Orbital
The electronic journal of chemistry

the electronic journal of chemistry

Paper on Education | http://dx.doi.org/10.17807/orbital.v14i1.1695

Identification of Science Teacher Practices and Barriers in Preparation of Minimum Competency Assessment in the Covid-19 Pandemic Era

Hayuni Retno Widarti* [a], Deni Ainur Rokhim [a,b], Maya Oki Septiani [a] and Mohammad Hilfi Azra Dzikrulloh [a]

The Minister of Education, Culture, Research, and Technology made a new policy that from 2021, a national assessment that will be held is minimum competency assessment or commonly known as AKM. AKM is measuring two basic skills that are literacy and numeracy. The occurrence of the Covid-19 pandemic has affected the implementation of education. The learning that was originally face-to-face in the classroom now must be changed to online system. This is causes delays in the preparation of minimum competency assessment. Therefore, this research is important to do so that teachers, schools, and the government have a strategy in preparing minimum competency assessments in the era of the pandemic and post-covid-19 pandemic. This study aims to identify the practices and barriers of science teachers in preparation for the minimum competency assessment during the Covid-19 pandemic. This study uses a qualitative descriptive research method with four stages of research, that is preparation, data collection, data analysis, and concluding. The subject in this research included 15 science teachers from East Java, Indonesia. Subject selection was carried out using criterion-based selection and sample determination using cluster sampling technique. The instrument uses consist of an open and closed questionnaire via a google form. Data was analyzed using descriptive statistical techniques. The result showed that in online learning, most teachers had implemented learning that oriented to the preparation of minimum competency assessment but had not shown a positive correlation to student learning outcomes.

Graphical abstract

Keywords

Minimum competency assessment
Covid-19 pandemic era

Article history

Received 23 January 2022
Revised 19 February 2022
Accepted 19 February 2022
Available online 29 March 2022

Handling Editor: Adilson Beatriz

1. Introduction

The Minister of Education and Culture made a policy that begin 2021st, the National exam (UN) will be abolished, and

[a] Department of Chemistry, Universitas Negeri Malang, Jalan Semarang No. 15, Malang, 65145, Indonesia. [b] Chemistry, SMA Negeri 3 Sidoarjo, Indonesia. Corresponding author. *E-mail: **hayuni.retno.fmipa@um.ac.id**

education assessments will be replaced with National Assessments (AN). The national assessment consists of a Minimum Competency Assessment (AKM), a character survey, and a learning environment survey [1]. In the national assessment, AKM measures two basic abilities that is reading literacy and numeracy. Reading literacy emphasizes the ability to reflect on reading text in various life contexts. Meanwhile, numeracy emphasizes the ability to use mathematical that relate with problems in daily. Both competencies are implemented to solve problems in various contexts to measure competencies in depth. Andiani et al. [2] said that competency assessment must at least accommodate four 21st century competencies which include critical thinking and problem solving, communication skills, creativity, and work ability [2]. Minimum competency assessment is an assessment of the basic abilities, that students must be possess in order to develop themselves and participate positively in society.

The abolition of the National exam (UN) is a reform in Indonesian education. So far, the national exam still raises pros and cons among academics. Based on Law Of The Republic of Indonesia Number 20, year 2003 about the National Education System, evaluation is an activity of controlling, guaranteeing, and determining the quality for various components of education at every path and level as a accountability for the implementation of education. But in fact, the national exam has been used as a determine of student graduation, not for the quality of education. In fact, according to Apriliana [3], national exam is triggers in students which have an impact on decrease in learning concentration. Beside it, the national exam only measures students in academics and hasn't measured other competencies. Based on Law Of The Republic of Indonesia Number 20, year 2003, education is held as a process of civilizing and empowering long life learning. A mean that education doesn't only to teach general knowledge in conceptual, but also must be teach the relevance between material subject and life, so that students are be able to implement the knowledge for future.

The policy of abolisih the National Exam (UN) received a positive response from students and teachers. Baro'ah [4] said that the abolition of the National Exam (UN) would reduce mental pressure on students, because graduation from an educational unit isn't determine by a value which obtained in just a matter of days. Implementation of the Minimum Competency Assessment (AKM) as a national assessment instrument, in accordance with Law Number 20th of 2003rd "*education is held by developing a culture of reading, writing, and arithmetic for all citizens. In contrast to the national exam which only measures the level of students' understanding of the content knowledge , the AKM assesses three aspects, that is reading literacy, numeracy, and character surveys*". Types and complexity of the questions are tested in AKM also different. Although AKM doesn't determine the graduation, but teachers need to prepare students for AKM to improve the quality of learning.

