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**Submission date:** 13-Feb-2024 02:02PM (UTC+0530)

**Submission ID:** 2293703615

**File name:** 6637-17583-1-SM.pdf (410.33K)

**Word count:** 5693

**Character count:** 32890

## EMPOWERING JUNIOR HIGH SCHOOL STUDENTS' EMPATHY AND COLLABORATION WITH DESIGN THINKING AND PJBL

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Submitted 2023-10-18	Accepted 2023-12-31	Published 2024-01-02	OPEN ACCESS		 
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### 8 Abstract

*This research seeks to guide the empathy of junior high school students through combining design thinking with PjBL (Project Based Learning) as many as 83 students, and two science teachers participated in this research. Data collection was carried out through interviews, observation notes, reflection notes, and student assessment rubrics to collect qualitative data. Aspects of student empathy and collaboration are built into the learning of digestive system material. Empathy as an initiator in project-based learning includes aspects of self-integrity and empathy for others which are closely related to elements of collaboration including aspects of cooperation, ways of communicating, positive dependence and social coordination. Design thinking as a process thinking framework includes the empathization stage, problem formulation, constructing ideas, constructing prototypes, and tests as student learning stages. Contextual learning with design thinking and PjBL is expected to be an integrated model to achieve aspects of the Pancasila student profile and 21st century skills.*

**Keywords:** design thinking; empathy; collaboration; PjBL.

### Abstrak

Penelitian ini berupaya untuk membimbing empati siswa SMP melalui perpaduan design thinking dengan PjBL (Project Based Learning) sebanyak 83 siswa, dan dua orang guru IPA ikut serta dalam penelitian ini. Pengumpulan data dilakukan melalui wawancara, catatan observasi, catatan refleksi, dan rubrik penilaian siswa untuk mengumpulkan data kualitatif. Aspek empati dan kolaborasi siswa dibangun dalam pembelajaran materi sistem pencernaan. Empati sebagai inisiator dalam pembelajaran berbasis proyek mencakup aspek integritas diri dan empati terhadap orang lain yang erat kaitannya dengan unsur kolaborasi meliputi aspek kerjasama, cara berkomunikasi, ketergantungan positif dan koordinasi sosial. Design Thinking sebagai kerangka berpikir proses meliputi tahap empati, perumusan masalah, mengkonstruksi ide, mengkonstruksi prototipe, dan tes sebagai tahapan belajar siswa. Pembelajaran kontekstual dengan design thought dan PjBL diharapkan dapat menjadi model terpadu untuk mencapai aspek profil siswa Pancasila dan keterampilan abad 21.

**Kata Kunci:** design thinking; empati; kolaborasi; PjBL.



## INTRODUCTION

The 21st century skills as an outcome of learning are highly expected and emphasized in the core content of each student's learning skills. This skill includes 4C and 6C consisting of 4C namely critical thinking, creativity, collaboration, communication and the next two aspects Citizenship and Character (Zubaidah, 2020). This also intersects with the outcomes expected by the Government of Indonesia in the formulation of Learning Outcomes and Dimensions of the Pancasila Student Profile (Kemendikbudristek, 2022). Pancasila Student's Profiles include independence, mutual cooperation, critical reasoning, creativity, and global diversity. Empathy is also important in preparing students to face the challenges of the 21st century. According to (Zeyer & Dillon, 2019) empathy as a part can be interpreted as a multi-aspect construct that has implications for social behavior.

Empathy skills need to be developed in learning, but currently there are still few studies on empathy-based learning. Empathy is the basis for strengthening students' cognitive and affective aspects. Previous research provides strengthening of character education through provision of puberty and reproductive knowledge for junior high school students (Cohen and Wheelwright, 2004 in Zeyer & Dillon, 2019; Istikomayanti & Trianawati, 2020; Trianawati et al., 2020). For example, several strategies for training students' empathy are carried out through training in the fields of psychology and counseling as well as introducing teenagers' identity (Primasari et al., 2021; Lilis Suryani, Syahniar, 2013; Trianawati et al., 2020).

