

Higher Order Thinking Evaluation Based on Teacher's Demography and Professionalism

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Article Info	Abstract
<p>Article History</p> <p>Received: June 04, 2021</p> <p>Accepted: January 08, 2022</p> <p>Keywords : Teacher's Demography, Professionalism, Analysis, Student</p> <p>DOI: 10.5281/zenodo.5831655</p>	<p><i>Many teachers do not pay attention to making exam questions based on High Order Thinking Skills (HOTS). As a result, they have not been able to improve students' thinking skills. The purpose of the study was to describe the influence of teacher's demographics and professionalism on the level of student thinking through the level of exam questions. This ex post facto research uses descriptive and Path Analysis for data analysis. The results show that Vocational High School (VHS) students have a low level of thinking, influenced by the type of teachers' made questions.</i></p>

Introduction

Education is a conscious and planned effort to create an atmosphere of learning and learning process so that students actively develop their potential, one of which has the skills needed by themselves, society, nation, and country. The purpose of education is to meet the needs of the community and improve the quality of human resources. At each school level from elementary, junior high, high school, or vocational school have different educational goals. Teachers are said to be successful when making their students achieve learning outcomes by predetermined standards and able to solve problems [1].

The quality of vocational high school graduates is not always getting a proper job. The level of open unemployment of VHSs is still the highest among other education levels, which is 8.63 percent [2]. In the evaluation activities at BSND, national assessments are directed at an assessment model that demands thinking skills that are not just recalling, restating, or referring without processing (recite), which can be referred to as higher-order thinking skills [3]. Students who have a high ability can create meaning, make opinions, and can conclude [4]. The low quality of SMK output is one of which is caused by the teacher in making test questions (test) [5]. However, in reality, vocational teachers generally have different abilities in making HOTS questions. Thus, HOTS questions made by teachers still need to be improved. In improving the ability to think at a higher level, teachers are required to be able to describe the ability to think at a higher level so they can make exam questions and can improve the thinking skills of vocational students.

The length of service affects the teacher's performance. Research result Udiyono (2011) explained that teacher professionalism also affects teacher performance [6]. One of the teacher's performance is competence in making exam questions. Competence is essential for all teachers; for example, developing competencies for practical problem solving or supporting student learning [7]. Test questions using HOTS improve student learning outcomes [8]. Forms of questions at low levels are generally characterized by the withdrawal of information, or the application of concepts, knowledge in familiar situations [9]. One of the duties of an educator is a professional development [10]. Demographic factors include age, sex, education, and experience [11]. One of the factors that influence the results of graduates in meeting demands is to be able to think at a high level, namely the professional ability of teachers [12], [13]. Professionals become the focus of the teacher to carry out the learning process in the ability in their fields [14]. Not professional because the teacher is not maximal in mastering the subject matter; not using varied methods and learning media; not yet utilizing technology [15], [16]. Teaching experience can influence the learning process, one of which is making exam questions that improve students' thinking abilities [17], [18].

The number of teaching staff in the learning process that has not spurred the high-level thinking skills of vocational students is due to the exam questions that still use low levels. Test questions made by teachers still use LOTS of exam questions that are not in line with expectations for achieving quality graduates who produce higher-order thinking skills in students. The test could be influenced by the personality demographics and

professionalism of teachers in making exam questions. Thus, this study aims to determine the effect of the personality demographics and teacher professionalism on the level of students' thinking through the types of exam questions made by teachers in the Building Engineering Program in Vocational Schools in East Java.

Methods

This research is a quantitative study with a type of ex post facto research that is descriptive and inferential. The independent variables in this study are the demographics and professionalism of the teacher, the dependent variable is the level of student thinking, and the moderator variable is the level of test questions made by the teacher. East Java has 83 Vocational High Schools in Building Engineering. The population in this study were all teachers in those schools. Based on the number of SMK teachers in East Java with a building engineering program. Samples were taken based on cluster sampling grouped by geographical area [19]. Research instruments on demographics have indicators of age, sex, education, and years of service; indicators of professionalism are pedagogical, social, professional and personality competencies; thought level indicators are LOTS and HOTS; and indicators of exam question types based on Bloom's taxonomic level of C1 (remembering), C2 (understanding), C3 (applying), C4 (analyzing), C5 (evaluating), and C6 (creating). Data collection techniques in research are to use a questionnaire. Data collection techniques using a questionnaire were used to determine the professionalism and demographics of each student. Fill out the questionnaire using Google Form, so students automatically respond immediately [20]. Documentation techniques to explore demographic data, student thinking levels, and the level of each teacher's test questions, the documentation data needed is secondary data sources [21]. Data analysis techniques using descriptive analysis and path analysis