The occurrence of the Covid-19 pandemic, has become a major problem in the implementation of learning that leads to the preparation of AKM. During online learning in pandemic, teachers also need to design learning system which increase the enthusiasm of students, especially when conducting assessments [5]. This is a challenge for teachers, because the changes in the implementation of learning that occur so fast. Furthermore, Rokhim et al. [6] said that online learning constraints also affect to the readiness of teachers and students in prepare of minimum competency assessments [1].

The COVID-19 pandemic has also caused some psychological problems for teachers. In the research of Silva et al. [7] stated that teachers have a level of anxiety by 17%, depression by 19%, and stress by 30%. This is exacerbated by findings which state that in Asia, anxiety levels are higher than in other continents [7]. In Indonesia itself, the same thing is experienced by teachers. This anxiety occurs because teachers are worried that during online learning students do not have good learning motivation and are worried about the use of technology being misused by students [8]. This is exacerbated by the fact that teachers in several regions in Indonesia feel unprepared to carry out online learning due to several factors such as the lack of support from related institutions and the lack of teacher confidence [9]. Therefore, this study aims to identify the practices and barriers of science teachers in preparation for minimum competency assessments during the Covid-19 pandemic. This identification is very important. From this identification, problems in the preparation of minimum competency assessment will be known. So, it can be used as an initial step to implement strategies in order to minimize problems at implementation of minimum competency assessment later.

2. Material and Methods

This study uses descriptive qualitative research methods with 4 stages of research, that is preparation, data collection, data analysis, and concluding. The subjects of this study were 15 science teachers from several schools in East Java Province. This study aims to identify the practices and barriers of science teachers in preparation for the minimum competency assessment during the Covid-19 pandemic. Subject selection was carried out using criterion-based selection, based on the assumption that the subject was the actor in this study [7]. Then, the determination of the sample uses a simple random sampling technique, which means that each element is chosen independently of every other element [8]. The procedure of this research is to retrieve data information through the distribution of questionnaire links using google forms. The type of question used closed and open questionnaires.

This questionnaire consists of four indicators which are contained in 8 questions. The instruments used explanations or opinions and multiple-choice based on Guttman's scale [8]. The data analysis technique used statistical analysis to reveal the practices and barriers of science teachers in preparing minimum competency assessments during the Covid-19 pandemic. The results are expressed by the percentage of the frequency distribution and a qualitative explanation. Interpreting of the data used 5 scale.

Tabel 1. Rate Conversion with 5th Scale.

No.	Percentage (%)	Category
1	81 – 100	Very good
2	61 – 80	Good
3	41 – 60	sufficient
4	21 – 40	Low
5	< 20	Very low

3. Results and Discussion

The identification of science teacher practices and barriers in preparation for minimum competency assessment during the Covid-19 pandemic is divided into four categories, that is (1) the readiness of science teachers in preparing the

minimum competency assessment, (2) the implementation of science literacy-based learning, (3) habituation of students in answering the questions which equivalent with AKM, and (4) barriers in preparation for minimum competency assessmentThis section may precede or follow the Results and Discussion section.

3.1 Readiness of science teachers in preparing the minimum competency assessment

The minimum competency assessment isn't designed like the National exam (UN), which juts assesses student learning outcomes individually, but AKM is rather to improve a quality of the education system. Thus, the results of this assessment can be used as a reference to improve the learning process. Different with the national exam, the minimum competency assessment isn't only oriented to measure of content knowledge, but the targets include literacy, numeracy, and character education. This is a reform in primary and secondary education that must be prepared carefully. Therefore, teachers need to understand this assessment. Based on research from Rohkim et al. [1], who conducted a survey of 44th high school teachers in East Java about the understanding of the assessment, it was found that 75% understood, 4.5% didn't understand, and 20.5% are stilldoubted. Fauziah et al. [10] also state that there are teachers who still didn't understand about the literacy and numeracy components which will be tested in the minimum competency assessment [10].

In welcoming the implementation of the AKM in 2021st, teachers are required not only to understand, but also must be ready. The results of this research that have been conducted using closed questionnaires show that 80% of respondent teachers have begun to prepare students for the minimum competency assessment, while are 20% still not yet.

