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DEVELOPMENT OF GUIDELINES FOR PREPARING HOTS QUESTION SCRIPTS FOR VOCATIONAL SCHOOLS MAJORING IN COMPUTER AND NETWORK ENGINEERING

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ABSTRAK

Tujuan dari penelitian ini adalah untuk mengembangkan panduan penyusunan naskah soal High Order Thinking Skill untuk jurusan TKJ (Teknik Komputer dan Jaringan) SMK di Kota Salatiga. Pendekatan yang digunakan dalam penelitian adalah adalah penelitian dan pengembangan (R & D). Penelitian ini menggunakan lima langkah model Borg and Gall (1983): penelitian dan pengumpulan informasi, pengumpulan data, desain produk, validasi desain, dan revisi desain. Semua guru SMK jurusan Teknik Komputer dan Jaringan SMK di Kota Salatiga ikut serta dalam penelitian ini. Teknik pengumpulan data dilakukan dengan studi dokumen, wawancara, dan angket. Analisa data dilakukan dengan analisis kualitatif model Miles dan Huberman. Hasil penelitian berupa pengembangan panduan penyusunan naskah soal HOTS untuk guru mapel TKJ SMK di Kota Salatiga, yang berisi panduan menyusun naskah soal HOTS mata pelajaran TKJ dan disertai contoh-contoh aplikatifnya. Berdasarkan ujicoba terbatas, panduan ini mendapat skor 3,68 dari skor maksimal 4,00, yang artinya "sangat baik", sehingga panduan ini bisa digunakan bagi guru TKJ di luar Kota Salatiga.

Kata-kata kunci: HOTS, panduan, naskah soal, Teknik Komputer dan Jaringan.

ABSTRACT

The purpose of this research is to extend a guideline for creating High Order Thinking Skill (HOTS) questions or test for Computer and Network Engineering majors at the Vocational High School in Salatiga City. Research and development (R & D) approach is used in this research. This research uses the five steps of the Borg and Gall (1983) model: research and information gathering, data collection, product design, design validation, and design revision.

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All vocational school teachers majoring in Computer Engineering and Networks in Salatiga City were participated in this research. Data collection techniques were carried out by document studies, interviews, and questionnaires. Data analysis was carried out by qualitative analysis. The results of the research were in the form of extending a guideline for creating HOTS questions and test for Computer and Network Engineering teachers at Vocational High Schools in Salatiga City. Based on limited trials, this guideline received a score of 3,68 out of a maximum score of 4,00. That is what makes a book great. So, it can be concluded that this guideline can be used for Computer and network engineering teachers outside Salatiga City.

Keywords: HOTS, guideline, questions, Computer and Network Engineering.

INTRODUCTION

Indonesian education adopts an international standard learning outcome assessment model in the form of High Order Thinking Skill or HOTS. This is done in line with the demands of the disruptive era that demands future human resources who are smart, dexterous, think critically and rationally. This is in accordance with the research of Sofyan (2019) which shows that to adapt to the future and the international world, the 2013 curriculum considers HOTS as a strategy that can be applied or used to be able to answer national education problems and the impact of globalization. Study conducted by Widana (2018) corroborates this opinion that the use of HOTS assessment in classroom learning has a significant effect and can effectively improve students' critical thinking skills.

The Graduation Competency Standards in the 2013 curriculum, both primary and secondary education, require students to have creative, productive, critical, independent, collaborative, and communicative thinking and acting skills. From elementary to secondary levels, students are taught this method in the hope that they will become a generation that is able to compete in the future era. In addition, based on the results of the PISA (Program for International Student Assessment) survey in 2018 shows that the learning outcomes of Indonesian students are relatively low, It is ranked 75th out of 80 countries evaluated. Indonesian students are still considered low in mastery of the material and difficulty in answering questions that require reasoning.

One of the factors causing Indonesia's educational position to rank at the bottom is because students in Indonesia are poorly trained in solving contextual problems, demanding reasoning, argumentation, and creativity in solving them. Students are used to accepting questions made by teachers only by rote memorization and understanding. Even according to studies (Mujib, 2018), the Elementary / MI National Examination questions for three consecutive years, namely the 2014/2015, 2015/2016, and 2016/2017 academic years, science subjects are still at the Low Order Thinking Skill level or low category. The cognitive map is still dominated by C1 and C2, about 50%, C3 and C4 around 15%, and C5-C6 actually 0%.

