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High Order Thinking Skills (HOTS) Of Ibtidaiyah Madrasah Teacher Education Program (PGMI) Study Program Students During The Covid-19 Pandemic

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Abstract

High Order Thinking Skills (HOTS) are competencies that are required for students to live in the 21st century. The Covid-19 pandemic makes learning to be done with the help of the media to avoid the spread of the Corona virus. Despite the Covid-19 pandemic. The achievements of HOTS are still being pursued in achieving quality education in the 21st century. This study aims to determine the HOTS achievement of the ibtidaiyah madrasah teacher education program (PGMI) students during the Covid-19 pandemic. The research design is in the form of a survey. The research subjects were all students of PGMI, State Islamic University Professor K.H. Saifuddin Zuhri in the fourth semester of the 2020/2021 academic year. A total of 32 test questions that have met valid and reliable qualifications were used to measure student HOTS. Data analysis used descriptive quantitative. The results showed that the HOTS achievement of PGMI college students was still low. This research is important to do as a material for determining the best learning strategy in order to achieve better HOTS for PGMI college students.

Kata kunci: high order thinking skills, college student, covid-19

INTRODUCTION

The 21st century is a momentum for the use of technology in almost all fields. This requires people to have various life skills, such as critical thinking, creative, problem solving, and decision making. These skills will be able to be possessed if students have been trained to have High Order Thinking Skills (HOTS) (Crossland, 2015).

HOTS is a level of thinking that emphasizes the application of knowledge that has been received, examination of reflection, problem solving, decision making, and formulating new things (Seman et al., 2017). (HOTS) is as part of Bloom's revised taxonomy (Setyarini et al., 2018), namely analyze, evaluate, and create. HOTS is very important in the educational process because one's thoughts can affect the ability, speed and effectiveness of learning (Ramdiah et al., 2019). (Baguma et al., 2019) added that someone (student) who is able to think critically, then they can apply the knowledge and skills acquired to new contexts. This shows that HOTS is very important for students to be able to later apply it to the environment through positive things. The same thing was conveyed (Heong et al., 2012) that students must be directed to obtain HOTS so that

they are able to answer challenges in competence that require critical thinking skills. The importance of HOTS makes it one of the goals of education in the 21st century (Jerome et al., 2017).

The Covid-19 (Corona Virus Disease) pandemic has limited learning. Efforts are made to avoid physical contact between humans to break the chain of spreading the Corona virus. The use of e-learning is the choice of educators in the midst of the Covid-19 pandemic. Various good news in electronic media states the ineffectiveness of online learning despite using e-learning media. This results in low learning achievement, one of which is HOTS. Research (Windhiyana, 2020) states that the use of applications in online learning is still constrained by internet connections. Another obstacle to online learning is the process of delivering material that is less than optimal (Anawati et al., 2020).

However, other research states differently. The results of the study (Baguma et al., 2019) state that the use of social media as an e-learning media greatly assists the implementation of learning, facilitates users to express and interact, and develop HOTS. That is, online learning using e-learning media provides opportunities for learners to develop HOTS. This was emphasized by (Nurhayati & Rahardi, 2021) that the level of creativity of students in developing learning media was very high during the COVID-19 pandemic. One of them is through assignments to conduct small research that can significantly improve critical thinking skills in identifying and evaluating problems (Nurtjahyani et al., 2021).

The difference between some online learning outcomes and the use of e-learning during Covid-19 pandemic raises a big question. How is the actual achievement of HOTS, one of which is among college students? Madrasah Ibtidaiyah Teacher Education (PGMI) is one of the study programs at the University which aims to produce professional elementary school teacher candidates. This can be realized if PGMI college students are able to carry out HOTS-based learning according to the demands of the times, namely the 21st century at the basic education level. PGMI college students will be at the forefront of forming student HOTS at the basic education level. They will become one of the factors in achieving student success at the next level. This research is an initial study to determine the extent to which HOTS college students have achieved during online learning due to Covid-19. The results of this study will be followed up by developing an online learning design by utilizing media to maximize the achievement of HOTS for PGMI students.

