Jurnal Pendidikan Vokasi
Volume 12, No. 3, 2022 (302-314)
Online: https://journal.uny.ac.id/index.php/jpv

Blended learning model in Seafarers Training Program for level II technical expert based on the needs of the shipping industry

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ARTICLE INFO

Article History
Received:
3 February 2022;
Revised:
21 April 2022;
Accepted:
12 October 2022;
Available online:
26 January 2023

Keywords
Blended learning;
Conceptual model;
Learning model;
Seafarers Training Program;
Shipping industry

ABSTRACT

Nowadays, the Level II Technical Expert Seafarers' Training Program learning is conventional. This is burdensome for students due to the increased cost of living for students and needs to be revised. The coronavirus pandemic also limits direct learning. This article discusses the blended learning model for Seafarers Training Program for Level II Technical Experts. This research uses mixed methods. Quantitative methods are used to determine student responses to learning conditions. Student response data was taken using a questionnaire filled in by 41 students. Qualitative methods are used in finding the Blended Learning Model in the Level II Technical Seafarers Training Program Based on the needs of the Shipping Industry. In preparing the data model, the literature review includes blended learning, e-modules, and problem-based learning. The learning model is based on a literature review using the principles of education management. The descriptive analysis describes the model findings of Blended learning at Level II Technical Seafarers' Training. The findings in this article are that The MixPAM (Mixture Blended Problem-based And e-Module) model is a mixture of blended learning and problem-based learning e-module. The results show that the MixPAM model is hypothetically effective and efficient in improving student skills according to industry needs. Professional skills include ship engine repair maintenance (according to industry requirements), ship electrical, control, and ship management systems. Interpersonal skills include communication, teamwork, responsibility, and critical thinking.

How to cite:
Widiatmaka, F. P., Raharjo, T. J., Sudana, I. M., Sumbodo, W., & Setiadi, R. (2022). Blended learning model in Seafarers Training Program for level II technical expert based on the needs of the shipping industry. Jurnal Pendidikan Vokasi, 12(3), 302-314. https://doi.org/10.21831/jpv.v12i3.47823

INTRODUCTION

Indonesia is an archipelago consisting of several islands separated by oceans and oceans. As an archipelagic country, Indonesia consists of land and sea areas. The number of islands in Indonesia, both large and small, reach 17,508 islands (Saksono, 2013). This potential is enormous for the shipping industry. The Indonesian government strives to meet the population's needs from Sabang to Merauke quickly and optimally. In addition, the development of the shipping industry in Indonesia has also increased quite rapidly to increase competitiveness with the global market (Wahidi et al., 2021). The activity of transporting goods to fulfill the needs of people separated by oceans and oceans can be carried out by the sea.

Transporting sea routes from one port to another is called shipping. Shipping is one of the government's efforts to accelerate economic growth in Indonesia (Nugroho et al., 2018). The shipping industry has a vital role in national and international trade which contains a high economic value (Frasyniuk & Primachova, 2018). The shipping industry is vital to the nation's economic growth (Kalgora & Christian, 2016). The shipping industry continues to contribute to providing quality national sea transportation. Quality sea transportation can be fulfilled if the human resources of the seafarers are also qualified.

Some of the optimization factors in the shipping industry in global economic growth, according to Frasyniuk and Primachova (2018), include (1) economic goals and strategies in certain countries, (2) differentiation of predetermined system development with decisions and approaches based on regulatory principles, standardization, and limitations, and (3) shipping technology. Its relationship with shipping technology requires human resources to increase industrial growth. One of them is through vocational education in the shipping sector. Indonesia has a problem with the gap in university graduates that needs to be in line with the needs of the world of work. The gap between the needs of the shipping industry and graduates produced by related institutions.

Nowadays, the Industry 4.0 era makes educational institutions catch up with technology in the teaching and learning process to produce competent and relevant graduates for the industrial world. The gap between the world of vocational education as the primary source of producing human resources for the shipping industry is that educational institutions have yet to produce graduates who are in line with the needs of the shipping industry.

