Research Paper

High-Level Thinking Ability of Class V Students in Thematic Learning Through the Problem Based Learning Model Assisted by Android-Based Learning App

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ABSTRACT

The purpose of this study was to test the quality of the implementation of the Problem-Based Learning Model with the Android-based Learning App Media Application on the high-level thinking skills of fifth-grade students and to obtain a description of the fifth-grade students' high-level thinking skills about the implementation of the Problem-Based Learning Model with the Android Perbasi App learning media in a review of student motivation. This research used a mixed methodology. Using quantitative analysis, qualitative and quantitative data are analyzed. The subjects of this study were 27 fifth-grade students from SDN Kalicari 01 in Semarang. Observation, interviews, and documentation are methods for collecting qualitative data. The technique for collecting quantitative data is a questionnaire with a Likert scale. This study demonstrates that learning tools and assessment instruments utilizing problem-based learning models supported by Android-based learning application media are feasible. Problem-based learning model learning tools aided by Android-based learning app media and research instruments have met the criteria for qualification as practical learning tools. The problem-based learning model aided by Android-based learning app media has a positive effect on increasing students' higher-order thinking skills and learning motivation, with results in the excellent category, specifically at the second meeting with a percentage score of 88.64 and at the third meeting with a percentage value of 91.36.

Keywords: PBL Learning, Android, Higher Order Thinking Skills

INTRODUCTION

Humans are the most perfect of God's creations. Humans are distinguished from all other creatures by their unique mental capabilities. By possessing the human mind, one can receive an education, which is then used to ensure his survival. Education is defined as the deliberate pursuit of a better life. According to Law No. 20 of 2003, education is the conscious and deliberate effort to create a learning environment and learning process so that students actively develop their potential to have religious spiritual strength, self-control, personality, intelligence, noble character, and the skills required by them, society, nation, and state.

Curriculum is a set of plans and arrangements regarding objectives, content, and learning materials, as well as the methods used as guidelines for organizing learning activities to achieve specific educational objectives. The curriculum utilized in Indonesia is continuously evolving and changing.

One of the 2013 curriculum applied in Indonesia in this era of globalization is the production of several results from

international research conducted by the Global Institute and the Program for International Student Assessment (PISA) referring to a conclusion that the achievements of Indonesian students are lagging behind and underdeveloped (Kartikasari & Mujib, 2020). Based on an analysis of the results of the 2012 PISA, it shows that Indonesia's ranking has slipped from 57th in 2009 to 64th out of 65 participating countries with a score from 383 to 382 and is below the international average of 500(Sumaryatun, Rusilowati, & Nugroho, 2016).

In the process of teaching and learning thinking skills are needed by a learner. Thinking skills are needed for human survival (Hasnan et al., 2020). There are three terms associated with cognitive abilities that are actually quite distinct: high-level thinking, complex thinking, and critical thinking. Higher-order thinking is an essential cognitive operation for thought processes that occur in working memory. Students need higher order thinking skills, also known as Higher Order Thinking Skills (HOTS) in English, because real-world problems are complex, unstructured, complicated, and novel, and require thinking skills that go beyond simply applying what has been learned (Purbonugroho et al., 2020 ; Rahayuningsih & Feriyanto, 2018). This ability continues to develop forward to provide valid results in accordance with the knowledge and experience of students (Fayakun & Joko, 2015). Higher-order thinking skills include cognitive abilities in the realm of analyzing (C4), evaluating (C5), and creating (C6) (Aprilia & Putri, 2020).

Teachers are anticipated to possess the ability to instruct students in the improvement of higher-order cognitive abilities, fostering an environment that promotes the cultivation of critical thinking among students (Puspitasari, Sutarno, & Dasna, 2020). Presently, numerous concerns exist about the advancement of global education within the framework of the 2013 curriculum. These concerns encompass a range of improvements, including the progressive integration of international standard assessment models (Jenariah, Wasliman, & Rostini, 2022). The assessment of learning outcomes is anticipated to facilitate the enhancement of students' higher order thinking skills (HOTS), as higher order thinking has the potential to stimulate students' comprehensive and profound engagement with the content of a given subject (Fanani, 2018). An overview of the thematic learning process has been conducted based on the facts and the results of observations and interviews conducted with fifth grade teachers in three elementary schools in the Pedurungan District of Semarang City from January to February. Good. However, a number of indicators suggest that students' higher order thinking skills continue to be subpar. This is a result of low student learning motivation and a learning process that remains Teacher-centered regardless of whether it is face-to-face or online. Based on the findings of structured interviews and initial observations of fifth-grade students in several elementary schools in Gugus Supriyadi, Pedurungan District, Semarang City, it was determined that in developing students' higher-order thinking skills, teachers still use learning methods that are less attractive to students and students are only faced with memorization learning techniques, so that it will reduce students' higher-order thinking skills. 15% of students answered the questions correctly in the medium category, whereas 85% of the total 60 students answered in the low category. This indicates that students' high-level thinking skills are still lacking, as demonstrated by the data presented above. The data indicate that the students at SDN Kalicari 01 and SDN Kalicari 03 have relatively low levels of higher-order thinking skills. The low level of students' higher-order thinking skills is due to learning methods that are less effective at training students to develop these skills. Teachers require learning methods or media that assist students in developing higher-order thinking skills and overcoming these challenges to develop students' higher-order

thinking skills.

