

Developing Cadets' Soft Skills through Project-Based Learning in Moodle LMS

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Abstract : This paper reports on a study conducted to examine the development of cadets' soft skills by implementing project-based learning in Moodle LMS during the COVID-19 pandemic. This study was classroom action research following the Kemmis & McTaggart's model. It was conducted in three cycles, each consisting of plan, action, observation, and reflection. The participants of this study were the cadets from four different study programs at Sekolah Tinggi Maritim Yogyakarta currently enrolled in online classes. The data were collected through observations and focused-group discussions. The results showed that the implementation of project-based learning in Moodle LMS contributed effectively to the development of the cadets' soft skills including responsibility, discipline, creativity, and problem-solving. After implementing the project-based learning for about 16 week-meetings, the researchers recorded the gradual improvement in the soft skills performed by the cadets as follows: 39.42%

(low) in Pre-cycle, 52.71% (average) in Cycle I, 69.91% (high) in Cycle II, and 83.71% (very high) in Cycle III. The aforementioned skills were perceived as key fundamental skills required by the cadets to perform their jobs successfully in the 21st century workplace, particularly in the maritime industry.

Keywords : Soft skill, project-based learning, Moodle LMS

1. Introduction

The World Health Organization (WHO) declared the novel coronavirus (COVID-19) outbreak a global pandemic on March 11, 2020. According to the Dictionary of Epidemiology (Porta, 2008), a pandemic is defined as an epidemic occurring worldwide, or over a very wide area, crossing international boundaries and usually affecting a large number of people. As stated by Nariswari (2020), the coronavirus is a large family of viruses that cause diseases ranging from mild to severe symptoms such as Middle East Respiratory Syndrome (MERS) and Severe Acute Respiratory Syndrome (SARS). The COVID-19 pandemic has affected and changed all aspects of life, including education. The physical and mental health of cadets, educators, and all school staff members is the main consideration for implementing the policy of physical distancing to prevent the spread of the coronavirus. In response to the COVID-19 pandemic, the Minister of Education and Culture of

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the Republic of Indonesia issued Circular Number 4 of 2020 related to the policy on conducting distance learning, from elementary school to higher education (The Minister of Education and Culture of the Republic of Indonesia, 2020).

In Indonesia, conducting distance learning during the COVID-19 pandemic requires careful consideration, especially about selecting appropriate learning models in order to achieve meaningful learning without neglecting aspects of character building. As pointed out in a ceremonial speech by the Indonesian Minister of Education and Culture at the National Education Day on May 2, 2020, the COVID-19 pandemic is seen as momentum to collaborate, innovate and experiment in learning. Furthermore, the Minister also suggested implementing the project-based learning model where cadets can collaborate, cooperate, and also develop their empathy.

Project-based learning is one of the popular learning models that make cadets more active and independent in learning. According to Thomas (2000), project-based learning can be used to apply the knowledge already learned to train various thinking skills, attitudes, and also concrete skills. Meanwhile, Blumenfeld et al. (1991) state that project-based learning is a comprehensive approach to classroom teaching and learning designed to engage cadets in the investigation of authentic problems in which technology can be used to support educators and cadets as they work on projects. Woodward, Sendall & Ceccucci (2010) also recommend that the project-based learning model can be used to develop the soft skills and technical abilities of graduates. In complex problems, project-based learning requires learning through investigation, collaboration and experiment in completing a project, as well as integrating various subjects (materials) in learning without ignoring the existing character values (Bell, 2010). Furthermore, a study on implementing project-based learning with video creation conducted by Iryanti & Pratama (2019) confirmed that the students gradually developed digital literacy skills as well as collaboration, communication, creativity, critical thinking (commonly known as 4Cs of 21st century skills).

In this current pandemic, possessing good characters such as adaptability, decision-making, self-control, and self-discipline is necessary to survive and anticipate the spread of the coronavirus. Character

building can begin with honing and developing soft skills at school (Susanti, 2011). Even before the COVID-19 pandemic, bringing soft skills into the classroom is challenging for many educators. Now it becomes much more challenging because the teaching and learning process is shifted to online. Therefore, implementing appropriate learning models is of the utmost importance where cadets can learn and develop soft skills more easily. Inculcating soft skills can start from integrating character values into the syllabus and also lesson plans with adaption to the educator's ability in classroom management (Sunarso & Paryanto, 2014).

A previous study conducted by Pratama & Pardjono (2016) before the COVID-19 pandemic identified a number of characters needed to work in the international shipping industry including responsibility, self-confidence, work ethic/creativity, problem-solving, and cooperation. Those characters can be possibly learned by cadets even during online classes. By developing such soft skills, cadets can prepare themselves to become more employable and highly competitive graduates in the maritime industry.