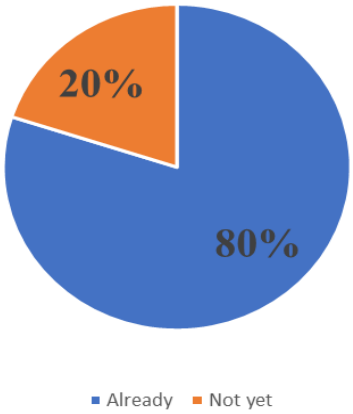

Fig. 1. Readiness percentage of science teachers in preparing the minimum competency assessment.

Then, a survey was conducted on teachers who had prepared students for the AKM to determine their readiness. Based on a survey using an open questionnaire, it was found that the percentage of teachers in preparing students to face AKM with an average of 41.58%. From these results, it can be said that the preparation of science teachers in East Java is at sufficient category. Therefore, the government must be conduct further training and socialization to the teachers.

3.2 Implementation of scientific literacy-based learning

PISA defines scientific literacy as "the *ability to engage with issues related to science, and with scientific ideas, as a reflective citizen*". Then, states that people who are scientifically literate, have knowledge, understood concepts and scientific processes that needed to make decisions, be able to realize, actively participate in discussions, have a sense of care and are able to make decisions in problems that happen in society and the world globally [11]. Furthermore, Holbrook et al said that the scientific literacy model emphasizes the need for a balance between various abilities and requires skills in decision making on socioscientific issues [12]. Based on this opinion, it can be concluded that aspects of scientific literacy include knowledge of science, scientific processes, scientific attitudes, and understanding of science to solve problems in daily. Scientific literacy is very important to be applied in learning, especially on science education, so that, the knowledge which gained by students is not only limited to concepts, but can also be implemented in real life. Therefore, literacy should be one of the goals in the implementation of learning. This is accordance with the government's policy that makes literacy as one of the aspects that assessed in the AKM.

Based on research that conducted of 15th science teachers in East Java, 80% of them have implemented scientific literacy-based learning, but 20% still not yet. Teachers who haven't familiar with scientific literacy-based learning, because they are still used teacher centered model, which learning is dominated by the teacher's role in explaining and doesn't trigger the activeness of students to build their own concepts. Thus, it can be said that the implementation of scientific literacy-based learning is in the good category.

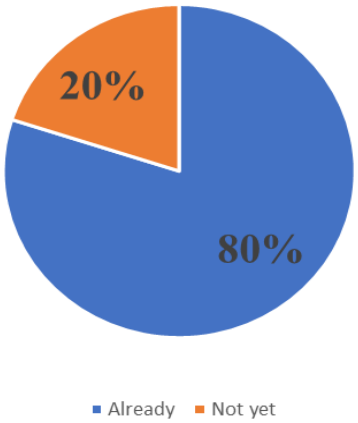

Fig. 2. Percentage of implementation scientific literacy-based learning.

Online learning during the pandemic also raises various problems in the implementation of teaching and learning activities. The lack of interaction between teachers and students, as well as the limited allocation of learning time is one of the obstacles to the implementation of scientific literacy . The results showed that 60% of the respondent teachers had applied literacy-based science learning, while the remaining 20% still never. Thus, it can be concluded that the implementationof scientific literacy-based learning in pandemic era is in the sufficient category. These results are lower if compared with offline learning before the pandemic. Morgan [13] said that changes which occurred briefly in online learning caused teachers can't be optimal in delivering material. Handayani [14] also stated that the unstability of the internet network is one of the obstacles for teachers in delivering learning materials. These problems of course

greatly affect to the preparation of AKM, one of which, hinders the implementation of literacy-based learning.

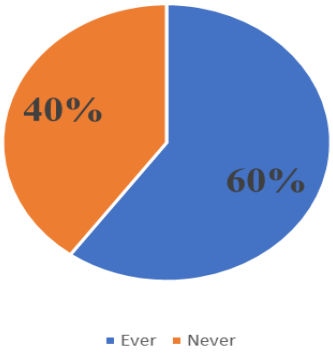

Fig. 3. Percentage of implementation science literacy-based learning in pandemic era.

3.3 Habituation of students in answer the questions which equivalent with AKM

The questions that will be tested in the minimum competency assessment consist of two aspects, that is the ability to reason using language (reading literacy), and mathematics (numeracy). Reading literacy is the ability to evaluate and reflect on texts in relation to the context of life. While, numeracy is the ability to use mathematical logic to solve problems in daily. The research of Cahyanovianty & Wahidin [15] states that the ability of junior high school students in solving numeracy problems is in the medium category [15]. Then, Muhammad et al. [16] also stated that students' literacy skills were in the sufficient category, with a percentage of 53%.