In line with Mujib's research, Awaliyah's (2018) research shows how few teachers are able to make HOTS questions, so students often take tests with questions that are not HOTS from their teachers. Of the 84 teachers who were given training to make HOTS questions for 2 days, it turned out that only 2 teachers could compile HOTS questions. Other teachers, as many as 80 teachers questions were compiled including LOTS. There are only 2 teachers whose results are included in the Middle Order Thinking Skill question category.

Apparently, HOTS question preparation training is not obtained by all teachers in Salatiga, especially TKJ teachers who are even recognized as having never attended HOTS question preparation training at all. According to one teacher, the school always reminds teachers to insert HOTS questions, such as during mid-semester tests, or end-of-semester

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tests, but there is no training on making HOTS questions. They only look for their own sources, from the internet, or books, and then compile the questions without anyone checking whether the questions that have been compiled are HOTS or not.

The little knowledge of teachers about HOTS questions is very unfortunate, considering that the national application of HOTS questions has actually been applied by the Ministry of Education and Culture since 2018 in the National Examination questions. Actually, the composition of the HOTS question in 2019 will be added again, there is a Covid-19 pandemic and UNBK will not be implemented. The government's decision to change UNBK to a Computer-Based National Assessment (ANBK) consisting of a Minimum Competency Test (AKM) and a Character Survey (Kompas.com, 2020), the questions in this test contain many aspects of reasoning. This can be seen in various examples of ANBK (AKM) questions published by the Ministry of Education and Culture, as seen on the https://pusmendik.kemdikbud.go.id/an/simulasi_akm website (accessed March 29, 2023).

Looking at the conditions above, it is necessary to make guidelines on the preparation of HOTS questions for teachers, so that they can compile HOTS questions for their students to do. So that from an early age, students will get used to doing HOTS questions.

RESEARCH METHODS

This research is included in the type of development research, because it develops products in the form of guidelines for preparing HOTS question scripts for TKJ SMK maple teachers. The development model was adapted from the model of Borg and Gall (1983) has 10 development steps. However, in this study researchers used only 5 steps, namely: 1) research and information collection, 2) data collection, 3) product design, 4) product design validation, 5) product design revision.

This research was conducted in three vocational schools in Salatiga that have TKJ expertise competence. The subjects of the study were teachers majoring in Computer and Network Engineering from the three schools. Data collection techniques and tools using interviews, document studies and questionnaires. First, interviews were conducted with 8 TKJ teachers to explore information about the questions that have been made and done by their students, the ability to compile HOTS question scripts, and participation in training in preparing HOTS questions. Unstructured interview techniques for interviews, so that the atmosphere is not formal and rigid, so that researchers dig into the information more easily and deeply. Second, questionnaires are given to training module validation experts and teachers as trainees. Questionnaires are used to assess products in the form of modules. Testing is carried out at the limited product trial stage, to find out whether teacher competence following the HOTS questions has improved after the use of the training module.

The data analysis technique in this study is qualitative. Qualitative data were analyzed using the Miles and Huberman model, whose steps are data collection, data reduction, data presentation, and conclusion drawing. To assess the quality of the products developed, the data obtained from the evaluation results disseminated through assessment questionnaires in the form of Likert scales, are converted into numbers. The quality of the products resulting from this development is further assessed. Data obtained from the evaluation results disseminated through assessment questionnaires in the form of Likert scales, are converted into numbers. After converting into numbers, the final calculation is then compared with a range of values that indicate the quality of the product. This study uses data analysis techniques, namely using a rating scale between numbers 1 to 4.

The conclusions drawn from such calculations are determined provided that if the average is 3.26-4.00 it means very good; 2.51-3.25 means good; 1.76-2.50 means good enough; 1.00-1.75 means not good. Based on the assessment criteria that have been formulated, then an assessment of the developed product is obtained.

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RESULTS AND DISCUSSION

Result

In Salatiga City, there are three schools that have TKJ Expertise Competencies, namely SMK Negeri 2, SMKS Pelita, and SMKS PGRI 3. Of these three schools, there are 8 (eight) TKJ teachers, one of whom teaches in 2 (two) schools at once. By interviewing all TKJ teachers in Salatiga, all teachers already know about HOTS. Some of them have even made HOTS questions in some test questions or assignments for their students. The test questions prepared already exist that contain elements of HOTS.

