Science Learning Based on the MIKiR Approach Assisted by WhatsApp for Junior High School Students

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Abstract. The Covid-19 pandemic has created various learning challenges. WhatsApp as one of the most popular messaging applications supports improvement communication between the teachers and students in distance learning during the Covid-19 pandemic. The MIKiR apparoach is one of the learning approaches that consists of four stage namely *Mengalami* (experiencing), *Interaksi* (interaction), *Komunikasi* (communication), and *Refleksi* (reflection). This study aims to analyze the implementation of the MIKiR approach on science learning assisted by WhatsApp. The method used in this research is descriptive qualitative approach. This research was conducted in MTs Darul Ishlah Sukorejo, Kendal Regency, Central Java. The subject of this research was 25 seventh grade students. Technique of collecting data was through observation, questionnaires, and documentation. The results showed that the students carried out science learning using the MIKiR approach. This study concluded that students have done active learning by applying four stages, but the quality of implementation must be improved. The participation of each students is varied due to the difference of availability of mobile device, internet network access includes data package, parental support, and self-motivation.

Keywords: distance learning, science learning, the Covid-19 pandemic, the MIKiR approach, WhatsApp

Abbreviation: MIKiR stands for *Mengalami* (experiencing), *Interaksi* (interaction), *Komunikasi* (communication), and *Refleksi* (reflection)

Running Title: Science Learning Based on the MIKiR Approach Assisted by WhatsApp

INTRODUCTION

Science learning has main role in the learning process and the improvement of technology. Science learning invites students to understand, explain, and discover concepts through discovery and inquiry process. Students must construct the knowledge and give meaning through real experience. Science learning generally involves more understanding of learning concepts and links these concepts to the phenomena of environment (Alpusari et al., 2020). Active learning is an option in implementing science learning. Prince (2004) as cited by Prastyo (2019) states that active learning is a cooperative process that involves students in the learning process, requiring students to carry out meaningful activities and think about what they are doing. Active learning can be applied by using the *Mengalami*, *Interaksi*, *Komunikasi*, and *Refleksi* (MIKiR) approach.

The MIKiR approach is an approach used in learning activities to develop the quality of education that has been applied in primary schools in partnership with Tanoto Foundation (Suhandi et al., 2019). The MIKiR approach consists of four stages namely *Mengalami* (experiencing), *Interaksi* (interaction), *Komunikasi* (communication), and *Refleksi* (reflection) (Tanoto Foundation, 2018). The learning process using the MIKiR approach triggers students to have some experiences in science, interrelate with other students, communicate their thoughts, and reflect what they have learned as shown in Table 1 (Tanoto, Foundation, 2018).

This approach invites students in order to learn creativitely, work in groups, and be critical during the process learning. The MIKiR approach can improve students' critical thinking skills and learning activities. It is able to provide meaningfull learning for students (Alpusari et al., 2020). Alpusari et al. (2020) in other research result found that students who learn use the MIKiR approach have good communication skills. The MIKiR-approached learning also supports 21st century skills that include creativity, critical thinking & problem solving, collaboration, and communication (Prastyo, 2019).

Table 1. Stages of the MIKiR Approach

Stage of MIKiR Approach	Description
Mengalami (Experiencing)	Make observation, experiments, making something, interview during learning process.
Interaksi (Interaction)	The process of exchanging mind or ideas between two or more people and responding to the ideas or opinions of others.
Komunikasi (Communication)	The process delivery ideas/ thought or feelings by someone to others, through oral and written, delivering the work, reporting the results of experiments, and reporting the results of group discussions.
Refleksi (Reflection)	Activities look back on learning experinces and take lessons to learn better in the future.

March 2020 was a surprising month for schooling in all crossways the country, including in Indonesia. Science learning must continue with various challenges and obstacles. The Covid-19 pandemic formed extraordinary challenges in learning for a multitude of participants, including teachers and students (Nasr, 2020). The uncertainty of how to quickly deliver instruction online to varied students posed a challenge to virtually all science teachers (Nasr, 2020). Finally, various learning models were tried. Therefore, the MIKiR approach was chosen as an alternative in the distance learning model. The students are expected can still gain direct experience with experiments, interact, and communicate actively. Furthermore, students are expected to internalize their character values in daily life with parental guidance at home. The purpose of this paper is to analyze the implementation of the MIKiR approach on science learning assisted by WhatsApp.