METHOD

The research method used is a survey. The study was conducted by asking research subjects to answer HOTS questions as an evaluation of social media-assisted learning carried out during the Covid-19 pandemic in the education statistics course.

The research subjects were all students of PGMI, Faculty of Tarbiyah and Teacher Training (FTIK), State Islamic University Professor Kiai Haji Saifuddin Zuhri (UIN Saizu) in the fourth semester of 2020/2021. They were 106 students divided into 12 male students and 94 female students. This research is a population study, no sampling technique is used. UIN Saizu is one of two Islamic state universities in Central

Java Province. UIN Saizu is located in Purwokerto City, precisely in the western part of Central Java.

The data analysis technique used a multiple choice test with four choices. A total of 50 test items were arranged by HOTS indicators based on Bloom's taxonomy which has been revised with indicators of analyzing, evaluating, and creating. HOTS-based questions are prepared, which contain course material for Education Statistics. Educational statistics course material contains descriptive statistics and inferential statistics. Descriptive statistics material contains sub-materials in the form of determining the size of data concentration (mean, median, mode, quartile, decile, percentile, variance, standard deviation) and presenting data using tables and diagrams. Inferential statistical materials include analysis prerequisite tests (normality test and homogeneity test), difference test (t-test and one-way ANOVA test), correlation test, and regression test. Educational statistical materials are compiled into HOTS-based items and tested for validity and reliability. As a result, as many as 32 item items were declared to meet the valid and reliable elements. The 32 questions were then tested on 106 respondents to produce data in the form of the HOTS achievement of PGMI students.

Data collection is carried out through an online process by utilizing the Google Form, which is part of the application on the Google platform. This was done because when the research was conducted, the situation did not support face-to-face learning.

The validity test by the expert stated that the 50 items met the valid aspects. The results of the empirical validity test were analyzed using the Pearson Correlation formula using SPSS software. The results of the empirical validity test showed that as many as 32 test items met the valid aspects. The other 18 test items were declared invalid. The 18 invalid items are numbers 16, 23, 25, 26, 27, 28, 30, 33, 34, 35, 36, 38, 39, 40, 41, 44, 48, and 50. Invalid questions are then discarded because all question indicators have been represented by valid questions.

The instrument reliability criteria are seen based on the Cronbach Alpha coefficient value following the rules (Santyasa, 2014), which are very high (0.80 - 1.00), high (0.60-0.80), moderate (0.40 – 0.60), and low (0.20 – 0.40). The results showed that the reliability coefficient value was 0.658, meaning that the test items met the reliability criteria with high criteria.

The following is a framework of HOTS-based questions on educational statistical materials that have met the valid and reliable aspects.

Table 1.
The framework of HOTS questions

HOTS Indicator	The questions	Number of questions
Analysing	Distinguishing descriptive statistics and inferential statistics	9
	Determining the type of data based on the characteristics	

	Analyzing the content of the graph of research results	
	Analyzing research data	
	Analyzing prerequisite tests before using certain statistical tests	
Evaluating	Choosing a research design that uses statistical tests	20
	Assessing research data	
	Interpreting the results of research data	
Creating	Making a statistical test design to answer the problem formulation	3
Total		32

Table 1 informs that the HOTS questions consist of 32 items consisting of indicators of analysis, evaluating, and creating. The number of evaluation items has the highest number with 20 items, followed by analysis (9 items), and creating (3 items). Even though the evaluating aspect is represented by the highest number of items, but the most indicators are actually in the analizing aspect, namely 5 (five) types of question indicators. The evaluating aspect is represented by 3 (three) types of question indicators. The creating aspect is represented by one type of question indicator.

The data analysis technique uses descriptive statistics to determine the achievement of competencies in the form of HOTS for PGMI college students, UIN Saizu for educational statistics courses. The analysis includes determining the average, maximum value, minimum value, standard deviation, and the percentage of graduation for educational statistics courses for PGMI college students. Data analysis was continued in determining the differences in the HOTS achievement of male and female college students. The difference is shown through the average HOTS achievement, maximum value, minimum value, and standard deviation. This analysis is expected to be able to provide information related to differences in the achievement of HOTS in male and female college students.

