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LEARNING PROCESS ANALYSIS BASED ON INDUSTRIAL PRODUCTS IN MECHANICAL PRACTICES

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Abstract

Revitalization of vocational education must be designed and developed according to the industry's needs through appropriate learning innovations. The selection of suitable learning methods influences the graduate competencies and learning experiences of students. This study aims to analyze the learning process based on industrial products in mechanical practices. The learning process analysis includes giving apperceptions and motivation, mastering learning materials, learning strategies implementation, learning resources or media, involving students, and closing the learning process. The research used an experimental method with a static group comparison design. This study used two groups consisting of the experimental and control group with 20 respondents for each. The experimental group is respondents who used industrial products-based learning, and the control group is respondents who used conventional learning (job sheet-based). The research respondents were students of the Mechanical Engineering Department Universitas Negeri Semarang who have passed the Mechanical Process I lesson chosen by random sampling technique. Research data were collected using a teaching and learning process questionnaire, while the data analysis technique used is the Mann Whitney U Test and descriptive statistics. The research findings show that there are differences in the process of the mechanical practice using industrial products-based learning and conventional learning (job sheet-based). Implementation of learning with the gift of apperception and motivation, mastery of learning materials, application of learning strategies, assembling of learning resources or learning media, students' participation in the learning process, and closing the learning process is better to use the industrial products-based learning compared to conventional learning.

Keywords*: industrial product-based learning, experiences learning, mechanical engineering skills*

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INTRODUCTION

Revitalization of vocational education learning should be built and develop in coherent with the competencies needed by the industry, so that appropriate learning innovations are obtained. The revitalization of learning must be able to improve the quality of measured, systematic and sustainable inputs, processes and outcomes. Vocational education revitalization policies instruct a need for learning innovation through synchronizing curriculum with industry and other partners, as well as strengthening the experience and competence of teachers. The curriculum and implementation of learning process must be appropiate to industry needs and the involvement of other stakeholders (Finch & Crunkilton, 1979). The basic principle of curriculum alignment constructively must consider the steps of learning to gain learning experiences in order to achieve the learning objectives (Kuhn & Rundle-Thiele, 2009).

The problems in vocational education learning innovations include: development of a lot of cooperation at the level of student internships with the industry, the lack of teachers, the results of curriculum alignment with industry have a little impact on learning innovation, vocational training has not been maximally carried out, curriculum alignment has not been implemented in learning, the resource sharing is not maximal. The principles in implementing vocational education is: (1) vocational education will be effective if teacher has had successful experience in applying skills and knowledge in the operations and work processes that will be carried out; (2) vocational education will be efficient if the teaching methods and personal relationships appropriate with student's characteristic; and (3) vocational education will only be effective where training tasks are carried out in the same manner, tools and machinery as determined at the workplace (Prosser & Quigley, 1959).

These conditions indicate that the lack of innovative learning models carried out as a follow-up to the development of aligning competencies with industry. Learning model innovations must continue to be done by following the development of competencies that occur in the industry. Learning model innovations are needed to improve learning experiences and student performance. Novel and more innovative learning strategies must be introduced and implemented in teaching and learning activities in order to facilitate the student's personal development (Leung & McGrath, 2010). These problems have impact on learning experience and student performance. The success on revitalization of vocational education learning is determined of the right learning model by the selection process that appropiate with industry needs, as well as the experience and performance that need by students. Thus, teachers must be able to create interesting learning experiences. Learning experiences are more interesting when refer to project that relevant to the industry (Hadgraft, 2017). Factory based learning has proven to be effective in developing theoretical and practical knowledge in real production environments. Factory based learning for production must be based on didactic, integrative and technical (Baena et al., 2017).

The concept of industrial products-based learning is a new paradigm of vocational learning, where the learning process integrates academic activities with industrial activities. This learning objective is to improve the student's learning experiences in schools and practice skills in industry (Rentzos et al., 2014). The industry needs for engineering graduates are developing, so we need new approach in education system (Uziak, 2016). The implementation of products-based learning must involve and work closely with the business and industry world, while vocational education provides sufficient skills and knowledge for the labor market and also provides sustainable education (Martinez Jr., 2007). The learning process in products-based learning can be designed with a focus on relevant competencies by expanding the adequacy in competency (Müller-Frommeyer et al., 2017). The benefits of collaborative project learning force students to work together for solving complex technological problems and developments, as well as encourage students to think critically (Mitchell et al., 2017). Products-based learning has proven to be an important tool to educate students and professionals about the practice application on the principles of production management (Erol et al., 2016).

The implementation of industrial products-based learning use the ACDIE stage (Alignment, Conceive, Design, Implement, Evaluation). Alignment stage is the most important stage in synchronize the needs with industry. This stage determines the types of products that will make by stu-

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dent and consider the competencies that will achieve, the equipment used, implementation of learning, and strengthening of work culture. The Conceive stage is a series of industrial products-based learning implementation processes, where students with the instruction from teachers discuss to determine what products will be produced. Teachers guide to choose the best from alternatives product that suggested by each group. Design stage make the detail of design based on the product that choosen from the alternative product. Each group divides the work, therefore, each member is responsible for the assigned work. Teachers ensure that the design is appropiate with the plan. Assistance and supervision from teachers is needed so that the implementation is appropiate with the design and the specified time.

The implementation stage is the product manufacturing stage. This stage determines students whether the product is successfully made and functions according to the design. Students need a lot of time to solve problems if the product is not functioning properly. Teachers need to provide motivation and direction so that students do not give up quickly. Evaluation stage is the stage of evaluating the process and the final product. Students communicate their performance and products in front of groups of other students, teachers, external reviewers or stakeholders if possible. The study was conducted to analyze the implementation of industrial product-based learning on machining industry in mechanical practices. This study was conducted also to analyze implementation of Mechanical Practices learning activities in industrial products-based learning. The learning process is a teaching and learning activity which consists of: giving perception and motivation, mastering learning materials, learning strategies implementing, implementing learning resources or learning media, involving students in learning, and closing the learning process.