Empathy as an interaction between cognitive and affective aspects that arise through interaction with other people includes skills in communication empathy, building relationships, and decision making (Walther et al., 2019). The skill aspect of reflecting and orienting oneself in situations is the second stage in empathy and the third stage is one's skills in placing oneself, caring and acting (Walther et al., 2019). The interpretation of empathy can also be described as aspects of empathy in thinking, empathy in feelings, and empathy in actions (Walther et al., 2019). The collaboration aspect is an outcome dimension of empathy (Zeyer & Dillon, 2019; Sunassee et al., 2021). Indicators for collaboration aspects include aspects of

contribution, problem solving, teamwork, and investigative skills (Alimah & Utami, 2019; Muhfahroyin & Oka, 2017; Thompson, 2011).

One of the learning strategies that generate empathy and collaboration is through Design thinking and project learning (Ananda et al., 2023; Sunassee et al., 2021) inviting students to care about the environment and addressing several global issues (Hidayati, 2012). Several learning strategies are applied to students (Anazifa & Djukri, 2017; Duong et al., 2022; Novitri Antik, 2017; Yustina et al., 2020) and students to develop empathy and collaboration including project-based learning (PjBL) which prioritizes hearts-on and hand skills (Istikomayanti dkk., 2016; Sunassee et al., 2021; Walther et al., 2019; Zeyer & Dillon, 2019) through problem based learning (Alimah & Utami, 2019; Mccurdy et al., 2020; Pritasari & Jumadi, 2018; Rahmawati et al., 2023; Rosadi et al., 2018) and some have developed design thinking (Ananda et al., 2023; Rahmawati et al., 2023). In this research, we try to adapt a combination of design thinking with PjBL.

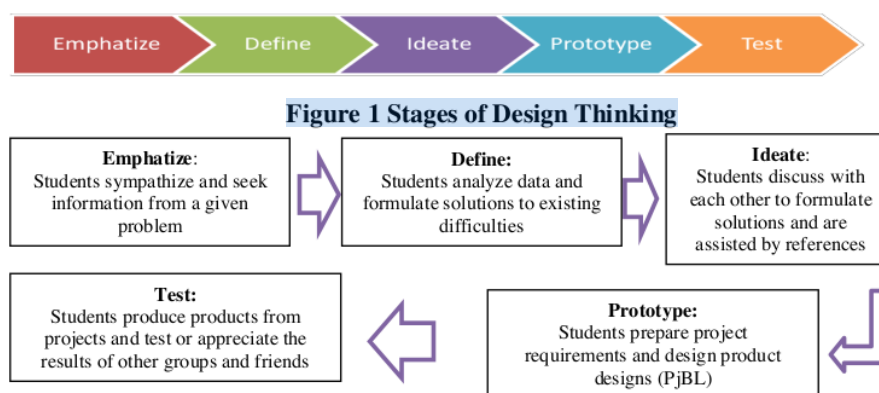
Learning design thinking combined with PjBL for Junior High School (SMP) students is a solution to the problems they face. The results of interviews and observations in May-June 2023 at SMPN 16 Malang and MTs Muhammadiyah 1 Malang obtained information about the need to develop student collaboration which still experienced many obstacles. Some facts include students tend to choose friends in groups, groups cannot run well in working on projects, creativity in project work is not optimal. Thus, learning efforts through design thinking-PjBL are needed on research subjects.

The learning chosen is material on the digestive system and alternative energy for class VIII junior high school students. This topic can be linked to several current issues that are quite important for teenagers in Indonesia from the news and even abroad about the challenge of eating spicy food. Several issues such as adolescent obesity, dietary factors, and adolescent diet need attention (Colmenarejo, 2020). Digestive system material is very contextual material that can be related to culture and diversity of regional and special foods, diversity of food sources, knowledge of disorders and diseases of the digestive system, as well



as increasing students' religious character in eating habits and being grateful and even sharing sustenance.

Learning that has developed empathy, for example in counseling education for high school students (Primasari et al., 2021), in strengthening environmental education (Sunassee et al., 2021) and in engineering education (Zeyer & Dillon, 2019) which has succeeded in developing creativity and problem-solving skills problem. Design thinking which aims to develop empathy is obtained through the empathize stage. The stages of design thinking are empathize, define, ideate, prototype, and test as shown in Figure 1. Design thinking combined with PjBL as in research (Ananda et al., 2023) succeeded in developing critical thinking skills. In this study Design thinking was combined with PjBL with stages as shown in Figure 2.



