



How is HOTS Applied in Elementary Schools? A Review

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Abstract. In this technologically advanced period, every individual, especially students, is expected to be able to compete in all parts of life when confronted with the twenty-first century. HOTS-based learning is required in the field of education at this moment. This study employs Systematic Literature Review which involves Google Scholar and ERIC as the databases. 10 relevant articles are obtained and examined in order to answer how HOTS is implemented in elementary schools. It entails transfer, critical thinking, and problem solving. It is classified as analyzing (C4), evaluating (C5), and generating (C6) in Bloom's Taxonomy. Learning skills and invention are two factors that are strongly connected to learning in general where teachers are expected to construct lessons that will help pupils think critically and solve issues. As a result, teachers must provide models and resources that can help pupils develop critical thinking abilities. Teachers must comprehend HOTS and whether there are any hurdles or obstacles in its implementation in order to apply HOTS in primary schools.

Keywords: HOTS, Student, Teacher, School

1 Introduction

Higher order thinking abilities (HOTS), such as transfer, critical thinking, and problem solving, are increasingly considered a need or trend in 21st century learning. Bloom's Taxonomy categorizes it as analyzing (C4), evaluating (C5), and creating (C6). Through the development of HOTS in students, several educational systems have included elements of creative and critical thinking into the learning process. A crucial characteristic of HOTS, or higher order thinking, is the capacity to think critically and creatively [1]. Students can improve creative thinking habits by discovering and adopting novel yet practical ideas in their learning involvement [2]. Of course, Creativity is defined as a person's ability to develop a new product or a useful and understandable combination of objects that already exist [3].

HOTS-based learning is vital for enhancing students' critical thinking abilities in the twenty-first century. Critical thinking skills are required for problem solving. This ability is required for pupils in order to discover the root cause of problems and to seek out and apply the best solution to the problem at hand. One of the important aspects of higher order thinking is critical thinking. This happens when a person correlates new

knowledge with previously stored information in his memory and links it, as well as rearranges and develops this information, to achieve a goal or find a solution to a difficult-to-solve problem. One of the competences necessary in the twenty-first century is critical thinking skills (Critical Thinking Skills), which also includes creative thinking skills (Creative Thinking Skills), communication skills (Communication Skills), and cooperation skills (cooperation Skills). These are known as 4C competencies.

Patterns, amassing explanations, formulating hypotheses, generalizing, and documenting discoveries with evidence are all crucial processes in developing critical thinking. This indicates that higher-level thinking necessitates the use of instructional methodologies supported by active student-oriented learning media, so that students may watch, ask questions, reason, attempt, and communicate. Teachers are expected to transfer their focus to HOTS-based education at this level. However, instructors have several problems in adopting HOTS, and their efforts have yielded extremely limited outcomes.

The purpose of this systematic literature review is to synthesize study findings on the usage of HOTS in primary school learning. This study may also be utilized as a resource for instructors and students to better understand how HOTS can be used in the classroom. The purpose of this systematic literature evaluation is to provide answers to the research question as How is HOTS Based learning implemented in elementary schools?

2 Method

This study employs the literature review approach or literature review. This strategy involves evaluating relevant articles and focusing on the use of HOTS in learning to develop students' critical thinking abilities. The articles used were obtained from two databases, ERIC and Google Scholar, by entering the keywords "HOTS application in learning" and focusing on "HOTS application", "HOTS learning model", "HOTS learning media", "critical thinking" and "21st century learning 4C", "designing HOTS learning", "HOTS learning teacher perspective".

2.1 Identification Phase

This stage entails identifying relevant research. This phase is comprised of two major procedures. The first stage is gathering relevant articles and choosing appropriate articles based on so-called inclusion and exclusion criteria. The primary databases for this investigation were Google Scholar and ERIC, as stated in Table 1. Furthermore, the publications were published between 2020 and 2022. This technique employs a number of keywords. HOTS learning models, HOTS learning media, using HOTS in elementary schools, and developing HOTS learning are among them.

2.2 Screening Phase

Corresponding articles are chosen from ERIC and Google Scholar, and any duplicates discovered are deleted within two to three weeks. The remaining papers were then cross-checked to confirm that they fulfilled the researcher's standards.

Table 1. Article Searching

Journal Source	Quantity	Keywords
Google Scholar	8	Model to promote HOTS Media to promote HOTS Designing HOTS learning
ERIC	2	Barriers to apply HOTS learning Trend of HOTS

2.3 Feasibility Phase

In the third phase, the gathered papers are examined for eligibility, and they must meet the criteria given in Table 2. This is a critical step in ensuring that the information gathered is of high quality and dependable.

