancement of students' critical thinking skills in thematic learning.	-

Based on Table 1, a total of 11 articles were analyzed, consisting of 4 international and 7 national journal publications. Different methods were also used in these articles, such as development research, experiments, systematic reviews, and literature studies. In this case, 6, 3, and 2 of the 11 publications emphasized the HOTS learning model, media, and assessment, respectively.

3.1. HOTS Learning Model

A total of 6 of the 11 journal articles prioritized the HOTS learning model, which consisted of 2 international and 4 national journals. These models were found to stimulate, train, develop, and improve HOTS in elementary school students. They also included project and problem-based learning (Andrean, 2021; Rosidah, 2018), Science, Technology, Engineering, and Mathematics (STEM) (Astuti et al., 2021), inquiry (Andrean, 2021; Vidergor, 2018), problem determination and solution (Andrean, 2021; Vidergor, 2018), concept construction and analysis (Vidergor, 2018), RADEC (Read, Answer, Discuss, Explain, and Create) (Tulljanah & Amini, 2021), and Carousel Feedback (Julaifah & Haifaturrahmah, 2019). The problem-based learning (PBL) model was applied according to a constructivist perspective, which emphasized the need for students to explore the surrounding environment and personally build meaningful knowledge (Rosidah, 2018). In this context, the HOTS aspects included analyzing, evaluating, and creating, which were part of the PBL learning syntax. The syntax also contained five main steps, namely 1) Orienting students to problems, 2) Organizing students in learning, 3) Guiding individual and group investigations, 4) Developing and presenting work, and 5) Analyzing and evaluating problem-solving processes (Andrean, 2021; Rosidah, 2018).

Using the PBL model, learning syntax systematically had the potential to develop students' HOTS in solving problems and ensure the knowledge prioritizing basic competencies. This enabled the possession of HOTS for students, due to their exploration of knowledge and attributes asides from listening to the teacher's explanations. Furthermore, the PBL improved the ability to apply concepts to new/real problems, integrated the principle of HOTS, desired to learn, as well as directed self-learning and skills. Students also identified their literacies and illiteracies regarding the information from textbooks or other sources (Andrean, 2021). PBL was subsequently integrated into a Science, Technology, Engineering, and Mathematics (STEM) approach, which was often applied to overcome students' low critical thinking skills (Astuti et al., 2021). Using this approach, the knowledge obtained was most useful in daily activities and provided different implementational interpretations (Ritz & Fan, 2015). STEM also integrated its knowledge into a student-centered learning environment, teaching them the patterns of investigating engineering-related problems, as well as determining the solutions and evidence emphasizing real-world phenomena (Changpetch & Seechaliao, 2019). The application of the STEM approach was the best learning method in elementary schools, to improve students' critical thinking skills (Yaki, Saad, Sathavisam, & Zulnaidi, 2019). This approach promoted active, meaningful, and creative learning processes, where the four scientific aspects were simultaneously acquired to solve daily real-life problems. The implementation of learning was also under the steps of the STEM approach, which consisted of reflection, research, discovery, application, and communication. Additionally, the approach established quality learning in student-centered schools, leading to the output below the academic objectives.

Using the STEM approach, students were required to be actively involved in the learning process, with the demand to integrate various knowledge in the development of critical thinking skills (Sasmita & Hartoyo, 2020). This approach needs to be taught through concrete and contextual phenomena, due to the inability of elementary school students to think abstractly. The four aspects of STEM also emphasized the improvement of critical thinking skills through predetermined indicators, including the focus, reason, inference, situation, clarity, and overview manifested as pre-test and post-test questions. Focus prioritizes the introduction of students to appropriate discussions and problem identification, leading to the provision of rational supporting reasons for the existing challenges. For inference, conclusions were often obtained regarding the appropriate arguments and the evidence analyzed and acquired, respectively. Situations are also defined as beliefs in the thinking and decision-making processes, which are supported by the physical and social environment. Since clarity is used to convey a message about adopted decisions, the overview then emphasized the revision and verification of existing problems. These indicators were adequately used to measure the level of students' critical thinking skills and the products obtained when using the STEM approach. The thinking process is