Results and Discussion

Demographics, Teacher Professionalism, Students' Level of Thinking, and Test Question Levels

Demographics consist of a person's age, sex, years of service, education. Many teachers are 51 years and older, and the least teachers are 41 to 50 years old. 65 % of teachers are male while the rest is female. Most teachers work for more than 21 years, and the few of them is a new teacher. Thus many teachers are male and have teaching experience.

The average status of teacher education is a bachelor's degree. The most professionalism of teachers is the high level of professionalism, and the average level of professionalism of teachers is professional. Thus many teachers who have a professional level have a lot of knowledge and teaching skills. The average level of thinking of vocational students based on Bloom's taxonomic domain has a low level of thinking.

The most test questions made by the teacher in the realm of implementing C3, and the least is the realm of creating C6. The common question made by the teacher is the domain of implementing C3. Thus the teacher in making test questions (test) is already at a high level (HOTS) with the right criteria.

Effects of Demographics and Professionalism of Teachers on Students' Level of Thinking with the Type of Test Questions Made by Teachers

Table 1. Summary of Probability Values in Analysis Using SPSS

Formulation of the problem	Criteria	Probability Value
Demographics of students' level of thinking	$X1 \rightarrow Z$	0,407 > 0,05
Professionalism towards the level of thinking of students	$X2 \rightarrow Z$	0,971 > 0,05
With the type of exam questions made by the teacher on the level of student thinking	$Y \rightarrow Z$	0,005 \leq 0,05
Teachers 'demographics and professionalism towards students' level of thinking with the type of exam questions made by the teacher	$X1 \& X2 \& Y \rightarrow Z$	0,004 \leq 0,05
Demographics of the types of exam questions made by the teacher	$X1 \rightarrow Y$	0,021 \leq 0,05
Professionalism in the types of exam questions made by the teacher	$X2 \rightarrow Y$	0,000 \leq 0,05
Teacher demographics and professionalism regarding the types of exam questions the teacher makes	$X1 \& X2 \rightarrow Y$	0,001 \leq 0,05
Total		

Based on Table 1, the probability value for simultaneous testing is smaller than 0.05, so that means that H_a is accepted, and H_o is rejected, means that the path analysis coefficient is significant. Thus testing individually for each independent variable with the dependent variable can be continued. Teacher demographics do not affect the level of student thinking as well as the professionalism of teachers does not affect the level of student thinking but the type of exam questions made by the teacher affect the level of student thinking. The more types of HOTS exam questions (C4, C5, and C6), the higher the student's level of thinking. Students can solve HOTS

problems given by the teacher, which makes students think at a high level because they are used to students who face problems that stimulate them to analyze, evaluate, and create or create.

The influence of teacher demographics and professionalism on the types of exam questions made by the teacher

Table. 2. Summary Decomposition of the path coefficient

Influence of Variables	Causal Influence		The Remaining ϵ_1 and ϵ_2	Total
	Directly	Indirectly Through Y		
X1 With Respect to Z	0,194			3,763%
		0,451		20,34%
X2 With Respect to Z	0,009			0,01 %
		0,404		16,32%
X1,X2, Y With Respect to Z	0,305		0,695	9,30%
X1 With Respect to Y	0,153			2,34%
X2 With Respect to Y	0,826			68,23%
X1 X2 With Respect to Y	0,300		0,70	9%

Based on Tabel 2, Demographics and professionalism of the type of exam questions made by the teacher have a probability value (sig) of less than 0.05, meaning that H_a is accepted, and H_o is rejected, which means that the path analysis coefficient is significant. Thus the demographics and professionalism of teachers affect the type of exam questions made. Simultaneously there is a significant influence so it can be tested individually between variables. Teacher demographics affect the type of exam questions made by the teacher directly contributing 2.34%. The teacher makes HOTS exam questions that are teachers who already have a lot of experience or a long time compared to new experiences. Tend to teachers who have new work experience not yet experienced in making exam questions, so it is necessary to hold training and development on him.