Table 2. Inclusion Criteria

Inclusion Criteria
The implementation of HOTS-based learning Methodologies of research include quantitative, qualitative, and mixed-method studies. Journal papers published between 2020 and 2022, using samples or respondents from diverse levels of education.

2.4 Exclusion Phase

The other publications were eliminated from this literature review after they were checked for eligibility in the third step. Table 3 lists the exclusion criteria for articles. Like the eligibility stage, the exclusion step was crucial in ensuring that researchers collected high-quality data.

Table 3. Exclusion Criteria

Exclusion Criteria
The implementation of learning is not dependent on HOTS. The model does not enable HOTS learning. The media does not encourage learning HOTS Journal articles published between 2020 and 2022

3 Result and Discussion

This section will go through the research publications' results in detail. After four steps of choosing suitable papers for evaluation, a total of ten articles were chosen for fit in this systematic review. Many researchers have presented studies on the implementation of HOTS-based learning in primary schools, and Table 4 describes the researchers' approach in this article.

Table 4. Extract Table

Author	Study Purpose	Participants	Discussions
[4]	The aim of this study is to determine and present an overview of elementary teachers' grasp of HOTS.	Elementary teachers	Among the challenges in implementing HOTS-based learning activities include 1) problems in developing and executing assessments, 2) issues in providing learning content, 3) difficulties in designing media, and 4) difficulties in building learning devices.
[5]	This research describes elementary school teachers' knowledge and abilities to design learning resources incorporating critical thinking skills and creative thinking.	200 elementary teachers in Banjarmasin.	The majority of responders lacked the necessary creative thinking abilities to produce instructional materials. This is demonstrated by the fact that the majority of teaching materials have not resulted in the supply of learning content that leads to the development of these abilities.
[6]	The subject of this study is how the process and assessment of natural sciences with HOTS based.		Problem-Based Learning and Contextual Teaching and Learning are two methods for increasing learners' HOTS. It is predicted that by employing a learning model and being supported by assessments that reflect HOTS, the quality of education in Indonesia would improve.
[7]	The purposes of this study are to assess the effectiveness of a blended learning strategy in improving students' Higher Order Thinking Skills in water cycle content for science courses for elementary school pupils in Mijen sub-district, Demak Regency.	476 public elementary schools and 147 private elementary schools in Demak regency	The application of blended learning has a significant impact on student HOTS in science lessons for grade V elementary.
[8]	The purpose of this research is to evaluate the efficiency of a thematic learning model based on	44 students	The average outcomes of the MT BAJEE Learning Model and Student Teams Achievement Division (STAD) application vary. Student

Author	Study Purpose	Participants	Discussions
	the culture of the Aneuk Jamee ethnic group with an integrated Higher Order Thinking Skills (MT-BAJEE) in South Aceh Regency.		learning outcomes in the MT BAJEE Learning Model are greater due to students' freedom to pick challenges. They can select tasks that are appealing to solve in order to encourage children to take an active role in their learning.
[9]	The purpose of this research is to create media for fun thinkers based on HOTS questions for fourth grade primary school pupils on theme 1, "Keindahan dalam Kebersamaan".	4 experts 2 practitioners, and 10 students	The media fun thinkers based on HOTS questions prepared for primary school pupils grade IV topic 1, "Keindahan dalam Kebersamaan" are legitimate and appropriate for usage in the learning process. Fun thinkers may make the learning process more successful by leveraging media, therefore teachers must be aware of the qualities of their pupils in class.
[10]	The purpose of this study was to assess the benefits of employing instructional media in elementary schools to create comic media based on local knowledge that can promote higher-order thinking abilities, as well as the practicality of producing comic media based on local wisdom.	60 students	The use of science-comic media with punokawan characters can improve students' ability to think at a higher level because it allows them to develop imagination and find identity by acting as real characters and situations in life using sequential science-comic pictures.
[11]	The findings of a research on the mathematical disposition of strategic thinking abilities when working on HOTS (High Order Thinking abilities) problems are presented in this article.	Students	The process of studying mathematics that can lead to scenarios that motivate pupils to think strategically, of course, by posing non-routine questions that are nothing more than HOTS issues. Students are required to have a strong mathematical disposition in order to strengthen their strategic thinking abilities.
[12]	The purpose of this study is to create HOTS-based mathematics teaching resources that are valid, practical, and effective in primary schools.	Students and teachers of SDN 4 Ngawen Blora.	The HOTS-based mathematics teaching material prototype created falls into one of the following categories: 1. Content Aspects of Teaching Materials 2. Aspects of view, image, table, and chart presentation 3. Aspects of Readability 4. Learning Aspects