RESEARCH METHOD

The research method used in this study is experimental method with static group comparison design. The design used two groups, namely the experimental and control group. The experimental group is the group of respondents treated with industrial products-based learning, while the control group is a group of respondents treated with conventional learning models (job sheet-based). The sampling technique used in this study is simple random sampling. There were 20 respondents in each group. The research respondents involved were students of Mechanical Engineering Department Universitas Negeri Semarang who joined Mechanical Practice 2 course. The respondents were already pass the Mechanical Process 1 course. The validity in this experimental research design used: (1) historical; (2) maturation; (3) statistical regression; (4) selection; and (5) mortality. Historical treatment control through group selection randomization and group members was plotted randomly. The maturation validity of the control treatment was randomized, while the validity of the selection was through the control group. Statistical regression validity control treatment used randomization and eliminated the extreme scores that appeared, while the mortality validity used subject acquisition

Research data collection used a learning activity questionnaire. The observed learning activities were related to the apperception and motivation provision, mastery of learning material, learning strategies application, learning resources or learning media application, students involvement in learning process, and closing the learning process. Data analysis techniques used the descriptive statistics and Mann Whitney *U* Test with data analysis application. The Mann Whitney *U* Test was used to analyze the differences between the two study groups. Descriptive statistics are used to analyze research variables based on the criteria that used. Interpretation of descriptive analysis can be shown in Table 1.

Table 1. Data Interpretation

Interpretation	Percentage (%)
Very good	76-100
Good	51-75
Less good	26-50
Bad	0-25

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RESULTS AND DISCUSSION

The results reveal a difference in the implementation of the industrial product-based learning with conventional learning in Mechanical Practices. The difference between industrial product-based learning and conventional learning is in the provision of apperceptions and motivation, mastering learning materials, implementing learning strategies, implementing learning resources or learning media, involving students in learning, as well as closing the learning process. Industrial product-based learning has an impact on improving the teaching and learning process of Mechanical Practices, the teaching and learning process in relation to the provision of perceptions and motivation, mastery of learning materials, implementing learning strategies, implementing learning resources or learning media, involving students in learning, and closing the learning process. The alignment stage becomes a decisive stage so that the implementation of industry-based learning is different. This stage aligns industry needs with academic activities in relation to the types of products that students will make, the level of competency achieved, equipment needed, learning process, and the strengthening of work culture. The process of aligning curriculum with industry must be designed and also developed appropriately so that programs can be implemented in the learning (Yudiono, 2017). Differences in the implementation of learning in relation to providing apperception and student motivation, mastering of learning materials, implementation of learning strategies, the use of media or learning resources, growing students' active participation, and also closing the teaching and learning activities. Learning process analysis result include giving perception and motivation, mastering the learning materials, implementing learning strategies, implementing learning resources or leaning media, involving students in learning, as well as closing the teaching-learning process.

Apperception and Motivation

Giving apperception and motivation when starting learning activities was done using several criteria, including preparing class activities and learning tools, informing the learning objectives, and motivating the students. Figure 1 shows that the use of industrial products-based learning for preparing class activities and learning tools increased by 53.85%, compared to conventional learning. Conveying learning objectives using the industrial products-based learning has increased by 30.16% compared to conventional learning. Motivating students to focus on learning using the industrial products-based learning increased by 79.17%, compared to the conventional learning. Giving apperception and motivation for the industrial products-based learning has very good qualifications.

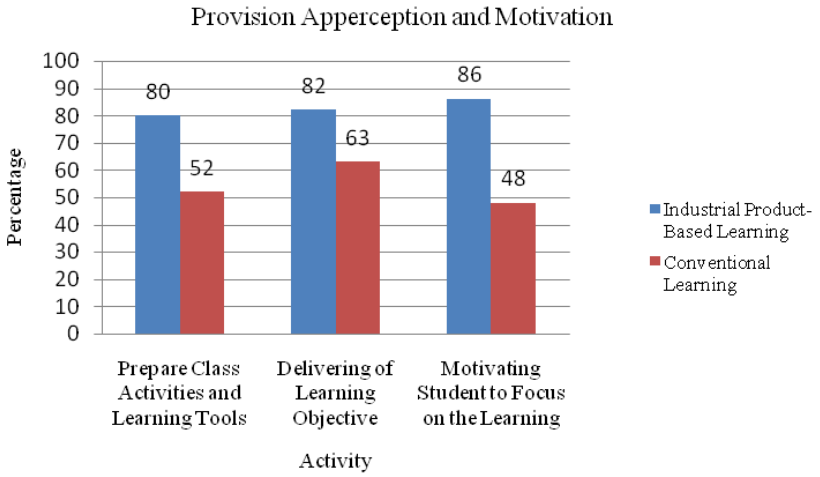

Figure 1. Provision Apperception and Motivation

Based on Table 2, it is shown that a *U* value is 8.000 and wilcoxon value is 218.000, if the value is converted to *Z* value the results is -5.244, Sig or *P* Value of .000 ($p < .05$). If the p value < .05, there is a significant difference between the industrial products-based learning and convention-

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al learning group in giving apperception and motivation to students. The differences in giving apperception and motivation activity in both learning models are in the preparing class and learning tools activities, delivering goals, and motivating students to focus on learning.

Table 2. The Result of Data Analysis in Difference of Provision Apperception and Motivation

	Apperception and Motivation
Mann-Whitney *U*	8.000
Wilcoxon *W*	218.000
Z	-5.244
Asymp. Sig. (2-tailed)	.000
Exact Sig. [2*(1-tailed Sig.)]	.000[b]

Learning differences occur in the provision of apperception and motivation in preparing class activities and learning tools, delivering learning objective, and motivating students to focus on learning. Industrial products-based learning with the ACDIE stage is more concrete so that it can stimulate students' mind, feelings, concerns, and skills so can encourage the learning process. Industrial product-based learning with ACDIE stage is appropriate with the students' characteristics and motivates students to focus on learning because it is holistic, interactive, scientific, contextual, effective, collaborative, student centered and competency oriented. Motivation is an important factor on academic performance, high student motivation impacts in the improvement of better academic performance. Educators must be able to identify learning models that can increase student motivation (Daniel et al., 2019). Industrial projects increase student motivation. Work is directed at the application of developed knowledge and technology, involving many scientific disciplines, and stronger self direction (Mills, 2003). Learning design with approach in the industry contains curriculum structure, learning materials, achievement of competencies, competency evaluation so it can produce learning experiences and learning outcomes that expected (Febriana, 2017).

Mastery of Learning Materials

The ability to deliver material in industrial product-based learning increased by 20.29% compared to using conventional learning. The ability to link science and technology, relevant knowledge, and real life in industrial product-based learning increased 34.85% compared to conventional learning. The ability to answer questions on industrial product-based learning increased 56.37% compared to conventional learning. Overall, mastering the material in teaching and learning activities with industrial products-based learning has very good qualifications, as shown in Figure 2.

