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Analysis of The Knowledge and Understanding Level of Madrasah Tsanawiyah Science Teachers in Banda Aceh in Constructing Exam Questions

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Abstract

This study aims to (1) determine the level of knowledge and understanding of Madrasah Tsanawiyah (MTsN) science teachers in constructing exam questions, (2) describe the knowledge and understanding of MTsN science teachers in writing questions based on the cognitive level of Bloom's taxonomy. This research is descriptive quantitative type. The data collection was carried out by a survey method using a developed questionnaire instrument. The population in this study were all MTsN (Islamic Junior High School) science teachers in Banda Aceh. The data obtained were analyzed descriptively. The results showed that: (1) most of the MTsN Banda Aceh science teachers already have very high knowledge and high understanding in constructing exam questions. (2) Knowledge and understanding of constructing questions are limited to levels C1, C2, C3 and C4. For questions on cognitive levels C5 and C6, some MTsN science teachers do not know and understand how to construct them. This research can be information for various parties who hold training or question writing workshops so that they can provide material that is right on target or is still not mastered by the teacher.

Keywords: constructing questions, knowledge, understanding

INTRODUCTION

Teachers are the cornerstones and leading implementers of education and curriculum developers in schools (Napitupulu, 2014). As the cornerstones of education, teachers are required to have the basic skills as educators, mentors and teachers. The abilities are reflected in teacher competence. According to Hamka, Asmawati, Muhiddin, & Rachmayani (2013), teacher competence is one of the factors that influence the achievement of learning and education goals in schools. Syofyan (2016) added that the teacher is the learning component that has a considerable role.

In Permendiknas No. 16/2007 concerning Academic Qualifications and Teacher Competency Standards, it is stated that one of the teacher core competencies is to carry out assessment and evaluation of learning processes and outcomes (Pendidikan, B. S. N., 2005). Fatmayanis (2016) described seven core competencies, two of which are: 1) understanding the principles of assessment and evaluation of learning processes and outcomes according to the characteristics of the handled subjects, and 2) developing assessment and evaluation instruments for learning processes and outcomes. Septiana (2016) stated that one of the teacher competence in the pedagogic dimension is being able to carry out assessments and evaluate learning processes and outcomes.

Pedagogic competence typically characterizes and differentiates the teaching profession from others (Nur, 2014). Assessment of student learning outcomes is one of the skills a teacher must have, which is included in pedagogical competence (Camellia & Chotimah, 2012). A teacher must be able to construct exam

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questions for evaluation to find out whether the students understand the material provided. Teachers must have the basic skill to construct questions and evaluate learning outcomes. Widodo (2012) stated that competence would be manifested in the form of mastery of professional actions in carrying out their functions as a teacher.

A teacher is a professional job, which requires a particular skill. Therefore, teachers have a crucial and strategic role in learning activities, which will determine the quality of education in an educational unit (Daharti, Susilowati, & Sutanto, 2013). Professional skill must be possessed by a person to carry out tasks and activities in the field of science, which must be deliberately studied and then applied for the public interest (Agusniar, 2015). So, professional teachers are teachers who can plan, carry out, and assess learning, also have a high responsibility in improving student learning achievement. A professional teacher will be reflected in the performance of the service implementation of tasks marked by expertise, both in material and method (Shabir, 2015).

Science learning requires an evaluation tool that is very useful to determine the achievement of learning competencies (Nurulshifa, Mutia, Linuwih, & Parmin, 2014). Regarding the teacher's task in evaluating students, the teacher should have the skill to construct test (Arofi, 2016). The teacher's skill to write questions will be reflected in the results or achievements of their students during the exam, such as the national exam. Therefore science teachers at MTsN Banda Aceh must have competence in constructing tests or writing questions based on Bloom's cognitive level because it is used as a tool to measure learning achievement. Learning outcomes are students achievements that can be shown in the form of numeric after the learning process.

However, the results of 2017/2018 National Examination of MTsN Banda Aceh for science was the highest with 46,35% of students, with the average score of 51.34 and the distribution of student scores ranging from 40.0 to 55.0. The highest score achieved by students was 90.0, and the lowest was 15.0 (Puspendik, 2018). This fact indicates that the cause of the large number of MTsN students in Banda Aceh who fail to obtain high national exam scores is predicted because science teachers cannot yet construct test questions on semester exams. It is possible that teachers usually use existing tests for exam questions, then adjust them to the teaching material. Another possibility is that science teachers often search from several existing question sets because they are not yet able to write questions. Therefore, this research needs to be carried out. The competence of the teacher in preparing exam questions can be seen through the manifestation in the form of mastery of knowledge and understanding in carrying out their functions as a teacher.