RESULT AND DISCUSSION

This study aims to analyze the HOTS achievement of PGMI college students during online learning since Covid-19 pandemic. The HOTS achievement analysis is also distinguished by gender review. The research subjects were students in the undergraduate program majoring in teacher education at Madrasah Ibtidaiyah (PGMI), Faculty of Tarbiyah and Educational Sciences, State Islamic University Professor Kiai Haji Saifuddin Zuhri, Purwokerto. A total of 106 students were involved in the study which were divided into 12 males and 94 females. The results of the study can be seen in Table 2.

Table 2
HOTS achievements of all PGMI students

No	Data	Value
1	Mean	50.3
2	Maximum value	75.0
3	Minimum value	15.6
4	Standard Deviation	13.6

5	Number of students who finished studying	40 (37.74%)

Table 2 shows that the average college students score of 50.3 with maximum value 75.0 and minimum value 15.6. It can be said to be low. In addition, the standard deviation of 13.6 indicates that the variance of the data is diverse. Table 2 also shows that the overall HOTS achievement of students is still low. This can be seen from the number of students who scored on criterion C as a requirement to pass the education statistics course, which was a minimum of 56 which only reached 37.74%.

Further analysis related to the achievement of HOTS in terms of gender can be seen in Table 3.

Table 3.
HOTS achievement of male and female PGMI college students

Data Description	Man	Woman	Information
Number of students	12	94	The number of female students is much more than male
Mean	48,7	50,5	The HOTS of female PGMI students is higher than that of male students.
Nilai Maximum	75	75	The maximum score for achieving HOTS for female and male students is the same.
Nilai Minimum	21,9	15,5	The minimum score for achieving HOTS for male students is higher than for female students
Standar Deviation	14,3	13,5	The distribution of HOTS data for male students is more varied than female students.

Table 3 shows that the average HOTS of female students is higher than that of male students. The average difference between male and female students is 1.5 points. Although the achievement of the maximum score between male and female students is different, the achievement of the minimum score for male students is much better than female students by 6.4 points. The standard deviation of both male and female students has a slight difference. There is a difference of 0.8. This means that the achievement of HOTS in male students is much more varied than female students. These results indicate that the achievement of HOTS for female students of the PGMI study program at Islamic universities (UIN Saizu) is higher than that of male students. This conclusion focuses on the average HOTS achievement data for male and female students as the main comparison.

HOTS is a higher order thinking ability that is needed to be able to live in the 21st century with all its challenges. The importance of HOTS is that graduates from

various levels of education from basic education to higher education are expected to have this ability.

The sudden onset of the Covid-19 pandemic paralyzed many sectors, including education. Lifestyle in the form of limiting physical contact between humans is a solution to break the chain of the spread of Covid-19. The government also issued a WFH policy (study, work, and worship at home) (Darmalaksana et al., 2020). This situation has made many changes from the habitual patterns of people who had woken up long before the pandemic came. These habits include: gathering with neighbors, chatting with friends while talking about something, shopping, and other habits. The sudden loss of long-established habits causes stress to become inevitable. Research (Fitria & Surya, 2021) found that the COVID-19 pandemic caused changes in sedentary behavior where there was an increase in the total hours spent by adolescents to engage in sedentary behavior, including significant changes in learning behavior. Sedentary behavior itself is a behavior that is carried out outside of bedtime (reducing sleep hours) but with a small number of calories. Sedentary behavior is one of the causes of obesity that leads to impaired health in a person.

The WFH policy has an impact on the use of e-learning as a learning medium. E-learning is a learning model that has characteristics that seem simple, so it can be used by anyone, anywhere, anytime and is free to use (Hadisi & Muna, 2015). The use of e-learning is expected to be able to answer the challenges of learning during the Covid-19 period.

