



The Use of Project-based Moodle Science Learning Integration on the Theme of City Noise

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Abstract: This study aims to determine the use of project-based Moodle science learning integration on the city noise theme. The type of research used is descriptive qualitative. The research was conducted in three junior high schools in the city of Semarang in the even semester of the 2020-2021 academic year. Based on the results of the study, teachers in each school responded positively to the use of Moodle science learning integration with the theme of city noise because the content in it was following the needs of teachers in science learning. In the first and second project assignments, there were only 10 students each who submitted their assignments. Based on the results of the study, it can be concluded that the use of project-based Moodle science learning integration on the theme of city noise is following the needs of science learning in schools, but has not been able to increase student activity optimally in the science learning process. Constraints found in the use of project-based integration of moodle science learning on the theme of city noise online are limited infrastructure, internet quota, learning time, low student interest and motivation, and lack of parental supervision in the implementation process.

Keywords: City noise; Moodle; Project; Science learning

Introduction

In the era of the industrial revolution 4.0, teachers and students are required to be able to adapt to the development of an all-digital era, even learning is not only done face-to-face but can be done online (Abidin et al., 2020). In the era of the industrial revolution 4.0, the boundary between humans and information communication technology is getting closer (Fomunyan, 2019). In the world of education, the use of technology is very important and is often discussed (Traxler, 2018), because with the use of technology the learning process is not limited only in the classroom (Denker, 2013) so there are no time and distance barriers (Ahmed, 2018). The Covid-19 pandemic has caused a change from face-to-face learning to online learning that can be done from home (Fortuna & Fitria, 2021; Prima & Lestari, 2021; Saputra & Sujarwanta, 2021; Winangun,

2021). Online learning is the core method used during the Covid-19 pandemic (Baczek et al., 2021). Learning during the Covid -19 pandemic, especially in exact subjects such as natural science, has its own challenges due to various limitations. In the implementation of online learning as an impact of the Covid-19 pandemic, synergy from various parties such as the government, schools, teachers, students and parents of students is needed so that the learning process can be carried out properly. Online learning is one of the innovations in the world of education by involving information technology in the implementation process (Fitriyani et al., 2020). So that learning can be optimally needed learning media that are in accordance with science learning that can be done online. Not all learning methods can be applied in online learning. Practical methods that are usually used in science learning become difficult to do. Whereas in science learning requires practicum to provide direct experience to students (Nurwahidah et al., 2020).

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Cooperative learning, which should make it easier for students to practice communication and collaboration skills, also becomes difficult to apply in online learning. Teachers must be good at innovating and being creative so that student competencies can be achieved in accordance with learning objectives (Handayani, 2020) including the implementation of online learning (Mutaqinah & Hidayatullah, 2020).

The readiness and skills of teachers in the use and utilization of information technology are important because during the Covid-19 pandemic, learning is carried out entirely online (Fajriana & Safriana, 2021). In addition, infrastructure such as internet connections and devices used to support online learning must also be considered (Tang et al., 2021). The success of online learning is highly dependent on the ability of teachers to use technology in the learning process (Assidiqi & Sumarni, 2020). Another thing that becomes a challenge is the amount of material in science subjects that requires practice such as practicum in the laboratory and observations that can be done outside the classroom. This becomes difficult to do because apart from online learning, the space for students to move is also limited due to government policies restricting community activities and calls for carrying out all activities at home.

Based on interviews with several junior high school science teachers in Semarang, some information related to online science learning was obtained. First, each teacher uses a digital platform to carry out online learning. There are schools that have determined the digital platform used by all teachers at the school, there are also schools that have not determined or freed their teachers to use the desired digital platform to support online learning. Second, the implementation time of online learning is different from face-to-face learning. This causes the limited material that can be delivered, so that the explanation of the material seems short. In addition, learning that should be student-centered has not been able to run optimally through online learning. Third, most of the teachers have not carried out practicum during online learning. And fourth, students tend to be passive during the online learning process, and there are even some students who do not join the online learning class. Based on the experience of junior high school science teachers in the implementation of online learning, there are still many obstacles faced so that appropriate media and learning models are needed so that science learning can run smoothly and optimally.