divided into three types, namely Scientific, Creative, and Future, which prioritized inquiry, problem determination and solution, as well as concept construction and analysis (Vidergor, 2018). The inquiry learning model is used in the investigation process with scientific thinking, involving problem definition, hypotheses formulation, experiment planning, experimental output analysis, and conclusion acquisition (Vidergor, 2010). Most classical scientific inquiry skills, such as asking questions, formulating hypotheses, planning experiments, or drawing conclusions, are also classified as HOTS. Furthermore, scientific thinking involves the inquiry process (Vidergor, 2018), which is used to intuitively underscore concepts, interpretations, and relationships toward conclusions (Andrean, 2021). Creative thinking then involves problem determination and solution (Vidergor, 2018), which included the following stages, (a) identifying the problem, (b) defining the problem, (c) suggesting various solutions, (d) recommending the criteria for the best solution evaluation, (e) applying criteria to select the best solution, and (f) designing an action plan. Since the definitions of creativity tend to vary, problem-solving was selected to represent creative thinking skills.

The RADEC learning model (Read, Answer, Discuss, Explain, and Create) is an alternative to improve HOTS in elementary schools' science education (Tulljanah & Amini, 2021). The model often begins with the Reading stage, where students are asked to read the teaching materials arranged by the teachers. This process is carried out before starting the lesson or carrying it out at home. To guide students in the reading stage, the teachers provide pre-learning questions, which are arranged according to the achievement of students in science learning materials. This activity is very important and should be included in the core learning process, leading to the performance of effective and meaningful academic activities. To determine student feedback at the Read stage, the Answer was subsequently initiated. In this process, the teacher provides post-reading questions to observe high and low-performing students. It also shows that students have adequately understood the material before the beginning of learning. This ensures the focus of the next learning process on incomprehensive elements.

At the Discuss stage, the students are active and enthusiastic, due to the possession of sufficient material provisions to evaluate science learning problems. Critical-analytic skills were developed through challenging discussions or conversations (Murphy, Rowe, Ramani, & Silverman, 2014). Based on these results, an active discussion process is found to specifically promote students to ask questions and use problem-solving strategies, leading to the development of HOTS. According to the revised Bloom's taxonomy, the evaluation skills were specially integrated into C5, through a communicative learning process, which was good in training thinking attributes during English education (Jabeen, 2014). In this discussion stage, HOTS is reportedly developed when students assess each other through the results obtained from other groups. In responding, a high-level thinking process is needed, namely assessing or comparing. The Explain stage requires communication as an integral part of innovative learning, which is contained in the syntax of the inquiry model capable of developing HOTS (Duran & Dökme, 2016). Meanwhile, the Create stage is able to develop HOTS, whose highest level often prioritized creativity. In this stage, the processes prioritize the development of students' creative ideas in product-making activities, which are not commonly limited by the teachers. This unlimited privilege indicated that the teachers provided the students with the freedom to realize their creative ideas in a work. These results were in line with (Handayani, Sopandi, Syaodih, Suhendra, & Hermita, 2019), where the RADEC learning model improved creative thinking skills. Therefore, relevance is observed between the RADEC model and HOTS at the Create stage, regarding the development of creative thinking skills. This is subsequently observed from the solution ideas generated by students in the experimental class, which are very clear with the cognitive level of C6.

Regarding the Carousel Feedback learning model, the HOTS of students is reportedly developed. This model provides opportunities for them to work together in groups, by exploring, asking, and expressing ideas, as well as producing feedback. It is also collectively carried out through the use of appropriate media. Moreover, Carousel Feedback affects HOTS due to the patterns by which students express ideas by commenting on the work of their friends or other groups. Asides from this merit, the

model also promotes independent learning (Julaifah & Haifaturrahmah, 2019). This was subsequently in line with (Yusmanto, Soetjipto, & Djatmika, 2017), where the Carousel Feedback and Round Table Cooperative Learning Models were used to improve HOTS. In this model, HOTS is commonly increased by developing the habituation of observation, discussions, team rotation, group work analysis, and feedback provision. Based on these academic models, the presentation of learning stages trained and stimulated students in analyzing, evaluating, and creating. They were also provided with the problems related to their experiences or phenomena occurring in the surrounding environment. Additionally, the students were invited to analyze the causes and consequences of these problems, as well as subsequently evaluate them to determine appropriate solutions. These solutions were then expected to provide creative ideas in product-making activities or work development.

