

Prediscourse Study on Identification of the Depth of Understanding Chemistry MGMP Teachers throughout Sidoarjo on Technology-Based Minimum Competency Assessment

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Abstract

Understanding regarding the Minimum Competency Assessment has not been fully obtained by teachers. Teachers find it difficult to construct minimum competency assessment questions according to the criteria set in preparing for the National AKM. The purpose of this study was to find out how the level of depth of understanding of chemistry MGMP teachers in Sidoarjo regarding technology-based minimum competency assessment. Data collection techniques used in research are questionnaires, interviews, test questions, and documentation. The questions from the interview serve to explore the perspectives of AKM Teachers at MGMP Chemistry in Sidoarjo. The population formed as general student data related to AKM knowledge through Googleform. The results of the implementation of the open questionnaire on 15 MGMP chemistry teachers as a sample. The teacher's statement has represented the existing population. 75% of teachers strongly agree that it is necessary to prepare for AKM. In addition, 91.7% of teachers strongly agree and need teaching materials for AKM questions. As many as 91.7% of teachers strongly agree and need an application that facilitates the preparation of the National Assessment. Therefore, teachers really need intensive assistance in the preparation of the National Assessment, especially in abstract chemistry material.

Keywords: *Depth of Understanding MGMP Chemistry Minimum Competency Assessment Technology*

I. Introduction

Chemistry as a branch of science cannot be separated from abstract concepts. This is felt by our students, even among university student [12]. Abstraction of chemistry is based on teaching materials that are not visible to the naked eye, such as the structure of atoms, molecules and ions [36]. According to Permendiknas No.22 of 2006, Chemistry is part of a group of science and technology subjects at SMA/MA/SMALB intended to acquire advanced science and technology competencies and to cultivate critical, creative and independent scientific thinking [30]. Chemistry is more difficult for students to understand when compared to science in other fields. Most students have difficulty understanding chemistry because the concepts are complex and abstract [28]. In addition, studying chemistry requires an understanding of mathematics and the correct relationships between concepts. Student understanding begins with understanding simple concepts and then more complex concepts [33]. In addition, students must absorb material in a relatively short time, making chemistry one of the most difficult lessons in class for students [6].

The teacher is also a person who imparts knowledge to students. Teachers in the view of society are people who carry out education in certain places [35]. Teacher competence is a set of knowledge, skills and behaviors that must be possessed, internalized, mastered and actualized by teachers in carrying out their main tasks [29]. Based on Government Regulation (PP) No. 18/2007 concerning teachers states that the competencies that must be possessed by teachers include pedagogic competence, personal competence, social competence, and professional competence obtained through professional education [25]. The competence of the teacher is comprehensive and is a unit that supports one another. However, a comprehensive understanding of the concept for a teacher is absolute, because one transfers knowledge from the teacher. Understanding of concepts that are lacking or even not comprehensive by the teacher will boomerang and even disastrous for students to acquire correct and appropriate knowledge [20]. Incorrect understanding, ambiguity, or (possibly) teacher misconceptions will have a serious impact on students, causing students to understand concepts that are not correct or even wrong [37]. From here there will be a fatal error or total failure for the transfer of knowledge to occur.

Assessment (assessment) of learning outcomes is a step taken to measure student learning outcomes [27]. Assessment of learning outcomes by educators aims to monitor and evaluate processes, learning progress, continuous improvement of student learning outcomes, and is used by the government to make policies in education [39]. Assessment requires an instrument (tool) that is used so that the results obtained are objective to measure student learning outcomes appropriately, both in the form of tests and tests [38]. Therefore, each assessment step should be based on the principle of achieving something

better than before, thus, each assessment is an effort to achieve a better quality of education. The development of AKM is based on a combination of the Program for International Student Assessment (PISA) and Trends in International Mathematics and Science Study (TIMSS) [18]. Furthermore, the Ministry of Education and Culture designed a prototype of an assessment method called AKSI or Competency Assessment of Indonesian Students. The Minimum Competency Assessment is designed to generate information that triggers improvements in the quality of teaching and learning, which in turn can improve student learning outcomes [21]. Reporting on AKM results is designed to provide information about the competency level of students. This level of competence can be used by teachers of various subjects to develop effective and quality learning strategies according to the level of student achievement [24].

