Communication and Collaboration Ability Through STEAM Learning Based Project Based Learning (PjBL) Grade V Elementary School

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Abstract: The aim of this research is to find out if there is an increase in communication and collaboration skills in learning using the STEAM approach based on Project Based Learning (PjBL) for fifth grade elementary school students. The method used is field research with a qualitative approach. The results of the study show that learning using the STEM-based project-based learning approach can improve students' soft skills, especially in the communication and collaboration skills of fifth grade elementary school students. STEAM is a new knowledge that is rarely used by teachers in learning. PjBL-based STEAM can develop students' communication and collaboration skills to adapt to 21st Century developments. MIM Patikraja, Patikraja District, Banyumas Regency is one of the madrasas that implements PjBL-based STEAM learning in teaching and learning activities that have a positive impact. Among them, in addition to learning to be creative and fun, MIM Patikraja students and teachers often make achievements in various fields of competition. Because students and teachers are used to establishing good communication and collaboration. In addition, STEAM teaches students and teachers to be literate in technology so as to facilitate the learning process.

Keywords: Colaboration ability; Communication ability; PjBL; STEAM

Introduction

The emphasis of 21st century learning is on students' capacity to formulate problems, locate solutions from many sources, think analytically, interact, and collaborate in order to find solutions. A 21st century competence is the ability to cooperate and communicate (Kemendikbud, 2018). According to Zannah et al. (2022), the skills advised for students to master in the 21st century include both soft skills and hard talents. Creativity and invention, critical thinking and problem solving, communication, and cooperation are all considered to be part of the soft talents. A person who is communication competent may be trusted to understand various verbal and non-verbal communication processes in diverse contexts in terms of knowledge, attitudes, and abilities. The practice of applying these skills must start from the classroom, in which there is teacher-student interaction, and between students. According to Martha et al. (2022), learning activities are a strategic tool to improve students' communication and collaboration skills. Group learning trains students to collaborate and work together.

Collaboration creates togetherness, a sense of belonging, responsibility and concern among members.

The Corona Virus Disease 2019 (Covid-19) pandemic, however, has actually had a remarkable influence on many sectors, including education (Monika, 2022). Students are accustomed to taking part in teaching and learning activities online, claim (Melinda et al., 2020). Most students are engrossed with cell phones, if they get an assignment, they just have to search on Google, which makes students lazy to study, addicted to gadgets, and even become individualists. After the arrival of the new normal era, students have returned to study together at school, forcing them to socialize and it turns out that students find it difficult to communicate and even collaborate with their colleagues. The next challenge is how strong communication and collaboration patterns can be built to create effective learning (Setyaningsih, 2020). One of the learning patterns that can be used is the application of PjBL (Project Based Learning) based STEAM learning. Annisa (2018) stated that the application of the PjBL STEAM model can improve student communication. This is in line with the expression of Susanti (2014) that the PjBL-

type STEAM approach can improve students' collaboration, communication, and critical thinking.

The STEAM approach, which integrates art into learning, is a multidisciplinary approach that evolves from the STEM approach (Mu'minah et al., 2020). Aspects of art (art) can help children and teachers develop cognitive abilities like listening, problem-solving, matching form and function, and decision-making through various kinds of expression, communication, creativity, imagination, and observation (Taylor, 2016). In the implementation of making projects, the artistic aspect is needed to create better products (Amiruddin et al., 2022). Learning with the STEAM approach involves students actively, involves practical activities, and is directed to real situations (Jung et al., 2022). Also through STEAM, teaching can also be delivered in an interesting and fun way, making it more meaningful for students (Jeong et al., 2019). The STEAM approach can hone and develop students' skills to provide ideas and ideas to become more creative (Rahmawati et al., 2019). In addition, STEAM learning can direct students to develop critical thinking skills, problem solving skills and collaboration (Mufida et al., 2020).