Author	Study Purpose	Participants	Discussions
[13]	The purpose of this study was to analyze the benefits of using instructional media in primary schools to develop comedic media based on local knowledge that can enhance higher-order thinking abilities, as well as the feasibility of generating comic media based on local wisdom.	33 students of class IV SDN 01 Sambirejo Jumantono District, Karanganyar Regency.	The findings revealed that: (1) the provision of instructional media facilities in the trial elementary schools was not optimal, (2) the developed comic media in terms of the quality of media aspects and material aspects were categorized as very good, and (3) comic media based on local wisdom is valid and can be tested. Students' ability to master higher-order cognitive skills is influenced by comic media.

Recently, HOTs-based learning is what is required in the field of education. Transfer, critical thinking, and problem solving are all included. It belongs to the categories of analyzing (C4), evaluating (C5), and producing (C6) in Bloom's Taxonomy. Learning abilities and invention are two aspects that are directly tied to learning in general. Where teachers are expected to provide learning that will help pupils think critically and solve issues. As a result, teachers must provide models and material that can help pupils improve their critical thinking abilities. Due to the need of adopting HOTs in primary schools, teachers must first comprehend HOTs and whether or not there are any impediments or challenges in their application.

Anderson and Krathwohl in [14] define high-order thinking skills as analyzing, evaluating, and producing. Problem Based Learning (PBL) and Contextual Teaching and Learning (CTL) are models and methodologies that can help students develop these skills. Problem Based Learning (PBL) is a learning methodology that may teach and build problem-solving abilities that are geared to true challenges in students' real lives. It includes exercises in which students assess and evaluate an issue that is meant to be solved. Contextual Teaching and Learning (CTL) involves students in activities that connect what they are learning to their context in real-life circumstances. When students finish a project or discover an issue, they make choices, discuss facts, and reach conclusions; when they actively pick, organize, touch, plan, examine, question, and make judgments to attain goals, they integrate learning with the real-world setting. It requires pupils to analyze, evaluate, and create a project or solve an existing problem.

Aside from these two methods, Blended Learning assists students in stimulating their learning. The learning process is efficient because the teacher can impart learning through multiple media, students can follow directions from the teacher, students can work together with other students, and students can solve problems well. This maximizes the achievement of the learning objectives. By examining the learning process, the implementation of the learning model is stated to be effective. The success of the established model is assessed by comparing the improvement in student learning outcomes between starting and end learning.

The presence of the media is just as significant as the above-mentioned learning model. The fun thinker media is one of numerous media that may help pupils improve their critical thinking skills. The usage of HOTs question-based fun thinker media can

assist pupils in comprehending the subject presented by the teacher. This media is designed in accordance with the 2013 curriculum, which is based on 21st century learning, because it emphasizes the ability to think, innovate, and collaborate in problem solving, as well as to train and develop students' critical thinking skills so that the information conveyed by the teacher is properly understood.

According to the research findings, some teachers have a poor understanding of the idea of critical thinking abilities. They still require socialization and technical assistance to grasp the notion of critical thinking along with how to use it in the learning process. Their capacity to grasp this is impacted by their educational history, such as the year they graduated and where they previously attended school. Furthermore, teachers must prepare properly before strengthening pupils' critical thinking skills. Because the quality of learning is determined by planning. Teachers' insufficient understanding of the notion of critical thinking limits their ability to apply HOTS-based learning to their pupils. These hurdles include: 1) challenges in planning and conducting assessments; 2) challenges in communicating content; 3) challenges in designing media; and 4) challenges in building learning devices. As a result, before introducing HOTS-based learning or higher order thinking to students, teachers must conduct thorough debriefing and preparation to ensure that later learning is carried out properly.

4 Conclusion

Critical thinking abilities of students must be enhanced in order to fulfill the demands of 21st century learning. One of these is through the use of HOTS-based learning. The availability of a model that encourages students' critical thinking is crucial. Among these are the Problem Based Learning (PBL) and Contextual Teaching and Learning (CTL) methods, as well as Blended Learning. The three models above assist users in conducting analyses, evaluating, and formulating. The availability of media capable of enhancing HOTS learning is also required, the most prominent of which is the use of fun thinker media based on HOTS questions. Then, in order to address all of these issues, a teacher's expertise in understanding critical thinking or a high standard is required. Teacher must have significant feedback and support in order for HOTS-based education to be effective and efficient.

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