Knowledge about the preparation of HOTS questions is obtained by teachers from various methods, including reading about learning and preparing HOTS questions, both from the internet and books, and some participate in discussions in the teacher professional program (PPG). Incidentally, there is a teacher of SMKN 2 Salatiga who is a PPG civil service teacher, so they can discuss with PPG participating teachers, one of which is about HOTS.

Knowledge about HOTS questions is also obtained by teachers from browsing the internet, by looking for examples of HOTS questions. Furthermore, the sample questions are used as a reference to make HOTS questions and are adjusted again to the needs of students. There are also teachers who get knowledge about HOTS questions from independent study, or participating in MGMP and Workshop or In House Training (IHT) activities, it's just that the introduction to HOTS questions is only an introduction on the surface and not yet in-depthPara guru mengaku komposisi soal HOTS yang telah disusun dalam soal tes berbeda-beda, ada yang baru 5-10 %, ada yang 30-40%, ada yang 50-75%, dan antara 60 – 80 % dari seluruh soal yang ada di setiap kali tes.

Even though the TKJ teachers already know about HOTS, some teachers still face obstacles, including lack of knowledge about HOTS, and believing in personal perception only, that HOTS questions are considered long scripts, operational verbs that are different from questions that are not HOTS. Even the tricky questions are considered about HOTS.

The assumption about HOTS which is a long script is also an obstacle, where teachers prefer to use a simple question model because the preparation of questions can be faster. Compiling HOTS questions is considered to take longer to make questions than questions that are not HOTS, while the question instrument must immediately be used for assessment, such as daily tests, mid-semesters or end-of-semester tests.

Another obstacle faced is that there is rarely training in preparing HOTS questions, so teachers are not confident, whether the questions made are already HOTS or not. In addition to rarely training, teachers are also difficult to find ideas, especially examples of HOTS questions in TKJ subjects are difficult to obtain.

Discussion

This HOTS question script preparation guide module is prepared by increasing the variety of sample question scripts that can be directly learned by the teacher. For each category of HOTS questions, there is a sample HOTS question script that the teacher can copy to compile a similar question script or modify the question. The real picture of sample questions from various categories of questions makes it easier for teachers to understand what and how to make HOTS questions, so that teachers can script HOTS questions. This is in line with Solekhah's research (2016), which developed a guide for writing scientific papers for Semarang Police Academy students. Examples seem to complement this guide from various aspects, such as language, writing systematics and grammar, so that users can easily refer to it. Taufiqurrahman's research (2018), which developed the HOTS assessment instrument for Islamic Religious Education subjects, also presents examples of HOTS questions, where the results of the development can make it easier for teachers to carry out HOTS assessments.

This HOTS question preparation guide can be said to complement the HOTS question

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preparation guide compiled by the Ministry of Education and Culture (2019), because the Ministry of Education and Culture guidelines do not include examples for TKJ subjects as developed by researchers. Examples of HOTS questions written by the Ministry of Education and Culture are mostly Indonesian and science subjects. However, in terms of the form of HOTS questions, they have something in common, namely that the questions are in written form, not about the form of performance appraisal. This is because this form of written test is widely used by teachers to take scores and grades of learners in a short time. Other research that is also relevant to researchers conducted in the development of HOTS assessment instruments, but subjects other than TKJ, are 1) Merta Dhewa Kusuma (2017) High School Physics maple, 2) Muhammad Solikin Salam (2019) maple Indonesian Junior High School, 3) Das Salirawati (2017) maple High School Chemistry. All of them are developing to improve teachers in making HOTS questions.

The advantages of this HOTS question script preparation guide include, 1) it can be an alternative for teachers to study independently, with flexible time according to the needs of Computer and Network Engineering teachers, 2) contains examples of question scripts from various categories of HOTS questions that clarify the real picture of what HOTS questions are like, 3) HOTS question material specifically for TKJ subjects that has never existed before, 4) become a means of increasing the competence of Computer and Network Engineering teachers, especially in the ability to evaluate learning.

In addition, the guidelines for preparing the HOTS question script are prepared based on government programs to improve literacy culture, especially reading literacy. This HOTS question script preparation guide can be used to encourage the reading literacy culture of teachers, especially TKJ maple teachers at the vocational level. This is in line with the results of research by Pamungkas (2018) which states that reading literacy skills that are always instilled can be effective in HOTS-based learning.