In online instruction, virtual platforms are needed to run the teaching and learning process effectively. Moodle is the most popular open-source Learning Management System (LMS) used by many educators to develop and deliver online courses. Moodle is an acronym for Modulator Object-Oriented Dynamic Learning Environment where teachers and cadets can carry out learning activities online (Dougiamas & Taylor, 2003). The use of Moodle is very useful especially amid the COVID-19 pandemic to support the continuity of teaching and learning. As stated by Begum (2018), the use of Moodle is very effective in enhancing the cadets' soft skills. Moodle is also a good online teaching tool to build cadets' hard and soft skills (Ivanova, Mertins, Aleksandrova & Baranov, 2017). The existence of Moodle platforms proves that distance does not hinder anything, especially in education (Astriawati & Pratama, 2021). At Sekolah Tinggi Maritim Yogyakarta, a Moodle LMS called Virtual Class is also developed to assist online learning. This platform is used as an alternative for teachers where they can create and deliver online courses to their cadets. Concerning this issue, classroom action research was conducted to investigate how this Moodle LMS contributes to the development of the cadets' soft skills through project-based learning.

2. Literature Review

2.1 Soft skills

Soft skills are generally understood as a group of personality traits, or abilities that a person needs to be able to work effectively and improve themselves. Soft skills are the key to success, including leadership, decision making, conflict resolution, problem solving, creativity, and achievement skills (Da Silva, Carolina & Gritti, 2020). The attributes of soft skills can include values, motivation, behavior, habits, character and attitudes. These skills are basically owned by everyone with different levels, influenced by habits of thinking, saying, acting and behaving. However, the soft skill attributes can change if a person concerned is willing to develop it by getting used to new things. Thus, soft skills can be taught and developed as they are necessary in every workplace for success in a particular task. The study from Harvard University showed that 80% of success in a career is obtained from soft skills while hard skills only contribute 20% (Rao, 2014).

Based on a study conducted in the UK, America and Canada, there are 23 attributes of soft skills that are dominant in the workplace (Aly, 2017). These attributes are sorted by priority needed in the workplace including initiative, ethics/integrity, critical thinking, willingness to learn, commitment, motivation, enthusiasm, reliability, oral problem solving, creative, analytical ability, can cope with stress, self-management, problem solving, can summarize, cooperative, flexible, team work, independent, listening, tough, logical argumentation, and time management.

Soft skills are in fact not a subject matter, but are aspects of life that must be possessed by students which can be obtained from experience. Soft skills which are considered as generic skills are skills that emphasize the production of human resources needed by a particular country (Muslim et al., 2012). Learning soft skills requires long-term learning management in order to reach the stage of success (Heckman and Kautz, 2012). Each learning method is specific to achieve a certain competency and therefore a particular type of soft skills integrated in a course may be not appropriate to be applied in another course. In this case, an educator's creativity in motivating students has a huge amount of influence on the success of skill integration.

There a number of models for integrating soft skills in learning, but basically the integration depends very much on planning, learning strategies, and evaluation methods. The integration model is usually carried out at the planning stage as the main key to the whole integration process. Furthermore, the implementation is also an important part in realizing the integration of soft skills.

2.2 Project-based Learning

Project-based learning is an innovative student-centered learning model where an educator functions as a motivator and facilitator and students are given the opportunity to work autonomously in constructing their learning (Nakada et al., 2018). This model involves the use of a project in the learning process (Gary, 2015). In project-based learning, a project or an activity is used as a learning medium (Scarborough et al., 2004). It also involves giving a task for students to be completed individually or in a group where they are required to observe, read and research (Blumenfeld et al., 1991). Based on those definitions, it can be concluded that project-based learning is focused on students' learning activities where students learn independently to comprehend a concept and principle by conducting in-depth research on a problem and looking for relevant solutions and the result is usually a product.

Some characteristics of project-based learning are developing students' thinking skills, allowing them to have creativity, encouraging them to work cooperatively, and leading them to access the information on their own and to demonstrate this information. It usually requires students to participate willingly in the meaningful learning activities proposed, mostly teamwork (De Graaff & Kolmos, 2003). It is argued that project-based learning where learners perform as decision makers and create frameworks (Kokotsaki, Menzies & Wiggins, 2016) also has the following common characteristics: (1) There is a problem without its predetermined solution; (2) Students perform as process designers to achieve results; (3) Students are responsible for obtaining and managing the collected information; (4) It needs continuous evaluation; (5) Students regularly review what they are doing; (6) The final result is a product and its evaluation; and (7) The class has a positive atmosphere that tolerates mistakes and changes.

2.3 Moodle

Moodle or Modular Object-Oriented Dynamic Learning Environment is an open source e-learning platform. It is basically a software package, sometimes also called Learning Management Systems (LMS) designed to help educators to create online courses. Moodle was first developed by Martin Dougiamas, a computer scientist and educator who deeply believes that a Course Management System (CMS) should be created by an educator and not by an engineer (Chourishi, Chanchal, & Chaurasia & Soni, 2011). The Moodle installation package can be downloaded from the official page at <http://moodle.org>.