Vocational education has a leading role in economic development if it is continuously pursued in harmony with the world of work around it, both in quantity and quality. The current industrial era 4.0 makes the shipping industry change from manual to digital and even automation. Goods and port shipping services are online and one-stop based on the context of effectiveness and efficiency of shipping costs towards sustainable competitiveness (Sari, 2019). Expert seafarers are excellent, professional, and ethical seafarers. These professional seafarers must be kept from the role of educational institutions.

Professional seafarers come from universities that provide vocational education in the shipping sector. Shipping Science Polytechnic Semarang is a higher education institution providing vocational education in the shipping sector. The Polytechnic of Shipping Science Semarang always strives to improve the quality of education so that it can produce professional graduates who meet national and international standards and compete in the global market. The condition of students has various characteristics. In this case, a sailor who wants to improve higher education while working has the same right to learn quickly. Seafarers' activities that are dense with a high workload for which they are responsible make it impossible for seafarers to carry out face-to-face/conventional learning.

However, seafarers need to increase their competence to facilitate their work on the ship and to get an increase in income. Seafarers need a non-conventional learning model that can be done anywhere to be more time and cost-efficient. Apart from these conditions, there are new problems with the spread of the coronavirus. Indonesia and the world are being hit by a major disaster in the health sector, namely the 2019 Corona Diseases Virus (Covid-19).

The wide spread of Covid-19 has made the government and stakeholders think hard in handling this case. Until now, the government has not taken any repressive steps such as strict territorial restrictions or lockdowns but has only implemented social distancing regulations. This is regulated in Law no. 6 of 2018 concerning Health Quarantine, later confirmed by Government Regulation No. 21 of 2020 and Minister of Health of the Republic of Indonesia No. 9 of 2020 concerning Large-Scale Social Distancing. The government firmly encourages working from home, learning from home, and worshiping from home. This has made our education world turn 180 degrees. The pandemic forces learning to be done online (e-learning). Efforts that can be made are learning blended learning (Alsarayreh, 2020).

Blended learning is a learning model that combines face-to-face learning in the classroom with e-learning (Lalima & Dangwal, 2017). Blended learning arises because of weaknesses in the face-to-face or conventional learning process, which tends to be boring, reducing students' motivation and some areas for improvement in e-learning learning. The combination of learning in blended learning becomes its attraction because face-to-face learning becomes a solution if there is

a miss of communication during e-learning. Blended learning will be more effective if students are highly aware of the meaning of learning.

For that, it is necessary to make an appropriate approach. The transformation of the learning method combined with the approach of students is carried out so that the teaching and learning process is more effective. Distance learning also needs special attention in several ways, including the inconsistency of students with learning hours, delays in capturing material, and other problems in the learning process, such as internet disruptions and power outages (Prawiyogi et al., 2020). Thus, the learning model in distance learning should not only be e-learning or online only but must also be combined with face-to-face (offline) meetings. This can help solve problems in online learning or distance learning.

Implementing blended learning online requires an online module or e-module (Cahyono et al., 2019). Implementing blended learning with modules is a solution when students carry out an internship program. The modules that are made can be in the form of web-based or android-based modules (Panyahuti et al., 2018). E-module is included in superior multimedia when implemented in online learning (Yulando et al., 2019). For graduates of the Seafarers' Training Program for Level II Technicians (ATT II Program) to suit industry needs, e-modules are designed according to needs. Nowadays, the competencies needed include technical competence, technology awareness, team-work, communication, responsibility, and critical thinking (Cicek et al., 2019).

For this reason, the approach that can be taken is problem-based learning. Problem-based learning (PBL) has been widely adopted in various fields and educational contexts to promote critical thinking and problem-solving in authentic learning situations. PBL is a pedagogical approach that allows students to learn while actively engaging with significant problems. Students are allowed to solve problems in a collaborative environment (Yew & Goh, 2016). Collaboration can be done when students take sailing practice (internship or work but studying higher education).