It is undeniable that this HOTS question script preparation guide still has several weaknesses, including this example of a HOTS question script that only contains questions, not equipped with an answer key. In addition, the printed lay out is still in the form of a book, so it is considered less practical when carried everywhere. Even if it is stored in softcopy, and read using a mobile phone, the book-shaped display is not comfortable because the writing in this guide will certainly look small.

The obstacle faced in developing this HOTS question script preparation guide is when translating explanations of various categories of existing HOTS questions and providing examples of question scripts that The material is specifically Computer and Network Engineering subjects. From various sources used, there is not a single example of a HOTS question script that specifically contains Computer and Network Engineering maple material. Most of these references contain examples of HOTS questions for subjects such as language, science, social, or mathematics. In addition, the obstacle faced by researchers when developing this guide is time management, which results in a long development process

CLOSING

Teachers majoring in Computer and Network Engineering in Salatiga in compiling questions already contain elements of HOTS questions. The composition of HOTS question manuscripts in each type of assessment, such as daily tests, midterm assessments, end-of-semester tests, and school exams, amounted to 5% to 80% of all question manuscripts. The categories of HOTS questions that are often used are in the form of analysis, comparison, causal relationships, inferences, and questions that have a stimulus in the form of pictures or story scripts.

The preparation of HOTS questions by TKJ teachers has encountered obstacles, including still not understanding the structure and categories of HOTS questions, understanding of HOTS is still narrow, namely that HOTS questions are only considered long and tricky questions, teachers are

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still difficult to compile sentences of question scripts that contain elements of reasoning, teachers feel more comfortable and simple with the usual question model (LOTS). There are also teachers constrained by the number of students whose tests are incomplete when doing HOTS questions, so teachers must re-evaluate and remidially.

The development of guidelines for preparing HOTS questions for TKJ SMK subjects was carried out using the Borg and Gall model. This HOTS question script preparation guide contains examples of HOTS question scripts from various types and categories of HOTS questions. Each type and category is presented with at least one example of TKJ subject-specific questions. The results of the development show that the guidelines for preparing the HOTS question script are suitable for use by Computer and Network Engineering maple teachers, after previously being validated by experts, then revised, then limited trials, and finally made slight improvements. The result of filling out instruments to teachers of Computer Engineering and Network SMK se-Salatiga after a limited trial was 3.68 from a maximum score of 4.00. This value means "very good" so that this guide can be used by teachers of TKJ subjects at the vocational level outside Salatiga City.

BIBLIOGRAPHY

Armiati, et, al. (2020). Profesionalisme Guru dalam Membuat Soal HOTS. Padang: Jurnal Nasional Pendidikan Matematika Universitas Negeri Padang, 4(1): 75-84

Awaliyah, Siti, (2018). Penyusunan Soal HOTS Bagi Guru PPKN dan IPS Sekolah Menengah Pertama, Malang: Jurnal Praksis dan Dedikasi Sosial (JPDS), 1(1), 46-53.

Dahlan, Dadang., Permana, L., Oktariani, M., (2020). Teacher Competence And Difficulties in Constructing HOTS Instruments in Economics Subject, Yogyakarta: Cakrawala Pendidikan, 39(1), 111-119.

Daryanto. (2013). Menyusun Modul Bahan Ajar Untuk Persiapan Guru Dalam Mengajar. Yogyakarta: Penerbit Gava Media.

Forster, M. (2016). High Order Thingking Skill. ACER Press

Hassan, M.N., Mustapha, R., Yusuff, N.A.N., Mansor, R. (2017). Development of Higher Order Thinking Skill Module in Science Primary School: Needs Analysis. Romania: International Journal of Academic Research in Business and Social Sciences, 7(2), 624-628

Heong, Y. M., Othman, W.D.,Md Yunos, J., Kiong, T.T., Hassan, R., & Mohamad, M.M. (2011). The Level of Marzano Higher Order Thinking Skills Among Technical Education Students. International Journal of Social and Humanity, 1(2), p: 121-125

Hitiyahubessy, Rosandra, P. (2014). Pengembangan Model Pembelajaran Inklusif "Show Learner" di SMP Negeri 7 Salatiga. Salatiga: MMP Program Pascasaraja FKIP-UKSW

Kurniati, Dian, et, al. (2016). Kemampuan Berpikir Tingkat Tinggi Siswa SMP di Kabupaten Jember dalam Menyelesaikan Soal Berstandar PISA, Yogyakarta: Jurnal Penelitian dan Evaluasi Pendidikan UNY, 20(2): 142-155.

