

## **EFFORTS TO INCREASE COMPETENCE IN THE DEVELOPMENT OF HOTS-ORIENTED LEARNING FOR TEACHERS**

**Dina Destari \*<sup>1</sup>**

University Sultan Aji Muhammad Idris, Indonesia  
Email : dina.destari@uinsi.ac.id

**Faisal Bin Husen Ismail**

Universiti Tun Hussein Onn Malaysia, Johor, Malaysia  
Email : faisalhu@uthm.edu.my

**S. Sabitha Shunmuga Priya**

KGISL College, Coimbatore, India  
Email : sabithashunmugapriya.s@kgkite.ac.in

### **Abstract**

Currently, the use of technology in the world of education can no longer be avoided because it has become a demand for the modern learning process. Teachers are always required to always be updated on changes that occur, so that learning is able to prepare students to face the changes that occur. One of the important things that teachers can do is develop modern learning that is HOTS (Higher Order Thinking Skill) oriented so that students become accustomed to critical thinking so they are able to develop their creativity. The development of learning oriented towards higher order thinking skills or Higher Order Thinking Skills (HOTS) is a program developed as an effort by the Ministry of Education and Culture to improve the quality of learning and improve the quality of graduates. Efforts that can be made to overcome the urgency are to strengthen teachers' insight regarding the HOTS-oriented Learning Model but carried out directly in the field. What is done for this activity is the presentation given by the resource person. Apart from that, the teachers immediately implemented it by trying to create HOTS-based lesson plans.

**Keywords:** Competency, Learning Development, Higher Order Thinking Skills

### **INTRODUCTION**

Teachers as educators have a very important role in determining the success of students so that they become a determinant of improving the quality of education in schools. The importance of the role of teachers in education is mandated in Law of the Republic of Indonesia Number 20 of 2003 concerning the National Education System in Article 3 which reads: "National

---

<sup>1</sup> Correspondence author.

education functions to develop abilities and shape the character and civilization of a dignified nation in order to educate the life of the nation, aiming to develop potential students to become human beings who believe and are devoted to God Almighty, have noble character, are healthy, knowledgeable, capable, creative, independent, and become democratic and responsible citizens." Law of the Republic of Indonesia Number 14 of 2005 concerning Teachers and Lecturers mandates the guidance and development of the teacher profession as the actualization of the teaching profession (Susilowati, W. W., & Suyatno, S, 2021). It is very clear that the function of teachers is in developing students' abilities in improving the quality of education in Indonesia.

Minister of Education and Culture Muhadjir Effendy stated on one occasion that the weighting of UNBK questions, especially Mathematics and Natural Sciences subjects, was indeed different from the usual assessment. The Ministry of Education and Culture has started implementing international standards, both for Mathematics, literacy and Natural Sciences questions, namely those that require high reasoning skills, or Higher Order Thinking Skills (HOTS) (Yusuf, I., et al, 2020 ).

The government expects students to achieve various competencies by implementing HOTS or Higher Order Thinking Skills. These competencies are critical thinking, creative and innovative, communication skills, collaboration and confidence (Fajriah, N., et al, 2020) . The five things conveyed by the government are targets for student character in the evaluation system, namely in the National Examination and are also 21st century skills. Higher Order Thinking Skills (HOTS) are also implemented following the still low ranking of the Program for International Student Assessment ( PISA) and Trends in International Mathematics and Science Study (TIMSS) compared with other countries, so that the standard of National Examination questions is increased to catch up (Suwama, I. R., & Apriyani, S, 2022).

The development of learning oriented towards higher order thinking skills or Higher Order Thinking Skills (HOTS) is a program developed as an effort by the Ministry of Education and Culture to improve the quality of learning and improve the quality of graduates (Indah, P, 2020). Empowering learning communities through Teacher Working Groups (KKG), Subject Teacher Deliberations (MGMP) is one of the program priorities of the Directorate of Basic Education Teacher Development in developing learning oriented towards higher level thinking skills.