One of the learning models that can be used in online learning so that students are active in the learning process is by applying project-based learning or project-based learning. Project-based learning is a learning model that allows students to be involved in the learning environment so that they become more active (Bilgin et al., 2015). With very limited online learning time, students are still given the opportunity to develop their

competencies so that they can achieve HOTS as expected in the 2013 curriculum. The 2013 curriculum refers to the development of 21st century knowledge requiring critical thinking skills to be able to solve problems critically and creatively (Nakano & Wechsler, 2018) and HOTS is needed to develop life skills (Widana, 2017). Skills to be able to achieve HOTS include critical thinking, creative, collaboration and communication skills (Paige et al., 2016; Retnawati et al., 2018; Uswatun Khasanah & Herina, 2019; Voogt & Roblin, 2012; Widana, 2018). Therefore, the learning process needs to be directed so that students have HOTS so that they can meet the graduate standards of this century (Sumarni & Kadarwati, 2020).

According to Saputra & Sujarwanta (2021) effective project-based learning is carried out online during the Covid-19 pandemic. Nugraheni (2018) stated that project-based learning can increase students' creativity in heat and transfer materials. Meanwhile, according to Winangun, (2021) project-based learning can give students an interesting impression on online learning. Furthermore Winangun (2021) stated that project learning can be used as a reference in providing practicum on online learning. Based on this explanation, it is necessary to apply project-based learning in online learning so that students can carry out simple practical activities independently at home. The purpose of this study is to determine the use of project-based Moodle science learning integration on the theme of city noise.

Method

This study uses a qualitative descriptive method to describe the use of project-based moodle science learning integration on the theme of city noise in class viii smp. The research was conducted from march 2021 to august 2021 in three schools in the city of semarang, namely SMPN 13 Semarang, MTs al Khoriiyyah semarang, and SMP Setiabudhi Semarang. The research subject is class viii in each school for the 2020-2021 school year. Determination of research subjects is based on school clusters taken from the upper, middle and lower criteria based on the results of the 2019 national examination (known with UN).

The number of each student in each school is, SMPN 13 semarang totaling 32 students, MTs Al Khoiriyyah

Semarang totaling 24 students, and SMP Setiabudhi Semarang 30 students. Observations were made to observe the learning process when students were given project assignments through moodle science. The moodle can be accessed online via pc, laptop, or android, making it easy for students to access it. Teachers and students in each school create an account in the moodle so that they can log in as teachers and students in the

moodle. Teachers and students enter the class according to their respective schools.

Data collection was done by means of observation and interviews with teachers. Observations were made during the learning process through zoom, moodle, and whatsapp groups. Teachers and students in each school create an account in the moodle so that they can log in as teachers and students in the moodle. Teachers and students enter the class according to their respective schools. Data collection was done by means of observation and interviews with teachers. Observations were made during the learning process through zoom, moodle, and whatsapp groups. Teachers and students in each school create an account in the moodle so that they can log in as teachers and students in the moodle. Teachers and students enter the class according to their respective schools. Data collection was done by means of observation and interviews with teachers. Observations were made during the learning process through zoom, moodle, and whatsapp groups.

Result and Discussion

Since the outbreak of Covid-19 in all corners of the world, face-to-face or offline learning has begun to shift to distance learning (known with PJJ). The Ministry of Education and Culture (known with Kemdikbud) through Circular Letter number 4 of 2020 compiled guidelines for the implementation of distance learning for teachers while schools were closed in the atmosphere of the Covid-19 Pandemic (Distance Learning Guide, 2020). The Ministry of Education and Culture asks teachers to be able to consider resources that can be used in learning. Therefore, information and communication technology platforms are important for learning. Many schools then choose the online mode or online with the help of the Learning Management System (LMS) to help organize learning activities. Some educational institutions are starting to use Moodle, which stands for modular object-oriented dynamic learning environment that is easy to customize and open source so that it can reduce some of the problems that may arise related to online learning infrastructure (Kolekar et al., 2018). Moodle is one of the LMS (Zacarias et al., 2016) which is popular and can help teachers to organize and manage online learning. Its various interactive features, such as discussion forums, online exams as well as a space to provide feedback and monitor student progress and participation, make Moodle a unique LMS for developing various higher-order thinking skills, one of which is in science learning (Al-Balushi & Al-Abdali, 2015). Moodle science learning used in this study supports government policies in limiting social activities including face-to-face activities at schools to prevent and control the spread of the Covid-19 virus so that learning is carried out online.