This pandemic is one of the crucial reasons e-learning learning needs to be activated as early as possible so that students can still carry out learning optimally in any condition. This is in line with expanding access to education services through e-learning to make it easier for students constrained by distance and time. The application of e-learning with the blended learning model is exciting for seafarers who must update their maritime education through education and training programs held by vocational education institutions such as PIP Semarang. For this reason, the researcher intends to develop a blended learning model for the Level II Technical Expert Seafarers' Training Program (ATT II) at PIP Semarang based on the needs of the shipping industry aimed at lecturers and training participants or student officers.

Blended learning (BL) is a new normal in learning and requires communication technology to implement. BL is learning conducted face-to-face and online (Dziuban et al., 2018; Sukardjo et al., 2020). The use of the blended learning strategy affects students' science process skills. BL is significantly more effective in improving science process skills when compared to conventional learning strategies (Harahap et al., 2019). Assessment is considered an effective tool in determining the acquisition of student knowledge in the particular subject that students take. There are various ways of assessing, some are formal, and some are informal. Under the formal grading category, a teacher usually assesses students' knowledge for courses using quizzes, practice exams, tests, viva, projects, homework, and exams (Khan et al., 2012).

The benefits of blended learning, according to Jerry and Yunus (2021), are to enrich and increase teacher knowledge in various aspects, such as:

> *(1) increasing pedagogical knowledge and digital competence, (2) training skills in using information technology for future generations, (3) learning and teaching time becomes more effective and organized, (4) saves budget, (5) increases student participation and involvement in class, (6) increases communication and collaboration inside and outside the classroom between students and teachers, and (7) improve language and communication skills.*

Blended learning will only be realized when the various engagement opportunities the two contexts provide are developed to present students with various experiences, individually and collaboratively. An essential aspect of this development is the integration of online and classroom components (Jeffrey et al., 2014). Among the design features, technology quality, online tools, and

face-to-face support are predictors of learner satisfaction. In contrast, learner characteristics of self-regulation and attitudes toward BL are predictors of satisfaction (Kintu et al., 2017). In implementing BL, the educator must provide a course-level mixed-learning environment. Practical teaching courses, which are the subject for study, are organized as a combination of face-to-face and online teaching activities.

For example, classes meet face-to-face once weekly for 2 hours on campus, and the rest is online. Participants must also teach at the participating schools for 6 hours per week. The face-to-face section in the field includes a discussion of lesson plans in other aspects of the teaching practice provided on the course Web page. Some features required in an online learning environment include additional content modules, lesson plans, discussions, methodology notes, teaching practices (videos), email, supplementary material, chats, and tips (Caner, 2010). The factors that influence the effect of BL should be addressed.

Examples are computer use, the efficiency of online tools, familiarity with technology, and student satisfaction with BL, among which student satisfaction plays an increasingly important role. Performance expectations, systaem functionality, content features, interactions, and the learning climate are claimed to be significant determinants of student satisfaction with mixed learning (Zhonggen, 2015). Figure 1 shows the factors that influence the choice of a blended learning design approach, according to Alammary et al. (2014).