The use of technology in terms of Minimum Competency Assessment is needed in the world of learning [2]. This is because it really helps the learning process and makes it easier for students and educators when creating learning materials. The use of data processing applications can create a systematic and interesting learning process [23]. Technological developments especially for students aim to optimize the use of easy application usage. The use of technology is made in order to create student interest to increase understanding regarding AKM and the process of implementing learning [31]. This activity has a very positive impact on students, because it is good when students take part in technology adaptation activities. After the technology adaptation activities, students often visit the library so that it has a very positive impact on technological developments [7]. Therefore, a pre-discourse study to identify the depth of understanding of Chemistry MGMP teachers throughout Sidoarjo regarding technology-based minimum competency assessment needs to be carried out to support the independent learning program launched by the Ministry of Culture and Education of the Republic of Indonesia.

II. Method

General Background

The type of research used is qualitative research. Qualitative research is research that creates findings that cannot be processed using statistical procedures or quantitatively [9]. This study does not generalize but emphasizes the depth of information so that it reaches the level of meaning [40]. The data collection method used in this research is in-depth interviews. Interviews are a series of interactions in the form of communication carried out by two or more people based on availability based on mutual trust, and the conversations that are carried out lead to the goals to be achieved [1].

Participants

Interviews were conducted with the aim of evaluating the results of the implementation of students' AKM, especially regarding literacy competencies. Preliminary study interviews were conducted qualitatively by asking questions to students and teachers. The purpose of the interview questions is to explore the perspectives of AKM Teachers at MGMP Chemistry in Sidoarjo. The population formed as general student data related to AKM knowledge through Googleform is 15 Chemistry teachers. Observations here, researchers make observations of teachers and students during the lead up to the implementation of AKM, in addition to observing the availability of supporting books for students to improve thinking skills and become material as preparation for facing AKM. Data collection through documentation was obtained by researchers through data on students' values before the AKM policy was in place and after the AKM policy was in place.

Instrument

This research was conducted at the Chemistry MGMP in Sidoarjo, East Java, which consists of public and private schools. Observations were carried out starting in May 2022. The results of interviews, observations, and documentation that have been collected are then further analyzed to gain an understanding of the results of the implementation of competency AKM from MGMP Chemistry in Sidoarjo, East Java.

Data Analysis

Data analysis techniques use three procedures, namely: data reduction, data presentation, and data verification. The data reduction stage is carried out by selecting, centralizing, and simplifying the data found in the field [32] in reducing data guided by research questions that must be answered based on field data. Presentation of research data is presented in tabular form. Data verification is carried out by taking the essence of real findings in the field and connected with the relevant basic theory [34].

III. Results and Discussion

The preliminary study was carried out qualitatively by posing questions to students and teachers. The purpose of the interview questions was to explore the perspectives of AKM Teachers at MGMP Chemistry in Sidoarjo. The population formed as general student data related to AKM knowledge through Googleform is 15 Chemistry teachers. The results of the questionnaire implementation are presented in Table 1.

Table 1.

Results of Implementation of Questionnaire Distribution

| Que | Answer |
|-----|---|
| 1 | Making a HOT literacy-numeration question bank, looking for references for learning and training questions, understanding AKM, collecting examples of AKM questions, making AKM questions, and training students to think critically by practising AKM questions. |
| 2 | Students are constrained by long reading/literacy, difficulty reading charts they are not used to, and the application of chemical material. |
| 3 | AKM Socialization, AKM Training, Workshops |
| 4 | Very good for student practice and challenging questions need to be studied continuously. |
| 5 | Provide daily test questions such as AKM questions to accustom children to working on literacy-numeration questions, apply learning models that improve soft skills, especially the assessment part, and create learning scenarios. |
| 6 | 3 teachers have conditions in preparing AKM questions in a very good category. 5 teachers have conditions in preparing AKM questions in a good category. 7 teachers have conditions in preparing AKM questions in a good category. |
| 7 | 7 teachers took part in the workshop; 7 teachers attended the training; 1 teacher did not follow anything |
| 8 | 11 teachers use AKM; 2 teachers use Sulingjar; 7 teachers used the Character Survey |
| 9 | 6 teachers answered the basic competency assessment needed by all students to be able to develop self-capacity and participate positively in society. 2 teachers answered the basic competency assessment needed by all students to be able to develop self-capacity and participate positively in certain subjects. 2 teachers answered the minimum assessment required by all students to be able to develop self-capacity in society 6 teachers answered the minimum competency assessment required by all students to be able to develop scientific knowledge and apply it to society. |
| 10 | 5 teachers answered writing literacy; 10 teachers answered reading literacy; 10 teachers answered numeration 1 teacher answered literacy |
| 11 | 10 teachers answered finding information; 9 teachers answered interpreting and integrating; 8 teachers answered evaluating; 8 teachers answered reflecting |
| 12 | 8 teachers answered understanding; 9 teachers answered application; 11 teachers answered reasoning |
| 13 | 91.7% of teachers answered yes regarding the involvement of AKM content in non-mathematics and literacy subjects. |
| 14 | 50% of teachers answered yes regarding the results of the AKM there is a minimum score. 41.7% of teachers answered that it was not related to the AKM results, there was a minimum score. 8.3% of teachers answered that they were doubtful that the AKM results had a minimum value. |
| 15 | 41.7% of teachers answered yes regarding the AKM participants of all students in certain education units. 50% of the teachers answered that it was not related to the AKM participants, all students in a particular education unit. 8.3% of teachers answered that they were unsure about the AKM participants, all students in a particular education unit. |
| 16 | There was no teacher who answered to replace the role of the National Examination in evaluating student achievement or learning outcomes individually; 11 Teachers answered replacing the role of the National Examination as a source of information for mapping and evaluating the quality of the education system; 4 The teacher answered As a tool to evaluate the quality of the system. |
| 17 | 6 Teachers answered monitoring quality developments from time to time. 3 Teachers answered monitoring gaps between sections of the education system. 1 The teacher answered indicating what should be the main goal of the education unit. 11 The teacher answered giving an overview of the essential characteristics of an effective educational unit to achieve the main goals. |
| 18 | 75% of teachers strongly agree that it is necessary to prepare for AKM. 25% of teachers strongly agree that it is necessary to prepare for AKM. |
| 19 | 91.7% of teachers really agree and need teaching materials for AKM questions. |
| 20 | 91.7% of teachers really agree and need references to AKM questions. |
| 21 | 91.7% of teachers really agree and need an application that facilitates the preparation of AN. |
| 22 | 91.7% of teachers strongly agree and need a companion in preparing AN. |