**Figure 2 Five stages of Design Thinking integrated with PjBL**

Ananda et al., (2023)

The empathy stage is the stage in which a designer obtains the basic reasons for the ideas that will be presented. Ideas can emerge from a designer's sensitivity and concern for the problems he observes and feels. The empathize stage involves a person to plunge into a real situation, explore and observe deeply and connect with his personal experience. Apart from direct experience and interviews, it can also be done by displaying provocative images. Research with photovoice media, namely provocative images as one piece of evidence that can generate someone's empathy so as to generate ideas or opinions (Primasari et al., 2021). The second

stage, namely define, is the formulation of the main problem or the cause of the phenomena faced by students. At this stage related to students' prior knowledge or previous knowledge. Project learning is strongly recommended that students have a prior understanding of the topics raised (Nilsson, 2008; Suryawati et al., 2020).. Defining stages can also be done with problem-based learning (Hizqiyah et al., 2023; Mccurdy et al., 2020).

The third stage is preparing ideas (ideate). This stage is a process of finding ideas that can emerge from the investigation and discussion process. Collaboration between group members plays a role at this stage. Interaction between members and between groups can occur in the formation of ideas. If there are obstacles to differences of opinion that do not meet a common idea. This is the key in drafting ideas, namely understanding other people's perspectives and accepting perspectives, as well as negotiating one's own ideas in group ideas.

The fourth stage is preparing a prototype as a solution and project action. Preparing product designs does not have to be successful and perfect. This process requires teamwork to fill each other's gaps and support ideas that may be different from their personal ideas. The fifth stage is testing as the final stage of design thinking by testing the product. Design thinking-PjBl is used to increase the meaningfulness of student group projects. Looking at the achievements of the **Pancasila Student Profile** with its **six** elements, **it** is hoped that this blended learning model can be fulfilled. With this research the aim is to develop empathy and collaboration for junior high school students through Design thinking-PjBL.

## METHOD

This research develops students' empathy and collaboration skills through the integration of design thinking-PjBL. Using qualitative research methods and exploring observational data of the learning process in class includes photo documentation data, video recordings, text, and personal information. This research was conducted at SMP Negeri 16 Malang and MTs 1 Muhammadiyah 1 Malang from June to August 2023 on two classes of students from each school. This research design uses a lesson studies approach (Lewis, 2012) to gain in-depth





understanding of the student learning process through observations by observers. The research stages consist of research planning, implementation, and reflection. The following is a scheme of research stages and research instruments in Table 1.

**Table 1 Research Stages and Research Instruments**

Research stages	Description	Research instrument
Planning Stages	Preparation of research plans and student learning in class Prepare lesson designs, assessment rubrics, and student worksheets	- Lesson design - Collaboration and Empathy Assessment Rubric - Student worksheet
Implementation Stages	Stages of implementing design thinking learning combined with PjBL and learning observations on aspects of student empathy and collaboration	- Observation notes - Learning documentation - Student reflection journal
Reflection Stages	Stages of learning discovery through reflection forums to analyze qualitative data	- Reflection notes

#### Data Collection Techniques and Procedures, and Analysis

Data collection is carried out through observation, notes and documentation. For data on student empathy and collaboration, an assessment rubric was used as a guide for observers with a Likert scale and descriptive notes. The observer observes learning from beginning to end, then gives a score for each student on aspects of empathy including communication empathy, building relationships, and decision making. As well as giving scores on aspects of collaboration including contribution, problem solving, teamwork and investigative skills (Muhfahroyin & Oka, 2017). This qualitative research uses data reduction, data display, and verification stages as data triangulation stages (Sugiyono, 2016). Data validity is a form of testing the validity and correctness of data through participation in the

research process, continuous observation, and progressive subjective member examination. Data triangulation was carried out by participating in learning observations to assess the collaboration process which began with the emergence of empathy in students. Complementary data includes photo documentation, short video documentation of learning, observer notes and reflection stage notes to complement research data (Lewis, 2012; Muhfahroyin & Oka, 2017; Saito, 2022).