Learning is carried out using the website version of the Moodle or the Android application version, and to facilitate communication, WhatsApp groups are used in each class. Moodle science learning can be accessed via a browser on a PC, laptop or smartphone with the address www.schoolipa.com. The android version with the same name can be downloaded by searching with the keyword "Sekolah IPA" on the play store and then it can be installed on each smartphone. The website and application versions of Moodle science learning have exactly the same content, for the application version only the appearance is adjusted to the android display. Moodle science learning is based online and can be accessed anytime and anywhere by teachers and students. This is in accordance with the principle of online learning which gives students the flexibility to study anytime and anywhere (Fitriyani et al., 2020).

Baczek et al., (2021) states that e-learning should not only contain the delivery of material but also provide opportunities for students to carry out an activity in accordance with the material presented. Based on this, Moodle science learning does not only contain sound wave material but also includes student activity sheets (known with LKS) that can be done by students at home. Project-based learning in digital form needs to be explored as an alternative to provide students with higher-order thinking skills (Widiyawati et al., 2020). Moodle science learning includes an explanation of sound wave material on the theme of city noise, worksheets for implementing project activities, as well as evaluation questions to improve students' high order thinking skills (HOTS). Explanation of the material is given through modules and also several learning videos to make it more interesting and easier to understand for students. Each LKS contains the activity title, activity objectives, introduction, project planning, information gathering, as well as discussion and planning video presentations. Activities in moodle science learning accommodate the improvement of students' competence in critical thinking, creative, communication and collaboration.

The research was conducted in the even semester of the 2020-2021 academic year in class viii of sound wave material with the theme of city noise at three junior high schools in the city of Semarang. The theme of city noise was chosen because it is in accordance with the condition of the city of Semarang which is quite noisy as one of the big cities. This can make it easier for students to understand sound wave material through direct observation of activities in their environment. The noise comes from various activities, especially public activities and activities related to technological developments, for example, factory operations, major roads, malls, markets, airports, stations, terminals, and other public places.

There are three projects in the LKS given to students according to the theme of city noise. The first project is

to measure the frequency and intensity of sound. In this project, students were asked to measure noise in crowded places such as markets, malls, roads using an application *sound spectrum analyzer* which can be downloaded in the play store via their respective smartphones. However, based on the results of communication with science teachers at each school, this activity is difficult to realize considering that there are still restrictions on social activities by the government during the Covid-19 pandemic, the limitations of smartphones owned by each student, as well as relatively few science lesson hours. short so this project can't be done. Based on these considerations, of the three projects in the LKS, only two projects were asked to be done by students. The first is to analyze the effect of sound on plant growth and the second is to make a simple silencer. Project activities are planned to be carried out in groups but because it is not possible to do online learning in the midst of the Covid-19 pandemic, activities may be carried out in groups with other students whose houses are close together or individually. This causes the development of collaboration and communication competencies to be less than optimal. In the first project, students were asked to plant sprouts in several containers. Furthermore, the plants in each container were given a different sound from the first day to the seventh day. To determine differences in plant growth, plant height was measured from the first day to the seventh day when the sound was given, then compared the results of the several plants. Furthermore, the plants in each container were given a different sound from the first day to the seventh day. To find out differences in plant growth, plant height was measured from the first day to the seventh day when the sound was given, then compared the results of the several plants. Furthermore, the plants in each container were given a different sound from the first day to the seventh day. To determine differences in plant growth, plant height was measured from the first day to the seventh day when the sound was given, then compared the results of the several plants.