The preliminary study related to the identification analysis of the depth of understanding of MGMP Chemistry teachers throughout Sidoarjo regarding technology-based minimum competency assessment was divided into three parts, namely the first part concerning the test of understanding the general insights of AKM and the preparations that have been carried out so far. The second part is about testing the understanding of the components supporting the AKM activity process, and the third part is about the need to support the preparation process for AKM activities. The three main parts of the information to be obtained are outlined in 22 questions answered by the respondents to obtain broader and in-depth information.

Table 1 of questions 1 and 2 provides information regarding the purpose of the National Assessment (AN), preparation for facing the National Assessment, and obstacles in facing the National Assessment. Based on the answers to questions 1 and 2, namely chemistry teachers revealed that the preparations made included making a literacy-numeration HOTS question bank, looking for references for learning and training questions, understanding AKM, collecting examples of AKM questions, making AKM questions, and training students think critically by practising AKM questions. In addition, the obstacles students face are long reading/literacy, difficulty reading graphs that are not used to it, and the application of chemical material. These findings are consistent with research conducted by Rokhim in 2021 showing that 46.6% of students understand the national assessment and 53.2% of students do not understand the national assessment well. This is because the related educational unit has not socialized the implementation of the national assessment [26]. The obstacle faced during the AKM was the problem of the internet network (WIFI) in a bad connection, but the proctor and technicians were looking for other alternatives, namely by connecting via a private network (mobile data) so that students could still take the assessment according to schedule [22].

Table 1 of questions 3 and 4 presents information regarding the objectives of AN participants, the agenda for activities at school, and information about literacy and numeracy questions that have been circulating on the internet/references/books. Based on the answers to questions 3 and 4, namely chemistry teachers revealed that the activities carried out at school included AKM socialization, AKM training, workshops. In addition, students need practice and challenging questions need to be studied continuously. These findings are in accordance with research conducted by Kartika in 2022, which shows that schools play an active role in improving students' numeracy skills. In addition, the way to increase numeracy is by giving students questions related to numeracy before going home from school and also giving them guidance such as (how to calculate multilevel additions, how to quickly multiply using your fingers, how to quickly divide manually, etc.) during Mathematics lessons [13]. In addition, an interaction space for literacy activists from all over which functions to provide input on systems,

content and other agendas. The attractiveness of this space is that it can contribute to school literacy activities, especially knowledge and skills for students with appropriate packaging [10].