It is necessary to install Moodle into the web server for use. This Moodle installation requires a domain and web hosting which can be obtained through a hosting service with the help of IT personnel as administrators who understand web servers and website management capabilities. Furthermore, Moodle need to be adjusted by the administrator by setting the user, role, and course type on the Moodle administration site and also some other adjustments such as installing additional plugins and displaying Moodle. A user in this context is anyone who can use Moodle, while a role is an access right given to a user to use the facilities in Moodle. According to Costa, Alvelos & Teixeira (2012), Moodle by default has seven categories of users and roles including administrator, course creator, teacher, non-editing teacher, student, guest, authenticated guest

Each category of users has different access rights in which the administrator can manage Moodle completely such as managing accounts and user identities and also providing courses. Teachers and course creators can manage learning activities on available courses and manage who can participate. Meanwhile, students, non-editing teachers, guests, and authenticated users can access the courses provided. All users can access Moodle facilities based on their category by logging in through an account managed by the administrator. Basically, Moodle provides a number of features to present learning activities such as managing membership administration, presenting material, quizzes, exercises, and assessments. The features available in Moodle support online learning activities as a whole (Cole & Foster, 2008).

3. Research Method

This study was classroom action research. Classroom Action Research (CAR) is defined as a method for investigating what works best in the classroom so that educators can improve their teaching and learning practices (Herbert, Stephen & Robin, 2002). This study aimed to identify and solve problems in the classroom by utilizing online interactions. It involved participation and collaboration among the researchers, the subject lecturers, and also the cadets currently enrolled in courses in Moodle LMS from four different study programs including Bachelor Program in Transportation, Diploma Program in Maritime Transport Management, Diploma Program in Marine Engineering, and Diploma Program in Nautical Science. As many as 80 cadets out of a population of 800 cadets were randomly selected as the research sample.

This study was conducted during the odd semester of the academic year of 2020/2021 with the focus of implementing project-based learning in four different courses taught in Moodle LMS. It followed Kemmis & McTaggart's model (Altrichter, Kemmis, McTaggart, & Zuber-Skerritt, 2002). It was conducted in three cycles, each consisting of plan, action, observation, and reflection with practical

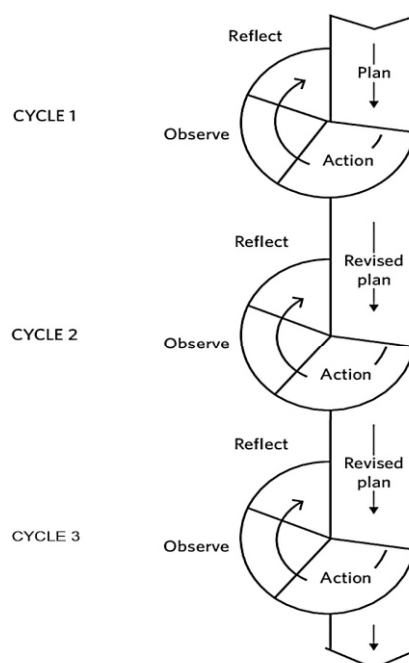


Fig. 1: Action Research Cycle (Source: Altrichter, Kemmis, McTaggart, & Zuber-Skerritt, 2002)

considerations towards any improvement achieved. The action research cycle can be seen in Figure 1.

In Kemmis & McTaggart's model, the plan, action, observation, and reflection are conducted simultaneously in each cycle to see improvement (Pardjono, 2007). The iteration in three series of cycles is seen as the movement towards a change or increase in soft skills where one cycle informs its successive cycle.

To collect the data, the researchers used an instrument consisting of the observation sheet and questionnaire related to the aspects and indicators of cadets' soft skills. The instrument was assessed using logic validity and reliability. The soft skills observed in this study were responsibility, discipline, creativity, and problem-solving. The level of cadets' soft skills was measured based on a five-point Likert Scale: (1) Very low; (2) Low; (3) Average; (4) High; and (5) Very high as presented in Table 1.

Table 1 : The Observation Sheet

No	Type of soft skills	Indicator	Item	Score/Level				
				1	2	3	4	5
1	Responsibility	Showing commitment	Students are committed to participate online learning					
		Showing integrity	Students do what it takes to get the assignment done (complete and on-time).					
		Maintaining credibility	Students do their own work.					
2	Discipline	Paying focused attention	Students pay focused attention when participating in online learning.					
		Showing punctuality	Students complete a task on time or early.					
		Willingness to follow classroom rules	Students follow classroom rules when participating in online learning.					
3	Creativity	Utilizing tools for learning	Students utilize tools for learning.					
		Taking initiative	Students show initiative to give an idea or an opinion.					
		Having curiosity	Students are eager to learn and try new things.					
4	Problem solving	Analyzing a problem	Students ask a thoughtful question to analyze a problem.					
		Having a solution thought	Students can solve a problem.					
		Giving a correct answer	Students can give a correct answer.					