One effort to improve students' higher-order thinking skills is the application of learning models that can adapt to situations and conditions and are supported by learning media that can motivate student learning (Ramadhan, Dwijananti, & Wahyuni, 2018). Students will be able to learn better and improve their performance in accordance with the goals to be attained through the innovative use of media and instructional aids (Aprilia & Putri, 2020). Effective equipment, also known as teaching aids, may serve as the instructional medium. Seeing this, the researchers attempted to use Problem-Based Learning (PBL) learning media supported by Android-based Media Learning App learning media. PBL media is one of the learning models that support the learning process of the twenty-first century. Problem-Based Learning is learning that can truly optimize students' thinking abilities through a methodical group or teamwork process, so that students can empower, hone, test, and develop ongoing thinking skills (Rusman, 2012).

PBL is a learning model that applies cognitive and constructivist theories because it constructs existing knowledge and skills with new information in order to solve problems (Nugraha, Suyitno, & Susilaningsih, 2017). The application of the PBL learning model is also encouraged by the use of interactive media, which can provide direct learning experiences to students in order to increase their motivation to learn (Sadiman, 2014). In line with Arief et al., (2016) which asserts that learning motivation plays an essential role in achieving academic success. Motivation must be increased and maintained in order for learning to proceed smoothly and for students to be engaged in these learning activities.

The Android-based Media Learning App is used by researchers as an interactive learning medium. The media is presented in the form of an application so that the visualization results are more appealing and easily accessible on smartphones running the Android operating system. The application is comprised of various types of material and thematic questions. With a variety of presentations and visualizations, it can attract the attention and motivate students, who are then able to improve their high-level thinking skills.

Judging from the results of several studies, the Problem Based Learning (PBL) learning model assisted by the Android-based Media Learning App media can be an alternative for developing students' higher-order thinking skills. Therefore the researcher raised a research entitled "Higher Order Thinking Ability of Fifth Grade Students in Problem Based Learning Assisted with Android-Based Learning App Media in View of Student Learning Motivation" and hoped it could help improve students' high order thinking skills.

LITERATURE REVIEW
Learning Model
The learning model can be interpreted as a conceptual framework that describes a systematic procedure for organizing learning experiences to achieve specific learning objectives and serves as a guide for learning designers and teachers to plan and conduct learning activities (Sukirman et al., 2022 ; Bezuidenhout, 2021). The learning model can also be interpreted as a set of plans or patterns that can be used to design learning materials and guide learning activities in the classroom or in places that carry out learning activities (Matinho et al., 2022 ; Sugiarti et al., 2011). The learning model can be interpreted as a blueprint that can be used to guide teachers in preparing and implementing learning (Remijan, 2016; Ainurrahman, 2009). While Batennie, (2009) ; Widana, (2020) suggests that the learning model is a pattern or learning structure that is structured and designed, determined and evaluated systematically to achieve the desired goals of the teacher. Joice & Weil dalam Rusman, (2017) argues that the learning model is a conceptual framework that is used as a guide in conducting learning. From the opinions of

the experts above, it can be concluded that the notion of a learning model is a pattern or guideline used by the teacher when preparing and carrying out learning.

Problem Based Learning Learning Model
The Problem-Based Learning (PBL) learning model trains students to deal with a variety of problems, both personal and group problems, to solve individually or collectively (Rijal et al., 2021; Rasto & Pradana, 2021). The basic principle in this model is the need for activity in learning something. Student activity will arise if the teacher explains the benefits of learning materials for students and society (Munawaroh et al., 2021 ; Tanjung et al., 2022). According to Setianingsih, (2020) ; Evendi et al., (2022) Problem-based learning or problem-based learning is a learning model that trains students to deal with various problems, both personal and group issues, to solve alone or in groups (Hamdani, 2011 ; Maskur et al., 2013 ; Moallem & Webb, 2016).