Table 1 of questions 5, 6, and 7 presents information related to lesson preparation, the condition of the teacher when preparing AKM questions, and competency/training/workshop activities that the teacher has attended in the last 12 months. Based on the answers to questions 5, 6, and 7, the chemistry teachers revealed that the activities carried out at school included AKM socialization, AKM training, and workshops. In addition, students need practice, and challenging questions must be studied continuously. The thing that the teacher must prepare to deal with the next AKM is the ability to identify AKM questions. The reason is that so that schools can carry out AKM well and students can also work smoothly on AKM questions, students must study and often practice AKM questions. This requires teachers to identify AKM questions and know how to make them. The competencies measured in the AKM questions are reading and reading literacy, measured by paying attention to three aspects: content, cognitive processes, and context. The AKM questions' forms vary, namely multiple choice, complex multiple choice, matching questions, short entries and descriptions. This finding is following research conducted by Ahmad in 2021, showing that the preparatory stage of teachers in carrying out national assessments, namely the minimum competence assessment, has been carried out to the fullest by teachers. However, teachers still do not know the expected achievement indicators [3]. In addition, planning to equip students with numeracy skills has gone well because the teacher has prepared several things, especially lesson plans, teaching materials taken from existing problems and designed procedures and strategies to process learning so that students can participate actively [19].

Table 1 of statements 8 and 9 presents information related to the explanation of AKM, AKM components, and cognitive levels in the AKM literacy section that chemistry teachers have known and believed in so far. Field data shows that 11 teachers used AKM, 2 used Sulingjarm, and 7 used the Character Survey. In addition, 6 teachers answered the basic competency assessment needed by all students to develop their capacity and participate positively in society. Most teachers in Sidoarjo Regency use AKM learning. In addition, teachers also use other assessment methods, namely Sulingjar and character surveys. The Character Survey is designed to describe students' character in each educational unit. Character Surveys are very important in AN. Besides competence, character is no less important for students. These findings are in accordance with research conducted by Mawaddah in 2020, namely compiling numeracy literacy instruments with the context of their respective characteristics. Both in the form of literacy instruments and learning modules. Three components of AKM must be understood: content, context, and cognitive level [16]. In addition, reading literacy has components, one of which is the cognitive process component, where the cognitive process has its own cognitive level, for cognitive level, namely finding information, understanding information, and

evaluating and reflecting. For the highest level of cognitive processes, namely evaluating, where students can make judgments on the text [14].

Table 1 of statements 10, 11, and 12 presents information related to the AKM component, the cognitive level in the literacy section of the AKM, and the cognitive level in the numeracy section of the AKM. Based on the results of data mining, information related to 10 teachers answering reading literacy was provided so that most of them already know information on reading literacy and the process of implementing this activity. 10 teachers answered that this information was important for students to use in building more complex and comprehensive knowledge. The cognitive level is divided into three levels in reading and numeracy literacy. Cognitive processes for reading literacy are finding information, interpretation and integration, as well as evaluation and reflection. First, finding information includes searching, accessing, and finding explicit information from discourse. Second, interpretation and integration, namely the ability to understand implied or explicit information, combine interpretations between parts of the text to produce inferences. Third, evaluation and reflection, namely the ability to assess the credibility, suitability and trustworthiness of the text, and being able to associate the contents of the text with other things outside the text [5]. As many as 11 teachers answered reasoning in understanding the cognitive level in the AKM numeration section, while only a few teachers gave options for understanding, applying, and reasoning. First is the ability to understand facts, procedures, and mathematical tools. The second is application, namely the ability to apply mathematical concepts in routine real situations. Third is reasoning with mathematical concepts to solve non-routine problems [4].

Table 1 of statements 13, 14, and 15 is a closed questionnaire so that respondents can choose yes, undecided, or no. This statement presents information related to the involvement of non-mathematics and literacy subjects as content in AKM, minimum score provisions from AKM, and information on AKM participants for all students in certain educational units [17]. 91.7% or most of the teachers answered yes, that is related to the involvement of AKM content in non-mathematics and literacy subjects. Other learning subjects also contribute to the breadth of reference sources and topics that make AKM content more lively and relevant to daily activities. As many as 50% or half of the respondent teachers answered yes regarding the AKM results there is a minimum score. So misinformation has infected the respondents. The implementation of AKM does not have a minimum score. AKM reports the percentage of students in each competency level. It is hoped that all students will reach a proficient or proficient level of competence. To master the National Assessment, you must study the concepts of each subject matter well, not just memorize the material [11].