3.2 HOTS Learning Media

Based on Table 1, a total of 3 articles emphasized the HOTS learning media, which contained 1 international and 2 national journals. The media also included HOTS questions-based fun thinkers (Pranyani et al., 2021), Android-based Word Search Educational Games (Gustina, 2021) and HOTS-based crossword puzzles (Kusuma, 2021). HOTS questions-based fun thinkers help students understand the material delivered by the teachers. This media is designed regarding the 2013 curriculum, by emphasizing the ability to think, innovate, and collaborate in a problem-solving establishment. In this process, the information conveyed by the teachers is adequately and effectively understood. It is also developed in a paper size of 21 cm x 29.7 cm and a total of 31 pages. In addition, art and glossy papers are used, for the media not to be easily torn and damaged (Pranyani et al., 2021). Compared to other media, the advantages of fun thinker are as follows, a) the questions are made of the best papers, to eradicate easy damage, b) the media is individually and collectively used by students, c) it trains and develops the HOTS of students, d) the media is designed to be learned while playing, to prevent boredom and maintain concentration (Nofrion & Wijayanto, 2018). Furthermore, the presentation aspect shows the following, a) the media has an attractive shape with a very suitable combination of colours, textures, and appearances, b) some tiles fit together according to the box provided, c) ease of use, and d) no obstruction is observed when the tiles are laid. HOTS questions-based fun thinker media ensures a very effective learning process, indicating that teachers need to understand the characteristics of students in the classroom. Elementary school students are also theoretically in a concrete operational phase, confirming the necessity for concrete or real objects, to highly understand the material easily. Subsequently, the development of this media facilitates students learning, leading to the appropriate conveyance and optimal achievement of objectives.

Android-based Word Search Educational Game is interesting and able to stimulate HOTS learning in the classroom. This media is an alternative for teachers and students to improve learning outcomes in Social Sciences. Besides learning becoming more meaningful, interesting, and fun, the media is also used by students to strengthen independent education. When using this media, several considerations should be prepared by teachers and students, namely (1) completing the prerequisites for the media, regarding eligible operational android facilities, and (2) possessing the appropriate skills to use the media. During the learning process, students often become active and focus on the media, based on the guidance of the teachers. In this case, students are capable of determining the materials for natural events/symptoms, which commonly occur in Indonesia and neighbouring countries. This game subsequently contains three categories of subject matter, leading to the development of meaningful and fun learning (Gustina, 2021).

The next media is the HOTS-based or pictorial crossword puzzle, which enables students to optimize critical thinking skills. This media emphasizes the stimulus with two pictures accompanied by sentences, leading to the optimal development of critical thinking skills. It also interestingly affects student learning greatly, leading to increased academic motivation and HOTS. Furthermore, the crossword puzzle prioritizes students' skills in reasoning and critical thinking, through the provision of appropriate answers to each statement provided. In this media, pictures commonly play a role in

subsequently deepening thinking skills. One of the pictures also serves as a distractor, leading to the adoption of reasoning for students, especially those in lower-grade elementary school (grades 1-3). These pictures are found to still help students optimize critical thinking skills. The advantages of the HOTS-based Crossword Puzzle emphasize more interest in actively thinking critically and independently. When using this media, students are also happy due to the implementation of a stimulus (pictures). It also increases and improves vocabulary usage, as well as ensures fun and challenging learning, leading to optimal critical thinking skills. In addition, the HOTS-based crossword puzzle is applied in the lower grades (grade III) of elementary school. This is because the subsequent presentation of pictures is a trigger for students to horizontally or vertically answer each keyword provided (Kusuma, 2021).

3.3 HOTS-based Assessment

According to Table 1, 3 articles focused on the HOTS-based assessment, consisting of 2 international and 1 national journal. This phenomenon includes the Two-Tier Multiple Choices Test (TTMCT) instrument (Rintayati et al., 2020), building criteria for product assessability with students, using formative and summative assessment, incorporating self, peer, and teacher evaluation (Vidergor, 2018), as well as the development of HOTS questions (Rahayu et al., 2020).

