



Implementation of HOTS-Based Learning in Higher Education

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Abstract. This study uses a phenomenological perspective to determine the implementation of HOTS-based learning in universities. The research subjects came from 198 students who took the Student Development course at the Program Studi PPKn PIPS FKIP Universitas Mataram. Collecting data through observation (implementation of HOTS-based learning), questionnaires (response of lecturers and students to HOTS-based learning), and tests (student learning outcomes in HOTS-based learning). The results showed the implementation of HOTS-based learning through communication skills, collaboration, critical thinking, creative thinking, computational logic, compassion, and civic responsibility. Lecturers argue that HOT-based learning helps students in solving problems. Active participation in HOTS-based learning and the active involvement of students in these activities impact their learning outcomes. Students feel a significant change in themselves in participating in HOTS-based learning. Learning like this is a challenge for them. Those who are active in learning contribute to their learning outcomes. 74% of students get good and excellent categories in their learning outcomes.

Keywords: high order thinking skill · perception · learning outcomes

1 Introduction

On Friday, November 9, 2018, when opening the Core Teacher Training for the High Order Thinking Skill Oriented Learning Competency Improvement Program (HOTS) in Yogyakarta, Minister of Education and Culture Muhadjir Effendy emphasized that teachers should improve their learning by emphasizing the use of the HOTS approach. This orientation is essential to prepare students to enter the era of the industrial revolution 4.0 and society 5.0 [1]. This commitment continued in the era of the next Minister of Education and Culture, Nadiem Anwar Makarim. Moreover, Indonesia still gets low results from the 2018 Program for International Student Assessment (PISA) for Indonesia by The Organization for Economic Co-operation and Development (OECD) [2].

The results of the OECD release show that Indonesia is ranked 72 out of 77 countries. With these results, 70% of third-grade junior high school students in Indonesia still have low thinking skills [3]. It is in line with INOVASI's research in the Provinces of NTB, NTT, Kastara, and East Java which found that 25% of 3rd-grade elementary school

students had not read words. More than half of them come from Sumba Island, NTT [4]. Lessons learned from the PISA and INOVASI studies indicate the need to improve the quality of learning activities. The learning process focusing on memorization will place students on memorizing concepts but not understanding concepts. Learning needs to be developed through the HOTS approach to understanding concepts [5].

HOTS-based learning is learning that develops critical thinking skills. Developing critical thinking requires finding patterns, constructing explanations, making hypotheses, generalizing, and documenting findings with evidence [6]. HOTS focuses on the analytical, evaluation, and creative skills [7] and [8]. In line with the needs of the industrial revolution era 4.0 and society 5.0, HOTS has become an unavoidable demand. These include communication, collaboration, critical thinking, creative thinking, computational logic, compassion, and civic responsibility (6Cs) [9]. HOTS-based learning requires educators to be aware of carrying out learning with students. The learning process provides a very open space for educators and students to think broadly based on the appropriate curriculum framework through the HOTS basis [10].

The curriculum must contain content that continuously stimulates student curiosity and motivates lifelong learning. Therefore, the curriculum as the basis of learning should facilitate students to learn to realize their roles and functions in their environment [11]. The learning atmosphere can encourage students to think critically and do high-level reasoning (HOTS) through an appropriate curriculum. Thus, the curriculum can optimize the potential of students to become the desired human being. Higher education has a significant role in organizing HOTS-based learning as institutions that produce prospective educators. Through this learning, graduates can organize HOTS-based learning in every education unit.

Even though the demands of HOTS learning are a must in higher education, what is the reality today? Has the institution implemented HOTS-based learning? A preliminary observational study [12] showed that some lecturers had organized HOTS-based learning activities, but some had not. This study also found that implementing HOTS-based learning is not easy, considering that learning requires high-level thinking that requires serious business support and adequate reference support. From the student's perspective, initial information shows that HOTS learning has not been utilized, making it difficult to follow. HOTS-based learning requires them to use higher-order thinking skills. It takes seriousness and thoroughness in planning each lesson and, at the same time, the learning process for each lecture.