Based on the description above, this study aims to (1) determine the level of knowledge and understanding of MTsN science teachers in constructing exam questions, (2) describe the knowledge and understanding of MTsN science teachers in writing questions based on the cognitive level of Bloom's taxonomy. Information on the level of knowledge and understanding in constructing Bloom's cognitive level questions by MTsN science teachers can be used as input and consideration to the Ministry of Religious Affairs in Banda Aceh and Aceh in developing teacher quality, especially regarding competence in constructing questions based on Bloom's cognitive level.

METHOD

This research is a type of development research that used a descriptive quantitative approach. This research was conducted in the odd semester of 2019/2020 with MTsN science teachers in Banda Aceh. The research activities followed these steps: (1) developing a questionnaire instrument to assess knowledge and understanding in constructing exam questions, (2) surveying MTsN science teachers to determine the level of knowledge and understanding of teachers in constructing exam questions based on Bloom's cognitive level by using a developed questionnaire

instrument. The instrument for assessing knowledge and understanding in constructing exam questions of MTsN science teachers referred to the theory of developing a typical performance instrument (Djaali & Muljono, 2008; Firdaos, 2016; Margono, 2013; Yusrizal, 2008; Yusrizal & Halim, 2009). The validity of the instrument was determined using the Pearson product-moment correlation formula, which is the correlation between the items and the total (Pujihastuti, 2010). Reliability testing was done with Microsoft Excel 2017. The formula used was Alpha Cronbach (Putra, Sholeh, & Widyastuti, 2014). The results of the construct validity test obtained 19 valid items. In the reliability test, the instrument reliability coefficient was 0.96.

Testing of knowledge and understanding instruments in constructing exam questions was carried out on MTsN science teachers in Banda Aceh. The instrument for assessing knowledge and understanding used a semantic differential scale which has seven options in the form of a contingent scale that contains conditions about the teacher's habits in constructing exam questions. Respondents were asked to choose one answer from seven choices that best matched the teacher's knowledge and understanding in constructing the questions.

Interpretation of the analysis results of the level of knowledge in constructing exam questions used categorization, according to Azwar (2012). If $X \leq 25$, then the knowledge of constructing questions is very low. If $25 < X \leq 35$, then the knowledge of constructing questions is low. If $35 < X \leq 45$, then knowledge is moderate. If $45 < X \leq 55$, knowledge of constructing questions is high. If $X > 55$, then the knowledge of constructing questions is very high.

Furthermore, to provide an interpretation of the results of the level of understanding in constructing questions, different categorizations were used. If $X \leq 22.5$, then the understanding of constructing questions is very low. If $23 < X \leq 32$, then the understanding of constructing questions is low. If $32 < X \leq 41$, then understanding is moderate. If $41 < X \leq 50$, then the understanding of constructing questions is high, and if $X > 50$, then the understanding is very high.

RESULT AND DISCUSSION

The results of the recapitulation of the knowledge level of the MTsN science teachers in Banda Aceh in constructing questions are depicted in Figure 1.

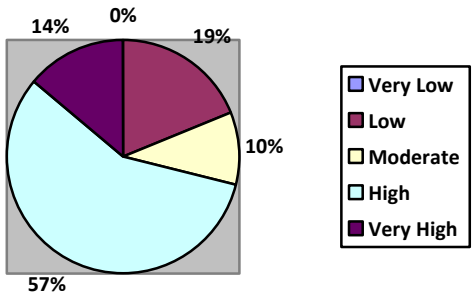

Figure 1. The level of knowledge of the MTsN science teacher in Banda Aceh in constructing exam questions.

14% of MTsN science teachers have a very high level of knowledge in constructing questions, 57% of teachers are in the high category, 10% of teachers are in the medium category, 19% of teachers are in a low category, and no teacher (0%) are in the very low category. From this data, it can be stated that the level of knowledge of most of the MTsN science teachers in Banda Aceh in constructing exam questions is in the high category. In other words, most of the Banda Aceh MTsN science teachers already know about constructing exam questions.

Figure 2 shows the level of understanding of the MTsN science teacher in constructing exam questions.

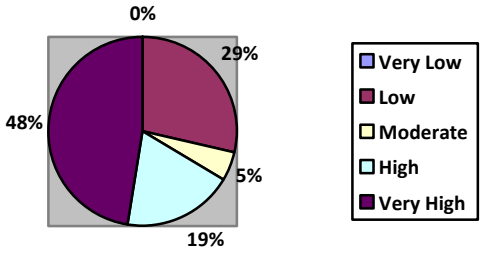

Figure 2. The level of understanding of the MTsN science teacher in Banda Aceh in constructing exam questions.