## RESULT AND DISCUSSION

### Summary of Research Implementation

The research was carried out in the stages of planning, implementation, observation and reflection. The research stages are in accordance with the lesson study model, namely consisting of a planning stage containing an initial analysis of research needs in accordance with class needs and curriculum aspects as well as specific research objectives. The planning stage also determines essential and non-essential material so that it is easier to map out the essential material to be taught. Next, prepare a learning step strategy in accordance with the chosen learning model, namely design thinking combined with PjBL. Data on aspects of student empathy and collaboration were obtained from observations using assessment rubrics and observation notes to support the collaborative activity process. Observational data were collected and consolidated in a reflection meeting to verify the facts and interpret the learning findings.

### Achievement of Empathy Aspect

The empathization stage as the initial stage in the design thinking learning strategy was raised as an effort to generate relationships between material concepts and student experiences (Ananda et al., 2023; Lynch et al., 2021; Zeyer & Dillon, 2019). The empathization stage is also the stage for forming relationships between students in the group by seeking to find out the experiences of other people on a given problem. Selection of videos of artists who face the challenge of eating spicy foods as a photovoice strategy (Primasari et al., 2021). The photovoice strategy is stated to be able to generate feelings of empathy for students. The images or videos chosen correspond to the habits of students, most of whom have eaten spicy or

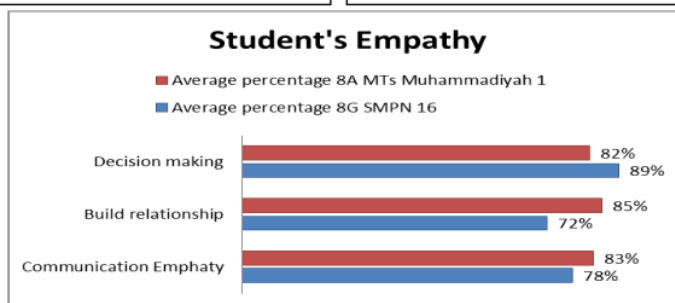




spicy foods. This empathization stage succeeded in bringing out empathy and was continued by giving students the opportunity to explore similar experiences or other experiences related to digestive system disorders. The results obtained are as shown in the graph of Figure 1. In the communication aspect of empathy, the two schools achieved an average score in the good category ( $> 78\%$ ). The communication aspect of empathy is a fundamental aspect of sympathy skills.

Observation notes are stated as follows:

<p><b>Class 8G</b></p> <p><i>When students saw the video that was shown, they immediately responded by feeling sorry and telling each other about spicy food with their close friends. There were also students who talked about their experiences of suffering from typhus which they suffered some time ago. His close friend also just found out that his friend had experienced that. Finally, a discussion process occurs in which students indirectly explore information and analyze information. (Observation, July 1, 2023).</i></p>	<p><b>Class 8A</b></p> <p><i>Students respond to each other if they eat something that is too spicy to the point that it harms the body and can cause diarrhea. Some students also said they had experienced other digestive disorders, such as constipation, and were also stressed so they had no appetite. His group friends ended up fluently asking each other about their experiences and collaborating to dig up information. (Observation, 14 August 2023).</i></p>
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**Figure 3 Achievements of Student Empathy Aspects**



**Figure 4 Students Learning Process: Emphasize, Collaborative, Product Representation**

The problem determination stage is a continuation to study the concept of the digestive system by connecting the problem selected by the group for further investigation. The empathy stage has led to communication between friends so that indirectly a new relationship is formed with the experience of having experienced digestive pain. The two schools have slight differences, namely good (72%) and very good (85%) categories. This difference does not have much effect on other aspects because each group condition cannot be predicted by looking at only one aspect. Relationships within the group are more likely to be influenced by differences in previous friendships and gender in the group based on observational records.