However, there are some things that are important to prepare for online learning. (Ariani, 2018) expressed the same thing that learning using e-learning cannot be optimal if the needs of one component are not supportive or there are obstacles. One of the obstacles that most learning experiences are the smoothness of the internet network. This was revealed (Windhiyana, 2020) and (Arizona et al., 2020), that internet connection problems are the main obstacle in implementing online learning.

In addition to a fluency internet network, learning also requires media that support online learning. Various applications are used in online learning with various advantages it has. (Anugrahana, 2020) found that there were 9 more media used during the pandemic namely WhatsApps, WhatsApp Web, Google Classroom, Google Group, TeamLink, Microsoft Teams, Kaizala Microsoft, Zoom Meeting & Webinars, Youtube, Google Hangouts, and others. As many as 100% of teachers (64 people) use WhatsApps as the main choice. The results of the study (Habibah et al., 2020) found that WhatsApps and google classroom as the learning media technology that is mostly used by elementary schools in online learning.

Various studies were conducted to determine the effectiveness of these various media. One of them, research conducted by (Marsiding, 2021)which states that the use of the zoom meeting application at the State Elementary School (SDN) 117 Leppangeng Bone is still "less effective". This is due to several factors, both from the side of students, parents, and teachers who have not been able to use the zoom application properly. (Atikah et al., 2021) researched the use of Google classroom to support online learning. Meanwhile (Susilowati, 2021) distinguishes WhatsApp group and Google Class in achieving learning objectives.

The use of e-learning has an impact on study habits and learning styles which greatly influence the success of learning objectives (Pusvyta Sari, 2015).

The Covid-19 pandemic with various challenges in learning activities and the importance of achieving HOTS places the achievement of HOTS as one of the learning outcomes. Therefore, research related to the achievement of HOTS during the Covid-19 pandemic needs to be carried out in order to obtain information regarding the effectiveness of online learning in achieving HOTS during the Covid-19 pandemic from various levels of education. This research is one of the studies that answer it, especially in the implementation in the realm of higher education.

The results showed that the HOTS achievement of PGMI college students during online learning using e-learning was low. This shows that the learning that has been done has not been effective. The same thing was conveyed by (Anawati et al., 2020) that the use of e-learning applications during the pandemic experienced many shortcomings in the process of delivering material.

To parse the results of the study, then conducted a study and observation in order to produce information that can be used to explain the results of the study. Based on some information, it is known that the weakness of the internet network is one of the factors for the low HOTS achievement of UIN Saizu students. The reasons include many PGMI UIN Saizu students come from several areas with inadequate internet networks. Network constraints and limited time in interacting make information not conveyed properly so that understanding of the material is low. In addition, UINS Saizu students generally also come from families with lower-middle economies who object to spending an additional budget to buy internet quota. Regarding this problem, UIN Saizu took the initiative to provide assistance in the form of internet quota packages to all students. Internet packages are sent once a month at the beginning of the month. UIN Saizu's policy is expected to help students implement online learning better.

E-class is a special application for UIN Saizu students and lecturers as an online learning tool. This e-class is the main application for online learning at UIN Saizu. The use of the application is allowed as long as it does not conflict with the e-class application. As far as the implementation of online learning and observations are concerned, the e-class application still requires system improvements. This is because students experience some difficulties while using e-classes, such as taking a long time to open the application. Whereas in online learning, attendance and learning agendas can only be seen through e-classes. Students also have difficulty in uploading assignments and exam results. This makes student attendance not recorded in the e-class, some assignments and exam results are slow to be received by the e-class. Even at the end of the semester, the application sometimes cannot be opened at all. This is possible because the server is too busy being overrun by many students. Difficulties are also experienced by lecturers in accessing and correcting student exam answers. For this reason, UIN Saizu continues to strive for e-class improvements in an effort to make online learning successful.