Despite facing many problems, lecturers and students recognize that HOTS-based learning is fundamental to meeting the present and future needs of thinking. It was mainly conveyed by students, where they realized the need for the industrial revolution era 4.0 and society 5.0, which required high-level thinking skills. Through the ability to think like this, they will solve every problem they face, authentic problems in the world of work that require problem-solving skills that use higher-order thinking. Given the importance of HOTS in learning in higher education, it is necessary to conduct an in-depth study through research to find out whether higher education has implemented HOTS-based learning? What are the supporting factors and obstacles faced by lecturers and students in carrying out the learning? What is the impact of HOTS-based learning on student learning outcomes?

2 Research Methods

This type of research is qualitative, using a phenomenological perspective [13] and [14]. It means that the researcher will qualitatively describe all the phenomena in implementing HOTS-based learning in higher education. The research subjects came from 198 students who took the Student Development (PPD) course in the Program Studi PPKN PIPS FKIP Universitas Mataram. To obtain research data following research data collection techniques, including observations to obtain data on the implementation of HOTS-based learning, questionnaires to obtain data on the responses of lecturers and students to HOTS-based learning, and tests to obtain student learning outcomes on HOTS-based learning. All research instruments were developed based on the indicators of each research question. To ensure data accuracy, researchers conducted triangulation [15]. The researcher conducted a qualitative data analysis [16].

3 Findings and Discussion

There are phenomena inherent in the three formulations of research problems which are descriptive in the following sections:

A. Implementation of HOTS-Based Learning

The learning process consists of three main parts: planning, implementation, and evaluation [17]. In connection with HOT's basis for learning, the three main activities are based on the HOTS concept as a whole [18]. Learning planning is preparation by educators before holding learning activities [19]. HOTS-based learning preparation is contained in the learning design, which contains the HOTS concept. It can be seen in the learning objectives, the selection of learning activities, the use of learning resources and the selection of learning evaluations.

The implementation of learning is the realization of the lesson planning. This activity is a reflection of complete learning preparation [20]. However, educators have full authority to adjust learning activities based on real situations and conditions when learning activities occur [21]. It allows the implementation of learning not to be the same as lesson planning content [22]. Learning evaluation is an activity to determine how the results obtained from learning to follow the lesson planning. All learning evaluation activities use complete instruments to measure all dimensions of learning.

To what extent is HOTS-based learning in the PPD course? Three main learning activities become the primary measure for determining it. The preparation, implementation and evaluation of PPD learning activities must include HOTS as the primary basis of learning. All stages of HOTS-based PPD learning activities must contain at least essential elements in 6Cs. All elements in these 6Cs are essential keys that must be considered by lecturers and students in every PPD learning.

Preparation of PPD Course

Does the semester learning design (RPS) contain a HOTS component? The RPS of the PPD course needs to be studied in-depth on its construction and structure. The results show that the 6Cs elements have been included in the RPS. It can be seen in the formulation of learning objectives, the selection/determination of lecture topics,

the choice/determination of lecture activities, the content of assignments for students, and lecture exams. The formulation of lecture objectives contains the importance of student activities in communication, collaboration, critical thinking, creative thinking, computational logic, compassion and civic responsibility. All verbs in the formulation of lecture objectives contain 6Cs elements.

In each course, the objective formulation contains complex topics obtained from the course material for the development of students [23]. The formulation of lecture topics is not single but encourages students to discuss each topic in formulating lecture objectives. Lecture topics are not automatically presented in lecture textbooks [24]. Students individually and in groups must study all lecture references [25].

The complex pattern of determining lecture topics encourages students to no longer easily use their low-level knowledge skills to find lecture material [26]. However, students must carry out activities that encourage them to develop higher-order thinking skills in completing lecture assignments [27]. This section shows that the 6Cs element is active where all students are encouraged to carry out activities that require higher-order thinking skills.