Besides literacy and numeracy, an assessment also related to character education. The types of questions in the AKM are also very different if compare with National exam (UN). In the national exam, the questions tested are only multiple choice and short entries, while in the minimum competency assessment, the questions tested include multiple choice, complex multiple choice, matchmaking, short entry, and descriptions. Based on the complexity of the types of questions being tested, students need to be familiarized or trained to work on such questions as an effort to prepare for this assessment.

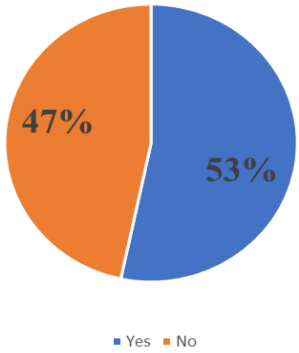

Fig. 4. Percentage of habituation students in answering the questions which equivalent with AKM.

The research conducted on science teachers in East Java showed that 53% of the 15 respondent teachers had train the students to work on questions that equivalent with AKM, while the remaining 47% are still not yet. The data regarding the resources used in the figure as follows.

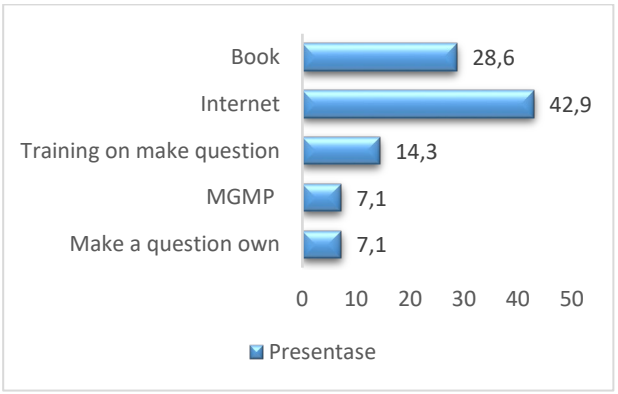

Fig. 5. Source of the question are used by teacher.

From these data, the questions which used by the teacher is get from the book (28.6%), the internet (42.9%), training on question making (14.3%), MGMP (7.1%), and make their own questions (7.1%). Most of the teachers get their questions from the internet, while the source of the questions which from the MGMP be the lowest percentage.

3.4 Barriers in preparation for minimum competency assessment

To carry out the preparation of the minimum competency assessment, teachers face several obstacles. The obstacles in this identification research are divided into four, namely (1) barriers to teacher readiness, (2) barriers to student readiness, (3) barriers to availability and use of facilities, and (4) barriers to time and place. limitations in learning. Barriers to teacher readiness include the ability of teachers to prepare minimum competency assessment questions which are still minimal and difficult. This obstacle occurs because the teacher is not used to making questions which are new things. In the research, Sudianto & Shinoda [17] revealed that teachers had difficulty in arranging questions in a coherent and coherent manner. In addition, 70% of the questions that have been designed are not good questions and can cause confusion for students [17].

The next problem came from the students. In the results of this study it was found that students still did not fully understand the material being taught and their learning motivation decreased. One of the causes of these problems is distance learning / online which causes students to feel bored. This is complicated by the lack of interaction between students and teachers during online learning. This interaction is necessary because it can increase the effectiveness and efficiency of learning. This agrees with Iswardhany [18], that the interaction between teachers and students can generate learning motivation [18].

The implementation of preparation at AKM is also constrained by the availability of facilities, including some inadequate student equipment and constrained by unstable internet networks, limited quotas and lack of understanding of the use of existing technology. In fact, the use of technology that supports learning such as the Google Classroom and Google Meet platforms is considered by students to reduce barriers during online learning and feel more confident when taught through these platforms [19]. Therefore, it is important for teachers to understand the use of technology in the future. In addition, this implementation is also limited by time and place. During online learning, students and teachers are only

allowed to do synchronous learning for 20-45 minutes. To overcome these problems, it is necessary to change the learning pattern during this pandemic by applying blended learning. In addition, by familiarizing student assessments based on literacy and numeracy with digital learning integration.