Apart from the technical factors of online learning, other factors were also found that resulted in the low achievement of HOTS. This factor is student learning motivation which still needs to be improved. This is evidenced through online learning activities carried out when using Google Meet. In learning activities, not a few students turn off the camera (off-camera). Students are also less serious in carrying out learning. This is evidenced by the appearance of other people's voices speaking or other voices during learning which causes learning not to be conducive. In fact, there are some students who only turn on and join in online learning but after that the students leave. This was found when the lecturer asked several students to answer questions, there was no response at all. Students' curiosity about learning materials is also low. This can be seen when the lecturer asks students to ask questions or ask for answers. In one meeting, only 2 (two) to 3 (three) students ask questions. Other students did not respond.

Apart from technical factors and student learning methods, what is possible to play a major role in achieving student HOTS is the skills of teachers in carrying out online learning such as research results (Arizona et al., 2020). One of these things is the creation of learning media, such as videos, presentation materials, and others. Unattractive media is one thing that makes learners less motivated to learn. Moreover, educational statistics material, which when viewed from the material side contains complex formulations and calculations. So, online requirements require teachers who are able to use online learning tools.

Therefore, socialization or training to improve online teaching skills for teachers needs to be carried out as has been done by (Nalendra et al., 2021), (Yoyonefendi et al., 2021) and (Terasne et al., 2020) with training on the use of Google. classroom, (Fajriah et al., 2021) with filmmaking training, and (Pratiwi et al., 2021) with Moodle training.

These various problems make online learning using e-learning for PGMI college students still not able to achieve good HOTS abilities. Similar things are also found in the results of research (Nabukeera et al., 2020) which states that online learning due to the Covid-19 pandemic has experienced many obstacles, ranging from technical skills to insufficient educator skills to conduct online learning.

If the various technical obstacles of online learning using e-learning can be minimized, then learning will be able to provide positive things. The results of the study (Nurhayati & Rahardi, 2021) stated that the level of student creativity in developing learning media was very high during the Covid-19 pandemic. For example, through assignments to conduct small research that can significantly improve critical thinking skills in identifying and evaluating problems (Nurtjahyani et al., 2021). The results of the study (Setyowati et al., 2021) also confirm that science learning is the easiest to do in learning during the Covid-19 pandemic in improving HOTS compared to Pancasila and civic education (PPKn), Indonesian language, mathematics, social sciences, cultural arts and crafts, and physical education, exercise, and health.

Based on the observations of several research results related to the success and failure of online learning in achieving HOTS, it can be concluded that learning that focuses on simple research or completing simple projects tends to be suitable for doing through online learning and is able to achieve HOTS. This is in line with research conducted by (Arizona et al., 2020) through his research on the use of learning approaches that can maximize online learning, namely project-based learning. The

strategies used can vary, but the basis is the same, namely problem solving (Ginting et al., 2021). In order for problem-based learning to be carried out properly, it is necessary to provide valid learning tools (S. M. Sari, 2020).

The study also showed that the HOTS achievement of male and female PGMI students was slightly different. The average HOTS achievement of female PGMI students is slightly higher than that of male students. This is in line with research (Eliza, 2020) that the HOTS of female students is higher than that of male students. The results of the study (Rahayuningsih & Jayanti, 2019) show the fact that the analysis aspect of male students is better than female students. On the other hand, in the evaluation aspect, female students were better than male students. In the aspect of creation, the abilities of men and women are the same.

Different things are shown by the results of research (D. E. Sari et al., 2020) that the achievement of HOTS in biology learning before the Covod-19 pandemic found different facts, namely there was no significant gender difference in the achievement of HOTS. This means that learning during the Covid-19 pandemic has an effect on the achievement of HOTS.

The implication of this research is that online learning using e-learning requires excellent internet network smoothness. In addition, the differences between male and female PGMI students in achieving HOTS need to be a concern for educators in designing learning to be able to accommodate these differences. This research will be followed up with the preparation of online learning designs using e-learning with more attention to the achievement of HOTS indicators in order to achieve better HOTS.

CONCLUSION

The results showed that the HOTS achievement of PGMI students during online learning due to Covid-19 was in the low category. In addition, the HOTS achievement of female PGMI students was slightly higher than that of male students.

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