Problem Based Learning (PBL) is a problem-based learning model, where the problem is used as a stimulus that encourages students to use their knowledge to formulate a hypothesis, search for relevant information that is student-centered through discussion in a small group to get a solution to the problem which are given (Suyatno, 2009) . From the aforementioned definitions of Problem-Based Learning, it can be concluded that the Problem-Based Learning learning model is a problem-based learning model in which students solve stimulus problems individually or in groups. There is a saying that goes, "it takes a village to raise a child" (17). This proverb implies the need for the role of parents, the community, and schools in realizing a curriculum that prioritizes students, and these parties are referred to as the three pillars of education. Therefore, when teachers design the curriculum, they need to prioritize the needs, opinions, experiences, learning outcomes, and interests of the students. The curriculum is designed for the students to achieve all the expected competencies, and thus all parties must collaborate to the maximum extent.

Media Learning APP Based on Android
This curriculum is the Independent Curriculum. The rapid development of the times has made students more knowledgeable and adept in technology-related matters, including learning. Using technology such as smartphones or smartphones increases children's engagement with learning. Smartphones equipped with Android facilitate access to various information, including applications, video images, and other conveniences.
Android is a mobile operating system that is developing alongside other operating systems. Android is a comprehensive mobile platform built on open-source software. Android is a mobile operating system based on the Linux. Android is the most popular operating system in the community due to its advantages, such as its open-source nature, which allows developers to create applications without restrictions (Anggraeni & Kustijono, 2013).
Mobile learning or learning applications developed on HTML platforms or websites are one of the Android-based media. Appypie is a medium used to create learning apps alongside Flip PDF Professional and Online App Builder. Appypie is one of the available online builders on the internet. Appypie can facilitate the application development process for Android, Mac OS, Blackberry, Windows Phone, and HTML (Nurhalimah, Suhartono, & Cahyana, 2017). Professional pdf flip software is an application that can be used to convert PDF digital page-flipping publications into interactive learning content with a number of features that support interactivity (Khairinal, Suratno, & Aftiani, 2021).

Higher Order Thinking Skills (HOTS)
According to Rahayuningsih & Jayanti, (2019) expressing high-level abilities is defined as the extensive use of the mind to find new challenges, high-order thinking skills should be someone to apply new

information or previous knowledge and manipulate to reach possible answers in new situations, and high-order thinking will occur when someone associates new information with information that has been stored in his memory or rearranging and developing this information to attain a goal or discover a regret from an event.

The definition of higher order thinking according to Resnick in Sucipto, (2017) is a complex thinking process in describing material, making conclusions, building representations, analyzing and building relationships involving the most basic mental activities. Haladyna, (1997) explained that the complexity of thinking and learning dimensions can be categorized into four levels of mental processes: understanding, problem-solving skills, critical thinking, and creative thinking, which can be applied to four content types: facts, concepts, fundamental principles, and procedures. Using this set of skills is a complex mental process.

Krathwohl & Anderson, (2010) revised on Bloom's taxonomy (1956) revealed that the ability to synthesize is a more difficult creative process than the ability to evaluate. The revised taxonomy distinguishes between cognitive processes and knowledge dimensions (factual, conceptual, procedural, and metacognitive knowledge). The revised taxonomy demonstrates that low-level cognitive abilities include remembering, comprehending, and applying. Analyzing, evaluating, and generating are all examples of higher order thinking. This is consistent with the increasing dimensions of cognitive processes from remembering to creating.

MATERIALS & METHODS

The type of research used is mixed method research. Mix method or mixed method is combination research that combines quantitative and qualitative research to be used together in a research activity to obtain more comprehensive, valid, and objective data.

The subjects chosen in this study were taken in two classes, namely grade V class 1 at SDN Kalicari 01 Semarang City as the experimental class with a total of 27 students and grade V class 1 at SDN Kalicari 03 Semarang City with a total of 26 students as the control class.

The preparation of test instruments is carried out through several steps consisting of (1) limiting the material being tested; (2) determining the form of questions in the form of essay questions; (3) determining the number of items; (4) determining the allocation of processing time; (5) making a grid of questions based on the applicable curriculum and learning objectives; (6) preparing the items along with the answer keys and (7) analyzing the results of the test trials including validity, reliability, level of difficulty, and distinguishing power.

Qualitative data analysis in this study uses the Miles & Huberman model analysis, carried out interactively and continuously until the data shows saturation. The activity components in the interactive model analysis were data collection, recitation, presentation, and conclusion. Analyzing quantitative data with prerequisite tests and final analysis tests.

RESULT AND DISCUSSION

The general assessment demonstrates that the student learning motivation questionnaire can be utilized with some revision—the revised questionnaire contained misspelled words and typographical errors. Before conducting the research test, it must be revised with the advice of experts. Expert validators conduct evaluations of learning tools. The learning tools include course outlines, lesson plans, and instructional materials. The quality of the planning of learning materials, including syllabus, lesson plans, and teaching materials, is rated very good by the expert. The overall evaluation indicates that learning tools can be utilized without review. Consequently, learning tools can be utilized during the research procedure.