Score/Level:

1 = Very low; 2 = Low; 3 = Average; 4 = High; 5 = Very high

In analyzing the data, the researcher used a qualitative method to present the improvement of the cadets' soft skills during the implementation of project-based learning in Moodle LMS. This qualitative method is used as a research procedure to generate descriptive data which can be observed (Sugiyono, 2005). For aspects of soft skills, the collected data consisted of attitudes or responses which reflected cadets' responsibility, discipline, creativity, and problem-solving skills. The data were identified and measured in percentage points showing the level of soft skills using the following statistical formula:

$$\text{Percentage} = \frac{\sum \text{score obtained}}{\sum \text{total score overall}} \cdot 100\%$$

Table 2: The Levels Of Cadets' Soft Skill Improvement (darmawan, 2008)

Score (%)	Category
81 – 100	Very high
41 – 60	Average
21 – 40	Low
0 – 20	Very low

The data were then presented in descriptive analysis to examine the cadets' soft skill improvement after the implementation of project-based learning in Moodle LMS. Each improvement was labeled or categorized based on the levels as presented in Table 2.

4. Results And Discussion

Before implementing the project-based learning in Moodle LMS, the researchers conducted a preliminary observation to contextualize the existing problems in classroom. We observed that the level of the cadets' soft skills in online learning was relatively low. The focused-group discussion with the subject lecturers from four different study programs also confirmed that the cadets performed well academically with a grade point average of more than 3.0. However, their soft skills such as discipline, responsibility, creativity, and problem-solving still needed to be improved.

The lecturers gave further examples of each soft skill inappropriately performed by the cadets during their online classes. Concerning their discipline, many of the cadets failed to submit their work on time. Regarding their responsibility, some of the cadets failed to manage and complete their workload as required by their lecturers. In connection with creativity as the main problem encountered in the four study programs, many cadets completed their assignments simply by copying from their friends or other online sources. Related to problem-solving, many of the cadets submitted poor quality work due to their inability to use higher-order thinking skills to express their original concepts or ideas. All of these problems led the researchers to conduct further investigation on developing the cadets' soft skills through project-based learning in Moodle LMS. The type of project-based learning used in this study was focused on a video-based project in which the cadets

were assigned to create a different learning video in each cycle related to the topics learned in online learning. The data from the observation showed that the cadets experienced such difficult situations during this COVID-19 pandemic where they adapted to 100% online learning.

In the pre-cycle, the conventional learning model was used by the lecturers to deliver online courses by giving the materials, assignments and also feedback in Moodle LMS. This cycle was carried out in two meetings (Week 1 and Week 2). The observation sheets were used to record and assess the cadets' soft skills during online learning. The results of the pre-cycle were analysed and then presented in Table 3.

Table 3 : The Results Of Pre-cycle

Study Program	Responsibility	Discipline	Creativity	Problem solving	Score	Category
Marine Engineering	35.09%	37.43%	33.92%	35.09%	35.38%	Low
Nautical Study	46.97%	47.47%	42.42%	43.94%	45.20%	Average
Maritime Transport Management	37.47%	40.96%	37.98%	38.76%	38.79%	Low
Transportation	39.68%	37.30%	36.51%	39.68%	38.29%	Low
Total	39.80%	40.79%	37.71%	39.37%	39.42%	Low

Table 3 shows that the average score for all of the soft skills performed by the cadets in all of the study programs was 39.42%, still in the low category. The highest scores of soft skills were obtained by the cadets from Nautical Study as much as 45.20% in the average category. The total scores for Marine Engineering, Maritime Transport Management and Transportation respectively were 35.38%, 38.79%, and 38.29%. Among the four aspects of soft skills, discipline was at the top. The data indicated that the cadets' soft skills still needed more improvement.

Cycle I was implemented to further inculcate the soft skills into the cadets by implementing project-based learning in Moodle LMS. It was carried out in two meetings (Week 3 and Week 4) consisting of plan, action, observation, and reflection. The project-based learning was carefully designed and implemented together with strategies to develop the cadets' soft skills. In this cycle, the cadets were given a class

orientation related to the project-based learning including the project description, requirements, completion steps and timeline. They were assigned to complete a video project individually in which they explained a particular concept with illustrations related to the already learned materials. An example of the video project can be seen in Figure 2.

For the first step, the cadets were involved in a brainstorming session to identify and discuss real-world issues related to the topics learned in their online class. This step was intended to activate their higher-order thinking skills in order to be able to generate and conceptualize ideas. Next, they were guided to elaborate their project content and work collaboratively in groups to finish their project in one week.