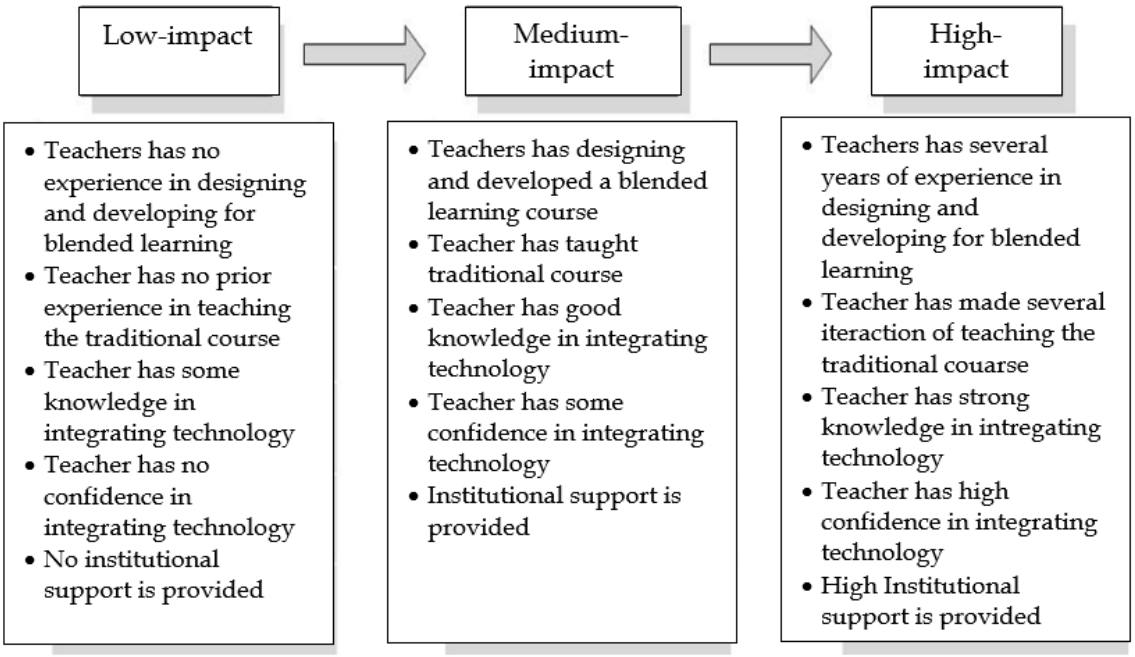

Figure 1. Factors that Influence the Choice of a Blended Learning Design Approach

One of the media and learning models that can be used in learning is an e-module based on problem-based learning. Applying problem-based learning e-modules can support learning effectiveness so that the learning atmosphere becomes attractive and students become motivated (Jaenudin et al., 2017). The e-module significantly improves learning outcomes and increases teacher motivation (Sugiani et al., 2019). E-modules are multimedia and interactive tools in an e-learning environment. This is very important to increase the transfer of knowledge and skills to users from the online platform (Wahidah et al., 2019).

Using e-modules is effective in practical learning (Astalini et al., 2019). E-module based on Problem-Based Learning (PBL) provides a variety of animated displays and simulations that students can run to facilitate students' understanding of the material presented. E-module based on PBL can improve students' science process skills (Serevina et al., 2018). Using e-modules can also improve critical thinking skills (Seruni et al., 2020).

PBL used problems as a context for students to learn problem-solving skills and acquire knowledge of basic and clinical sciences. PBL is based on adult learning principles. PBL does not require expensive resources and the latest technology (Shankar, 2010). PBL is a comprehensive approach, and the scope of its application depends on various individual, social, and institutional factors (Simone, 2014). PBL is an effective teaching and learning approach, primarily when evaluated for long-term knowledge retention and application (Yew & Goh, 2016). In implementing PBL, the evaluation includes curriculum, facilities, facilitation, student experience, and learning effectiveness for consideration (Gibbon & Marcangelo, 2012).

PBL has advantages, including (1) improved problem-solving skills, but student motivation remains, (2) more effective than conventional teaching methods, and (3) there is no gender difference in learning effectiveness (Argaw et al., 2016). As an application-focused discipline, Engineering is well suited for achieving pedagogic benefits through PBL in course design. With Teknik, there may be confusion around abbreviations, as 'PBL' can refer to 'project-based learning,' which often involves similar practices to problem-based learning (Lambert & Ashwin, 2021).

The implementation of conventional methods to PBL takes time. A model that can be done is a short workshop at the Faculty. Effective PBL tutors are: (1) able to know the subject matter and can communicate their knowledge in a way that students easily understand; (2) can assess when and how far they intervene in student learning; and (3) able to develop students' understanding of knowledge according to predetermined objectives (Williams & Paltridge, 2017). Based on the background, what is the Blended Learning Model in Seafarers Training Program for Level II Technical Experts Based on?

RESEARCH METHOD

This research uses mixed methods. Quantitative methods are used to determine student responses to learning conditions. Student response data was taken using a questionnaire filled in by 41 students. Qualitative methods are used in finding the Blended Learning Model in the Level II Technical Seafarers Training Program Based on the needs of the Shipping Industry. In preparing the data model, the literature review includes blended learning, e-modules, and problem-based learning. The learning model is based on a literature review using the principles of education management. The descriptive analysis used to describe the model findings of Blended learning at Level II Technical Seafarers' Training.