MATERIALS AND METHODS

Study Area

This research conducted on 23 July-6 August 2020. Twenty-five students of seventh grade of MTs Darul Ishlah Sukorejo participated in this study.

Procedures

This study uses descriptive qualitative research method because this study aims to identify and analyze the implementation of the MIKiR approach on science learning assisted by WhatsApp.. Data were collected through observation and interview. The distance observation is used to collect some information about students' learning activity using MIKiR approach during Covid-19 pandemic.
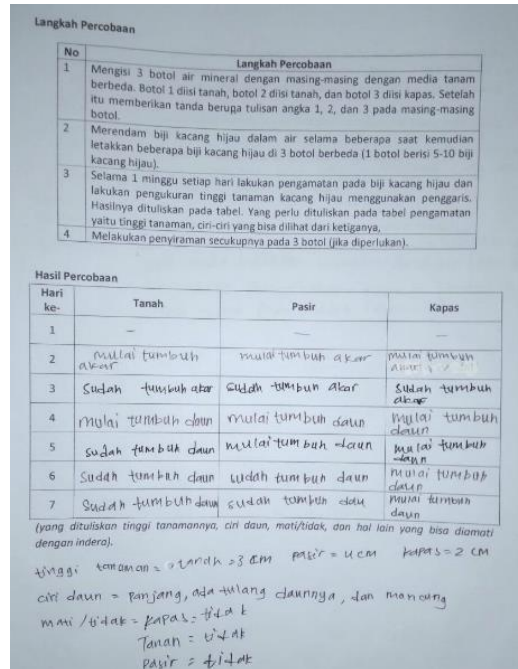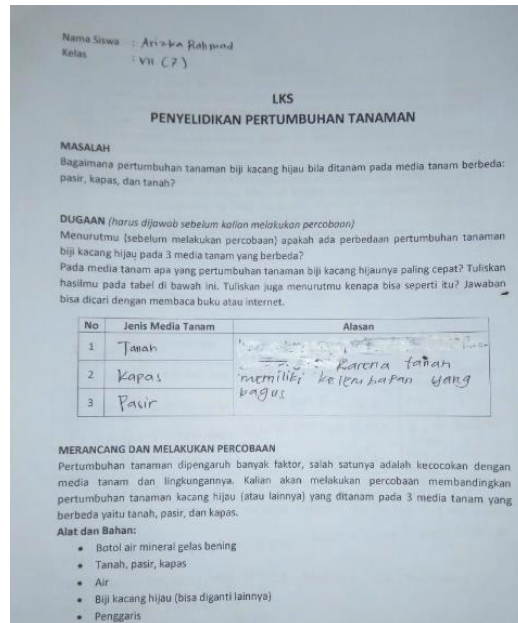
RESULTS AND DISCUSSION

Results

Learning activities of scientific investigation were ordered based on MIKiR approach. Learning carried out online using the assistance by WhatsApp Group. In the stage namely *Interaksi* (I) or interaction, the teacher and students had a discussion. Initially, the students were challenged with a problem given by the teacher. The students must answer the question, how is the growth of green bean plants planted on different planting media? The students answered are conveyed via the text message feature in WhatsApp group. This answer become the initial hypothesis of the investigation. Next, the teacher began to provide teaching materials on scientific investigation in science by sending material files and activating the voice message feature.

At the stage namely *Mengalami* (M) or experiencing, students directly investigated the growth of green bean plants. In the first week, students are given an assignment to plan and conduct scientific investigation. The teacher has been send student worksheets based on the MIKiR

approach through the WhatsApp group. During one week (23-30 July 2020) the students had to conduct an experiment in the form of investigating the growth of green bean plants. Every day during a week students must report to the teacher by sending photos of their activities via WhatsApp. One of student worksheets is shown in Figure 1.
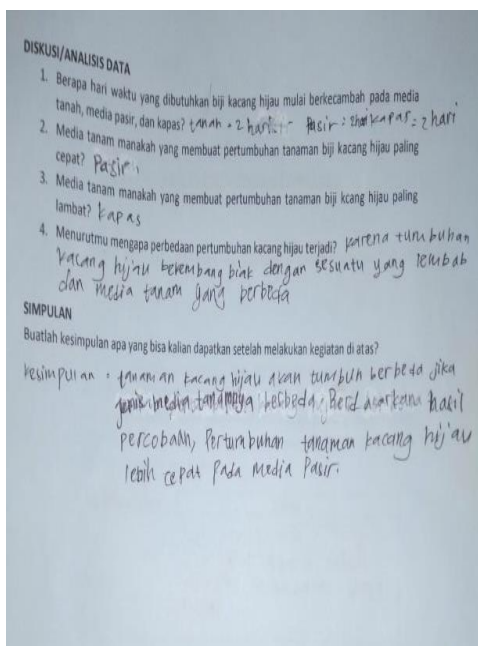
Figure 1. Student Worksheets Results