Evaluation as the final part of the lecture also contains the 6Cs. There are two types of evaluation for students during lectures: mid-semester and end-semester [28]. Furthermore, [29] emphasized that the two types of evaluation stages have been designed to contain questions that require higher-order thinking skills, including analysis, evaluation, and creation. In the analysis, students will learn the concepts that have been discussed during lectures following natural phenomena in the field (school). Students conduct an in-depth study of the lecture concept in the evaluation by assessing its implementation in the context of events in the field (school). In the creation section, students must formulate new ideas to accumulate case solutions as actual events in the field (school).

PPD Course Implementation

The implementation of learning follows a predetermined learning design. However, there are still some critical notes that show changes during the learning activities. This change is part of the adaptation made by the lecturer to the situation and conditions of the change. The holidays require adjustments to the course design stated in the RPS. It also influences the implementation of learning designed in the RPS. Some students experience pain when they take turns completing assignments and presentations. It also influences the implementation of the planning contained in the RPS.

On the other hand, some students showed less enthusiasm during the learning process. Even though their number is relatively small (3%), the essence of learning becomes less comprehensive, considering that the main objective of lectures is to accommodate all students to participate actively in each lecture activity.

Internet network is needed for learning activities. During the Covid-19 pandemic, all lectures were conducted online. As a result, the need for internet networks is a significant factor that must exist. However, in reality, there are still disruptions to the online network.

Even though the obstacle was not significant (2%) during lectures, it did not contribute to the entire implementation of lecture activities.

Evaluation of PPD Course

Learning evaluation has been carried out following the typeset in the RPS [30]. The evaluation is carried out during the middle of the semester in the form of the Mid-Semester Examination (UTS), and at the end of the semester, the Final Semester Examination (UAS) is carried out. UTS has a contribution of 30% of the total course evaluation. Meanwhile, UAS contributed 50% of the total assessment during the lecture. The two weights on this type of evaluation are not singular but must be combined with the results of regular assignments, final assignments, presentations, and student activities during lectures. Through provisions like this, the implementation of evaluation assesses one aspect in the form of tests and comprehensively covers the work results (assignments), active participation, and student performance (individually and in groups).

PPD Course Evaluation

The implementation of the learning evaluation follows the provisions in the RPS [30]. Evaluation in the middle of the semester is the Mid-Semester Examination (UTS) and at the end of the semester in the form of the Final Semester Examination (UAS). UTS has a contribution of 30% of the total course evaluation. Meanwhile, UAS contributes 50% of the total assessment during lectures. The two weights in this type of evaluation are not singular but must be combined with the results of regular assignments, final assignments, presentations, and student activities during lectures. Through these provisions, the evaluation implementation assesses all aspects comprehensively, including work results (tasks), active participation, and student performance (individual or group).

B. Lecturer and Student Responses to HOTS Based Learning

Educators' and students' essential roles determine the primary key to implementing the learning process. Likewise, lecturers as educators in HOTS-based learning have an essential role in encouraging students to participate actively in every learning activity. To determine the response of lecturers and students to HOTS-based learning, they are asked to respond to the predetermined components. They have the opportunity to submit their responses to all existing components. Responses are accessible in supporting aspects and the constraints they feel during the learning activity.

Online Learning System

The important thing in online communication is a real need in the industrial revolution 4.0 [31]. This need cannot be avoided. HOTS-based learning online is a challenge in itself that wants to be realized [32]. Online habits are relatively new. Not everyone can adapt to this new habit. For lecturers and students, this component has a score of 15% as an essential factor influencing the process and the success of implementing HOTS-based learning.

Independence in Learning

As the main parties controlling learning activities, Lecturers and students should have an independent spirit in thinking and acting [33]. HOTS-based lectures require both parties

as determinants of learning to have new habits always to be independent [34]. The habit of thinking and doing be autonomous requires habituation from an early age. It becomes a problem for parties who do not have such habits when the situation and conditions of learning are realized. This component impacts 10% of HOTS-based learning to achieve the expected goals.