RESULT AND DISCUSSION

The current educational process is carried out face-to-face so that instructors or lecturers provide material to student officers so they can gain knowledge from the campus. The existence of the educational process requires input in the form of student officers and lecturers or instructors to be on campus so that the material is delivered directly through the laboratory so that student officers can gain more profound knowledge. The process is done by showing the existing laboratory so student officers can practice with the available equipment. The expected output is the creation of competencies that student officers expect to be able to have the expected competencies. In this learning process, there is no BL, so all lecture activities are carried out on campus. However, several things can be used as an evaluation because of constructive input and suggestions from student officers to carry out the lecture process using BL. The existing model is shown in Figure 2.

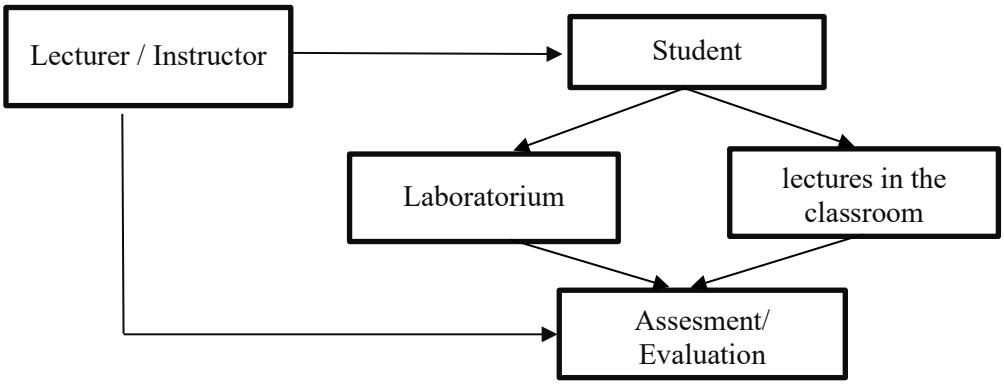

Figure 2. Existing Model ATT II Program

Based on the fact analysis in the field, there is the fact that the two-semester lectures held on campus are burdensome for the cost of living. During the learning process, student officers do not receive a salary. This is because students only work while attending lectures. The existing learning model has several weaknesses, including the implementation of lectures required face-to-face at the campus, the income of officers being reduced due to unemployment, and the burden of living costs increasing. Concerning the coronavirus pandemic, it is not recommended because it can cause virus transmission.

Initial research was conducted by conducting interviews with students. This is to determine conditions in the field and student perspectives. The literature review that has been carried out and the initial research can be used as a reference in developing the model. The existing condition shows that on-campus lectures could be more financially manageable for students. The results of data retrieval are based on a questionnaire to the students. As many as 61% of learning is currently burdensome for students financially. The graph of the questionnaire results is shown in Figure 3.

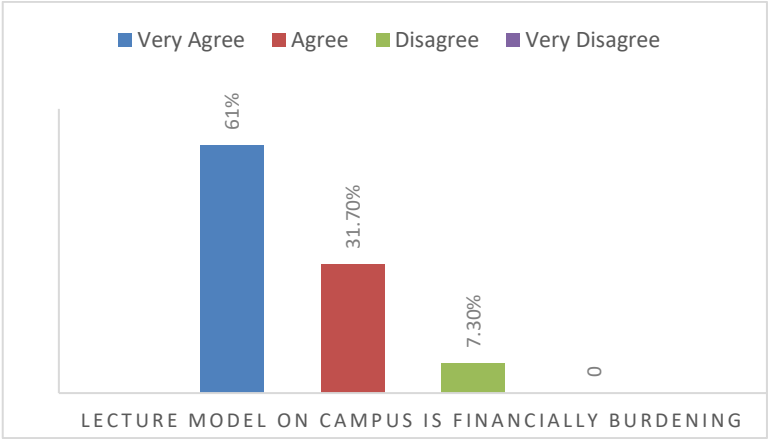

Figure 3. Lecture Model on Campus is Financially Burdening

Figure 3 shows that most of the respondents, namely as deep as 61%, stated that they strongly agreed that studying on campus could be burdensome for the cost of living. This cost of living is due to the necessities needed to fulfill lecture activities and the life needed while in Semarang. The existing learning model uses a face-to-face system, meaning that student officers must meet in a room or class to gain knowledge orally or directly from the instructor. Therefore, a flexible process of both time and energy is needed.