48% of MTsN science teachers have a very high level of understanding in constructing questions, 19% of teachers are in the high category, 5% of teachers are in the medium category, 29% of teachers are in a low category, and no teacher (0%) are in the very low category. So for the level of understanding in constructing questions, 48% of the MTsN science teachers were in the very high category.

Figure 3 is a comparison of the level of knowledge and understanding of the Banda Aceh MTsN science teacher in constructing exam questions. From Figure 1 and Figure 2, it can be seen that there is a difference in the percentage between the level of knowledge and understanding in constructing the exam questions. For the high category, the number of teachers who know how to construct questions was 57%, while only 19% understand that. It means that teachers have a higher level of knowledge than understanding. Furthermore, in the very high category, the number of teachers who understand is more than teachers who know. There were 48% of the teachers who understand about constructing questions, while only 14% of the teachers who know. However, these two conditions do not guarantee that the teachers can construct the questions because to construct or write the questions is a skill that is acquired from the practices. According to Anggraeni (2016), being able to construct items that meet the requirements is quite tricky because it requires relatively high knowledge, skills and accuracy. Writing questions is the process of preparing the instruments to determine the level of students' ability to the material that has been taught by the teacher. It means that the Banda Aceh MTsN science teacher does not only know and understand questions but more importantly is skilled in constructing or writing questions.

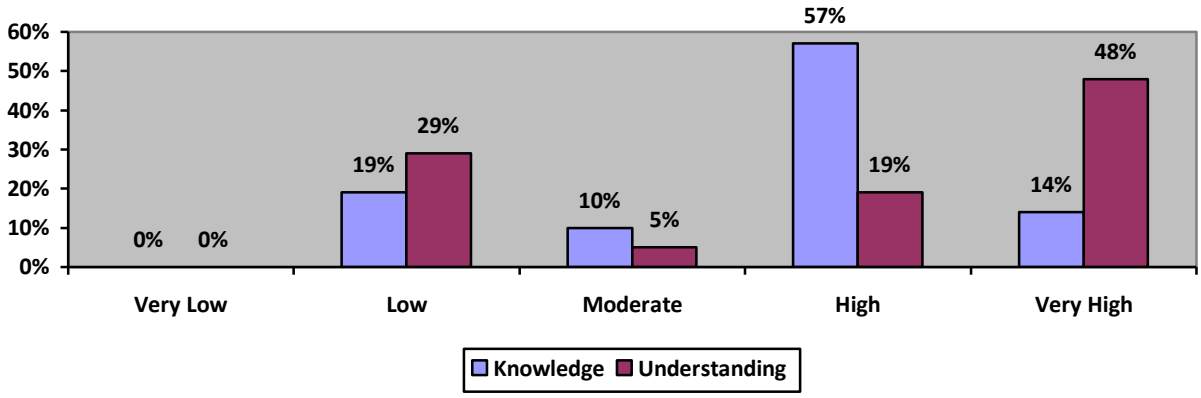

Figure 3. Comparison of the level of knowledge and understanding of the Banda Aceh MTsN science teacher in preparing exam questions.

Furthermore, even though the teacher can construct or write questions, it is not certain that these questions have quality before the validation or testing process. According to Purnomo (2007), theoretically good questions must also be tested empirically to obtain certainty about their quality. The lack of teacher skills to write questions shows that teachers still have low competence. According

to Prasetya (2012), one of the competencies that teachers must have is developing assessment instruments, evaluating processes and learning outcomes. Kadir (2015) argued that as an educator, the skills that must be mastered are the assessment system of student learning outcomes. In the assessment of the process and student learning outcomes at school, aspects relating to the selection of assessment tools are the preparation of questions, analysis of items to obtain the adequate quality of questions, and processing and interpretation of assessment results data. So a teacher must be able to evaluate to find out whether students can understand the material given (Stronge, J. H., Ward, T. J., & Grant, L. W., 2011).

Furthermore, Siswantari (2011) stated that the low competence of teachers also reflects that school programs are carried out in moderation and have not been appropriately implemented. What is important is that programs that have been planned can be implemented even with various limitations, including limited competencies. Knowledge and understanding, as well as skills related to the question construction process, are near related to efforts to improve the quality of education (Kivunja, C., 2015).

According to Fatmayanis (2016), the quality of learning outcomes as an indicator of the quality of education is determined by the quality of the questions and the level of questions developed by the teacher in quality.