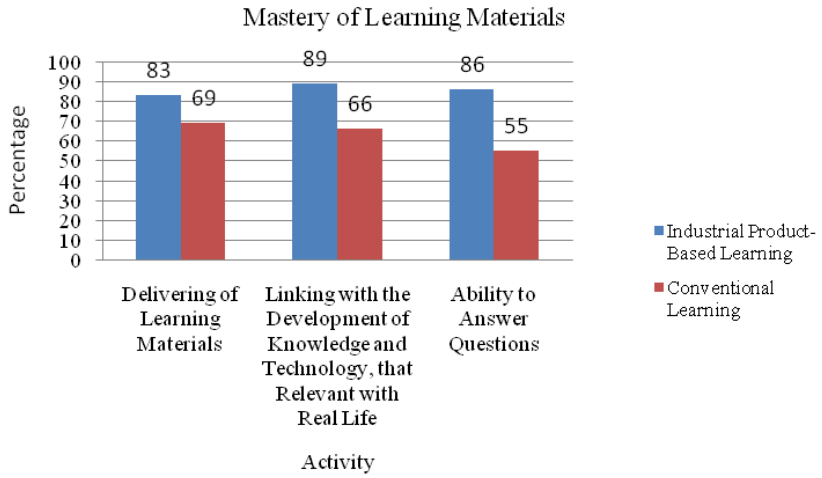

Figure 2. Mastery of Learning Materials

Table 3 shows that U value is 33.500 and wilcoxon value is 243.500, if that value converted to Z value then the result is -4.553. If the p value < .05, there is a significant difference between the industrial products-based learning and conventional learning group in mastering material. In mas-

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tering learning materials, there are differences in industrial products-based learning models and conventional learning. The differences can be seen in the ability to convey learning material, related to science and technology, knowledge that is relevant to real life, and answering questions.

Table 3. The Result of Data Analysis in Mastery of Learning Materials

	Mastery of Learning Materials
Mann-Whitney *U*	33.500
Wilcoxon *W*	243.500
Z	-4.553
Asymp. Sig. (2-tailed)	.000
Exact Sig. [2*(1-tailed Sig.)]	.000[b]

Mastery of industrial products-based learning materials is better with the use of the ACDIE stage in delivering of learning materials, linking with the development of knowledge and technology that relevant with real life, and the ability to answer questions. Industrial product-based learning increases the student's ability to elaborate with work in the appropriate stages. Industrial products-based learning contributes to students' self development in competency that has been widely accepted (Lasauskiene & Rauduvaite, 2015). Learning models have good potency to increase student's interest and involvement in mastering learning material, encourage and empower learners to increase their responsibilities in learning, and enable students to actively ask questions and provide feedback to teachers (Park, 2003). This learning also provides motivation and real world assignments for students according to the demands of the job (Balve & Albert, 2015). Mechanical education must focus on develop student's creative thinking and ability to solve mechanical problems by design a creative learning that make creativity, critical thinking, and transfer of student mechanical skills (Wu & Wu, 2020). The involvement of teachers in designing and organizing teaching and learning activities is very necessary to keep students motivated and participate in every activity. Teacher involvement is a challenging task to improve learning performance and achievement. The student's learning achievement is always directly proportional to the involvement of teachers in designing, organizing, and evaluating learning (Joshi et al., 2019).

Implementing Learning Strategies

Figure 3 shows the accuracy of implementing industrial products-based learning strategies has increased by 71.43% compared to conventional learning. Fostering positive activities in industrial product-based learning has increased by 70.21% compared to using conventional learning. Soft skills in learning activities have increased by 63.46% compared to conventional learning activities. Based on these criteria, the application of industrial product-based learning strategies is very well qualified compared to conventional learning.

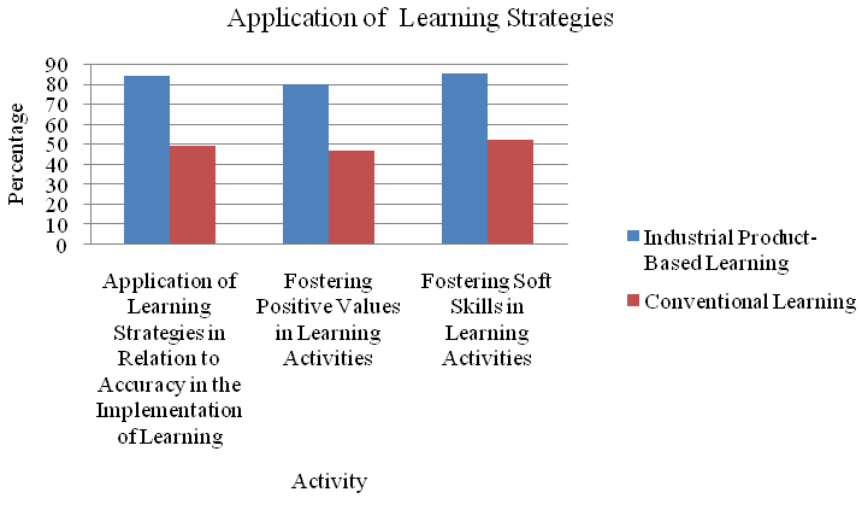

Figure 3. Application of Learning Strategies

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From Table 4, U value is 8.000 and wilcoxon value is 218.000. This value is converted to Z value and the result is -5.244. If the p value < .05, there is a significant difference between the two groups in implementing industrial product-based learning strategies. The differences in applying learning strategies in both models are in implementing learning strategies appropriately, fostering positive activities in teaching and learning process, and cultivating soft skills in learning activities. The difference is very clear in the ability to foster positive and soft skills in teaching and learning activities.

Table 4. The Result of Data Analysis in Application of Learning Strategies

	Application of Learning Strategies
Mann-Whitney *U*	8.000
Wilcoxon *W*	218.000
Z	-5.244
Asymp. Sig. (2-tailed)	.000
Exact Sig. [2*(1-tailed Sig.)]	.000[b]

The industrial product-based learning implementation is better in applicating learning strategies. Learning strategies application is related to accuracy in the implementation of learning, fostering positive values in learning activities, and also fostering soft skills in learning activities. Industrial product-based learning use is a constant strategy to foster positive value in learning activities. This learning model can cultivate soft skills that are needed for vocational education graduates' competencies. Student competencies that must be mastered in the 21st century are critical thinking and problem solving, collaboration across networks and leading by influence, agility and adaptability, initiative and entrepreneurialism, effective oral and written, accessing and analyzing information, and also curiosity and imagination (Wagner, 2008). The right learning model selection helps improve learning experiences and student competencies after completing learning. Educational success is determined in choosing and applying the right learning model (Asfani et al., 2016). The effective and efficient learning strategies improve student's learning experience. The ineffective and inefficient learning strategies used by teachers impact the teaching and learning activities (Biwer et al., 2020). Student's learning experience increase their involvement in learning (Bizimana et al., 2020).

Implementing Learning Resources or Leaning Media

Figure 4 shows the selection and skills in using sources or media in product-based learning increased by 88.37% compared to using conventional learning. These results show the use of learning resources or media in teaching and learning activities using industrial product-based learning meets very good qualifications.