Based on the expert's evaluation of the interview guide instrument, the researcher's interview guide belongs to the excellent category. The general assessment indicates that the interview guide can be utilized as-is.

Therefore, it was stated that the interview guide instrument would be utilized in the research process.

Based on the expert's assessment of the observation sheet instrument, the researcher's observation sheet falls within the category of "very good." The overall evaluation indicates that the observation sheet can be utilized without modification. Consequently, the instrument observation sheet can be utilized throughout the research procedure.

Table 1 Results of Validation of Learning Devices and Assessment Instruments

No	Devices and Instruments	Mean (%)	Note
1	Syllabus	93,27	Excellent
2	Lesson plan	91,52	Excellent
3	Teaching materials	93,27	Excellent
4	Implementation of Learning	92.86	Excellent
5	Test	95.83	Excellent
6	Motivation Questionnaire	91.25	Excellent
7	Interview guidelines	91.25	Excellent

The findings from the validation process of learning tools and research instruments indicate that the validated tools and instruments fall within the "excellent" category. However, certain items require revision based on the provided suggestions and involve the participation of multiple validators. It can be inferred that the learning tools and research instruments developed can facilitate the execution of research endeavors.
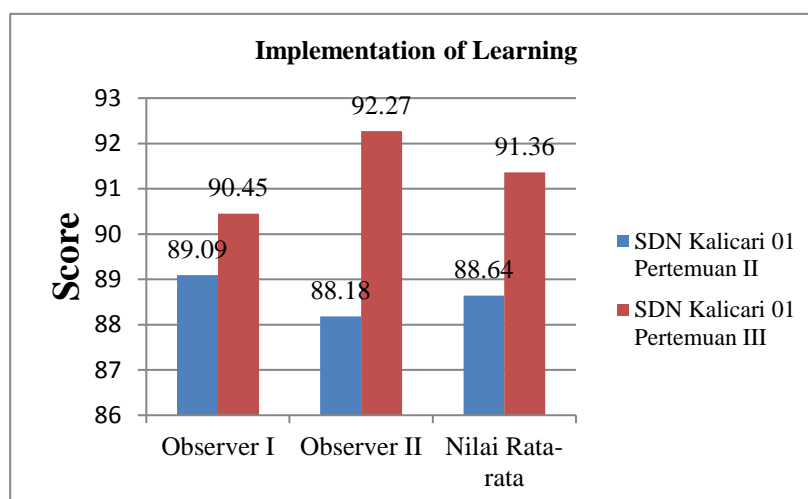

Figure 1. Values and Average Results of the Implementation of the Problem Based Learning Model Assisted by the Android-Based Media Learning App.

The implementation of the Problem-Based Learning model assisted by Android-based learning App media yielded positive results that met the criteria for classification as very good; namely, at the second meeting, the percentage value of the data results was 88.64 > 81, and at the third meeting, the result value was 91.36 > 81, so each meeting was classified as excellent.

Implementing the Problem-Based Learning model aided by Android-based learning app media has yielded positive results that meet the criteria for the classification of "excellent."

The Android-based Media Learning App motivates students to participate in learning activities using the Problem-Based Learning model. The results of the student motivation questionnaire will reveal this. Attention indicators received an average score of 3.472 in the good category, relevance indicators received an average score of 2.815 in the good category, confidence indicators received an average score of 3.111 in the good category, and satisfaction indicators received an average score of 2.852 in the good category.

Thus, the implementation of the Problem-Based
Learning model supported by the Android-based Media Learning App for students demonstrates a good category fit.

Category	Percentage	Frequency
sangat tinggi	≥81%	6
tinggi	73-80%	15
sedang	65-72%	5
rendah	56-64%	0
sangat rendah	≤55%	0

Table 2 Student's motivation to study

Based on the responses to a questionnaire administered at SD Negeri Kalicari 01, Pedurungan District, Semarang City, there were 26 students. According to the findings of the study on student learning motivation, six students were extremely motivated, fifteen were highly motivated, and five were moderately motivated.

CONCLUSION
1. The quality of the implementation of the problem-based learning model due to the feasibility analysis of the learning device and the assessment of the syllabus, lesson plans, teaching materials, and assessment instruments of problem-based learning models supported by Android-based learning app media is high. The implementation of the Problem-Based Learning model assisted by Android-based learning App media yielded positive results that met the criteria for classification as very good; namely, at the second meeting, the percentage value of the data results was 88.64 > 81, and at the third meeting, the percentage value of the results was 91.36 > 81, so each meeting is classified as excellent.
2. escription of the Higher-Order Thinking Abilities of Fifth-Grade Students with Grades in the Very Good Range. Six students had extremely high motivation because they enjoyed learning with the Android-based APP, and fifteen students had high motivation because they liked the interesting pictures in the Android-based app. Five students had medium motivation because they still find android-based learning challenging.

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