HOTS-oriented learning starts from planning. Like learning planning in general, learning that is in line with the demands of 21st Century skills (HOTS) is also planned from the start, starting with analyzing competencies to preparing a learning implementation plan. 21st Century Learning is learning that must prepare the 21st Century generation with advances in information and communication technology (ICT or ICT) which are developing so quickly. Technological developments affect various aspects of life, including the learning process (Nurhayani, N., & Retnowati, H, 2022). Therefore, the 2013 Curriculum continues to be improved in accordance with the demands of ICT progress but must remain rooted in national culture as stated in Pancasila and the 1945 Republic of Indonesia Constitution. In accordance with the character of 21st Century education (4K or 4C), the learning developed must be able to encourage students. to develop higher order thinking skills (Higher Order Thinking Skills = HOTS).

Assessment of learning outcomes in learning in order to develop 21st century skills is basically the same as assessment of learning outcomes in general in accordance with applicable regulations (Handayani, F., et al, 2019). However, apart from having to fulfill the basic principles of assessment, in order to meet the demands of 21st Century skills, the assessment of learning outcomes must also be able to measure students' mastery of character quality, competence and literacy mastery, and be able to develop higher order thinking processes. Thinking Skills (HOTS).

## **RESEARCH METHOD**

The study in this research is qualitative with literature. The literature study research method is a research approach that involves the analysis and synthesis of information from various literature sources that are relevant to a particular research topic. Documents taken from literature research are journals, books and references related to the discussion you want to research (Earley, M.A. 2014; Snyder, H. 2019).

## **RESULT AND DISCUSSION**

### **Conceptual HOTS-Oriented Learning**

High-level thinking is a complex thinking process in describing material, making conclusions, building representations, analyzing, and building relationships involving the most basic mental activities (Nofrion, N., & Wijayanto, B, 2018). According to Siagian, E., & Iskandar, I (2020). Higher Order Thinking Skills (HOTS) are triggered by four conditions, namely (1) A certain

learning situation that requires specific learning strategies and cannot be used in other learning situations, (2) Intelligence that is no longer seen as an ability which cannot be changed, but is a unity of knowledge that is influenced by various factors consisting of the learning environment, strategies and awareness in learning, (3) Understanding views that have shifted from unidimensional, linear, hierarchical or spiral towards understanding views that are multidimensional and interactive, and (4) More specific higher order thinking skills such as reasoning, analytical skills, problem solving, and critical and creative thinking skills.

HOTS-oriented learning skills are also used to underline various high-level processes according to Bloom's taxonomy (Agustihana, S., & Suparno, S, 2019), which classifies skills into two parts, namely: First are low-level skills that are important in the learning process , namely remembering, understanding and applying, and the second is classified into high-level thinking skills in the form of analyzing, evaluating and creating skills.

HOTS has at least three role dimensions, namely: First, HOTS as Transfer of Knowledge, which is closely related to thinking skills in accordance with the cognitive, affective and psychomotor domains which are one unit in the learning and teaching process. HOTS as a transfer process in the learning context is giving birth to meaningful learning, namely the ability of students to apply what they have learned to new situations without direction or guidance from educators or other people.

Second, HOTS as Critical and Creative Thinking, is essentially an active process, where someone thinks about everything in depth, asks various questions, finds relevant information in solving problems that arise, makes decisions, analyzes all assumptions that arise and carries out investigations or research based on data and information that has been obtained so as to produce the desired information or conclusions. HOTS as a critical thinking process in the learning context is to form students who are able to think logically (reasonably), reflectively, and make decisions independently.

Third, HOTS as Problem Solving is needed in the learning process, because learning designed with a HOTS-oriented learning approach cannot be separated from a combination of thinking skills and creativity skills for problem solving. HOTS as a problem solving process is to make students able to solve real problems in real life, which are generally unique so that the solving procedures are also unique and not routine (Supriyadi, S., et al, 2023).