Development and training in this self will make teachers professional in their work because teacher professionalism influences the types of questions made by teachers who contribute directly at 68.23%. The more professional the teacher, the more HOTS questions made include C4, C5, and C6. Because the type of exam questions made by the teacher affects the level of thinking of students who contribute directly by 20.33%. So that teachers need to be held training and self-development in order to have significant experience and professionalism so that in making exam questions can include HOTS bloom taxonomy that is analyzing, evaluating, and creating. The simultaneous contribution of 85%, with the remaining 15%, is the influence that comes from other factors.

Teachers who are male can work together, communicate, and social order in the community [22]. Another difference in gender is that the making of several questions using a high level of cognitive domain is measurably more important for women than for men. It can be explained that male teachers are less concerned with making diverse questions in the high-level cognitive field, but have the ability to work together and communicate superior so that the ability to teach to stimulate students' higher-order thinking skills is better.

Educators must have a minimum qualification and certification in accordance with the level of teaching authority, physically and mentally healthy, and have the ability to realize national education goals [23]. In addition to the requirement to work, a minimum of D3 or S1 graduate must be supported by work experience. During his tenure, teachers are required to carry out their duties as educators and conduct research, attend training, and guide. Workload includes guiding, doing research, doing additional tasks. So a lot of experience gained by the teacher during his work [24]. The recognition of teachers as professional staff is evidenced by teacher certification. Professionalism of educators to understand students' ability to think and can improve skills in teaching or will be an achievement for teachers [25]. Professionalism really determines expertise in the teaching knowledge and skills possessed by teachers so that professional development must be retrained [26]. Educator certification is proof that the teacher is professional. Teacher professionalism is the ability to improve students' higher-order thinking skills.

In improving students' high-level thinking skills, the teacher must facilitate students to be creative and critical in solving problems better by providing a problem that allows students to use higher-level thinking skills [27]. Giving HOTS questions to students can encourage critical and creative thinking and students are able to answer these questions [28]. Having the ability to think at a low level because it is only able to answer problems at the C1-C3 level. There are some students who are able to answer problems at the HOTS level but the results of students' level of thinking are still in the low category.

The level of cognitive domain applying C3 is the cognitive level that is often used by teachers in making questions because it approaches HOTS. In each subject matter, there is a form of questions from low level to high level based on Bloom's taxonomic domain [29]. Vocational school must be able to reach level 6, which is the level of applying [30]. Thus the test questions (test) with good criteria and have met the criteria of the IQF is the level of applying C3. That is because it refers to the material or type of dominant subjects at the level of applying C3. Work experience is in the working life and professionalism because of the longer working period

and professionalism, it has a lot of work experience in improving students' abilities. Improving students' thinking skills with HOTS types of questions that are essential for education and development because school graduates need skills such as creativity, imagination, and innovation to overcome any production and development challenges that arise in their lives including the world of work [31]. The ability of teachers is still in a fairly professional level in activities that involve analysis based on Bloom's taxonomy, and in activities that increase skills at a high level so it is necessary to emphasize the improvement of teachers in improving students' thinking skills by giving a problem (exam questions) that HOTS [32]. Improving students' thinking skills with the types of questions created by the teacher are still at a low level [33].

The new working generation is a young generation who has creative and ambitious characteristics [34]. So that in increasing the ability to think highly students are very creative. Demographic factors do not affect students' thinking abilities or ability to teach. The sexes of men are more enthusiastic in working so many men carry out work [35]. Low thinking skills (LOTS) become the dominant factor in students' level of thinking [36]. The longer the work period, the more age increases so that a person's expertise, speed, intelligence, and energy shrink from time to time. Based on the results of the discussion above, it can be explained that there is no significant effect between the new work tenure, moderate work tenure, long work tenure, and long work tenure on students' level of thinking. Teachers in teaching technical programs can ask more questions at the level of analysis and synthesis than just remembering facts at the level of knowledge [28].

