Stimulating Elementary Student Higher Order Thinking Skills Through Educational Games in Chromebook

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Abstract. This study focuses on efforts to stimulate Higher Order Thinking Skills (HOT Skills) in elementary students by using Educational Games in Chromebook. The subject is Mathematics, because Mathematics contains many elements of HOT Skills. The students used in the research were 3rd grade elementary school students in Boyolali Regency with a total of 21 students. This exploration utilizes a qualitative approach, the sort is field research. Information examination procedure utilized is descriptive qualitative analysis. The outcomes showed that the utilization of chromebook included educational games could increase the HOTS of elementary school students, especially in the learning outcomes of 3rd elementary school students in Mathematics.

Keywords: HOT Skills, Elementary Student, Educational Games, Chromebook.

1 Introduction

"Education is a conscious and planned effort to create a learning atmosphere and learning process so that students actively develop their potential to have spiritual strength, self-control, intelligence, noble character, and skills needed by themselves, society, nation and state" [1]. Elementary school is the level of education that forms the basis of secondary and basic education as a "ticket" for further education.

One of the subjects taught by students since elementary school is Mathematics. This subject is one of the lessons at school that gets better attention from teachers, parents and students themselves. The general public's view of Mathematics subjects has not been replaced, namely subjects that are difficult, scary, and boring.

This can be seen in the fact that the average Indonesian student's grades on math learning outcomes fell by 7.4 points, as the PISA (Program for International Student Assessment) results show. organized by the OECD (Organization for Economic Cooperation and Development) and the international consortium in charge of Sampling, instrument, data, reporting, and secretariat problems which are held every 3 years show that Indonesia gets a score of 371 for reading, 379 for mathematics, and 396 for science [2].

Here are the results of PISA 2018:

Snapshot of performance trends in INDONESIA

Mean performance	Reading	Mathematics	Science
PISA 2000	371		
PISA 2003	382	360*	
PISA 2006	393*	391	393
PISA 2009	402*	371	383*
PISA 2012	396*	375	382*
PISA 2015	397*	386	403
PISA 2018	371	379	396
Average 3-year trend in mean performance	+1.2	+2.2	+2.5
Short-term change in mean performance (2015 to 2018)	-26.3*	-7.4	-7.0
Overall performance trajectory	hump-shaped (more negative over more recent years)	hump-shaped (more negative over more recent years)	flat

Fig 1. Snapshot of PISA 2018 results for Indonesia
(source: PISA 2018 Results (Volume I)

A student's learning achievement is influenced by many factors, both external and internal factors. One of the external factors includes learning styles, learning media, learning facilities, and so on, while internal factors are interest in learning mathematics, IQ, and other intelligences. The success factor of a student in learning mathematics is indicated by learning achievement [3], [4]. Also, one of the reasons for poor math grades is that students' higher thinking skills are still low, besides this other factor are school facilities, family, student psychology, student abilities, electronic media, and student discipline. Less student-centred learning can also be attributed to the fact that learning is still teacher-centred (teacher-centred learning) rather than student-centred (student-centred learning).

They need Higher Order Thinking Skills (HOTS) to learn math [5]. HOTS are critical, logical, reflective, supercognitive, and creative thinking skills [6] [7], It is the ability to think of higher dimensions. Higher Order Thinking Skill (HOTS) is a thinking ability that requires not only the ability to remember, but also other high abilities such as the ability to think creatively and critically. Applying HOTS education is not an easy task for teachers. Brings life. In addition to having to actually internalize materials and teaching strategies, teachers also face challenges related to the environment and recruitment of the students they teach.

One of the government's efforts to improve the quality of basic education services is to provide information and communication technology (ICT) equipment to elementary schools. The support mechanism is to distribute funds to schools. The school then carries out procurement of goods and services through the school procurement information system (SIPLah). One of the important milestones in the product's primary educational use is the use of Chromebooks for teaching and learning and distance learning. The government's efforts are to support technological developments that occur today, especially in basic education which also affects the curriculum, learning to learning evaluation, with the advancement of ICT science and technology.

Observations made by researchers in 3rd SD N 1 Tarubatang students, particularly in mathematics, showed that 15 out of 21 students did not meet the *KKM* (based on minimum completeness). These observations are supported by interviews with classroom teachers and researchers. Researchers interviewed teachers and found a number of contributing factors, including low student HOTS and students' readiness to learn mathematics, the facilities used, and the learning media used.

Based on the problem of low student achievement and to support the government in terms of improving the quality of basic education services and teachers should be able to stimulate students to be enthusiastic in learning [8], researchers are interested in conducting research to simulate HOTS in elementary school students. HOTS in learning does not act as a learning method but HOTS here means learning that is able to create students to think HOTS such as the ability to understand, analyze, evaluate, create, identify a lesson or questions in learning, in this

case it is devoted to Mathematics on the grounds that Mathematics is very closely related to HOTS. Chromebook is a medium that has adaptive elements, as the needs of the 4.0 era challenges [9]. The use of Chromebooks with the reason that on Chromebooks there are various educational games.