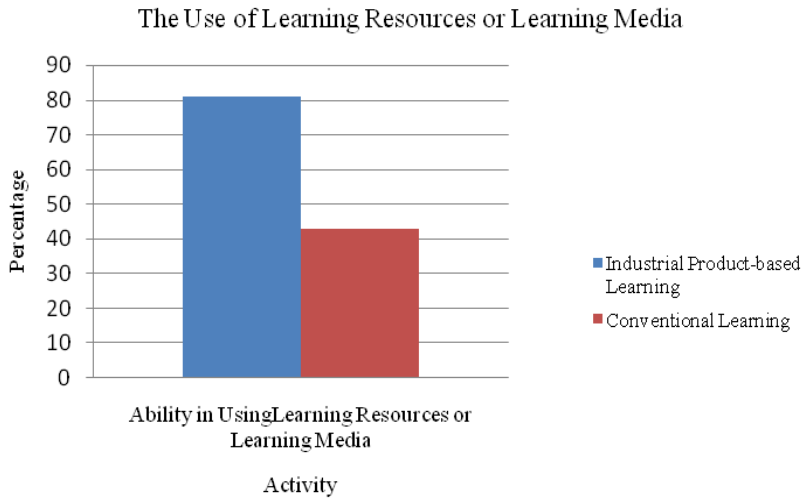

Figure 4. The Use of Learning Resources or Learning Media

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Table 5 shows that *U* value is 6.000 and wilcoxon value is 216.000. If converted to *Z* value, the result is -5.510. If the p value is < of .05, there is a significant difference between groups using industrial product-based learning with conventional learning in utilizing learning resources and media. The difference is seen in utilizing learning resources or media in both models, such as selecting sources or media, and skills in using resources and media in implementing learning. The use of learning resources or media with the industrial product-based learning is more effective and efficient in achieving learning objectives, so the teaching and learning process is easier, more concrete, and relevant to the learning objectives, and increases student motivation. Learning sources or media are important elements in teaching and learning activities to make it easier for students to improve understanding and learning outcomes, and to obtain maximum and understandable learning outcomes. The use of learning media or resources in industrial product-based learning can stimulate learning motivation to enhance the experience and understanding of learning innovations. The right approach and method in learning can increase motivation and value of education (Gregoriou, 2019).

Table 5. The Result of Data Analysis in the Use of Learning Resources or Learning Media

	The Use of Learning Resources or Learning Media
Mann-Whitney *U*	6.000
Wilcoxon *W*	216.000
Z	-5.510
Asymp. Sig. (2-tailed)	.000
Exact Sig. [2*(1-tailed Sig.)]	.000[b]

Student Involvement in Learning

Activities to foster active participation through interactions using industrial product-based learning increased by 38.98% compare to conventional learning. The openness in responding students in product-based learning increased by 26.56% compared to using conventional learning. Activities to foster critical thinking, cooperation, creative and communication attitudes have increased by 38.00% compared to using conventional learning. The involvement of students in product-based learning has very good qualifications, these results are as shown in Figure 5.

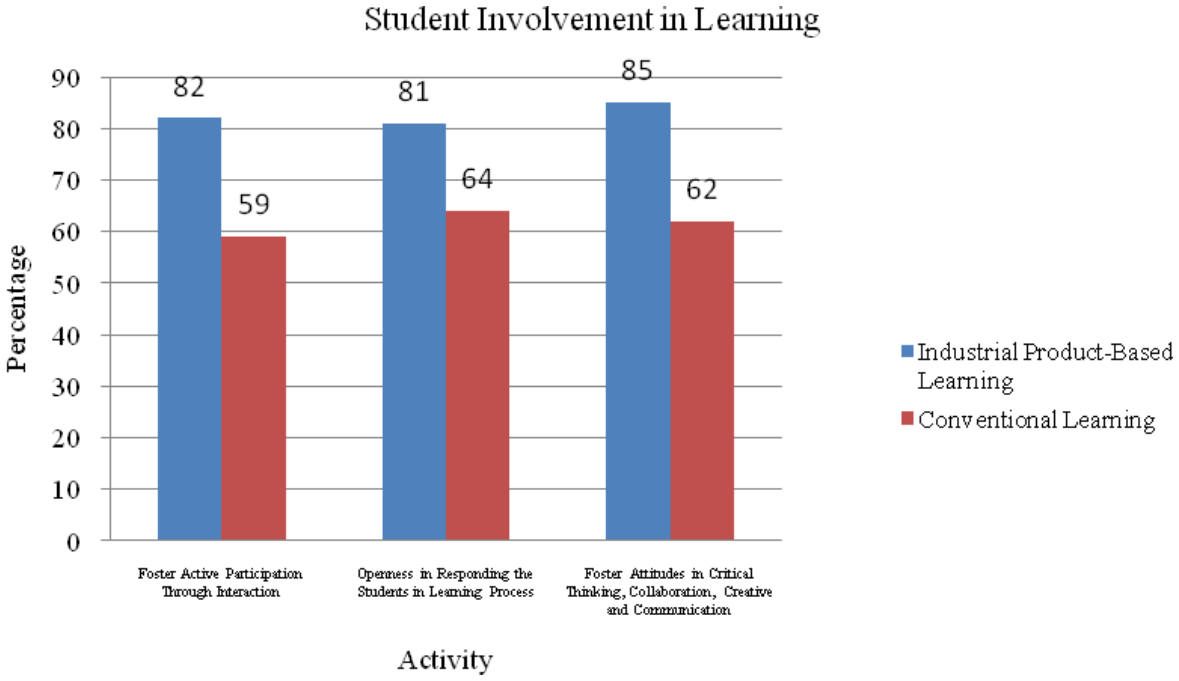

Figure 5. Student Involvement in Learning

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Table 6 shows *U* value is 26.000 and wilcoxon value is 236.000. The result of the conversion of that value to the *Z* value is -4.857. If the p value < .05, there is a significant difference between the group using industrial products-based learning and conventional learning in involving students in implementation of learning. The difference in the involvement of students in teaching and learning activities from the two learning models is in the ability to foster active participation through interaction, openness of teachers in responding to activities, and fostering critical thinking, collaboration, creative and communication attitudes of students.