As for Project Based Learning (PjBL) is an innovative learning model using projects/activities as learning media, so that it can involve students actively in the learning process and problem solving activities, and students can work in groups and produce a valuable product (Melinda et al., 2020). Wicaksana et al. (2022) explains that the application of a project-based learning model can integrate academic content with everyday life conditions, Project Based Learning (PjBL)-based learning can increase student enthusiasm so that they can play a role in the learning process. In line with Fahrezi et al. (2020) the PjBL learning model is a learning model that applies problems as the first step in acquiring new knowledge based on the experience of concrete life activities. PjBL focuses on a relatively long learning system, focuses on problems and combines concepts from several components, both in terms of knowledge and disciplines (Pratiwi et al., 2018).

Based on observations made by researchers on November 19, 2022 at MIM Patikraja, Patikraja District, Banyumas Regency, implementing learning that is oriented towards PjBL-based STEAM learning. Learning at MIM Patikraja is not normative but related to the surrounding environment. Herawati (2022) statement as the head of MIM Patikraja explained that the application of a learning model that is in accordance with the times has made the number of students at MIM Patikraja increase every year. In 2016 the number of students was 160 students with 10 teaching staff, until 2022 there will be 280 students with 31 teaching staff. Students come from and outside the Patikraja District. The statement of Ridwan et al. (2021), as a class V teacher of MIM Patikraja, Patikraja District, in special thematic teaching and learning has used PjBL-based STEAM learning even though its implementation has not yet reached an optimal point. Teachers are required to familiarize communicative and collaborative students with packaging material through fun and environmentally friendly activities.

Fatmah (2021) statement as vice president of student affairs stated that the use of technology was also being carried out intensively, each class was equipped with air conditioning, projector TV and LCD, even staff and guest attendance had used barcodes. Students and students are accustomed to using technology so they are not clueless. Learning is carried out bilingually which requires students to learn to communicate using Indonesian and English. In addition, the implementation of STEAM through PjBL requires students to collaborate in completing various tasks that make them independent and agile individuals, not dependent on the teacher. That way not only the hard skills but also the soft skills of students are always being honed. No wonder the achievements were achieved by the staff and students in various competitions. Based on the description above, in preparing this paper the researcher is interested in raising the title "Communication and Collaboration Skills through STEAM Learning Based on Project Based Learning (PjBL) Thematic Class V" with various considerations including the MIM teacher Patikraja has implemented PjBL-based STREAM learning so that every year the number students are always increasing and the average graduate from MI is able to compete and excel at the next level of education.

Research by Wulandari et al. (2022) demonstrates how the PjBL model can be implemented with a STREAM-based approach to improve student learning outcomes up to 92.1 (very good), and how their engagement in learning activities fosters greater creativity in the design of appealing products. In this study, students created four original products: a water cycle, a test of the water's quality, and stories based on picture books. The results of this study offer primary school teachers a fantastic opportunity to implement the PjBL paradigm using a STEAM-based methodology. Research by Septian (2021) the findings indicated that both teachers and students were more active during the research. This is consistent with the rise in the average value of critical thinking abilities following the adoption of project-based learning. Consequently, it can be stated that using the project-based learning approach can help primary school kids' critical thinking abilities. Research by Herawati (2022) states that the STEAM method is very useful for early childhood because it can generate natural imaginations from the direct observation process and increase children's knowledge and will be more creative. Educators as facilitators to develop and apply the STEAM method and explore curiosity also do habituation to train their independence.

Research by Fatmah (2021) the outcomes and inventiveness of students' learning in class 11 using the STEAM-based Project Based Learning (PJBL) learning approach. These are the findings from this study for each creative indicator: Fluency 91.6%, originality 97.2%,

flexibility 94.4%, and originality 100%. The fluency indication had the lowest improvement, 91.6, while the elaborate indicator saw the largest gain, 100%, for a total of 95.8%, which is considered to be very good. 85 as a class value. The average value of 85 is the average value above the best practice (75) minimum completeness criterion (KKM). Research by Rifka Annisa, et al (2018) The correlation between pretest and posttest values was 0.263 > 0.05, indicating that there was no correlation between the two sets of scores. There is a significant difference in students' capacities for creative thought in the pretest and posttest data, as indicated by the 2-tailed significance value of 0.000 0.05. Based on the study's findings, it can be said that SMAN 11 Kota Jambi students' creative thinking skills differ significantly when they use the project-based learning model for acids and bases.