On the other hand, there are tuition fees that are considered high enough by student officers, so it takes time to consider further education. In increasing the competency needs in the shipping industry, experience in the industry is needed, namely sailing experience. The average sailing

experience carried out by the respondents is around 4-5 years. The sailing experience is shown in Figure 4.

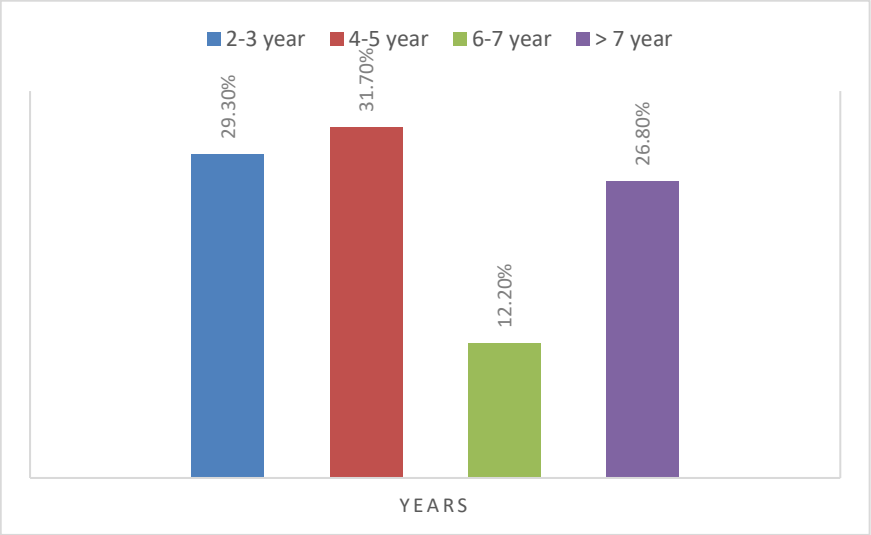

Figure 4. Long Student Sailing Experience

Based on the research results, it was found that practical lectures on campus could not be implemented optimally due to the limited study time. Respondents answered by agreeing that practical lectures could not be implemented optimally, this was due to the limited time. This limitation led to the delivery of material that student officers did not fully accept based on the delivery carried out on-campus face-to-face, so this could lead to a lack of ability for student officers to get the material thoroughly and comprehensively reduce understanding.

The majority of respondents stated that campuses have yet to be able to provide optimal learning experiences. Therefore, there are still obstacles that need to be addressed when face-to-face meetings or classes. Because there is still a gap that needs to be repaired and bridged between the reality on the ground and lecture practice, an adjustment or strategy is needed so that education on campus can approach reality, especially in terms of mechanical aspects.

The majority of respondents stated that they strongly agreed with this statement, this indicated that there needed to be an improvisation carried out by the Semarang Shipping Science Polytechnic so that student officers who were studying could get an education that was close to the existing reality.