Table 6. The Result of Data Analysis in the Student Involvement in Learning

	Student Involvement in Learning
Mann-Whitney *U*	26.000
Wilcoxon *W*	236.000
Z	-4.857
Asymp. Sig. (2-tailed)	.000
Exact Sig. [2*(1-tailed Sig.)]	.000[b]

The use of this model is able to foster active participation through interaction, increase openness in responding the students in learning process, and foster attitudes in critical thinking, collaboration, creative and communication. Industrial products-based learning is able to increase student learning participation by promoting active learning. The model can also improve student communication and collaboration skills (Suswanto et al., 2017). Industrial product-based learning allows students to work together to solve real problems or challenges. Project diversity requires a lot of competencies from a variety of scientific disciplines, so students can increase their knowledge and development of complex technology, solve problems and think critically, and collaborate with teams for many types of work.

Closing Learning

The involvement of students in conducting final reflection increased by 26.98% compare to using conventional learning. Closing learning through written or oral evaluation has increased 23.08% compare to conventional learning in closing learning process. Follow-up learning increases 69.39% when compare to using conventional learning. The closing activity for industrial products-based learning has very good qualifications, these results are as shown in Figure 6.

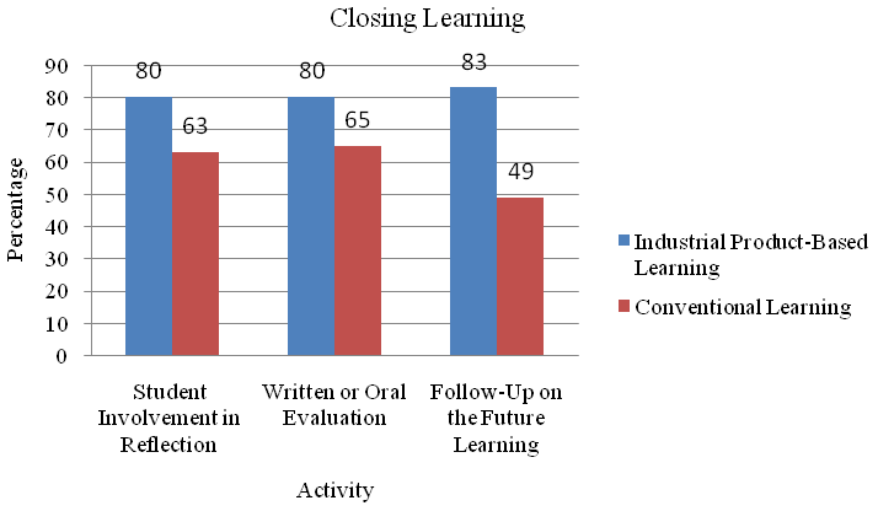

Figure 6. Closing Learning

U value is 17.000 and *W* value is 227.000. This value when converted to a *Z* value is -5.020, Sig or *P* Value of 0.000 (p < .05). Because the p value < .05, there is a significant difference between the two groups in closing learning activities as shown in Table 7. The difference in closing

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learning activities between industrial products-based learning and conventional learning model is in doing reflection involving students, conducting written or oral evaluations, as well as follow-up on future learning activities.

Table 7. The Result of Data Analysis in Closing Learning

	Closing Learning
Mann-Whitney *U*	17.000
Wilcoxon *W*	227.000
Z	-5.020
Asymp. Sig. (2-tailed)	.000
Exact Sig. [2*(1-tailed Sig.)]	.000[b]

The implementation of closing learning in industrial products-based learning can increase student involvement in reflection, written or oral evaluation, and also follow upon future learning. These results show that closing learning activities can measure the level of student's and teacher's success in the implementation of learning especially in follow up on future learning. Measurement of success in industrial products-based learning is part of evaluation step. The success of the learning process is determined from the process and the suitability of the products. The success of the learning process measure by presenting the manufacture of industrial products from planning to producing of expected products. Each group presents the process of making products that appropriate with the objectives and application of the learning model accompanied by the teacher. Intergroup discussions allow students to improve self-reasoning, communication skill, practicing to work together. The results of the discussion as part of the evaluation will be use to improve the next performance. Evaluation of machining industry products is done by the teacher after presenting an evaluation of the implementation of learning process. Product evaluations use industry standard references. Instrument of product evaluation is in the form of dimensional accuracy, level of surface flatness, profile accuracy, timeliness of workmanship, and work safety. Limitations in the implementation of industrial products-based learning through the alignment of competencies such as the involvement of the industry in the implementation of learning, the involvement of process and product evaluations, exchange of resources, time synchronization of learning activities, and business planning assistance after the product is finished. The limitations need to be developed for the future implementation.

CONCLUSION

Based on the research findings, some conlusions are drawn, elaborated as follows. (1) Giving apperception and motivation process in implementing industrial product-based learning is better compared to conventional learning in Machining Practices. (2) Mastering the material process in implementing industrial product-based learning is better compared to conventional learning in Machining Practices. (3) Implementing strategies process in implementing industrial product-based learning is better than conventional learning in Machining Practices. (4) Applying learning resources or using media process in implementing industrial product-based learning is better than conventional learning in Machining Practices. (5) Involving students process in implementing industrial product-based learning is better than conventional learning in Machining Practices. (6) Closing process in implementing industrial product-based learning is more meaningful than conventional learning in Machining Practices. (7) There is a significant difference in giving apperception and motivation in the implementation of industrial product-based learning compared to conventional learning in Mechanical Practices. (8) There are significant differences in mastering material in the implementation of industrial product-based learning compared to conventional learning in Mechanical Practices. (9) There are significant differences in the application of strategies in the implementation of industrial product-based learning compared to conventional learning in Mechanical Practices. (10) There are significant differences in the application of learning resources or media in the implementation of industrial product-based learning compared to conventional learning in Mechanical Practices. (11) There is a significant difference in student involvement in the imple-

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mentation of industrial product-based learning compared to conventional learning in Mechanical Practices. (12) There is a significant difference in closing the learning process when implementing industrial product-based learning compared to conventional learning in Mechanical Practices.

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ENHANCING E-LEARNING EFFECTIVITY THROUGH THE DISCUSSION METHOD COMBINED WITH E-PORTFOLIO ASSIGNMENTS FOR VOCATIONAL EDUCATION MASTER STUDENTS DURING A PANDEMIC

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Abstract

Discussion is one of the effective methods to make the e-learning condition to be student-centered. However, the use of the discussion method only focuses on specific issues, so that it could not explore broader knowledge and obtain feedback from many sources. The study aims to get the impact of using the discussion method combined with e-portfolio assignments on e-learning during the Covid-19 pandemic in students' perceptions perspective. This research has been carried out with a simple procedure using a survey approach. The research subjects are students of the Vocational Education Master Degree who participated in the Vocational Learning Theory and Strategy course. The research instrument is a closed questionnaire to explore student perceptions, including 8-aspects, using statements with options on a 4-degree Likert scale. The average perception level for each aspect is the total score divide by the total maximum score of the research subjects. Perception is declared good if the ratio is above 80%. The results showed that e-portfolio assignments combined with the discussion method in e-learning gave positive student perceptions. Students feel that an e-portfolio is a learning tool that can increase learning effectiveness, provide useful feedback, help carry out self-assessments, and increase interaction between teacher and student. The results also show that the students gave a positive perception to the e-portfolio as a tool that is easy to use, useful, systematic, motivating, and effectively to improve learning outcomes. In general, this result shows that e-portfolio tools can increase the effectiveness of e-learning.

