

INCREASING TEACHER'S ABILITY TO DEVELOP TEACHING AND LEARNING MATERIAL BASED ON HIGHER ORDER THINKING SKILLS (HOTS)

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Abstrak

Pembelajaran dengan bahan ajar berbasis keterampilan berpikir tingkat tinggi dapat meningkatkan pemahaman peserta didik. Penelitian pengabdian masyarakat ini memberikan pelatihan dan pendampingan bagi para pendidik fisika untuk menyusun bahan ajar fisika yang inovatif. Dua puluh orang pendidik dari Madrasah Aliyah mengikuti kegiatan pengabdian masyarakat tersebut. Keberhasilan kegiatan terlihat dari para pendidik saat melakukan pendampingan dalam penyusunan bahan ajar. Para pendidik mempunyai minat yang tinggi terhadap kegiatan tersebut. Mereka mempunyai tujuan yang sama dalam kegiatan menciptakan bahan ajar yang inovatif. Dengan demikian, siswa saat belajar fisika mempunyai motivasi belajar yang tinggi. Secara umum pelaksanaan program masih dalam rangka kegiatan, workshop dan pelatihan pengembangan bahan ajar dan penilaian berbasis HOTS. Bahan ajar yang dikembangkan membuat para guru antusias untuk mengembangkan bahan ajar berbasis HOTS. Produk yang dihasilkan terdiri dari tiga modul berbasis HOTS, satu buku, satu asesmen berbasis HOTS, dan tiga karya cipta guru.

Kata Kunci: Kemampuan Guru, Bahan Ajar, HOTS

Abstract

Learning with teaching material based on higher-order thinking skill could improve the learners' understanding. This community service research provides training and mentorship for physics educators to compose innovative physics teaching materials. Twenty educators from Islamic Senior High Schools joined the community service activity. The success of the activity was observable on the educators while mentoring the teaching material preparation. The educators have high interest on the activities. They had the same objectives in the activity to create innovative teaching materials. Thus, the students while learning physics had high learning motivation. Generally, the program implementation remained within the activity orders, the workshop and training to develop teaching materials and HOTS-based assessment. The developed teaching material made the teachers enthusiastic to develop the HOTS-based teaching material. The products consisted of three HOTS-based modules, one book, one HOTS-based assessment, and three copyrighted works of the teachers.

Keywords: Teacher's Ability, Teaching and Learning Material, HOTS

INTRODUCTION

The 2021 learning undergoes various learning system changes. One of the aspect changes for learning system adjustment is teaching material. Teaching materials become the primary matters in learning because teaching materials influence the learners' cognition (Rahmani et al., 2021). With teaching materials, learners could acquire and apply the information. Therefore, educators must prepare the teaching materials properly because teaching materials influence learning quality (Wahyuni, 2015). Educators must also understand the learning system and learners' characters while developing the teaching materials (Ahmar & Rahman, 2017).

Understanding of students, design and implementation of learning, and student development for actualizing the various potentials it has will be determined by the extent of the teacher's competence in designing learning while still considering curriculum requirements (Sesunan et al., 2023). This matter will influence the innovation of the concept preparation.

Concept or information in teaching materials must receive some considerations especially the teaching material inovation (Akbari et al., 2018). Various concepts from various science disciplines provide specific characters for the developed teaching materials (Sihombing et al., 2018). This matter also goes for physics concept. People are aware that physics has both physical and mathematical concepts. The physics concept mostly deals with burdening material for the learners. Teaching material with physics material in systematic and innovative mode could lower the negative stigma against physics. This situation requires low misconception within the physics materials.

One of the applicable innovations to develop innovative physics teaching material is delivering the physics material with high-order thinking skill concept. Besides that, higher-order thinking skills become the objective of the learning in this century (Gupta & Mishra, 2021). The material delivery of physics must receive some adjustment base don the indicators of high-order thinking

skills. This matter makes the learners understand the physics concepts better. With the reference of higher-order thinking skill indicators, educators could present various implementation and application of physics in the teaching materials (Agustihana & Suparno, 2019). This trains students to think high. Efforts to reveal students' understanding must receive various questions related to physics in teaching materials. The treatment applied is by providing questions that are innovative and included in HOTS. This is expected to be able to improve students' high-level thinking abilities and also achieve learning goals.