The teacher recognizes that the types of questions that HOTS greatly influences in students' higher-order thinking skills [37]. The type of exam questions is very influential in improving the ability of students so they will be accustomed to dealing with problems in high society [38]. Test questions given by teachers are still at a low level; this will hinder students' thinking abilities [39]. Asking HOTS questions for students can encourage critical and creative thinking [28]. Test questions (tests) that must be made by vocational school teachers in building engineering programs are in the form of HOTS because it will affect the level of thinking of these students. In order for students to face the world of work and reduce unemployment, teachers must be able to make HOTS exam questions.

Efficient exam questions must cover various levels of difficulty to refer to various abilities of students [40]. There are several exam questions in one of the lessons that only focused on low-level thinking skills [41]. Demographics and professionalism influence in making exam questions. The test questions made by the teacher are still at a low level, but there are questions (questions) on the cognitive dimension prioritizing the level of remembering and understanding demographics and professionalism at low levels [29]. Educators must raise questions for all cognitive levels and increase students' higher levels of thinking by asking questions that initially demand basic and simple thinking skills and then develop into complex questions that require involvement with questions through inference, reasoning, evaluation, and compilation [42]. The more professionalism of the teacher and the longer the working period, the questions are made in the form of HOTS. Therefore, it is necessary to increase work experience and professionalism of teachers by increasing training and competency testing.

There were no significant differences in making the types of exam questions and improving students' abilities based on demographics [43]. Demographics (years of work) significantly influence the form of questions, someone who has a longer experience than in giving questions already at a high level [44]. High-level questions are practical tools to encourage thinking and improve other cognitive skills such as problem-solving and decision making that are influenced by the work experience of the teacher [45]. High-level questions may be unfamiliar to students because they demand answers through reasoning, decision making, analysis, synthesis, and critical thinking due to the lack of teacher work experience in applying HOTS exam questions [46], [47]. The longer the working period, the more HOTS questions are made. Therefore it is necessary to improve the work experience for teachers.

The teacher's professionalism in teaching will affect making HOTS questions. Because the teacher can encourage students to develop their thinking skills. So the teacher must develop teaching skills (professionalism)[48]. Educators need to develop their professionalism so that each student can become independent and can think at a higher level because one of the learning processes is the evaluation by giving questions that HOTS will provide students with high-level thinking skills [49]. The teacher must encourage to use questions that are stimulating students' critical abilities [50]. High-level thinking ability that must be taught by students is by providing problems that stimulate students' thinking, namely creative and critical thinking in lessons [51]. The more professional the teacher, the higher the level of thinking in making exam questions. Teacher professionalism improvement is due to frequent training, seminars, advanced studies, research, and teaching. Thus, they are certified as professional instructors.

Conclusions

Based on the results of research and discussion that have been described, conclusions can be drawn, namely (1) Demographics and professionalism of teachers in Vocational Schools in East Java Building Engineering Program, namely the average sex, namely men, the average educational status of the undergraduate, the average average age above 40-60 years so that the working period in the long work period of about 21 years and above,

then already has an educator certification that is as evidence that the teacher is professional; (2) The level of thinking of students is still at a low level, ie students are only able to answer questions in the realm of C1-C3 .; (3) The type of exam questions made by the teacher is LOTS but the most in C3 cognitive domain is applying with good criteria and fulfilling the KKN criteria for Vocational High School, namely the level of applying; (4) There is no significant influence of demographics (years of service) and teacher professionalism on students' level of thinking; (5) There is a significant influence on the type of exam questions made by the teacher on the level of student thinking. So the more HOTS questions made by the teacher, the higher the level of student thinking; (6) There is a significant influence of teacher demographics and professionalism on students' level of thinking in the test questions made by the teacher. (7) There is a significant influence on teacher demographics and professionalism on the types of exam questions made by the teacher. So the longer the work period and professionalism of the teacher, the higher the level of test questions made.

Based on the results of the study the authors provide suggestions that (1) it is expected for teachers to compile test questions for the realm of knowing (C1) and the realm of understanding (C2) to be reduced and make questions with higher levels that are appropriate to the curriculum as at the realm apply (C3), analyze (C4), evaluate (C5), and create (C6). In order to be able to support and stimulate students' abilities so that they can meet the needs of the community. Also, in order to reduce unemployment in Indonesia and prepare vocational students for the world of work; (2) Study programs and schools should often hold training, seminars, advanced studies, research, and community service so that it can support the success of students and the progress of the department

Conflicts of Interest

There is no conflict of interest regarding the publication of this paper.

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