### **Higher Order Thinking Skills (HOTS) Oriented Learning**

## A. HOTS Learning Principles and Characteristics

In accordance with Ministerial Regulation No. 20 of 2016 concerning graduate competency standards which stipulates that graduates at each level of educational unit are expected to be able to master thinking skills, productive work, independence and critical thinking. Therefore, it is important for every institution and fellow teachers to start getting used to developing learning concepts that are oriented towards higher level thinking in every student learning activity (Yani, A., & Mulyadi, A, 2022).

According to Resnick (educator and education researcher, High Order Thinking Skills (HOTS) or higher order thinking skills are complex thinking processes in describing material, making conclusions, building representations, analyzing and building relationships involving the most basic mental activities. High order thinking skills as Knowledge Transfer it must cover the cognitive, affective and psychomotor domains which become one unit in the learning process (Tyas, E. H., & Naibaho, L, 2021).

Initially, HOTS was a concept for developing mental skills in Bloom's Taxonomy. Benjamin S. Bloom (Djidu, H., & Retnawati, H, 2018) categorizes various levels of thinking, from the lowest to the highest, which includes: knowledge, understanding, application, analysis, synthesis and evaluation. Benjamin S. Bloom et al.'s concept. in the book *Taxonomy of Educational Objectives* (1956), the learning objectives are actually divided into three domains. These three domains are Cognitive, which are mental skills (regarding knowledge); Affective, emotional side (regarding attitudes and feelings); and Psychomotor, which is related to physical abilities (skills).

Later in development, the cognitive domain was revised by Lorin Anderson, David Krathwohl, et al. in 2001. The sequence then became Lower Order Thinking Skills (LOTS) which includes skills C1-C3: remembering, understanding, applying, and Higher Order Thinking Skills (HOTS) whose learning outcomes include abilities C4- C6 namely: analyzing, evaluating, creating. In the end, learning outcomes in the realm of knowledge according to Minister of Education and Culture Regulation number 21 of 2016 concerning basic and secondary education content standards are based on the Bloom taxonomy as revised by Anderson, et al. This is (Hanafiah, S., & Suryani, I, 2021).

## B. Application of HOTS Oriented Learning

### 1. Transfer of Knowledge (knowledge transfer)

High-level thinking skills are closely related to thinking skills in accordance with the cognitive, affective and psychomotor domains which become one unit in the learning and teaching process.

2. Critical and Creative Thinking (critical and creative thinking)

Essentially it is an active process, where students are expected to be able to think about everything in depth, ask various questions, find relevant information and elaborate on the context of the problem. Meanwhile, creative thinking can take the form of imaginative thinking, produce various different possible solutions, and be lateral.

3. Problem Solving (problem solving)

In learning, students are accustomed to being given tasks to solve problems that are posed in the form of case studies, observations, experiments and various other learning challenges so that they are accustomed to solving problems that exist around them (Indah, P, 2020).

C. Assessment in HOTS Learning

In carrying out a HOTS-oriented assessment process, fellow teachers can of course apply various forms of assessment. Judging from the aspect of the knowledge dimension, the instruments and questions for HOTS-based assessments do not merely measure metacognitive dimensions, such as factual, conceptual and procedural dimensions only. The metacognitive dimension also includes the ability to connect several different concepts. interpreting, solving problems, choosing problem solving strategies, discovering new methods, arguing (reasoning), and making the right decisions. For example, in learning practice, one form of relevant assessment is used, namely authentic assessment (Ichsan, I. Z., et al, 2020). According to the definition from the Ministry of Education and Culture (2013), authentic assessment is an assessment carried out comprehensively (thoroughly) to assess the input, process and output of learning, which includes the domains of attitudes, knowledge and skills.

In developing your own assessment you need at least two things, namely instruments and indicators (Wiyaka, W., et al, 2020).

1. Instruments

Assessment instruments can be defined as assessment tools or assessment tools. The instruments used in HOTS-based assessments can be test and non-test instruments. The form of the instrument can be an essay or an objective test, depending on the aspect to be assessed. If EdVision colleagues only want to assess students' high-level thinking abilities from a cognitive aspect, then objective tests can be used.