METHOD

This research uses a mix method to determine teachers' abilities in developing Teaching and Learning Materials Based on Higher Order Thinking Skills (HOTS) through community service activities. The researchers promoted this community service in the Subject-Teacher Discussion of Islamic Senior High Schools in Magelang regency. The community service realization was a mentorship for the educators to develop teaching materials. The activity provided mentoring and training for the educators to develop and compose physics learning materials base don innovative HOTS.

Table 1 shows the mentoring activity.

Table 1. The Mentoring Activity

No	The Objectives of Activities	The Types of the Activities
1	The Agreed Perception of Learning Instruments	The Workshop of Learning Instruments
2	The Understanding of HOTS Concept	The Workshop of Learning and the Assessment based on Higher-Order Thinking Skill
3	The Teaching Material Collection (Brainstorming)	The Problem and Material Collections for Physics Teaching Materials The Development of the Modules and Textbooks based on HOTS
4	The Development of Learning Instruments	The Development of HOTS-based Physics Assessment The Design of Lesson Plan
5	The Copyrights of Intellectual Property (HAKI)	The Mentoring of Proposing the Copyrights of Intellectual Property of the Teachers

RESULT AND DISCUSSION

Educators found the development of teaching materials effective and efficient, tailored to individual learner characteristics to prevent monotony. HOTS-based materials promoted higher-order thinking skills, enhancing physics learning motivation. Researchers monitored mentoring outcomes, leading to a prolonged community service period

to observe changes. Despite initial challenges, teacher participation decreased from thirty to twelve, yet improvements were evident across various aspects, as illustrated in Table 2. The mentoring program demonstrated enhanced teacher skills, validating the effectiveness of the innovative teaching materials in fostering a dynamic and engaging learning environment.

Table 2. The Research Result from the Activities

No	The Objectives of Activities	Before	After
1	The Understanding about the Instrument Development Principle	74.3	92.3
2	The Understanding of HOTS	67.3	91.7
3	Format	80.5	86.4
4	The Relevance with the Learning Achievement	63.3	83.2
5	The Material Accuracy	69.8	96.6
6	The Contextual	70.1	89.6
7	The Material Relevance with the Aspects of HOTS	66.2	85.2
8	The Assessment Relevance with the Aspects of HOTS	67.9	80.6

This activity involved 30 physics education from various classes. The mentoring of the teaching material development provides the benefits for educators about the material delivery of the teaching materials. The educators understood the teaching materials were not merely knowing the superficial theories from books or

textbooks but the implementation of the theory. This implementation facilitates learners to understand and connect it with others. HOTS-based teaching materials with accurate innovation provide positive impacts toward the learners' learning motivation (Abadi, Pujiastuti, &

Assaat, 2017; Hendripides, Hikmah, 2018).

Thus, innovative physics teaching materials could realize the learning and attract the learners to learn. Rokhman & Yuliati (2010) explains the important of teaching material development systematically, starting from (a) conceptual reference, (b) material development and design, (c) material organization, and (d) language skill development.

HOTS-based learning facilitates the educators to explain the materials because of the improved learning motivations (Permana & Utomo, 2020). Educators also understand the adjustment of the teaching materials with the learning system and the targeted competences. The implementation of HOTS could meet the two matters because HOTS encourage learners to broaden their thoughts comprehensively (Purwanti & Putri, 2021). Therefore, teaching materials influenced the learning quality of the learners.

The community service for the Islamic Primary School teachers could run properly. The teachers intended to follow the high education

activity proven with 100% participation. The result shows the teachers have positive behaviors toward the promoted activity. The activity answered the principals' expectations. They wanted the teachers to join upgrading activities both in terms of the study program or the teaching method. The evidence is - most teachers, 60%, are older than 40 years old. Thus, they need upgrading.

The initial step begins with the workshop promotion to determine the perceptions of the teachers about the learning instruments. This instrument is important to develop and to improve the learning quality. Ramdani et al (2021) also states that the developed learning materials could facilitate the learning process. Learners could understand the materials in the learning with the contents of concepts, problems, and question items based on HOTS. Any innovative learning could encourage learners to learn joyfully.

Educators must have new knowledge about creativity and innovation of developing teaching materials. Educators must have skills

to design innovative teaching materials and improve the teaching materials. The development of HOTS-based physics learning is also important. The development of the teaching material is important for teaching-learning process (Siregar, Khairina & Robin, 2020). HOTS also refers to the individual competence in this century. Surtikanti, Hertanto, & Agung (2020) explain that learning with HOTS-based materials could trigger the critical thinking and creativity of the learners.. Agustihana and Suparno (2019) explain that any HOTS-based instruments or teaching materials could train the learners, improve their evaluation, and improve their creativity.