During the project completion, the lecturers provided online consultation forums in Moodle to anticipate any problem or whenever the cadets needed further assistance. The cadets with low participation were encouraged by the lecturers to get actively involved in the project-based learning. The rest were also highly praised for their active participation in the project-based learning. After completing the project, the cadets were required to submit their work on time in Moodle. They were also involved in a reflection session where they shared feelings and experiences and also discussed what needed changes or improvement. Feedback were given to the cadets in response to their project results.

The observations were conducted throughout the implementation of the project-based learning in this cycle. The data related to the development of the cadets' soft skills were recorded and analysed. Based on the data collected in the first cycle, the project-based learning in Moodle was carried out well. Many positive responses were captured related to the project-based learning. The cadets started to show initiative to ask and answer questions related to the given project. This project-based learning also encourages the cadets to work collaboratively and also independently. However, it appeared that some cadets still needed more time to adjust and adapt themselves to this learning model. Sometimes, they remained passive and just waited for being instructed by their lecturer about what to do. A cadet, when reflecting on his project-based learning experience, noted:

"This is a new type of learning for me. And I think

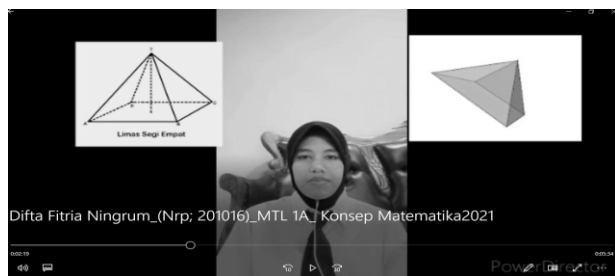


Fig. 2: The video project example

I'm not going to understand what I'm doing if my lecturer doesn't tell me how to do it. I need more time to understand how to perform a task in a project."

The results of Cycle I were analysed and then presented in Table 4.

Table 4 : Results Of Cycle I

Study Program	Responsibility	Discipline	Creativity	Problem solving	Score	Category
Marine Engineering	48.54%	49.12%	46.78%	48.54%	48.25%	Average
Nautical Study	63.64%	63.13%	59.09%	59.60%	61.36%	High
Maritime Transport Management	48.06%	54.26%	48.06%	48.97%	49.84%	Average
Transportation	53.97%	51.59%	49.21%	50.79%	51.39%	Average
Total	53.55%	54.53%	50.79%	51.97%	52.71%	Average

Table 4 shows the results of the implementation of Cycle I. The results can be interpreted qualitatively by comparing the quantitative with the expected target (Arikunto, 2002). The four aspects of soft skills were recorded in the average category with a percentage of 52.71%. Specifically, Nautical Science was in the high category with an average score of 61.36% while the rest were in the average category, namely Marine Engineering (48.25%), Maritime Transport Management (49.84%) and Transportation (51.39%). These scores already met the target score of 45% but it still needed improvement. Thus, the next actions were implemented in Cycle II.

Cycle II was carried out in two meetings (Week 5 and Week 6). The implementation of Cycle II was basically the same as Cycle I, using the project-based learning model in Moodle LMS. However, the improvement efforts in Cycle II related to the online learning process were carefully revised to improve the cadets' soft skills. In this implementation, the cadets' soft skills were reinforced with a number of learning activities which involved the cadets in developing their responsibility and discipline skills. At the beginning of online learning, the cadets were first situated in a more conducive learning atmosphere, both mentally and physically. Next, the students were assigned in groups to create an animation video

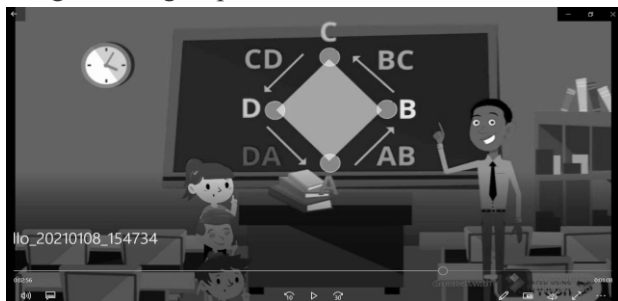


Fig. 3: The video project example

project about a particular concept related to the already learned materials. In this project, the lecturers motivated the cadets to be more prepared and actively engaged in online lessons by giving constructive feedback and encouragement. An example of the video project can be seen in Figure 3.

At the end of the meeting, the lecturers discussed the project with the cadets to make everything clearer. The cadets actively performing their soft skills were given praise. Meanwhile, the passive cadets were encouraged to be more motivated to develop better attitudes.