Keywords: *enhanching e-learning, e-portfolio, vocational education*

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INTRODUCTION

The coronavirus's current spread has reached pandemic levels and crossed territorial boundaries on an extensive scale. This situation has a direct impact on all aspects of human life, including education. Through his reportage, Rajab (2020) reports that in March 2020, the United Nations Educational, Scientific and Cultural Organization (UNESCO) has declared that the world of education has felt the pandemic's impact. This condition has caused nearly 300 million students worldwide to be disturbed in their school activities and threatened their future educational rights.

The world of education is currently adapting so that school management and learning activities can continue. Before, many countries have used online learning activities implemented in a blended scenario with face to face. During a pandemic, education authorities in almost every country have established policies to implement fully online learning.

Online learning is one of the e-learning types. The definition of e-learning is very dynamic; it changes from time to time following the development of technology that supports it. Basak et al. (2018, pp. 194-195) concluded that the definition of e-learning is related to the terms mobile and digital learning. The study stated that e-learning is learning supported by digital electronic tools and media, and mobile learning is e-learning using mobile devices and wireless transmission. Meanwhile, digital learning is a type of learning facilitated by technology or instructional practices that make effective use of technology in all fields and domains of learning. There are some differences between them, mobile learning is the subset of e-learning, and digital learning is the combination of e-learning and mobile learning.

Waldrop (2013), Mornal et al. (2014), Knox (2014), and DeBoer et al. (2014) in Cope and Kalantzis (2017, p. 3) said that there are two categories of e-learning environment: new and traditional locus of learning that is being changed by technologies influence. Striking new locus forms are the rise of fully online learning and virtual school, the phenomenon of MOOCs, and open education. Traditional learning locus is also changing, including blended and ubiquitous, extending the range of classical classroom interactions beyond the physical classroom and class time.

In the constellation of education type, the experts have been placed e-learning as part of distance learning. However, other experts view both as the same. As statd by Traxler (2018, p. 2), online learning, digital learning, e-learning, and virtual learning are synonymous and interchangeable and are merely the preferred delivery mechanism for most distance learning. By referring to those views, e-learning is very appropriate to support learning during a pandemic. Implementing the education authorities' policies is mostly aimed to ensure a safe distance between teachers and students in the learning processes. Thus, the learning approach chosen must provide support for remote content delivery, so e-learning is the right choice.

Actually, as a learning tool, e-learning has many advantages. Gon and Rawekar (2017, p. 24) explained that e-learning can give learning outcomes that are not significantly different from learning outcomes using the face-to-face learning method. Meanwhile, other reports show that e-learning is an excellent tool for providing students flexible time, enabling them to study and do other work simultaneously, promising high productivity, and increasing student effectiveness in learning (Mobo & Sabado, 2019, p. 104). Moreover, if it is carried out by students using a learning style in line with the character of the subjects, e-learning will impact increasing high learning achievement (Surjono, 2015, p. 121). However, the use of e-learning without considering students' problems will make this learning ineffective. Some issues in the use of e-learning include: students feel contemplated, isolated, and lack of interaction or relationships, therefore, needed strong motivation and time management skills to reduce these effects (Arkorful & Abaidoo, 2015, p. 34).

Embedding the discussion method in an e-learning process can reduce or even eliminate these problems. Many studies have shown that beside can reduce students' loneliness in learning, the discussion method provides high effectiveness in an e-learning process. Through the discussion method, e-learning can improve students' critical thinking, involve students actively in the learning process, improve class learning achievement, provide problem-solving activity, accommodate individual needs, and increase student motivation (Laal & Ghodsi, 2012, pp. 486-487). Using the discussion method in e-learning activities will no longer cause students to be alone but feel they have a study partner in the knowledge acquisition processes.

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Although the discussion method, especially the collaborative small-group method used to support e-learning, has advantages, students only focus on specific problems. Therefore, doing activities for gaining broader knowledge cannot be carried out through this method. On the other hand, in Vocational Learning Theory and Strategy course at the Vocational Education Master Degree, students need to receive a lot of knowledge and feedback from various sources to build comprehensive knowledge. If the method used is an only online discussion, it becomes insufficient to achieve the learning objectives.

Recent research on the online discussion method shows that this method has weaknesses due to the emergence of factors that play a role in individual learning outcomes through group discussions. The study from Stenlund et al. (2017, p. 145) shows that even though 98 respondents have given the written feedback on the group discussions were carried out, it still does not provide a significant effect on increasing knowledge, so this method becomes ineffective. The research recommends that teachers avoid using excessively group discussion as a learning method. There are other exciting study findings that students do not need more than the learning methods. On the contrary, they need something else, namely, the results of learning reviews that are more real from teachers or peers.

This study has previously described that the students need to obtain knowledge and feedback from many sources and review learning from a teacher and other friends. Based on these facts, beside using the discussion method, e-learning needs to be equipped with additional tools to accommodate these needs. E-learning also needs to be equipped with tools for enabling high-order thinking assessments such as applying, comparing, analyzing, synthesizing, evaluating, interpreting, and reflecting. An E-portfolio is one of the means appropriate to support these needs.

The word e-portfolio consists of the letter e, which means electronic, and the word portfolio. There has been much understanding about portfolios since schools first used this learning tool in 1980. Technology developments have changed the portfolio form, from physical files to electronic files, so the term has also changed to e-portfolio. Citing the Cyprus Pedagogical Institue (2015), Poole et al. (2018, p. 3) stated that the e-portfolio concept originated from its predecessor, the traditional paper-based portfolio. Furthermore, they said that both have the same educational goals as storage, display, and assessment media. One of the differences between the two is data management; the traditional manages manual data while the e-portfolio organizes digital data. More specifically, e-portfolios are digital representations of students' work and accomplishments, along with their reflections on learning. The e-portfolio can enhance student learning through the process of collecting, selecting, reflecting, and sharing (Buyarski et al., 2017, p. 8)

The first consideration that must be decided when implementing an e-portfolio is the technology that will be involved. E-portfolio technology provides a collaborative workspace and online repository for learning artifacts, allowing students to create websites showcasing and reflecting on artifacts for a particular purpose (Benander et al., 2017: 99). Based on this definition, the teacher can implement an e-portfolio tool using the web to make students more accessible. The other researcher has also given an e-portfolio definition with applying the web as the basis for development. Eynon and Gambino (2017, p. 1) define student e-portfolios as an attractive element of a web-based digital learning ecosystem that provides facilities for collecting learning artifacts such as scientific articles (papers), multimedia projects, sounds and images, and related reflections focused on the learning process and the growth of student knowledge. The development of a web-based e-portfolio allows one's learning process to be seen by other students in the group, teachers, and even by audiences, depending on the publication's arrangement.