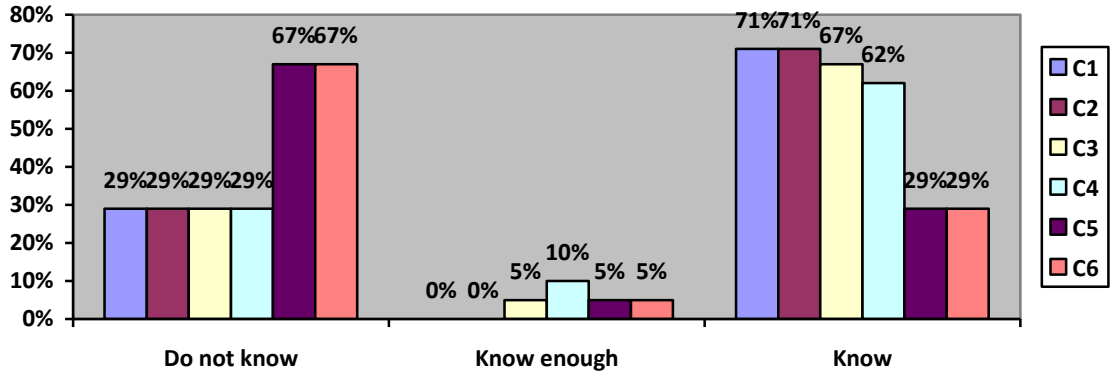

Figure 4. The level of knowledge of MTsN science teacher in constructing questions based on Bloom's cognitive level.

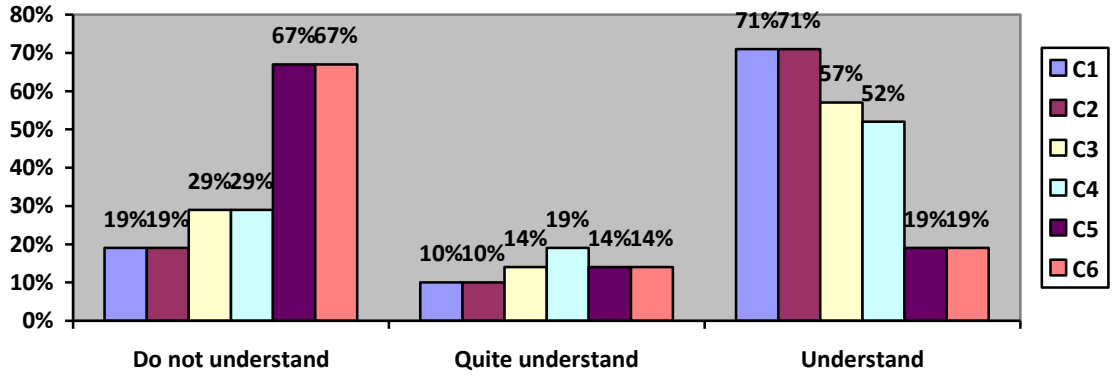

Figure 5. The level of understanding of MTsN science teacher in constructing questions based on Bloom's cognitive level.

From the level of knowledge (Figure 4) and level of understanding (Figure 5), the MTsN science teacher in constructing questions based on Bloom's cognitive level had a slight difference. For the level of knowledge, it can be seen that most (above 60%) of the teachers know how to construct questions based on Bloom, only for questions on the C1, C2, C3 and C4 levels. 67% of teachers do not know how to construct questions level C5 and C6. In term of understanding, it can also be seen that most teachers already understand how to construct questions only at levels C1, C2, C3, and C4. This situation is very concerning because the development of Higher-Order Thinking Skills (HOTS) in learning is one form of implementing the 2013 curriculum so that the learning and evaluation activities carried out should be HOTS-oriented (Badjeber & Purwaningrum, 2018).

CONCLUSION

Based on the description above, it can be concluded that (1) most of the MTsN Banda Aceh science teachers already have very high knowledge and high understanding in constructing exam questions. (2) Knowledge and understanding of constructing questions are limited to levels C1, C2, C3 and C4. For questions on cognitive levels C5 and C6, some MTsN science teachers do not know and understand how to construct them.

It is advisable to hold a workshop before constructing questions so that MTsN science teachers can cooperate and exchange information well to improve the quality of the school and practice in question writing skills. All science teachers at MTsN Banda Aceh need to collaborate and exchange ideas with teachers of other subjects in carrying out tasks to construct and analyze questions or tests. The Heads of MTsN Banda Aceh also need to ask the head of the Ministry of Religious Affairs in Banda Aceh and Aceh to conduct workshops on the preparation of Bloom cognitive-based questions regularly, especially the HOTs level.

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