Meanwhile, if you want to assess students' cognitive aspects and HOTS processes, you can use essay or description tests. The non-test instruments used can be in the form of performance, project, product or portfolio assessments.

## 2. Indicators

It is a marker or variable for achieving basic competencies that can be used as a measure to determine the achievement of learning objectives. In the HOTS-based assessment dimension, there are three core indicators used, namely C4-C6: Analyzing, Evaluating, Creating.

### **Assessment in HOTS Learning**

Assessment according to Minister of Education and Culture Regulation No. 23 of 2016 is the process of collecting and processing information to measure the achievement of student learning outcomes. This process is carried out through various assessment techniques, using various instruments, and comes from various sources to make it more comprehensive. Assessment must be carried out effectively. Therefore, the collection of information that will be used to measure student learning outcomes must be complete and accurate in order to produce the right decisions. Assessment is not only focused on learning outcomes, but also on the learning process (Merta Dhewa, K., et al, 2017). Students are involved in the process of self-assessment and assessment between students (assessment between friends) as a means of practicing assessment.

Assessment in HOTS learning should be carried out through three approaches, namely assessment of learning (final assessment of learning), assessment for learning (assessment for learning), and assessment as learning (assessment as learning). Higher order thinking skills are logical, critical, creative and problem solving skills independently. Logical thinking is the ability to reason, namely thinking that can be accepted by common sense because it meets the rules of scientific thinking. Critical thinking is evaluative reflective thinking. Critical people always use the knowledge and experience they have to analyze new things, for example by comparing or identifying advantages and disadvantages so that they are able to justify or make decisions (Rifâ, A., et al, 2018).

Meanwhile, creative thinking is the ability to find new or different ideas. With new or different ideas, someone will be able to carry out various innovations to solve various real problems they face (Rosidin, U., et al, 2019). Thus, looking at the knowledge dimension, HOTS questions generally measure

the metacognitive dimension, not just the factual, conceptual or procedural dimensions. The metacognitive dimension describes the ability to connect several different concepts, interpret, solve problems, choose problem solving strategies, discover new methods, argue (reasoning), and make the right decisions.

HOTS-oriented learning assessment instruments have different characteristics and characteristics from assessment instruments in general. Characteristics of questions for HOTS-oriented learning assessments include transferring one concept to another, processing and applying information, looking for connections between different pieces of information, using information to solve problems, and reviewing ideas and information critically. Meanwhile, the characteristics are (1) Measuring high-level thinking abilities, (2) Divergent in nature, (3) Using multiple representations, (4) Based on contextual problems, and (5) Using various forms of questions (Pulungan, M., et al, 2021).

### **The Urgency of Implementing HOTS-based Learning**

The application of higher thinking skills for students is very urgent, considering the times with various extraordinary challenges. The development of the digital world which has the potential to create dependency, false maturity of students, and the challenges of globalization need to be answered by implementing HOTS in the world of education. A side effect of the digital modernization that is currently occurring (Sirait, S., et al, 2021). Even though currently information is very easy to access, not hampered by time and space, this also has a bad effect, especially on school-age children. Parents nowadays are used to providing digital media such as cellphones, laptops or computers. Not only for children to learn but also so that children can play games. And parents can work. This can be the first trigger for children to become "addicted" to playing cellphones. Children are more busy playing games than studying. And children will speculate that cell phones or other digital media are used to play games. The next effect is that children become lazy about studying, lazy about learning new things. This happens a lot to elementary school age children. Where a child's brain development is based on habits, what he sees, and what he likes. So when the teacher applies the HOTS learning model, students are unable to follow and finally the teacher returns to teaching with the LOTS learning model.