Research by Sigit (2022) in a Jakarta high school (SMA), 72 students in grade 10 participated in this study. The research's tools comprised pretest and posttests on ecological concept mastery. Data were analyzed using independent sample t-test. The results showed that the PjBL STEAM learning model improved students' mastery of ecological concepts. Based on the description above, learning using PjBL-based STEAM generally improves students' abilities. On the other hand, no one has researched the ability to communicate and collaborate through PjBL-based STEAM learning. The average subject studied was MTK subjects for high school students, while this study focused on thematic subjects for MI students so that this research had a novelty.

Method

This study uses a qualitative approach with a field research research method according to Fadli (2021). Detail-oriented interviews, observation, and documentation are employed as data collection methods. Teachers and students served as the study's informants. The Miles and Huberman model is utilized in the data analysis technique, namely reduction of the collected data to focus on research problems, then presenting the data so that it is easy to understand, and then drawing conclusions and verifying the data (Sugiyono, 2019). Test the credibility of the data using the check technique, namely digging up the same information with different data collection techniques (Victoria et al., 2021).

Result and Discussion

In the context of STEAM-based project-based learning in fifth grade at MIM Patikraja in Patikraja District, Banyumas Regency, this study focuses on analyzing students' communication and teamwork skills. The PjBL learning model was utilized by MIM Patikraja, particularly class V, in teaching and learning activities, according to the findings of the researchers'

learning observations. This is done so that students are able to communicate and collaborate with other students. Communication skills are closely related to collaboration skills. This is because communication and collaboration skills have in common that requires more than one party in the process. Collaboration is a type of social interaction in which individuals work together to accomplish shared objectives by supporting one another and understanding one another's flaws and abilities. In line with this, Win (2022) describes that with communication students can convey their understanding to be implemented, whereas through collaboration the completion of the implementation of tasks in groups is expected to achieve the goals that have been determined.

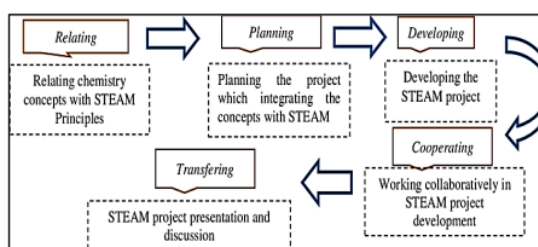Project Based Learning in STEAM Project by Rahmawati et al. (2019):

Figure 1. Project based learning in STEAM project

In addition, in learning MIM Patikraja students utilize the available technology, considering that the learning they apply uses the STEAM approach. Not infrequently the projects they work on are presented using power point/canva. Canva makes it very easy for teachers to design learning media, as Kurniasari et al. (2022) said that Canva makes it easier for teachers and students to carry out learning processes based on technology, skills, creativity, along with other benefits. This is because the design results using Canva are able to increase student interest in learning activities and increase student motivation by presenting teaching materials and material in an interesting way (Wulandari et al., 2022). To minimize the use of evaluation paper, the quizziz application is carried out with interesting animations. Student work is also published through Instagram and YouTube accounts. Attendance lists and other administrative needs also use barcodes.