4. Conclusions

Assessment is needed to evaluate the achievement of students in the learning process in order to map the quality of education. Therefore the goverment making a new policy that national exams which evaluate student learning outcomes individually, will be replaced with a minimum competency assessment The aims by this assessment is to evaluate the quality of educational units. Based on the research conducted, the readiness of science teachers in preparing the minimum competency assessment, Java is at sufficient category. Therefore, the government must be conduct further training and socialization to teachers. The implementation of scientific literacy-based learning also in the sufficient category. 53% of the 15th respondent teachers had train the students to work on questions that equivalent with AKM. Then, te barriers in preparation for minimum competency assessment divided into four, that is (1) barriers to teacher readiness, (2) barriers to student readiness, (3) barriers to availability and use of facilities, and (4) barriers about time and place limitations in learning.

Author Contributions

Hayuni Retno Widarti and Deni Ainur Rokhim contributed with conceptualization, formal analysis, investigation, methodology and writing – original draft. Maya Oki Septiani contributed with investigation, visualization, writing – original draft and writing – review & editing. Mohammad Hilfi Azra Dzikrulloh contributed with writing – review & editing.

References and Notes

[1] Rokhim, D. A.; *Rahayu*, B. N.; *Alfiah*, L. N.; Peni, R.; *Wahyudi*, B.; *Wahyudi*, A.; *Sutomo*, S.; *Widarti*, H. R. *J. Adm. dan Manaj. Pendidik.* **2021**, *4*, 61. [Crossref]

[2] Andiani, D.; Hajizah, M. N.; Dahlan, J. A. *Majamath J. Mat. dan Pendidik. Mat.* **2020**, *4*, 80. [Link]

[3] Apriliana, I. P. A. *Couns. J. Bimbing. dan Konseling.* **2018**, *8*, 37. [Crossref]

[4] Baro'ah, S. *J. Tawadhu.* **2020**, *4,* 1063. [Link]

[5] Muchson, M.; Munzil; Setiawan, N. C. E.; Sari, M. E. F. S.; Novitasari, S.; Rokhim, D. A. *J. Pengabdi. Kpd. Masy.* **2021**, *5*, 420. [Crossref]

[6] Rokhim, D. A.; Wulandari, I. A. I.; Alifah, L. N. *JAMP J. Adminitrasi dan Manaj. Pendidik.* **2020**, *3*, 216. [Crossref]

[7] Silva, D. F. O.; Cobucci, R. N.; Lima, S. C. V. C.; Andrade, F. B. *Med. (United States)* **2021**, *100*, e27684. [Crossref]

[8] Uruk, F. H. *J. Inov. Peneltiain*. **2019**, *1, 2227*. [Crossref]

[9] Subijanto, S.; Ali, N. B. V.; Widiputera, F.; Kadaryanto, B.; Sulistiono, A. A.; Martini, I. A. D. *J. Penelit. Kebijak. Pendidik* **2021,** *14*, 135**.** [Crossref]

[10] Fauziah, A.; Sobari, E. F. D.; Robandi, B. *Edukatif J. Ilmu.* **2021**, *3*, 1550. [Link]

[11] Rahayu, S. Abstract of the Semnas Pendidikan Kimia & Sains Kimia di Pendidikan MIPA-FKIP-Universitas Nusa Cendana, Kupang, Indonesia, 2015. [Link]

[12] Holbrook, J.; Rannikmae, M. *Int. J. Environ. Sci.* **2009**, 4, 275. [Crossref]

[13] Morgan, H. *Clear. House A J. Educ. Strateg. Issues Ideas*, **2020**, *93*, 135. [Crossref]

[14] Handayani, L. *J. Ind. Eng. Manag. Res.* **2020**, *1*, 16. [Link]

[15] Cahyanovianty, A. D.; Wahidin, W. *J. Cendekia J. Pendidik. Mat.* **2021**, *5*, 1439. [Crossref]

[16] Muhammad, S. N.; Listiani, L.; Adhani, A. *QUANTUM: Jurnal Inovasi Pendidikan Sains* **2018**, *9*, 115. [Crossref]

[17] Sudianto, S.; Kisno, K. *J. Akuntabilitas Manaj. Pendidik* **2021**, *9*, 85. [Crossref]

[18] Iswardhany, R.; Rahayu, S. *Jurnal Pendidikan Teknik Sipil* **2020**, *2*, 78. [Link]

[19] Miranda, M. L. D.; Cruz, C. C. *Ed. Científica Digit.* **2021**, 95. [Crossref]

How to cite this article

Widarti, H. R.; Rokhim, D. A.; Septiani, M. O.; Dzikrulloh, M. H. A. *Orbital: Electron. J. Chem.* **2022**, *14*, 63. DOI: http://dx.doi.org/10.17807/orbital.v14i1.1695