What happens will result in the emergence of "pseudo-mature" children. Agustina, T., et al (2020) stated that "pseudo-mature" children are



children who are physically perfect, however, they are not wise and very bad at dealing with and solving problems around them. Children's development grows faster compared to the past, but their souls grow slowly. The tendency of children like this is not to develop well emotionally and socially. Children cannot cope with anxiety and self-anxiety, are impulsive and have difficulty socializing with peers. Children are unable to adapt to their surrounding environment.

Another inhibiting factor is the teacher's lack of understanding regarding how to formulate indicators and operate existing infrastructure in schools. Then teachers' understanding is still low regarding HOTS-based learning so that teachers do not apply the HOTS learning model (Sudana, I. M., et al, 2020). Then there is still a lack of training and assistance for teachers regarding HOTS. If training is held regarding HOTS, it is still only about theory, not oriented towards direct examples in the field.

## **CONCLUSION**

Higher order thinking abilities (HOTS) are thinking skills that are able to shape children not only to retain knowledge, but also at a transfer level. Retaining knowledge is learning that only aims to make children memorize, know, without being able to put it into practice. However, ideally learning is at the transfer level, children can apply and practice their knowledge to solve the problems they face today, especially the challenges of modernization and globalization. Efforts that can be made to overcome the urgency mentioned above are to strengthen teachers' insight regarding the HOTS-oriented Learning Model but carried out directly in the field. What is done for this activity is the presentation given by the resource person. Apart from that, the teachers immediately implemented it by trying to create HOTS-based lesson plans. The next day, material was given on how to make HOTS-based grids. After all the material has been provided, the next step is for the teachers to conduct outreach to the community. This aims to enable the teacher to immediately implement what has been conveyed by the resource person. This method is seen as more effective than just delivering the material.

## **REFERENCES**

Agustihana, S., & Suparno, S. (2019). Development of HOTS Oriented Cognitive Problems in Thermodynamics for Senior High Schools. *Jurnal Penelitian Fisika Dan Aplikasinya (JPFA)*, 9(1), 44-54.

- Agustina, T., Oktavia, W., & Inderasari, E. (2020). The Implementation of Higher-Order Thinking Skills (HOTS) in Text-Based Learning at SDN Banyurip 3 Sambungmacan. *Al-Bidayah: jurnal pendidikan dasar Islam*, 12(1), 15-30.
- Djidu, H., & Retnawati, H. (2018). Cultural values-integrated mathematical learning model to develop HOTS and character values. In *Character Education for 21st Century Global Citizens* (pp. 363-370). Routledge.
- Earley, M. A. (2014). A synthesis of the literature on research methods education. *Teaching in Higher Education*, 19(3), 242-253.
- Fajriah, N., Sari, A., & Suryaningsih, Y. (2020). Higher-order thinking (HOT) oriented learning: exploration of mathematics teachers' perception. In *Journal of Physics: Conference Series* (Vol. 1422, No. 1, p. 012003). IOP Publishing.
- Hanafiah, S., & Suryani, I. (2021). The Effect of Science in Development of Student Character Education with the Application of HOTS. *LINGUISTICA ANTVERPIENSIA*, 2861-2873.
- Handayani, F., Hartono, H., & Lestari, W. (2019). Need analysis in the development of HOTS-oriented study project assesment instrument in android-based science learning. *Journal of Research and Educational Research Evaluation*, 8(1), 57-64.
- Ichsan, I. Z., Hasanah, R., Ristanto, R. H., Rusdi, R., Cahapay, M. B., Widiyawati, Y., & Rahman, M. M. (2020). Designing an Innovative Assessment of HOTS in the Science Learning for the 21st Century. *Jurnal Penelitian dan Pembelajaran IPA*, 6(2), 211-224.
- Indah, P. (2020). Development of HOTS (high order thinking skill) oriented learning through discovery learning model to increase the critical thinking skill of high school students. *IJCER (International Journal of Chemistry Education Research)*, 26-32.
- Merta Dhewa, K., Rosidin, U., Abdurrahman, A., & Suyatna, A. (2017). The development of Higher Order Thinking Skill (Hots) instrument assesment in physics study. *IOSR Journal of Research & Method in Education (IOSR-JRME)*, 7(1), 26-32.
- Nofrion, N., & Wijayanto, B. (2018). Learning activities in higher order thinking skill (HOTS) oriented learning context. *Geosfera Indonesia*, 3(2), 122-130.

