



The Influence of HOTS Problems in Developing Mathematical Literacy through Cooperative Learning Model

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Abstrak

When students do math problems at school, it is found that students are still not able to do the given problems properly. This can happen due to the lack of mathematical literacy skills in students. However, mathematical literacy is one of the important skills to face the incoming challenge of this 21st and disruption century. This article aims to examine the influence of using HOTS problems on developing mathematical literacy skills through cooperative learning models. The method used in this article is through a literature study that collects several previous studies to answer the influence of using HOTS problems on developing mathematical literacy skills through cooperative learning models. The use of HOTS problems has an influence on developing mathematical literacy skills in cooperative learning models. So that teachers can provide and develop HOTS problems to improve students' mathematical literacy skills and students can also practice solving HOTS problems to improve mathematical literacy skills.

Kata kunci: Cooperative Learning Model, HOTS Problems, Mathematical Literacy.

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1. Introduction

The definition of Indonesia Emas, related to Indonesian quality, is appropriate in accordance with what was stated by president Joko Widodo in writing seven points of his dream for Indonesia by 2045 (Kemendikbud RI: 2017). The indicators of Indonesia Emas' achievement according to Wena (2020) is the increasing quality of human resources. One of way to increase human resources quality is education in the younger generation. Because education is the most important thing in life in order to enhance human potential and improve the quality of Human Resources (Hasnadi, 2019).

However, what we meet today, the human resources of the Indonesian nation are still low due to the low quality of education, especially in mathematics (Kusumawardani et al., 2018). Likewise with mathematical literacy skills, when students do the questions given by the teacher, it is found that they are still not able to do every problem well, this is related to their mathematical literacy ability which is still relatively low (Simamora & Tilaar, 2021). In fact, according to Janah et al. (2019), the importance of mathematical literacy skills is one to face challenges in the future, namely in the 21st century and in this era of disruption.

According to Ojose, in research conducted by Betha, *et al* (2018) the mathematical literacy ability is knowledge to understand and be able to use mathematical concepts in helping daily life. Efforts to improve mathematical literacy skills can also be achieved with high-level skills (HOTS) which is one of the government's mandatory goals to prepare students for the 21st century challenge (Saragih & Nasution, 2019). The cooperative learning model is one of the efforts to improve mathematical literacy in students. Several studies on the application of HOTS or cooperative learning models that have been carried out are then collected and reviewed to find out the influence of using HOTS problems on developing mathematical literacy skills through cooperative learning models.

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Based on the background that has been mentioned, learning is needed to improve students' mathematical literacy skills. One solution that feels appropriate is cooperative learning with the application of HOTS (Higher Order Thinking Skill) Problems. Thus, the purpose of this paper is to find out the influence on developing mathematical literacy skills in cooperative learning models.

2. Discussion

The search key for this article uses the keywords of HOTS, cooperative learning model, and mathematical literacy. Based on keywords, 11 articles were found that met the criteria for review.

No.	Researcher(s)	Year	Research Method	Research Result
1.	Nabilah & Wardono, 2021	2021	Literature review	This SPUR-nuanced CIRC learning assisted by Google Classroom is predicted to develop students' higher order thinking math literacy skills.
2.	Yuberta et al., 2020	2020	Mix method with concurrent triangulation design.	Mathematical literacy ability using the CPS learning model after the test and interview results found that low group students were only able to achieve 2 levels of mathematical literacy skills. In the moderate group students are able to reach 4 levels of mathematical literacy skills. As for the high group students, they have been able to reach 6 levels of mathematical literacy skills.
3.	Syafi'i, 2018	2018	Action research occur in 3 cycle. Every cycle includes 4 steps, namely planning, action, observation, and reflection.	Based on the results of this study, it can be concluded that the spirit of literacy in the development of the TGT learning model can improve student mathematics learning outcomes.
4.	Tasyanti et al., 2018	2018	Mixed method desain concurrent embedded design, with qualitative research as the primary method.	The results show that Group Investigation of cooperative learning was in good quality as both quantitatively and qualitatively.
5.	Afni & Hartono, 2020	2020	Literature review	Mathematics competence is improved by applying CTL to the learning of mathematics through several stages. There are five stages, knowing, connecting, experimenting, applying, collaborating and transferring, which of course are in accordance with the students' life context. These five stages are interrelated to develop and improve students' mathematical proficiency.
6.	Janah et al., 2019	2019	Literature review	21st century learning model emphasizes students ability to think critically connect knowledge with the real world and be ICT proficient and collaborative. Things that need to be studied in learning are especially mathematical literacy and mathematical critical thinking as an effort to face the 21st century.