After implementing the revised actions, we observed that many of the cadets became much better conditioned to project-based learning. The online class atmosphere was relatively conducive compared to the previous cycle. In relation to responsibility and discipline, many of the cadets started to take responsibility and maintain self-discipline during their online learning. They became more actively engaged in online learning and also completed their tasks on time. The results of Cycle II were analysed and then presented in Table 5.

Table 5 : Results Of Cycle II

Study Program	Responsibility	Discipline	Creativity	Problem solving	Score	Category
Marine Engineering	66.08%	67.84%	61.99%	66.08%	65.50%	High
Nautical Study	79.80%	74.75%	71.72%	74.24%	75.13%	High
Maritime Transport Management	71.71%	73.26%	71.06%	70.16%	71.54%	High
Transportation	73.02%	68.25%	63.49%	65.08%	67.46%	High
Total	72.65%	71.02%	67.06%	68.89%	69.91%	High

Table 5 shows the results of the implementation of Cycle II. The results can be interpreted qualitatively by comparing the quantitative with the expected target (Arikunto, 2002). The four aspects of soft skills were all recorded in the high category with a percentage of 69.91%. The total scores for Marine Engineering, Nautical Science, Maritime Transport Management and Transportation respectively were 65.50%, 75.13%, 71.54%, and 67.46%. These scores already reached the target score of 60% but still needed more improvement. Thus, the next actions were implemented in Cycle III.

Cycle III was carried out in two meetings (Week 7 and Week 8). The implementation of Cycle III was based on the reflection on the previous cycle. The project-based learning model was still used in Moodle LMS with the focus of developing the cadets' soft skills. In this implementation, the cadets' soft skills were reinforced with a number of learning activities

which involved the cadets in developing their creativity and problem-solving skills. They were assigned to complete a role-play or simulation video project related to the already learned topic. The lecturers facilitated learning by asking more open-ended questions and providing feedback to promote creativity and problem-solving skills. By working collaboratively in groups, the cadets were more encouraged to generate creative ideas and learn how to solve problems. An example of the video project can be seen in Figure 4.



Fig. 4 : The video project example

After implementing the revised actions, we observed that the cadets showed more active participation in online learning. They also completed their project with more creative concepts and techniques. When having a problem with their project, it also appeared that the cadets even initiated to solve it by discussing it with their classmates or the lecturers. It also appeared that most of the cadets learned how to be self-regulated and independent learners. They become more aware of taking responsibility for their online learning. One cadet described her responsibility in online learning as the following:

“Being actively involved in several class projects makes me more aware of my own responsibility in online learning. I manage time to both learn independently at home and attend online classes. I do what it takes to get the things done (complete and on-time). And when I don’t make good progress, for example in a project, I will see which needs improvement, then I will spend more time to re-learn it.”

The results of Cycle III were analysed and then presented in Table 6.

Table 6 highlights the significant improvement in the cadets’ soft skills in all of the prescribed soft skills. The overall score of the four soft skills in the four study programs was 83.71% in the very high category. Among the soft skills, responsibility was the most performed by the cadets from the four study programs

Table 6 : Results of Cycle III

Study Program	Responsibility	Discipline	Creativity	Problem solving	Score	Category
Marine Engineering	78.36%	80.12%	75.44%	80.12%	78.51%	High
Nautical Study	90.40%	87.37%	83.84%	87.37%	87.25%	Very high
Maritime Transport Management	87.73%	87.47%	85.01%	85.92%	86.53%	Very high
Transportation	90.48%	87.30%	76.19%	76.19%	82.54%	Very high
Total	86.74%	85.56%	80.12%	82.40%	83.71%	Very high

with a total score 86.74%. Specifically there were three study programs achieved the very high category: Nautical Science with a total score of 87.25%, Maritime Transport Management with a total score of 86.53%, and Transportation with a total score of 82.54%. Meanwhile, Marine Engineering obtained the high category with a total score of 78.51%. All of these scores reached the target score of 75%.

Overall, the implementation of the project-based learning in Moodle during the online classes at Sekolah Tinggi Maritim Yogyakarta improved the cadets' soft skills. The gradual improvement in the cadets' soft skills can be seen from the results of the

The result of cadets’ soft skills improvement in each cycle

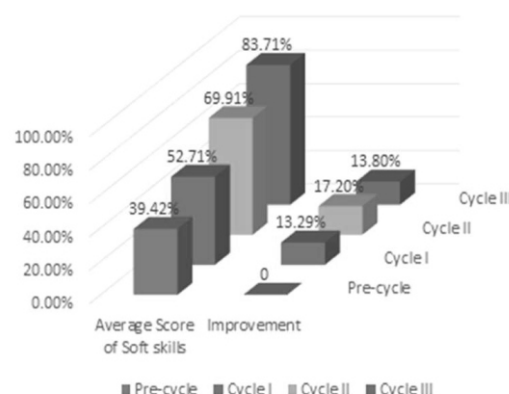


Fig. 5: The result of the cadets' soft skills improvement in each cycle

implementation of the three cycles. More details related to the improvement is presented in Figure 5.