Individual Work in Regular and Final Assignments

Before entering higher education, students generally have become accustomed to doing activities in groups [35]. When entering the higher education level, there is a shift in demands for responsibility from groups to individuals [36]. The new habit of being responsible for tasks individually is not easy to do, considering that the old habit demands more responsibility as a group [37]. As much as 15% of the score for this component impacts lecturers and students when conducting HOTS-based learning.

HOTS Contents on Class Assignments and Assessment

HOTS's basis for learning encourages students to use high-level thinking skills [38]. This skill is very much needed in real life, both now and in the future [39]. In principle, real everyday life requires high-level thinking skills as an essential factor for solving existing problems [40]. HOTS-based learning is very beneficial for students and lecturers in honing their thinking skills and at the same time being actively involved in solving contextual problems in everyday life.

Higher-order thinking can be realized if someone always practices and practices to solve contextual problems. This level of thinking cannot just be realized without consistent and continuous habituation. The statement [22] reinforces that the biggest challenge for lecturers and students is that they are not used to using HOTS in every learning activity. As a result, according to [33], when learning requires the HOTS base as a primary essential factor, the implementation process is not easy to do, so the results are not easily realized. Lecture assignments have a score of 20% as a determining factor for the success of HOTS-based learning.

Discipline in Following Learning Activities

One of the main requirements for implementing HOTS-based learning is using time in a disciplined manner [37]. This discipline habit will deliver all parties involved in learning to realize the learning mission optimally and comprehensively [38]. For some people who are not accustomed to being disciplined, the demand for disciplined behavior is an important issue that is not easy to realize. Some people do not realize that disciplinary behavior determines a person's success in all areas of life.

The Requirement of Active Participation and Performance During Lectures

The learning process is a multi-directional interaction carried out by lecturers-students, students, and lecturers with student groups [19]. The process takes place interactively and continuously. Each party is in an equal and egalitarian position [20]. Through such a position, everyone is expected to make a constructive contribution as an inseparable part of the entire interaction process. All parties must contribute according to their duties and functions as an interactive process.

Even though lecturers and students must know the interactive lecture process, lecturers still dominate lecture activities and inevitable student participation [33]. Various factors have allegedly been an obstacle for all students to participate actively. Most (25%) students considered that their participation had been represented by students who had been active participation so far. Others (50%) think that being an active participant in lectures is an inseparable part of their habit of attending lessons. On the other hand, 25 students considered that active participation required strong guts so that if they did not feel confident understanding a concept, it would be difficult for them to be involved in learning.

6Cs Elements as the Essential Part of HOTS-Based Learning

HOTS-based learning can be realized if the 6Cs of learning, including communication, collaboration, critical thinking, creative thinking, computational logic, compassion, and civic responsibility [39]. Communication has a score of 35% as the most significant contributor (core) to implementing HOTS-based learning. Communication is the process of lecturers delivering learning messages to students. On the other hand, students also respond to the learning messages delivered by the lecturers. This communication process requires collaboration between various parties, namely lecturers and students. Thus, a collaboration between lecturers and students is needed. This collaboration must be built from critical perceptions, where the lecturer is responsible for developing students' critical abilities. It is better if students are required to use critical and creative abilities to continuously review the learning materials discussed in learning.

In addition, computational logic, compassion, and civic responsibility are other things that should not be ignored [18]. HOTS learning process requires an essential role of logic in thinking so that the involvement of lecturers and students in the interaction process is based on logical thinking, knowledge base, and in-depth study. Lecturers and students use the role of mutual respect when studying essential concepts and ideas, both textually and contextually. All of this becomes the primary basis for joint efforts to create citizens responsible for advancing education in their surroundings, nation, and country.