- Nurhayani, N., & Retnowati, H. (2022). Higher-order thinking skill oriented learning: Are teachers and students ready?. *JNPM (Jurnal Nasional Pendidikan Matematika)*, 6(2), 291-302.
- Pulungan, M., Toybah, T., & Suganda, V. A. (2021). Development of HOTS-based 2013 curriculum assessment instruments in elementary school. *Journal of Teaching and Learning in Elementary Education*, 4(1), 51-64.
- Rifâ, A., Serevina, V., & Delina, M. (2018). The development of High Order Thinking Skills (HOTS) assessment instrument for temperature and heat learning. *Jurnal Penelitian & Pengembangan Pendidikan Fisika*, 4(1), 19-26.
- Rosidin, U., SUYANTA, A., & Abdurrahman, A. (2019). A combined HOTS-based assessment/STEM learning model to improve secondary students' thinking skills: A development and evaluation study. *Journal for the Education of Gifted Young Scientists*, 7(3), 435-448.
- Siagian, E., & Iskandar, I. (2020). HOTS-ORIENTED LEARNING LANGUAGE LEARNING, PROJECT-BASED IN THE 21ST CENTURY LEARNING CONTEXT. *IJLECR (International Journal of Language Education and Cultural Review)*, 6(1), 9-19.
- Sirait, S., Murniarti, E., & Sihotang, H. (2021). Implementation of HOTS-based learning and problem based learning during the pandemic of COVID-19 in SMA Budi Mulia Jakarta. *Advances in Social Sciences Research Journal*, 8(2), 296-305.
- Snyder, H. (2019). Literature review as a research methodology: An overview and guidelines. *Journal of business research*, 104, 333-339.
- Sudana, I. M., Oktarina, N., Apriyani, D., & Achmadi, T. A. (2020). An Implementation of HOTS Based Learning Strategy in Vocational High Schools. *International Journal of Innovation, Creativity, and Change*, 13(12), 1327-1340.
- Supriyadi, S., Ika, W. U., Nelly, A., Sukamto, I., Frida, D., Fadhilah, K., & Amrina, I. (2023). Implementation of HOTS-Oriented Problem Based Learning on Science Literacy Ability. *Jurnal Pendidikan Progresif*, 12(3), 1492-1499.
- Susilowati, W. W., & Suyatno, S. (2021). Teacher competence in implementing higher-order thinking skills oriented learning in elementary schools. *Premiere Educandum: Jurnal Pendidikan Dasar Dan Pembelajaran*, 11(1), 1.

- Suwarma, I. R., & Apriyani, S. (2022). Explore teachers' skills in developing lesson plan and assessment that oriented on Higher Order Thinking Skills (HOTS). *Journal of Innovation in Educational and Cultural Research*, 3(2), 106-113.
- Tyas, E. H., & Naibaho, L. (2021). HOTS learning model improves the quality of education. *International Journal of Research-GRANTHAALAYAH*, 9(1), 176-182.
- Wiyaka, W., Prastikawati, E. F., & Adi, A. K. (2020). Higher-order thinking skills (hots)-based formative assessment: A proposed model for language learning assessment. *Vision: Journal for Language and Foreign Language Learning*, 9(2), 115-130.
- Yani, A., & Mulyadi, A. (2022). Higher Order Thinking Skills (HOTS)-Oriented Learning in Geography Learning. *Jurnal Pendidikan Ilmu Sosial*, 31(1), 105-118.
- Yusuf, I., Widyaningsih, S. W., Prasetyo, Z. K., & Istiyono, E. (2020). Higher order thinking skills (HOTS)-oriented e-module in electric circuit. In *Journal of Physics: Conference Series* (Vol. 1521, No. 2, p. 022027). IOP Publishing.