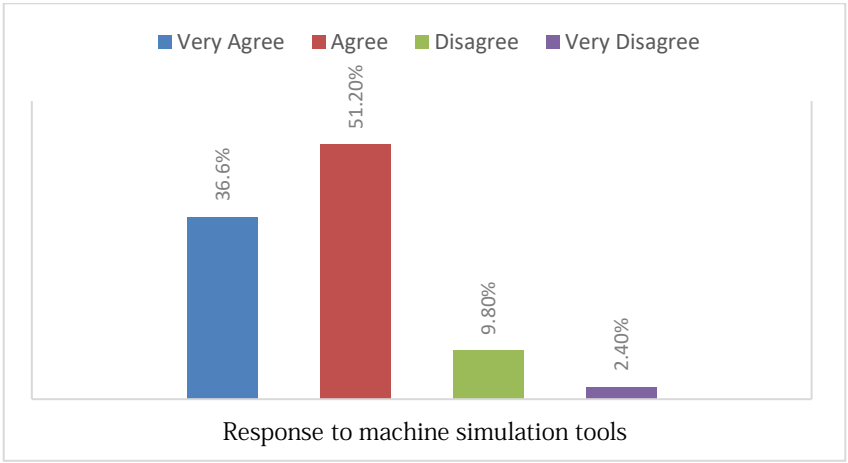

Figure 5. Response to Machine Simulation Tools

Based on the research results, the respondents answered that practical learning on the ship could be carried out more effectively. This effectiveness is because student officers can face

conditions that match reality. Based on the results of distributing questionnaires and answers from respondents who are student officers, studying for two semesters can be burdensome for the cost of living for student officers.

In addition, blended learning can be pursued in addition to sailing experience so that student officers not only get theoretical material but obtain a combination of time flexibility and hands-on learning experience on board. This learning experience can increase the competence of student officers to obtain training certificates for two engine simulation tools that are on board at the lecture location does not necessarily match the actual conditions. Blended learning can encourage better knowledge and skills when compared to offline lectures.

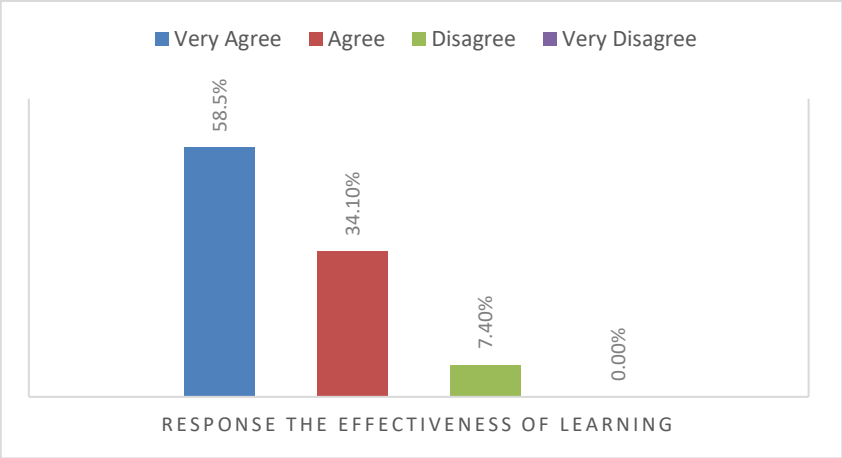

Figure 6. Response to the Effectiveness of Learning

Learning is an interactive process between students and educators and learning resources in a learning environment. Learning is assistance provided by educators so that the process of acquiring knowledge and knowledge can occur, mastery of skills and character, and the formation of attitudes and beliefs in students. In other words, learning is a process to help students learn well. The success of the learning process is determined by the strategy and learning model used. The results obtained from the expected learning are suitable to the needs of the industry.

We have entered the industrial era 4.0, where soft skills are needed, including communication, teamwork, responsibility, and critical thinking (Grzybowska & Łupicka, 2017; Maisiri et al., 2019). Critical thinking skills will be needed for problem-solving (Ulger, 2018). In addition, professional skills such as occupational health and safety (BAST), ship engine repair maintenance (according to industry needs), ship electrical systems, control systems, and ship management systems are also needed (Ahluwalia & Pinha, 2014; Bozorgpour et al., 2017; Turan & Asar, 2020). The practical learning model is blended learning. This model uses two implementations, namely face-to-face and online.

Based on educational management principles, some stage needs attention, namely planning, organization, actuating, controlling, and evaluating. In the planning stage of industrial needs analysis, nowadays, the competencies needed include technical competence, technology awareness, teamwork, communication, responsibility, and critical thinking (Cicek et al., 2019). This competence needs to be designed in the curriculum.

The curriculum must ensure that at the end of the teaching period, students must be able to (1) use technology, (2) think creatively and independently, (3) develop and communicate their own beliefs and views about the world, (4) achieve success in various fields of activity, (5) developed knowledge and understanding, (6) make informed choices and decisions, (7) communicate in different ways and different settings, and (8) work in partnerships and teams (Mouzakitis, 2010). Besides the curriculum, the learning planning needs to be designed for its implementation in the semester learning plan. Then the preparation of teaching materials (online module based on web/Android mobile).