				So, mathematical literacy is very needed in daily live because it is one of key to face community which is always disruptive/differ.
7.	Simamora & Tilaar, 2021	2021	Descriptive quantitative approach	Students' mathematical literacy skills in terms of HOTS-type math problems are quite good, judging from the 4 aspects assessed, namely the understanding aspect, the representation aspect, the analysis aspect and the communication aspect.
8.	Maslihah et al., 2020	2020	Literature review	Curriculum integration can improve math literacy skills by exposing students to real-world problems. Knowing mathematics can improve higher-order thinking skills reasoning skills representational skills and mathematical communication skills.
9.	Wena, 2020	2020	Literature review	Teachers can develop modern learning that is oriented towards HOTS so that students become accustomed to thinking critically so that they are able to develop their creativity. Hots-oriented thinking ability will spur the development of our human resources to realize the golden generation of Indonesia in 2045.
10.	Prastiti et al., 2020	2020	Experimental research	The use of HOTS math questions has effectively improved the math literacy of UT Surabaya students.
11.	Hasanah et al., 2022	2022	Descriptive research with qualitative approach.	The PBL-HOTS model can be used to cultivate students mathematical literacy.

The result from 2 articles related to the importance of mathematical literacy, 4 articles related to the influence of cooperative learning to develop mathematical literacy, and 5 articles related to the influence of HOTS problem to develop mathematical literacy shows the application of HOTS problem through cooperative learning model can develop student's mathematical literacy skill.

We know that the 21st century learning model emphasizes students critical thinking skills ability to connect knowledge to the real world and the ability to access and collaborate with information and communication technologies. Things that need to be studied in learning are especially mathematical literacy and mathematical critical thinking as an effort to face the 21st century to face community which is always disruptive/differ (Janah et al., 2019). This can become a way to succeed the Indonesia Emas 2045. According to Wena (2020), the application of HOTS problems in learning mathematics gives a lot of mathematics skill development which can realize the golden generation of Indonesia in 2045. In reality, most of HOTS problems give positive influence to develop mathematical literacy skill. This statement proven by Hasanah et al (2022) with the PBL-HOTS learning model. Furthermore, Prastiti et al (2020) also find out if the result valid for UT Surabaya students. Then specified by the aspects, HOTS problem can developed mathematical literacy in aspect of understanding, representation, analysis, and communication (Simamora & Tilaar, 2021). Actually the relation between mathematical literacy skill and HOTS problem were interplay each other. Like in some case, the mathematical literacy skill is can develop the HOTS problem Maslihah et al. (2020) and otherwise.

Not only by HOTS problems, but the implementation of cooperative learning model is also influence the development of mathematical literacy skill. The result of Nabilah & Wardono (2021) stated that SPUR-nuanced CIRC learning assisted by Google Classroom is predicted to develop students' higher order thinking math literacy skills. Then, proven by the research of Tasyanti et al. (2018) shows that the Group Investigation of cooperative learning was in good quality as both quantitatively and qualitatively. Furthermore, Yuberta et al. (2020) Mathematical literacy ability using the CPS learning model after the test and interview results found that low group students were only able to achieve 2 levels of mathematical literacy skills. In the moderate group students are able to reach 4 levels of mathematical literacy skills. As for the high group students, they have been able to reach 6 levels of mathematical literacy skills. The relation between mathematical literacy skill and cooperative learning model were interplay each other, just like another type of cooperative learning, TGT, can improve student mathematics learning outcomes by the spirit of literacy (Syafi'i, 2018).

3. Conclusion

Indonesia Emas is related to Indonesian quality for Indonesia by 2045. One of the indicators is the increasing quality of human resources, especially younger generation. And the way to develop it is by education. Facing this 21st. century era, mathematical literacy skill become important things to develop quality of education. Based on the results of reviewing several articles, it can be concluded that the use of HOTS questions affects the development of mathematical literacy skills in the cooperative learning model, namely the application of HOTS problems through a cooperative learning model can develop students' mathematical literacy skills. So that teachers can provide and develop HOTS questions to improve students' mathematical literacy skills and students can also practice solving HOTS questions to improve mathematical literacy skills

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