C. Student Learning Outcomes in HOTS-Based Learning

Do students' positive perception and active involvement in every HOTS-based learning activity impact their learning outcomes? There are at least two crucial supporting factors:

HOTS Dimensions on Student Learning Outcomes

HOTS-based learning is not a learning activity that has become common for lecturers and students [30]. Based on the responses of lecturers and students, it appears that although this learning is considered relatively new learning, most (86%) students consider learning something challenging to follow and optimize its implementation. However, a small proportion of students (14%) felt significant difficulties and could not encourage them to be actively and pleasantly involved. Students in this group feel pressured to get used to developing HOTS-based thinking skills. These situations and conditions impact student learning outcomes at the end of the semester.

In the general description of student learning outcomes, it appears that most students (62%) have scored in the good category (B and B +), strengthened by 12% in the

excellent category (A). On the other hand, 16% of students have sufficient abilities (C + and C). Only a small proportion (11%) of students scored poor (D +, D, and E). This data shows that student learning outcomes are identical to student perceptions/responses and active involvement in HOTS-based learning activities. The active participation of active students (86%) has relatively good and excellent learning outcomes (74%).

Follow-Up on Student Performance-based on Learning Outcomes.

Based on the description of the HOTS dimension on student learning outcomes, there is a positive relationship between positive responses and student activeness in HOTS-based learning and learning outcomes at the end of the semester. Even though students admitted that they were not familiar with HOTS-based learning in general, they felt a positive challenge after being actively involved in these learning activities [28]. This positive challenge motivates them to carry out constructive activities in realizing expectations in higher-order thinking. As emphasized by [22], the HOTS-based learning process encourages students to think reconstruction leads to positive action that produces good products.

This positive achievement needs to be maintained and pursued a more positive development. Therefore, the follow-up that needs to be done is to maintain a HOTS-based learning process. As thoughts and actions are not commonly carried out, it is only natural that they do not get extensive responses from various parties (lecturers and students) [39]. Efforts are continuously made in line with efforts to shift unattractive habits into something challenging so that students are encouraged to be actively involved. If this challenge can be realized, then the subsequent development needs to be endeavored to find HOTS-based learning activities that are varied and contain various alternative learning activities. It will attract attention for any student to learn about these activities and try to get involved in them as self-actualization. HOTS-based constructive thinking is a constructive part of learning that lecturers and students should carry out.

4 Conclusions and Suggestions

A. Conclusions

The conclusion formulated from the description of the results and discussion is that learning in education has shown HOTS bases in planning, implementation, and evaluation. All stages of learning based on HOTS have encouraged lecturers and students to change their paradigm of thinking, which was initially dominated by low-level thinking to high-level thinking. The active participation of the lecturers in facilitating HOTS-based learning and the active involvement of students (86%) in these activities had a positive impact on the acquisition of learning outcomes. There are learning outcomes in the good and excellent categories (74%), which is evidence that the active involvement of students in learning has a positive impact. This positive achievement needs to be followed up with efforts to maintain existing achievements while at the same time striving for more varied activities on HOTS-based learning. This effort will encourage the involvement of more students in each HOTS-based learning preparation and implementation.

B. Suggestions

So far, the Prodi PPKn PIPS FKIP Universitas Mataram has not used HOTS as an essential basis in the implementation of learning. One of the challenges is no agreement

with HOTS as a learning base. There are many variations of interpretations of HOTS-based learning, so deep thinking is needed to develop each design, implementation, and evaluation. Through the results of this study, the researcher wants to prove to the study program that implementing HOTS is not difficult to do, but rather the need for creativity in translating the contents of HOTS content in a course. Therefore, based on the results of this study, suggestions are proposed to the study program to formulate policies as follows:

- Each course should be designed using HOTS to plan, implement, and evaluate learning. If this is done, it can simultaneously prepare prospective teachers accustomed to using higher-order thinking skills today and when they become teachers in the future.
- Periodically, the study program needs to evaluate lectures to determine how the implementation of HOTS and its achievements impact the thinking skills of prospective teachers.
- Further research needs to be done to see how the implementation of HOTS in learning and its impact on all lectures improves the higher-order thinking skills of prospective teachers. The research results then become a prototype for prospective teachers in implementing HOTS-based learning at the education unit level.

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