After being given project activities with online learning, it turned out that not many students actually participated in these activities until they were finished. The number of students working on project activities to analyze sound on plant growth in the three schools can be seen in Table 1. Based on Table 1, it can be seen that the comparison of students who worked on the first project in the three schools. At SMP Negeri 13 Semarang as many as 28.13% are working on projects, at SMP Setiabudhi Semarang no one is working on projects at all, and at MTs Al Khoiriyyah as many as 4.17% are working on projects. These results are in line with the activeness of students in the learning process. Some students at SMP Negeri 13 Semarang are quite active in answering and asking questions when learning takes place. Some

students showed their enthusiasm although some of them were passive. Slightly different at MTs Al Khoiriyyah, there were only a few students who seemed active in the learning process. This is also evident in the results of the project, which is only 1 student who collects.

Table 1. The Project Analyzes the Effect of Sound on Plant Growth

School name	Total students	Collecting Project Assignments	Not Collecting Project Assignments
SMPN 13 Semarang	32	9	23
SMP Setiabudhi Semarang	30	0	30
MTS Al Khoiriyyah Semarang	24	1	23

At SMP Setiabudhi in Semarang, from the beginning of learning to the end of the deadline for giving projects, students tend to be passive. In fact, only one to two students wanted to ask about the project even though in the end none of the students collected it. Communication between teachers and students during the learning process is also very limited because students rarely respond to instructions and questions given by the teacher. This affects the implementation of Moodle integration learning *science learning* online so it cannot run optimally as expected. Student-centered learning which is expected to be in accordance with the 2013 curriculum has also not been carried out well at SMP Setiabudhi Semarang.

From the 10 project assignments that were collected by all students, the results were quite good, this can be seen from the activity videos that were collected by students in accordance with the instructions in the LKS. All of them quite clearly describe the activities of students during the observation of giving music to plants. This project assignment allows students to understand the differences between different types of sound or music and their effects on plant growth. So, it is known that not only humans and animals are affected by noise or sounds around them, it turns out that plants also experience it. Through this project, students' critical thinking and creative thinking skills have been carried out.

The second project is to make a simple silencer according to the creativity of each student. In student worksheets, students are given instructions regarding the title and learning objectives in the project but are not clearly told what tools and materials or product results are. This is done to foster the creativity of each student so that they can determine for themselves the tools and materials they want to use. Students are free to choose

and use tools and materials that are around them without having to buy new tools and materials that are expensive. The basic difference between the first and second projects lies in the level of the given project. From the second project, there were 10 students from three schools who submitted project assignments. Details of the number of students who collect assignments at each school can be seen in Table 2.

Table 2. Projects for Making a Simple Sound Silencer

School name	Total students	Collecting Project Assignments	Not Collecting Project Assignments
SMPN 13 Semarang	32	6	26
SMP Setiabudhi Semarang	30	0	30
MTS Al Khoiriyyah Semarang	24	4	20

Table 2 shows that not many students did the second project assignment. At SMP Negeri 13 Semarang there were 18.75% students who submitted project assignments. This value is certainly quite small when compared to the total number of students. At SMP Setiabudhi, Semarang, none of the students collected it, just like the first project assignment, and at MTs Al Khoiriyyah there are 16.67% of students who collect project assignments. The results showed that students tended to be less active in the learning process, one of which was seen at the time of project collection. Based on the results of 10 simple damper products that have been made by students, overall, they are good. Each student has their own creativity in the manufacture of the resulting simple silencer. This can be seen from the tools and materials used. Each student is able to take advantage of used goods in their environment, so there is no need to buy new tools and materials. For example, there are those who use gift boxes, boxes or tins of used food or drinks, the use of styrofoam or the use of foam. Through this project, one of the 21st century skills, namely creative thinking, has been able to be realized. Of the two projects that have been awarded, the percentage of students who submit project assignments is very small. To find out the factors that cause this and to find out the teacher's response in using. For example, there are those who use gift boxes, boxes or tins of used food or drinks, the use of styrofoam or the use of foam. Through this project, one of the 21st century skills, namely creative thinking, has been able to be realized. Of the two projects that have been awarded, the percentage of students who submit project assignments is very small. To find out the factors that cause this and to find out the teacher's response in using. For example, there are those who use gift boxes, boxes or tins of used

food or drinks, the use of styrofoam or the use of foam. Through this project, one of the 21st century skills, namely creative thinking, has been able to be realized. Of the two projects that have been awarded, the percentage of students who submit project assignments is very small. To find out the factors that cause this and to find out the teacher's response in using moodle science learning integration then a discussion was held with teachers from the three schools where the research was conducted. Based on the results of observations on the implementation of learning using moodle science learning the theme of city noise from the three schools is very minimal student activity in learning.