The following is an example of the implementation of PjBL-based STEAM learning communication and collaboration implemented in class V MIM Patikraja. Thematic, Theme 5 Ecosystems, Sub-theme 2 Relationships between Living Things and Ecosystems, Learning 1 Food Chain with pattern: 1) PjBL-based STEAM learning planning; 2) Implementation of PjBL-based STEAM learning; 3) PjBL-based STEAM learning evaluation.
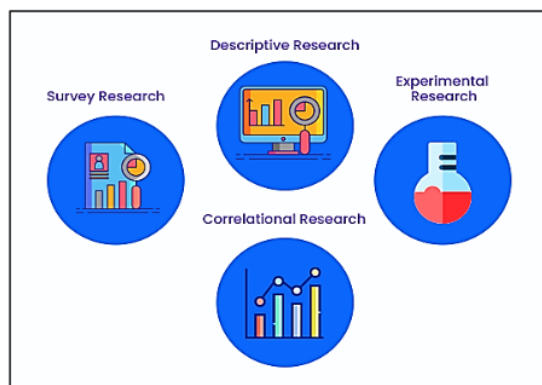
Figure 2. Research design

Planning

At the planning stage the teacher determines the expected material outcomes through learning activities on theme 5, sub-theme 1, learning 1 KD 3.5 analyzes the connection between the elements of an ecosystem and the local food webs. Work is done on the idea of food webs in an ecosystem in KD 4.5. Achievements to be achieved: 1) through reading and watching animated videos students can understand the food chain; 2) through outing classes and discussions students can develop communication skills; 3) through group evaluation with presentations and making works can develop collaboration skills; 4) through individual evaluation using digital applications can develop students' mastery of technology.

Implementation
a) Preparation

The teacher greets students and conditions the class to be ready for learning. One of the students led the prayer. Then the teacher checks attendance. After that the teacher explains the activities to be carried out and the learning objectives. Students are invited to exercise "Food chain" by viewing shows that have been prepared using a projector with the aim of motivating learning to run with enthusiasm and fun.

b) Watch animated videos

Students watch an animated video about the order of a food chain. With colorful cartoon animations it makes students feel happy because it's not boring. The video is played using a projector and the help of a sound system which was prepared jointly by the teacher and students, totaling 30 people. This is done so that students are not clueless (according to STEAM's goals). From listening to the animated video followed by the material by the teacher, students can hone their communication skills through question and answer.

c) Outing class

To better understand the material presented, the teacher invites students to go to the farmer's fields which

are not far from the school. Students bring stationery to draw food chains in the fields and record various important information obtained. Arriving at the fields, students interact with nature and interview farmers related to the food chain in the fields. These activities can train students' communication skills. This activity is also in accordance with STEAM's goals because students learn to understand a theory related to knowledge and the environment.

d) Discussion and making work in groups

After the information provided is considered sufficient, teachers and students return to school. In class, the teacher gave the task of designing a work on the order of the food chain that had been observed, drawn and sequenced using the Canva application. Previously, students had brought 1 laptop for each group. This activity kills students' collaboration skills. Where they work together to solve a problem together.

Evaluation
a) Group evaluation

Done by presenting the work of each group that has been made. Using Canva is about the order of the food chain in the rice fields. Followed by a question and answer process. This activity can develop students' communication and collaboration skills.

b) Individual evaluation

The teacher makes evaluation questions related to the food chain using the quizziz application which students can access via cellphones. Individual evaluation is done by students at home. In addition to saving on the use of paper, this activity can develop STEAM through the use of technology which is carried out in collaboration between teachers and students. The teacher can make questions with applications that are not boring, the rest can operate where student answers will be recorded and the teacher doesn't need to be tired of correcting because right and wrong answers will appear automatically.

Conclusion

STEAM is a new knowledge that is rarely used by teachers in learning. PjBL-based STEAM can develop students' communication and collaboration skills to adapt to 21st Century developments. MIM Patikraja, Patikraja District, Banyumas Regency is one of the madrasas that implements PjBL-based STEAM learning in teaching and learning activities that have a positive impact. Among them, in addition to learning to be creative and fun, MIM Patikraja students and teachers often make achievements in various fields of competition. Because students and teachers are used to establishing good communication and collaboration[8]. In addition, STEAM teaches students and teachers to be literate in technology so as to facilitate the learning process. PjBL-based STEAM at MIM Patikraja is

implemented through several learning stages including: 1) planning; 2) implementation; 3) evaluation.

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