**Class 8G (Observer note, July 1, 2023)**  
*BY student: yes, I have experienced typhus. At that time I didn't know, maybe it was because I ate the wrong food or ate something spicy.*  
*KL student: wow, you like eating spicy food, don't you? What does typhus feel like?*  
*Student BY: yes, it really hurts in this part of the stomach. Then I was taken to the hospital, the doctor said I was asked to rest and drink water too.*  
*Student KL: so what now, do you ever get sick again? OK, let's just choose thypus, friends. This is someone who has been sick.*

**Class 8G (observer notes, 1 July 2023)**  
*(Group 2 consists of 4 women and 1 man)*  
*Teacher: how... are there any obstacles to choosing a disease?*  
*YU student (female): yes ma'am, this is a toothache and also stomach pain*  
*Student MM (female): yes ma'am, it looks like we should just choose a toothache, okay?*  
*Teacher: Ok, please... this is what male friends are also discussing*  
*RS student (male): yes ma'am, it's okay, I'll continue to follow the discussion (smiling)*

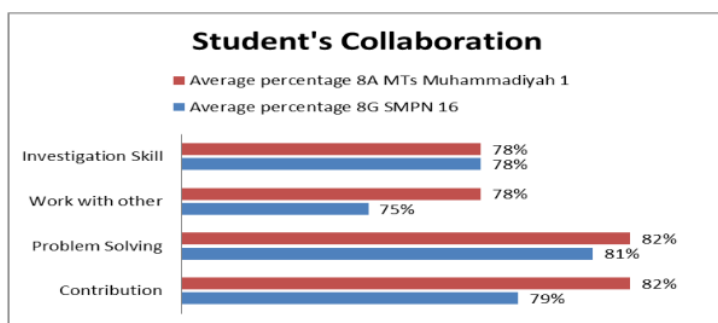
At the stage of determining the most important problem is the skill in group decision making. Some groups moved more quickly to choose the problem to be chosen, while some groups still had long discussions to choose one problem topic. Decision making by a group is not easy to do if the group is not fluent in communicating and empathizing. The constraints faced by the groups varied, but in general the two schools had different characters. Some are quick to make decisions and some need more time to make decisions. However, both schools have very good decision-making skills (>82%). This is estimated by the habit of learning beforehand which is used to giving assignments in groups.

#### Achievements of Collaboration Aspects

The Idea Composing Stage is a continuation or third <sup>5</sup> stage of design thinking, this stage is also the syntax of PjBL. Developing ideas in the form of solutions to student problems is not easily obtained. These two classes from different schools have almost the same characteristics in forming ideas. There are students who



already have one or two ideas, but the idea has not yet matured. Students need help to support the ideas of their group. Some processes for selecting ideas for lower secondary school age levels are at a reasonable level. According to research (Alimah & Utami, 2019) students need help strengthening and directing ideas so that they are more perfect. Several group members move dynamically. Students collaborate sometimes smoothly and sometimes falteringly. This is a dynamic within the group as shown in Figure 5 below.



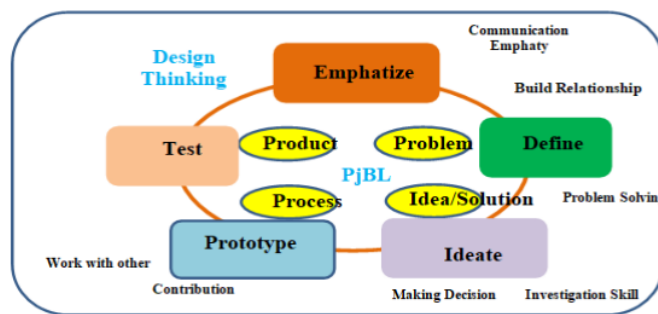
**Figure 5 Achievements of Student Collaboration Aspects**

The contribution aspect is a fundamental aspect of the collaboration process. The emergence of empathy, especially in communication, can trigger contributions from each group member. However, if communication empathy does not occur at the start, it is predicted that there will be more group obstacles to successful collaboration. According to (Saat et al., 2021) good communication will form collaboration between group members. One of the students volunteers to become a coordinator or chairman. Naturally he usually starts with the question " ..this I wonder how..?" or " come on... how about this? " the emergence of this sentence is an initiation of group work. Empathy is built from one person to involve other friends in solving problems. However, there is also a collaboration process that is not perfect, usually starting with one person who is silent, working alone or several people who talk more with certain people.