Based on the focus group discussion (FGD) conducted with teachers from SMP Negeri 13 Semarang, SMP Setiabudhi Semarang and MTs Al Khoiriyyah Semarang, it is known that so far in the application of online learning students tend to be more passive when compared to face-to-face learning. According to these teachers, the activities in the moodle science learning based on the project has been in accordance with the needs of science learning in schools. the content in moodle science learning is complete and can improve critical thinking skills, creative thinking, communication and collaboration. through the use of moodle science learning integration, teachers gain new experiences and can further explore sound wave material and its relation to everyday life that is close to the student's environment. some students are quite active and enthusiastic during the learning process, although they have not been able to foster an active attitude in all students in the class. the theme of city noise also makes students understand more about noise levels and how to deal with them in the environment. the teachers found it helpful and gave a positive response to the use of moodle science learning integration on the theme of city noise. although the implementation in the field there are several obstacles so that it has not been able to increase student activity optimally in the learning process using the moodle science learning.

Based on the results of interviews with teachers at the three schools, there are several things that cause students' inactivity in working on project assignments. First, the limited use of infrastructure such as laptops or smartphones because not all junior high school students have personal laptops or smartphones. This is in line with the statement Purwanto et al. (2020) that the availability of adequate facilities and infrastructure at home is an important key in the smooth process of online learning. And some of them use smartphones together with their parents, so it is not possible to access learning through the smartphone at any time. The second, limited internet quota. This is one of the biggest obstacles for students in online learning (Abidin et al., 2020; Anugrahana, 2020; Saputra & Sujarwanta, 2021) because online learning utilizes an internet connection in its

implementation (Fajriana & Safriana, 2021). The third is that the teacher reveals the limited time, because during the Covid-19 pandemic, besides learning must be done online, the learning time will also be shorter. The duration of teaching time varies from school to school, but from the information provided, all of them reveal that the time allotted is only about 60 minutes per meeting. Fourth, students tend to be passive because students' interest and motivation to learn is getting lower during the online learning process. according to the teacher's statement, the students in each school were getting bored with online learning. considering that online learning has been going on for quite a while starting in early 2020 so it has been going on for more than 1 year. students feel bored because they cannot meet face to face in the learning process so they cannot interact directly with the teacher and their friends (Purwanto et al., 2020). Continuous online learning forces students to always use laptops or smartphones for learning. Mustakim (2020) stated that this had an impact on students' physical and psychological complaints.

And the fifth, is the lack of parental supervision. This happens because most of the parents of students in the city of Semarang are workers, and school hours coincide with the working hours of the guardians of the students so that the supervision process cannot be carried out optimally. This is in accordance with the statement Anugrahana (2020) that the lack of parental supervision and assistance due to work makes students late or even not submitting assignments. The role of parents is very important in the implementation of online learning so that learning can run optimally even though it is carried out by students at their respective homes (Putro et al., 2020; Saputra & Sujarwanta, 2021). Teachers cannot provide direct supervision of project work carried out by students at home, that's why good cooperation between teachers and parents is needed so that parents can help guide students in online learning (Mokodompit, 2020).

Conclusion

Based on the results of the study, it can be concluded that (1) the use of project-based Moodle science learning integration on the city noise theme is in accordance with the needs of science learning in schools; (2) the use of project-based Moodle science learning integration on the theme of city noise has not been able to increase student activity optimally in the science learning process; (3) constraints in using project-based Moodle science learning integration on the online city noise theme, namely limited infrastructure, internet quota, learning time, low student interest and motivation, and lack of parental supervision in the implementation process.

Suggestions that can be given in future research are (1) improve communication with students and parents during project-based online learning; (2) provide motivation so that students' interest in learning increases so that students are willing to follow all instructions given by the teacher during the online learning process; (3) improve parental supervision and guidance in implementing project-based online learning.

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