The metamorphosis of the portfolio into an e-portfolio has implications for the increasing number of new functions facilitated by this tool. The students have more convenience in compiling content and, at the same time, being able to present exciting portfolios for themselves and others. In general, by citing Barret and Garret (2009), Macias (2012, p. 502) said that e-portfolios would facilitate content management and collaborative work, allow students to keep notes electronically, and link ideas from multiple sources.

As previously described, the definition of e-portfolio is very diverse. It also has many classifications, and experts have classified these learning tools in various forms. Baumgartner (2009) as quoted by Slepcevic-Zach and Stock (2018, p. 293), divides the types of e-portfolios into reflection

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portfolios, development portfolios, and presentation portfolios. Meanwhile, Greenberg (2004) and Barnett (2007) quoted by Mohammed et al. (2015, pp. 329-330), both identified the following three types of portfolios: learning portfolios, presentation portfolios, and evaluation portfolios. This study uses a learning e-portfolio, in which students can collect the ideas as students' reflections on each lesson followed.

There is currently much software that can provide e-learning management functions so that teachers can do their implementation quickly and easily. Software that provides this function is called a Learning Management System (LMS). Some of the LMS software widely known today are Blackboard, WebCT, FirstClass, and Moodle. Generally, LMS has features such as delivering lesson content, online class transaction arrangements, tracking and reporting student progress, assessing learning outcomes, reporting on achievement and completing assignments, collaborative learning arrangements through discussion forums, and setting student documents.

The use of LMS is mostly oriented towards asynchronous online learning with content in various forms, from the text, images to videos that can be accessed by students. Also, this LMS provides feature activities for discussion. This study uses the LMS application from Moodle, which provides a comprehensive content management function. In addition to content in the form of text, images, and videos, the learning used in this study is complemented by two main activities, namely the Discussion Forum and the task of compiling an e-portfolio using the Wiki module (mini blog) available in the Moodle LMS.

Many experts and researchers before have studied the role of e-portfolios as a learning tool that can increase learning effectiveness and be well accepted by students. Macias (2012, pp. 505-506) reports that embedding an e-portfolio approach in a lesson that contains collaborative discussion activities makes students who follow the project-based learning method: (1) agree that e-portfolio as a learning tool that useful, practical, systematic, motivate, and assist the self-assessment process; (2) appreciate the usefulness of the feedback provided by the e-portfolio; (3) agree that e-portfolios can provide mechanisms for building fundamental interactions and are easy to manage, navigate and learn. In general, this research has shown that e-portfolios, combined with collaborative discussion methods, will provide positive perceptions to increase student motivation.

Another survey shows that because students feel that its use can improve learning outcomes and motivate them, they also decide to use e-portfolios continuously, and even outside their majors, especially as a tool for (1) collecting artifacts of knowledge (papers, videos, pictures, voice) and projects in the real world; (2) assist in self-assessment; (3) receive feedback and comments from teachers and other students; and (4) tools to pursue a career (Thibodeaux et al., 2017, p. 7). This view has reinforced that students very accept the use of e-portfolios. The students desire to use it not only as a course requirement but also to support their progress.

A study from other researcher shows that it is more interesting because it turns out that the use of a portfolio can: (1) be a medium for students to demonstrate their higher-order thinking skills in a digital space; (2) offers an excellent opportunity to reflect on their undergraduate career; and (3) become a tool for institutions to assess the knowledge and skills students have acquired throughout the curriculum (Morreale et al., 2017, p. 22).

Beside being used for elementary and middle school students, the portfolio also provides effective learning outcomes for higher education students. Research by Scholz et al. (2017, p. 149) shows that e-portfolios can help support college students in integrative and experiential learning. For the learning process using e-portfolios to be effective, this study provides recommendations teachers have to ensure that students' e-portfolio assignments will be relevant to the desired learning outcomes. Teachers have to monitor the writing of the e-portfolios by students periodically; for example, every time they finish a lecture session. Teachers did it for matching the content written in the assignment with the lecturer's material. This control brings a dilemma because, on the one side, the teacher must always make adjustments so that the portfolio written by students is relevant to the course material. Still, on the other hand, the teacher needs to provide sufficient freedom to express their ideas in an open-ended manner.

E-portfolios are also useful in raising students' self-awareness (reflection) of the achievements. The results of research conducted by Slepcevic-Zach and Stock (2018, p. 299) show that by using e-portfolios, the majority of students who are research subjects have found previously un-

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known competencies themselves. The research also found that students become more aware of their competence, better understand themselves, describe themselves better, and feel more capable than they think. This study also shows they become engaged in deeper self-reflection and better formulate competencies and better utilize them. Based on its character, which can generate thinking or reflect, an e-portfolio is very appropriate for a learning tool combined with the online discussion method. In this case, the key to the discussion method's success is the emergence of students' ability to reflect on their learning achievements.

Another study related to the advantages of e-portfolios found that this learning tool can facilitate knowledge sharing and creative thinking activities, and teachers can integrate it with every subject (Chang et al., 2018, p. 39). Through this study, the researcher also found that e-portfolio could help students create new ideas. E-portfolios can facilitate knowledge creation, provide support for reflection activities, self-assessment, peer observation and imitation, peer assessment, and peer feedback.

Based on the description of the various advantages of e-portfolios before, this study can argue this learning tool is very appropriate for use in e-learning learning. In this way, students will gain knowledge from various sources and feedback (reviews) from multiple groups, such as from their peers or teachers. This study investigates responses in student perceptions of using e-portfolios in e-learning, combined with online discussion methods. The methods and classroom settings in this study differ from previous research. This study uses master program students as a research subject for Vocational Education Learning Theory and Strategies lesson. This study also uses the Wiki or Mini Blog features in the Moodle LMS that have never been used on previous studies reviewed.

RESEARCH METHOD

This study is simple to research in the form of a survey of respondents. The research subjects were students of the Vocational Education masters degree at Ahmad Dahlan University as the Vocational Education Learning Theory and Strategy course participants. They are students for the 2018/2019 and 2019/2020 academic years who had participated in the e-learning learning with the group discussion method equipped with an e-portfolio of 53 people. The research sample used the last batch of students as many as fourteen people.