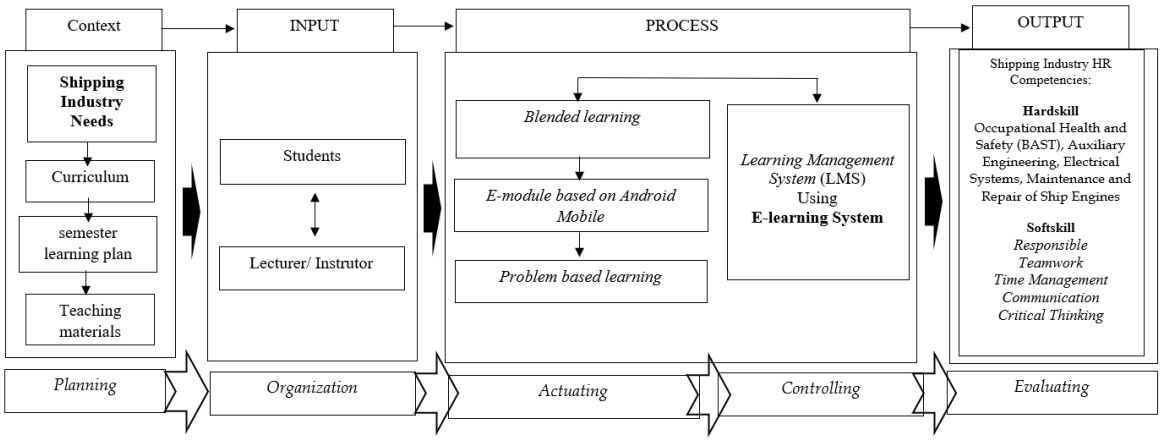

Figure 7. The Model of Blended Learning in the Level II Technical (ATT II) Expert Seafarers' Training Program at PIP Semarang is Based on the needs of the Shipping Industry

Organizing the learning model of students and educators needs to be considered. In implementing blended learning, habituation is required from conventional learning to blended learning. Organizing students is necessary to determine the competencies to be achieved. Besides that, discipline in implementing blended learning, mastery of technology, or web learning is also needed.

Educators are advised to have competence in technology and management of learning management systems (LMS). It takes a short course to organize the implementation of the blended learning model. In the implementation of learning, the findings in this study were the MixPAM learning model in learning at the Level II Technical Expert Seafarers' Training Program (ATT II) at PIP Semarang based on the needs of the shipping industry. The MixPAM (Mixture of Blended Problem-based and e-Module) model combines blended and problem-based learning e-module.

The findings show that the MixPAM model is hypothetically effective and efficient in improving student skills according to industry needs. Professional skills include ship engine repair maintenance (according to industry requirements), ship electrical, control, and ship management systems. Interpersonal skills include communication, teamwork, responsibility, and critical thinking.

CONCLUSION

Based on the results of the study shows that in the learning process of the Level II Seafarers' Training Program for Technicians, it is necessary to plan to improve student skills that are needed by the industry in curriculum design. The application of the blended model in the curriculum is designed to be a maximum of 80% of the total. Then the lecturer prepares a semester learning plan. Furthermore, blended learning is carried out using an e-module based on problem-based learning. E-modules should be designed based on Android to make it easier for students to learn anytime and anywhere while sailing. Learning control for the Level II Seafarers' Training and Education program is carried out using a Learning Management System. Lecturers are expected to have Information and communications technology (ICT) skills. Lecturers are suggested to create an interactive learning environment so that students feel satisfied and motivated in its implementation. In implementing blended learning, students need to be disciplined when meeting face-to-face and online learning to achieve learning objectives. Future implications indicate that blended learning will often be used in learning. Future research requires limited trials in the control class and experimental class and expanded trials to ensure the effectiveness of the conceptual learning model developed. Furthermore, to find the effect of increasing students' hard and soft skills using the MixPAM learning model.

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