The implementation of community service activity receives excellent enthusiasm from the principals,

teachers, and school supervisors. The school supervisors expect the community service to direct and develop the teachers in creating various teaching materials. The school supervisors and teachers expect the follow-up activities of the community service, such as appointing the relevant study program to mentor the teachers' material preparations, improve their skills, improve their teaching, and prepare the Olympiad materials.

The training activity made the teachers enthusiastic to practice developing the teaching materials during the peer-teaching activity. The teachers shared various suggestions about the mentoring. Figure 1 shows the graphics based on the research results.

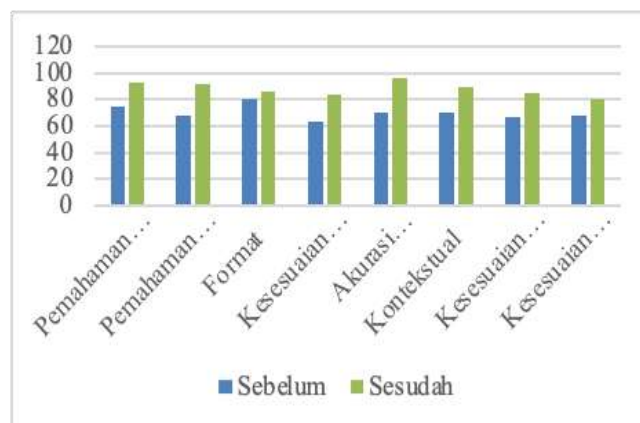


Figure 1. The HOTS-based Teaching Material Developments and Learning

This mentoring, by applying the innovative teaching materials, could improve the learning implementation. The developed lesson plan is based on the relevant curriculum and the integrated teaching material. The expected output of this community service for the teachers was - the capability to develop the HOTS-based teaching materials for the learning. The enthusiasm of the teachers was observable on the teachers' products. The initial target is - to collaborate the

teachers in developing the teaching materials and the learning assessment instruments. The product of the collaborated teaching materials could be the pilot project and the question bank for the teachers.

Some materials in the textbooks are relevant with the competence standard, the core competence, and the applied curriculum at schools. Here are the parts of the teaching materials from the textbooks (Figure 2).



Figure 2. The Excerpt of the Textbooks by the Teachers during the Mentoring with Innovative Teaching Materials

Besides teaching materials in the form of textbooks and modules, the teachers could also implement the knowledge and skills in designing HOTS-based physics questions. This

mentoring begins with a training and intensive supervision in developing the physics questions. Here are the development parts of the HOTS-based physics questions (Figure 3).

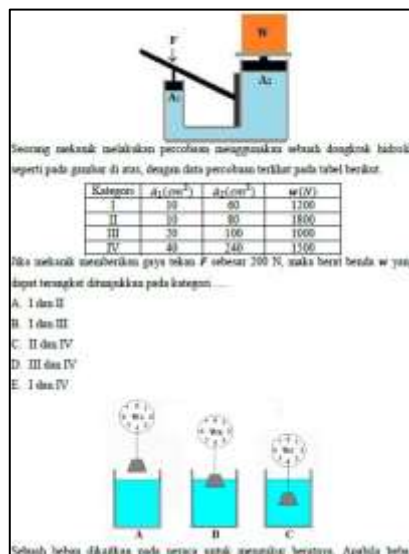


Figure 3. The HOTS-based Physics Questions by the Teachers

CONCLUSION

The promoted community service includes workshop, product-based practice to create learning instrument, and HOTS-based assessment instrument. Generally, the implementation process of the program consists of some serial activities, such as workshop, training, teaching material development, and HOTS-based assessment. The second stage is - the mentoring in the form of HOTS-based teaching material. The developed teaching materials made the teachers enthusiastic to innovate the HOTS-based teaching materials. The activity produced three HOTS-based teaching module, 1 HOTS-based learning assessment, and 3

intellectual properties of the teachers. Based on the activity, the teachers found the benefits of the workshop to motivate and to improve the HOTS-conceptual understanding and HOTS-based teaching material. The future plan of the research must improve the teachers' awareness of developing the HOTS-based teaching materials and questions.

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