Kusuma, M.D., Rosidin, U., Abdurrahman, Suyatna, A. (2017). The Development of Higher Order Thinking Skill (HOTS) Instrumen Assessment In Physics Study. India: IOSR-JRME, 7(1), 26-32.

Liariyanah, S. (2018). Studi Deskriptif Kompetensi Guru Dalam Menyusun Soal Higher Order Thinking Skill (HOTS) (Survei pada Guru Ekonomi SMA Negeri di Kota Bandung). Bandung: Repository UPI Bandung.

Narayanan, S., & Adithan, M. (2015). Analysis Of Question Papers In Engineering Courses With Respect To Hots (Higher Order Thinking Skills). American Journal of Engineering Education (AJEE),6(1), 1-10.

Padmini, K.H. (2017). Pengembangan Modul In-House Training Untuk Meningkatkan Kompetensi ICT di Kalangan Guru Sekolah Dasar. (Tesis Program Pascasarajana Magister Manajemen Pendidikan FKIP-UKSW)

DOI : 10.21009/improvement.v10i1.34792

Pratiwi, N.P.W, et., al., (2019). The Reflection of HOTS in EFL Teachers' Summative Assesment. Journal of Educationa Research and Evaluation, Universitas Pendidikan Ganesha, 3(3): 127-133

Ramadhana, N.A, et, al. (2018). High Order Thinking Skills – Based Questions in The Test ITEMS Developed by Senior High School English Teachers of Padang. Padang: Journal of English Language Teaching, Universitas Negeri Padang: 7(4): 720-731

Salam, M.S., (2019). Penyusunan Soal HOTS Guru Bahasa Indonesia SMP Negeri di Kota Tulungagung. Malang: Jurnal Ilmiah "Nosi" Program Pendidikan Bahasa Indonesia Universitas Islam Malang, 7(2).

Salirawati, Das, et, al. (2017). Pelatihan Pengembangan Soal HOT (Higher Order Thinking) Sebagai Peningkatan Kompetensi Pedagogik Guru. Yogyakarta: Inoteks, Journal UNY, 12(1), 14-25.

Schleicher, A. (2019). PISA 2018: Insights and Interpretations. Paris: OECD

Singh, C.K.S, et, al. (2018). Developing a Higher Order Thinking Skills Module for Weak ESL Learns. Malaysia: English Language Teaching, 11(7). 86-100.

Sofyan, Fuaddilah Ali. (2019). Implementasi HOTS pada Kurikulum 2013. Surabaya: Inventa: Jurnal Pendidikan Guru Sekolah Dasar, 3(1).

Sudana, I.W. (2017). Modul Penyusunan Soal Higher Order Thinking Skill (HOTS). Direktorat Pembinaan Sekolah Menengah Atas Direktorat Jenderal Pendidikan Dasar dan Menengah Kementrian Pendidikan dan Kebudayaan. Jakarta.

Sugiyono, (2017). Metode Penelitian Kuantitatif, Kualitatif, dan R&D. Bandung: Alfabeta

Thomas, A., Thorne, G., (2010). How to Increase Higher Order Thinking. Diakses dari https://www.readingrockets.org/article/how-increase-higher-order-thinking pada 30 Maret 2020.

Tyas, M.A, et. al. (2019). Developing Higher Order Thinking Skills (HOTS) – Based Question: Indonesia EFL Teachers'. TIIKM Publishing, Proceeding of the 2nd Internasional Conference on Future of Education, 2(1): 52-63.

UNCC. (2010). Higher Order Thinking: Bloom's Taxonomy. Diakses dari https://learningcenter.unc.edu/tips-and-tools/higher-order-thinking/ pada 30 Maret 2020.

Widana, I.W., et al. (2018). Higher Order Thinking Skills Assessment Towards Critical Thinkning on Mathematics Lesson. South America: Internasional Journal of Social Sciences and Humanities (IJSSH), 2(1), 24-32

Yuliati, S.R., Lestari, I. (2018). Analisis Higher-Order Thingking Skill (HOTS) Siswa di Indonesia dalam Memecahkan Pertanyaan HOTS di Perguruan Tinggi. Jakarta: Perspektif Ilmu Pendidikan, 32(2), 181-188.

Yani, Ahmad. (2019). Cara Mudah Menulis Soal HOTS. Bandung: Refika.

DOI : 10.21009/improvement.v10i1.34792