The next aspect of collaboration, namely investigative skills, also appears in the idea selection process. Group investigations have occurred during ideation discussions. This stage also plays an important role in continuing with the product

preparation stage. The aspect of working in groups is also an important aspect of collaboration. Students who are empathetic will contribute more and work in groups. Group characteristics and dynamics are very diverse. The overall findings of this research are summarized in a scheme as shown in the figure 6. Teachers play a very important role in supporting the learning process. The teacher acts as a stimulator and controller. The teacher will stimulate if there are obstacles encountered, and the teacher will control if the direction of the discussion is not yet focused on studying the material, but also play a role in providing the required information sources, emphasizing the use of gadgets in class is also a concern that needs to be taken.

The work presentation stage is a process that students look forward to. This stage is also dynamic in some groups. Several groups that did not collaborate smoothly at the beginning, also seemed to experience a few problems up to the product presentation stage. The incomplete collaboration process also causes dissatisfaction with the work produced. So that some students tend to only complete the presentation task. However, some groups may even surpass their learning achievements. The study of the digestive system is carried out by investigating the processes that occur when there is a disturbance. Several obstacles are also faced in the learning process. Students do not smoothly learn and discover concepts. However, disfluency or ease in learning will provide valuable experience for students.



**Figure 6 Scheme of Strengthening Aspects of Student Empathy and Collaboration Through Design Thinking-PjBL (Researcher Data)**



### **Interpretation of Student Relations in Learning and Begin with Emphaty**

Through the investigation process, results were obtained, namely the process of constructing concepts built by students both individually and in groups. Students are not asked to study the concepts of the flow of the digestive system in detail, but students are presented with information and asked to relate one piece of information to other sources so they can be more creative. The collaboration process occurs with the learning stages in groups. However, not all groups can run well, this is also a common finding in classroom learning and as a dynamic of learning. Several analyzes of students' relationships with the learning process have been carried out, one of which is by (Walther et al., 2019). Walther et al (2019) states that there is a relationship between student relations in learning which is expressed in four aspects, namely student relations with himself, student relations with other students, student relations with content or material and student relations with the learning process. This is also in line with research (Saat et al., 2021) that student relationships can also be strengthened by the relationship between teachers and students.

The empathy that students already have and is strengthened by learning design thinking, namely the empathy stage, has given students the opportunity to learn to sympathize with their close friends. Having problems that are closely related to students has an influence on students' closeness to the material. This learning model is a new learning strategy and provides new learning experiences for students. The aspects of empathy and collaboration are mutually reinforcing and good collaboration begins with empathy in the group. Several studies also state the same thing, for example by providing problems closest to students and by generating empathy for environmental problems, providing good environmental awareness project results. Several studies with the main approach of design thinking also give rise to many ideas regarding surrounding problems such as research (Sunassee et al., 2021). The limitation of this research is that it does not specifically make students think designers. This research is the initial stage for teaching empathy using design thinking stages combined with PjBL. The results of

this research have provided findings that there is a close relationship between empathy in groups and group collaboration processes.

## CONCLUSION

The conclusion of strengthening student character has been obtained by combining design thinking-PjB through the stages of empathic learning, formulating problems, compiling ideas or solutions, building prototypes and testing product results has provided an opportunity to relate digestive system material that is closer to students' thoughts and conditions. Through the collaboration of the research team and teachers with a lesson study approach, benefits were obtained for the professional development of teachers and research findings. The aspect of empathy as a basic strengthening for the collaboration stage is an important thing to consider. As well as collaboration aspects including working with other people, investigative skills, contribution and problem solving skills. Several dynamic learning processes are valuable findings that serve as inspiration for further learning innovations.

## ACKNOWLEDGEMENT

Thank you to the schools at SMPN 16 Malang and MTs Muhammadiyah 1 Malang, science teachers Mrs. Pratika, Mrs. Suryani and Mrs. Novia Tita and Mr. Mashuri who contributed to improving learning, the research team and students. Thank you to the Ministry of Education for funding research on novice lecturer grant Number 0536/E5/PG.02.00/2023.

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