2 Research Methods

This research includes field studies, that is, "studies in which data is extracted from the field and conducted systematically." The method used in this study was a qualitative research method. According to Bodgan and Taylor, a qualitative methodology is an exploratory process that generates descriptive data in the form of people's written or spoken and observed behavior [10]. This approach is for backgrounds and the general population. Where to get the results of this study, authors look for existing data to get the data they need with field data. In other words, authors collect data related to the issue they are discussing. Researchers also conduct research that highlights and comprehensively describes all activities carried out within the framework of a field approach, where data and information gathering efforts are accompanied by analysis and revalidation of everything intensively collected.

At this stage, the researcher wants to find and collect various data sources related to the problem under study. This study has master data (primary) and confirmatory data (secondary). The primary data were collected by researchers directly from the source of the question, and the primary data of this study were 21 elementary school students. The secondary data are collected and documented data, and the secondary data of this study are all related to 21 elementary school students. Data collection techniques are the most important step in a survey because the purpose of the survey is to retrieve data from a data source. Therefore, data collection techniques can be implemented in different social situations, taking into account different sources and different means that may be appropriate for the study.

To facilitate the collection of field data, the author uses the following data collection methods: 1) Interviews, interviews are conversations with a specific purpose. The conversation was conducted by two people, the interviewer who asked the question and the interviewee who answered the question. 2) Observation, observation is a technique performed through careful observation and systematic recording. One of the data acquisition technologies records various phenomena (situations, conditions) that occur. 3) Documents, documents search for data about things and variables in the form of notes, transcripts, books, newspapers, magazines, and more.

3 Result and Discussion

The implementation of HOTS-Based Learning for 3rd grade Elementary School Students in Boyolali Regency is carried out through several stages including:

a. Learning Preparation Stage

   The preparatory stage was carried out at Elementary School Students in Central Java Province by making a learning implementation plan (*RPP*) based on the existing syllabus and paying attention to the HOTS values in it. The lesson plans have been made completely and systematically by including the HOTS values. The learning objectives have been designed to develop HOTS values. The application of HOTS values in the learning implementation plan lies in the models, strategies, and learning methods that are planned to be used in learning, as well as on the media used, namely Chromebooks. The use of student

center learning (SCL) learning strategies by utilizing educational games in Chromebooks, and etc.

b. Learning Implementation Stage

HOTS-based learning implementation activities emphasize student-centered learning or known as student center learning (SCL). In carrying out the learning, students are asked to discuss a learning material, then students complete educational games that are in the Chromebook. The teacher is tasked with ensuring that students are always active in learning activities. Learning is designed to achieve learning objectives by involving happy activities for students through games. Students have demonstrated the process of analyzing and evaluating. Students solving problems contained in the game show they have been able to analyze. After completing the games, they conduct an evaluation to find out the advantages and disadvantages when completing the game.

c. Learning Evaluation Stage

Evaluation of learning carried out on 3rd grade students of SD N 1 Tarubatang has used HOTS questions. Using higher level thinking questions in learning assessments trains students with multi-view thinking, which influences their ability to think. The evaluation used refers to Bloom's taxonomy of HOTS [11] , are: 1) Knowledge transfer, the transfer of knowledge and thinking skills along the cognitive, emotional and psychomotor domains that become an integral part of the teaching and learning process. Knowledge transfer is not just a teacher presenting material to a class, but students becoming listeners. However, there should be student feedback on the material presented by the teacher. Knowledge transfer is already part of the game on Chromebooks. 2) Problem Solving, Skills with a strong desire to solve problems are born in everyday life. Problem solving is included in the Chromebook game. 3) Critical and Creative Thinking, skills used to solve problems, make decisions, analyze them, investigate them, and draw conclusions when they occur. Critical and creative thinking dominates Chromebook educational games.

Fig 2. The instructional with a chromebook included educational games.
(Source: Personal Documents, 2021)

4   Conclusion

Based on the data that has been collected and the analysis that has been carried out, the researchers conclude that from the implementation of HOTS-based learning implementation activities for 3rd grade students of SD N 1 Tarubatang, Boyolali Regency, Central Java Province as follows:

Based on the data collected and the analysis performed, the researchers conclude from the implementation of HOTS-based learning practices for 3rd students of SD N 1 Tarubatang in the Boyolali Regency, Central Java: a) Since the 2013 curriculum implemented, HOTS-based learning has been conducted. This requires teachers to be able to equip their students with higher thinking skills and 21st century skills, including HOTS; b) The main emphasis in shaping HOTS is on curriculum using the Student Center Learning (SCL) model. Students who use the SCL model to engage in educational activities have higher thinking skills than those who do not. You can maximize your HOTS ability if your training phases are continuous; c) Using a Chromebook in an educational game can increase the HOTS of 3rd grade elementary school students, especially when it comes to math learning outcomes.

Acknowledgement

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