After students have successfully completed their scientific investigations, the teacher began to invite students to discuss activities that have been carried out. The discussion and question and answer session was entirely done via WhatsApp group. At the stage namely *Komunikasi* (Ki) or communication, students compile a written report on the results of the investigation. In the second week, during 31 July-6 August the students begin compiling narrative written reports. The written reports were collected to the teacher via the WhatsApp picture message feature.

At the end of the session as stage *Refleksi* (R) or reflection, students reflected under the guidance of the teacher. The stage, namely reflection on learning is done by answering three questions (1) how did you feel when studying; (2) what I have understood and have not understood; and (3) what I would like to learn more about. In summary, the activities of learning science using the MIKiR approach are summarized in Table 2.

Table 2. Students Actvities in Learning Science with MIKiR Approach

Stage	Activity
Mengalami (Experiencing)	• Students prepared the tools and materials and then carried out experiment to investigate the growth of mung bean seeds at home.
Interaksi (Interaction)	• Students observed changes and growth of mung bean seeds every day for one week.
Komunikasi (Communication)	• Students measured the height of green bean plants using the right measuring instrument.
Refleksi (Reflection)	• Students asked questions and answer questions via WhatsApp

	groups.
	• Students discussed and work with groups at home.
	• Students expressed opinions through the WhatsApp group.
	• Students reported the results of their work in the form of a written report.
	• Students reflected by rethinking their work.
	• Students answered three questions (a) how did you feel when studying; (b) what I have understood and have not understood; and (c) what I would like to learn more about.

Discussion

The selection of the WhatsApp application as a communication medium is due to the consideration that WhatsApp is the most popular application. This is the right choice because it is in accordance with the conditions of the school and the students' environment. Abualrob & Nazzal (2019) stated WhatsApp has many feature, like free unlimited messages; sending out questions to other students and the teacher; staying in contact with other students as well as with the teachers; getting response from the teachers and other students; exchanging thoughts about the matter in question; creating free calls; and transfer and receiving audio messages, pictures, or videos. All features enhance the teaching learning process during Covid-19 pandemic.

WhatsApp as one of the most frequently cited benefits of social media in the realm of education is that it stimulates social interaction among WhatsApp users (Suardika et al., 2020). This decision supports the strengthening of the stage *Interaksi*, interaction stage between teachers and students as well as students and other students. Abualrob & Nazzal, (2019) stated there are four directions of communication flow namely student-teacher, student-teacher, student-student, and teacher-teacher. Previous finding research showed the students' interaction was found to be rather encouraging (Abualrob & Nazzal, 2019). This fact is also supported by research results that by using WhatsApp, students and teacher can communicate anywhere and anytime in order to facilitate the process of learning and ask to the teacher more questions (Zarei, Fathi, & Kaur, 2020; Say & Yıldırım, 2020). Students and teacher doing collaborative tasks in a time saving atmosphere (Abualrob & Nazzal, 2019). WhatsApp group also had meaningfully stronger sense of classroom community compared with the face-to-face group, interaction was not inhibited by time and space (Suardika et al., 2020).
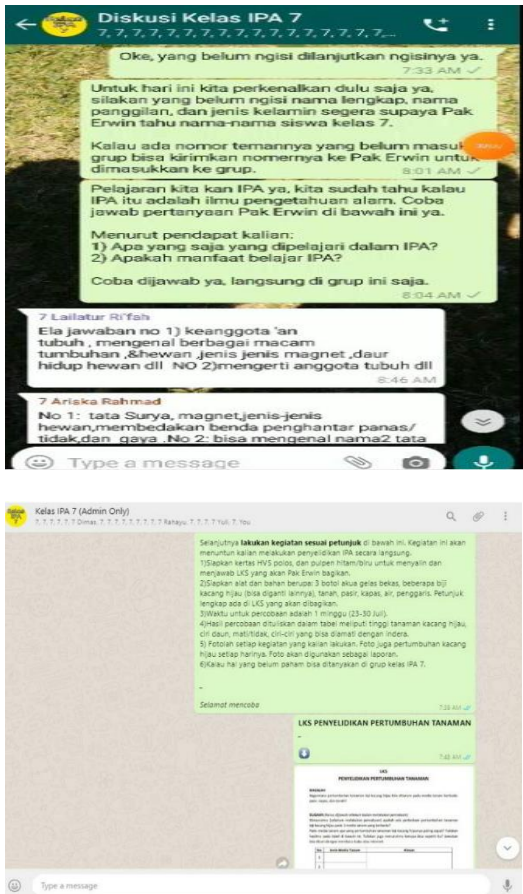
Figure 2. Implementation of Stage *Interaksi* using WhatsApp Group