HOTS-based assessments provide little opportunity for students to develop deeper knowledge, subsequently serving their abilities to identify and solve problems. One type of instrument used to measure HOTS objectively is the two-tier multiple choices test (TTMCT), which analyzes the success of achieving cognitive indicators, such as analyzing, evaluating, and creating skills. This instrument contains 25 items, including 3 competency indicators for 5th-grade elementary school students, such as (1) identifying the gravity, frictional, and magnetic forces, as well as their uses in daily life, (2) analyzing the relationship between force, motion, and energy, and (3) formulating solutions to the problems related to gravity, friction, and magnetic forces or simple machines. These indicators are then translated into 25 indicators, as tests combining the operational verbs of HOTS as follows, identifying, analyzing, describing, and defining features (C4), criticizing, clarifying, and interpreting (C5), making generalizations, connecting and proposing hypotheses, as well as predicting (C6) (Rintayati et al., 2020). Furthermore, the questions are modifications of the multiple choices test, which is often objectively grouped. In this process, the developed test consists of two question levels, namely (1) the main question content with two answer choices, and (2) the reason for the answers provided based on the first choice. TTMCT measures HOTS because development commonly depends on various indicators, namely analyzing, evaluating, and creating skills. This instrument provides students with high-level thinking skills, by selecting the available options. The advantages include measuring the level of HOTS (analysis, evaluation, and creation), which is generally difficult to perform with general multiple choices. It also ensures easy, fast, and objective assessment processes. Moreover, TTMCT is applied to determine learning teacher effectiveness, measure problem-solving and critical thinking skills, diagnose material understanding, and detect possible misunderstandings by students.

In the multidimensional curriculum model (MdCM), the assessment tools for product evaluation need to be designed and agreed upon with students. They should include formative and summative assessments, as well as incorporate self, peer, and teacher evaluations (Vidergor, 2018). Students also need to be provided with the opportunity to undertake individual, pair, or group projects and products. Since the teachers intend to enhance their creativity levels, the suggested products include written action plans and scenarios, speeches, maps, flow charts, predictive models, role-playing and computer games, poems, songs, picture books, and others (Vidergor, 2010).

The development of HOTS questions is subsequently emphasized. In this process, teachers are able to develop their questions during the preparation stage, starting with Basic Competency analysis, grid development, stimuli selection, writing inquiries, scoring guidelines (rubrics), and answer keys (Rahayu et al., 2020). According to the Revised Bloom's Taxonomy criteria regarding HOTS, an indicator was developed for the establishment of questions at the Basic Competency analysis stage.

This was accompanied by the arrangement of the question grids, whose matrix contains the criteria/standards needed in compiling the items. An interesting and contextual stimulus is then selected to stimulate the thinking abilities of students, for easier problem solutions. In this process, the problems presented emphasize daily life challenges, which are academically interesting and motivational. The stimuli used also include tables, pictures, photos, diagrams, case fragments, paragraphs, fairy tales, poetry, drama, and others. Additionally, questions are arranged by considering the use of operational verbs, which prioritize the stages of thinking at cognitive levels, C4, C5, and C6. The questions written are then equipped with answer keys and assessment guidelines.

4. CONCLUSION

Based on the results, several learning models, media, and assessments were observed and used to stimulate, train, develop, and improve HOTS in elementary school students. The model that activates the analysis, evaluation, and creation of activities also focuses on the HOTS indicators. Besides using HOTS questions, learning media were also commonly developed by training students' reasoning and critical thinking skills. Similar to assessment, the instruments and questions developed were able to measure various HOTS aspects, such as analyzing, evaluating, and creating. Teachers were also able to apply HOTS in educational processes, by using learning models, media, and assessments. In this process, the absence of guidelines or modules related to the implementation of HOTS caused a few adoptions of the entire learning process, especially at the elementary school level. This research is only limited to explaining how HOTS learning is implemented in elementary schools by tracing several articles in journals. It is hoped that this article can be a reference for teachers who will apply HOTS-based learning. The recommendation for further research is to carry out field research to determine the effectiveness of applying HOTS-based learning models, media, and assessments in elementary schools.

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