Table 1 of statements 16 and 17 presents information regarding the role of the AKM, and the function of the National Assessment. As many as 11 people or the majority of teachers answered to

replace the role of the National Examination as a source of information for mapping and evaluating the quality of the education system. The purpose of the AKM is designed to measure the achievements of students or students from cognitive learning outcomes, namely literacy and numeracy. Teachers can use this level of competence to develop effective and quality learning strategies [11]. AKM will support "Teaching at the right point". Learning designed based on AKM will make it easier for students to master the expected competencies. AKM is intended to measure competency in depth, not just content mastery [3]. In addition, as many as 11 people or the majority of teacher respondents answered giving an overview of the essential characteristics of an effective education unit to achieve the main goals. AKM or Minimum Competency Assessment, compiled by the government through the Ministry of Education and Culture, has a general objective, namely to increase students' knowledge to solve a problem using reasoning methods, not just rote memorization [22]. In addition, through the AKM (Minimum Competency Assessment), it is also hoped that the learning process will run innovatively. Well, through this innovative learning, an increase in students' reasoning abilities that are oriented towards literacy and numeracy competencies will be achieved later. Not only that, through the existence of this AKM, it is hoped that information will be achieved to evaluate the quality of education in an area [39].

Table 1 of statements 18, 19, and 20 provides information regarding needs in preparation for dealing with AKM questions, learning needs for AKM questions and needs for references/books on AKM questions. As many as 75% of teachers, or three-quarters of respondents, strongly agree that it is necessary to prepare for AKM. Different preparations need to be made regarding the two basic competencies that must be achieved. The AKM assessment also includes forming Pancasila student profiles, character surveys, and learning environment surveys. Because of this, assessment preparations such as discussion of questions in the AKM book or tryouts and simulations will begin to be carried out [17]. This preparation will usually last until it is close to the assessment time. In addition, 91.7% of teachers strongly agree and need teaching materials for AKM questions. Every student should prepare to take the assessment. Both school-facilitated preparation and independent preparation with the help of AKM books. Participating in AKM tryouts or simulations can help students get used to the types of AKM questions. Participating in the simulation will make students calmer when undergoing assessments later. Apart from online simulations, learning to use AKM books is also worth trying [23]. The third aspect of presenting information shows that 91.7% of teachers strongly agree and need references to AKM questions. Assessment questions require a good understanding of the material being studied. Therefore, students need to repeat lessons regularly. Students can repeat lessons using reference books and summaries or ask questions from AKM books for grade 5, grade 8, or grade 11 according to their level of education [8].

Table 1 of statements 21 and 22 presents information related to application requirements that facilitate AN preparation and the need for companions in AN preparation. 91.7% of teachers or most respondents strongly agreed and needed an application that facilitated AN preparation. Today's students are the alpha generation familiar with application-based technologies, especially digital ones. Of course, it would be great fun if they learned to use what they are good at, namely, technology based on digital applications. Likewise, implementing the Pancasila Student Profile will be easier if you use digital technology. One form of utilizing digital media as an application of the Pancasila Student Profile that the Ministry of Education and Culture has made is the learning house portal [2]. In addition, as many as 91.7% of teachers or most respondents strongly agreed and needed a companion in preparing AN. With the implementation of mentoring activities, it is hoped that it can help the school prepare for and carry out AN smoothly. Increased insight and experience of students, teachers and school principals in preparing for the implementation of AN, as well as technical preparation in the midst of limited equipment and resources needed for the implementation of AN in schools, where this assessment activity must be carried out simultaneously. Limitations are not a barrier, while there are still efforts to progress and good cooperation with various parties [39].

The results of the implementation of the open questionnaire on 15 MGMP chemistry teachers as a sample. The statements of the fifteen teachers have represented the existing population. AKM is considered effective in providing an understanding of chemical material through literacy and numeracy. This is in accordance with the research Rokhim et al., (2022) that the results of the interviews were analyzed separately for each question and content analysis was carried out to examine the data in more detail. The results of AKM provide space for teachers and students to carry out teaching and learning processes that are more efficient to increase students' understanding of a given material. In addition, in research Kartina et al., (2022) shows that scientific learning can improve students' literacy AKM abilities in class VIII.1 SMP Negeri 2 Payaraman which can be seen from the increase in student scores. In the first cycle, it only reached a value of 51.52, increasing to 67.04 in the second cycle. The new improvement reached individual mastery but was not yet classical, so it continued to cycle III. In cycle III, an average value of 83.7 was obtained, exceeding the KKM 65, so it experienced an increase.

IV. Conclusion

The results of the implementation of the open questionnaire on 15 MGMP chemistry teachers as a sample. The teacher's statement has represented the existing population. 75% of teachers strongly agree that it is necessary to prepare for AKM. In addition, 91.7% of teachers strongly agree and need teaching materials for AKM questions. As many as 91.7% of teachers strongly agree and need an application

that facilitates the preparation of the National Assessment. Therefore, teachers need intensive assistance in preparing the National Assessment, especially in abstract chemistry material.

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