As illustrated in Figure 5, before the pre-cycle was implemented, the cadets showed poor performance in the prescribed soft skills with a total score of 39.42%. Then after implementing the actions in Cycle I, we observed that their scores increased to 52.71% in the average category. In Cycle II, the scores again increased to 69.91% in the high category. Finally, in Cycle III, the scores increased to 83.71% in the very high category. To sum up, the improvement scores in the pre-cycle, Cycle I, Cycle II, and Cycle III were 13.29%, 17.20%, 13.80% respectively. The average influence of the project-based learning implemented

in Moodle for the development of the cadets' soft skills was 14.76%.

The first soft skill we identified during the implementation of project-based learning in Moodle was related to the cadets' responsibility. In the pre-cycle, we observed that many of the cadets lacked responsibility for their online learning. They occasionally procrastinated in completing their work or copied their classmates' work. After being involved in the project-based learning in Moodle, however, the cadets were encouraged to the work collaboratively in groups, share ideas, and even motivate each other to take more responsibility towards their online learning. They gradually changed their bad habits and performed their roles as active learners in online

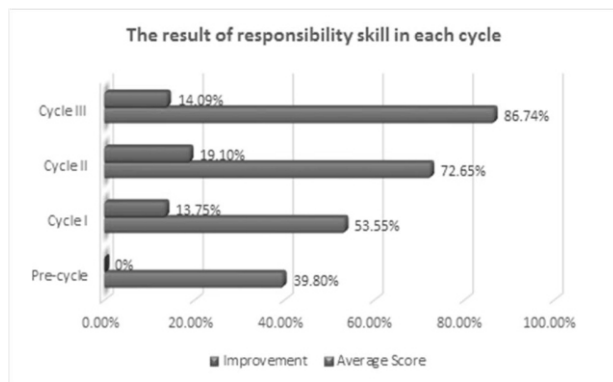


Fig. 6: The result of the cadets' responsibility skills in each cycle

classes. More details regarding the improvement in the cadets' responsibility in each cycle can be seen in Figure 6.

Figure 6 shows that the cadets' responsibility skills increased gradually in each cycle. From the pre-cycle to Cycle I, the score increased by 13.75%. Then, it increased again in Cycle II, by 19.10%. Meanwhile, in the last cycle, it finally increased by 14.54% (from 72.65% to 86.74%) in the very high category.

Regarding the cadets' discipline, we observed that many of the cadets performed inappropriate attitudes towards online learning in the pre-cycle with a total score of 40.79%. The focused-group discussion with the lecturers confirmed that there were several problems related to the cadets' discipline such as late or missing submissions in task completion and class attendance. After being involved in the project-based learning in Moodle LMS, the cadets showed more improvement to act and behaved in a good discipline manner. The gradual improvement in the cadets'

discipline for each cycle can be seen in Figure 7.

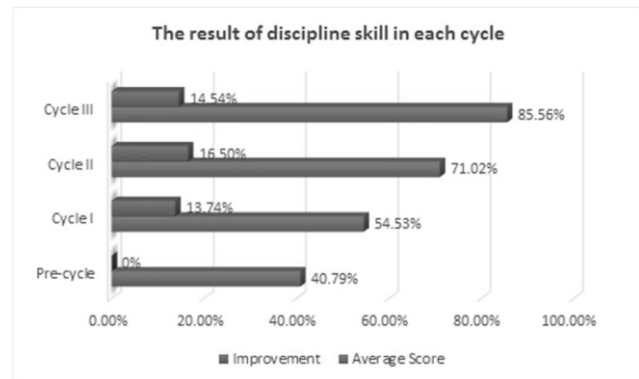


Fig. 7: The result of the cadets' discipline skills in each cycle

Figure 7 shows that the cadets' discipline increased gradually in each cycle. From the pre-cycle to Cycle I, the score increased by 13.74% in the average category. Then, it increased again in Cycle II, by 16.50% in the high category. In the last cycle, it finally increased by 14.54% (from 71.02% to 85.56% in the very high category). The cadets' scores in discipline gradually increased after the lecturers gave more positive reinforcement and encouragement to the cadets about maintaining self-discipline, especially in the context of maritime workplace.

Prior to the action implementation, the cadets' creativity in online learning was considered the lowest compared to the other skills. In the pre-cycle, the average score of the cadets' creativity was only 37.71%. However, after the three-cycle implementation of project-based learning, we recorded the gradual improvement in the cadets' creativity skills with a total score of 80.12%. The cadets were involved in project-based learning where they experienced creative processes by exploring new ideas and imagination, finding their own ways to complete their project. All of these strategies were implemented by the lecturers during online classes with positive reinforcement and encouragement leading to the development of their cadets' creativity. It then appeared that the cadets become more actively participated in online classes, especially in the discussion forums when completing their group project. For more details about the gradual improvement in the cadets' creativity in each cycle, see Figure 8.