The stage *Interaksi* is closely related to the stage *Komunikasi*. At these stage students were trained to communicate the results in writing in the form of a narrative report. This is with the research results of Abualrob & Nazzal (2019) found by using WhatsApp students can feel at ease communicating their thoughts and engaging themselves actively in discussions. Students were able to communicate and connect with the teacher everytime and everywhere for learning purposes (Nuraeni & Nurmalia, 2020). At the stage *Refleksi*, more than half of the students stated that they were quite happy to learn though direct practice. Choe et al. (2019) stated the affective responses of students to online learning deliver information on creating both effective and attractive online learning experiences.

Online learning is fundamentally distinct from learning face-to-face and requires teacher and other facilities to develop new lesson planning skills (Choe et al., 2019). Science learning that is carried out face several obstacles which are influenced by several factors such as availability of mobile device, internet network access includes data package, parental support, and self-motivation. Based on the results of the analysis of these factors shown in Figure 3, it was found that the potential factors for supporting learning were the availability of mobile devices with a percentage of 88% belongs to the high category, self-motivation with percentage 52 %

belongs to the low category, the availability of internet network access and data packages by 50% belongs to the low category, and the lowest was parental support by 44% belongs to the low category. The study conduct by Say & Yıldırım (2020) also stated there are factors inhibiting online learning, namely the lack of internet in the home environment, low internet speed or the lack of technical equipment of computers.
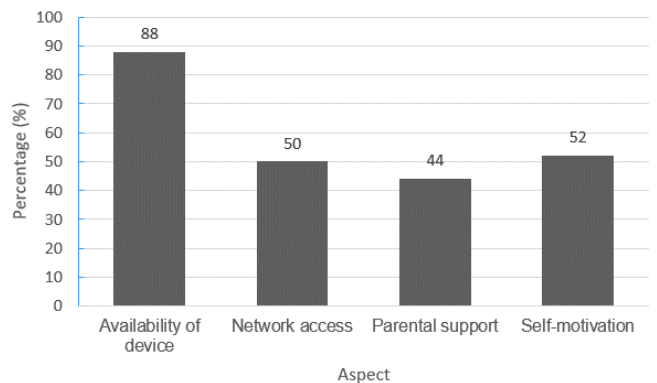

Figure 3. Supporting Factors for Online Learning

The lowest supporting factor is the parental support factor of 44%. These result indicated that this is in strak contrast to the importance of the parenting. Vartiainen & Aksela (2019) stated parents' understandings, organization of the experiments and finding time to do experiments are important factors to consider, when looking at parents' awareness to involve in science learning activities with their children. It is important for children, with the help of an adult, to be able to become familiar with science phenomena happening in their situation. Parents' attitudes have an influence on the development of child's upcoming attitude, motivation, and interest to science (Vartiainen & Aksela, 2019).

However, parents have low sense of ability to announce science for children in home contexts and they do not essentially even identify that science is something that can be teached to children outside formal schooling system. Science learning environmental at home can support students' learning of science, the development of the ability of wondering, an increase in pleasure and enthusiasm to science when done well (Vartiainen & Aksela, 2019). In general, science learning with the MIKiR approach assisted WhatsApp is enough and needs some improvements in several aspects.

CONCLUSION

Based on the results of research and discussion of science learning based on MIKiR approach assisted by WhatsApp. This study concluded that students have done active learning by applying four MIKiR stages, but the quality of implementation must be improved. The participation of each students is varied due to the difference

of availability of mobile device, internet network access includes data package, parental support, and self-motivation.

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