Figure 8 shows that the cadets' creativity increased gradually in each cycle. From the pre-cycle to Cycle I,

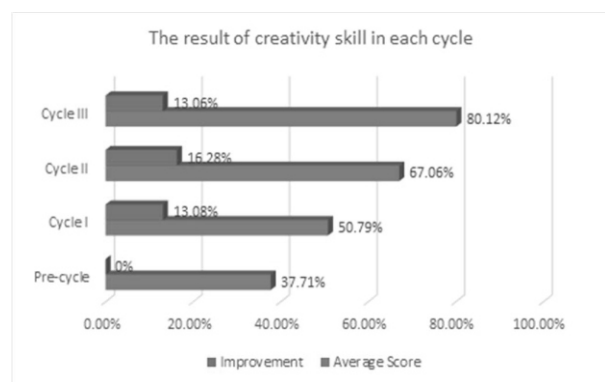


Fig. 8 : The result of the cadets' creativity skills in each cycle

the score increased by 13.08% in the average category. Then, it increased again in Cycle II, by 16.28% in the high category. In the last cycle, it finally increased by 13.06% (from 67.06% to 80.12% in the very high category.

Concerning problem-solving skills, we found from the focused-group discussions with the lecturers that problem-solving was the main problem encountered during their online learning. Some common problems were related to the cadets' attitudes in dealing with the project completion, for example, difficulties in understanding the concept, identifying the specific problems, finding the solution, and drawing the conclusion. To overcome these problems, the lecturers made more efforts such as by modelling the step-by-step process in problem-solving and providing positive reinforcement. After the action implementation, the cadets showed much better performances in this aspect. The gradual improvement of problem-solving skills performed by the cadets in each cycle can be seen in Figure 9.

Figure 9 shows the gradual improvement in the

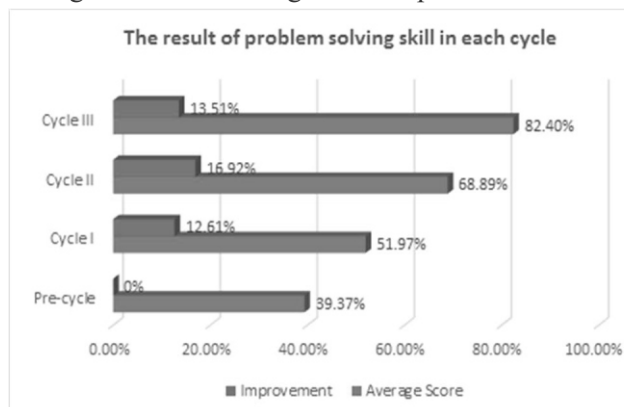


Fig. 9: The result of the cadets' problem-solving skills in each cycle

cadets' problem-solving skills after the action implementation. First, the score in Cycle I increased by 12.61% (from 39.37% to 51.97%). Next, the score increased in Cycle II by 16.92% (from 51.97% to 68.89%). In the last cycle, there was an increase of 13.51% (from 68.89% to 82.40%). This final score in problem-solving skills reached the target score with a very high category.

The overall results showed that there was a significant increase in the cadets' soft skills after the implementation of project-based learning in Moodle LMS. This increase was relatively high in each cycle. The improvement scores in the pre-cycle, Cycle I, Cycle II, and Cycle III were 39.42%, 52.71%, 69.91%, and 83.71% respectively. There were still some common problems in the discipline skill, such as missing and late assignment submissions. However, the number of late submissions decreased over time compared to the previous cycles. After implementing the project-based learning, the cadets gradually changed their bad habits. We also observed that the cadets' performances were also much better in all aspects of the prescribed soft skills.

5. Conclusion

Based on the results and discussion, it can be concluded that the implementation of project-based learning in LMS Moodle contributed effectively to the development of the cadets' soft skills with a significance level of 14.76% in each cycle. Responses indicated that cadets performed well academically during their online classes and also showed a number of positive attitudes in terms of responsibility, discipline, creativity, and problem-solving. After implementing the project-based learning for about 16 week-meetings, the researchers recorded the gradual improvement in the soft skills performed by the cadets as follows: 39.42% (low) in pre-cycle, 52.71% (average) in Cycle I, 69.91%, (high) in Cycle II, and 83.71% (very high) in Cycle III. The aforementioned skills were perceived as key fundamental skills required by the cadets to perform their jobs successfully in the 21st workplace. By developing such soft skills, cadets can prepare themselves to become more employable and highly competitive graduates in the maritime industry.

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