The research instrument is in the form of a closed questionnaire to explore students' perceptions, using statements that have options on a 4-degree Likert scale, namely: 1: strongly disagree; 2: disagree; 3: agree; 4: strongly agree. This study explored eight factors of perception include; six were adopted and developed from the research of Macias (2012) and two others from Chang et al. (2018) and Scholz et al. (2017), as shown in Table 1.

Table 1. The Factor of Perception to E-portfolio

Factor	Source
Capacity	Macias (2012)
Feedback	Macias (2012)
Self-assessment	Macias (2012)
Student-Teacher Interaction	Macias (2012)
Student-Platform Interaction	Macias (2012)
Learning Processes	Macias (2012)
Generating New Idea	Chang et al. (2018)
Learning Integration	Scholz et al. (2017)

Each factor has five statement items as an indicator so that the complete statements in the questionnaire are 40 pieces. The instrument testing in this study was only conducted with a content validity approach. Based on Table 1, all instrument items have been derived from factors that support the concept of perceptions of e-portfolios so that researcher has confidence that all instrument items are valid. This study does not test the reliability of the instruments used. Questionnaires were given to subjects after the teacher carry out the learning process.

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In this study, the researcher has designed e-learning using the Moodle application. Beside installing the downloaded facilities, the teacher, as a researcher, also provide a Forum Application to facilitate group discussion activities and a Wiki application (Mini Blog) to support e-portfolio writing activities. The teacher has carried out the e-learning process in 14 virtual meeting sessions.

Data analysis of the student perceptions of the e-portfolio was carried out using the ratio formula. The average perception level for each factor is the ratio between the total score to the total maximum score of the research subjects. Perception is declared good if the ratio is above 80%.

RESULTS AND DISCUSSION

By scoring the data obtained, the results can be presented as in Table 2. Based on Table 2, this study's results indicate that students view the e-portfolio as having an adequate capacity as a learning tool. However, one capacity indicator is perceived to be less practical than others, as presented in Figure 1.

Table 2. Score of Perception to E-portfolio

Factor	Score	Percentage
Capacity	3.43	85.7%
Feedback	3.67	91.8%
Self-assessment	3.29	82.1%
Student-Teacher Interaction	3.26	81.4%
Student-Platform Interaction	3.37	84.3%
Learning Processes	3.23	80.7%
Generating New Idea	3.10	77.5%
Learning Integration	3.16	78.9%

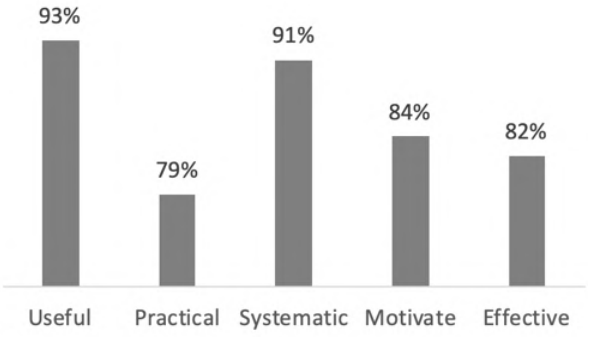

Figure 1. Perception of E-portfolio Capacity Indicators

With only 79% perception of practicality indicators, the results of this research show that e-portfolios are considered less practical as a learning tool. This result can happen because students first find it difficult to operate the Wiki application as an e-portfolio support on the Moodle platform. Students begin to adjust after several lecture sessions to give the impression that it is less practical. However, research data shows that e-portfolios are useful in improving learning, systematic, motivating, and effectively improving learning outcomes. The students' awareness of the usefulness of e-portfolios makes them enthusiastic about using this tool for other workshops in the future, as in Ciesielkiewicz (2019, p. 660).

This study also found that the feedback facility on the e-portfolio has been able to help students improve their material descriptions, improve the communication process with lecturers and other friends, and help improve learning progress. Combining this e-portfolio learning tool with the Forum feature has enriched students' materials with the discussion results. These results indicate an inline with the findings in Macias (2012, p. 5) research.

Students consider e-portfolios a useful tool for improving learning outcomes in the self-assessment factor. However, two indicators have not had a good perception, as shown in Figure 2.

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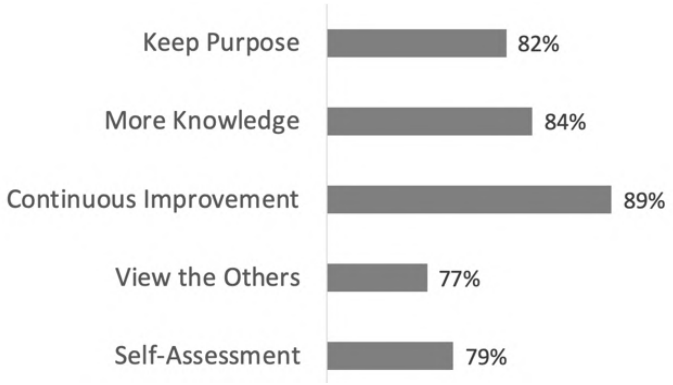

Figure 2. Perception of E-portfolio Self-Assessment Indicators

The facts in Figure 2 show that students could not fully utilize the e-portfolio as a self-evaluation tool. It is assumed that in the learning process, students perceive that the e-portfolio is just as a requirement for attending lectures only. In this case, there is not an awareness of the importance of e-portfolios as part of learning tools that can be used to improve learning.

Actually, the e-portfolio is used by students to share information by seeing each other. However, with a perception score of only 77% on the View the Others indicator, it has shown that e-portfolios have not functioned as a media for sharing information. Perhaps this situation arises because the View facility provided by the Wiki application is not user friendly, so students are reluctant to see other friends' writings.

Students also consider e-portfolios a learning tool that can increase interaction between students and lecturers, increase online discussions and collaborations, and create dynamic lecture situations. E-portfolio also can involve lecturers and students and assist in obtaining study guidance from lecturers and friends.

The data analysis results also found that students feel easy and comfortable to use e-portfolio learning tools embedded in e-learning to compile learning outcomes. Also, they did not take long to adjust the features provided. In general, the survey results show that e-portfolio learning tools are perceived positively by students in the interaction of student-platform factor. Other research of Morreale et al. (2017, p. 17) shows the same results, of the 14 students who responded to the survey, mostly showing an increase in their use of digital media platforms (average 3.36/4.0) and an increase in the likelihood of using their technical skills in other digital media projects in the future (average 3.64/4.0).

This study also found that in the learning process factor, students generally gave a good perception of the e-portfolio tool as a tool that could increase learning effectiveness, even though two indicators were perceived as unfavorable, as shown in Figure 3.

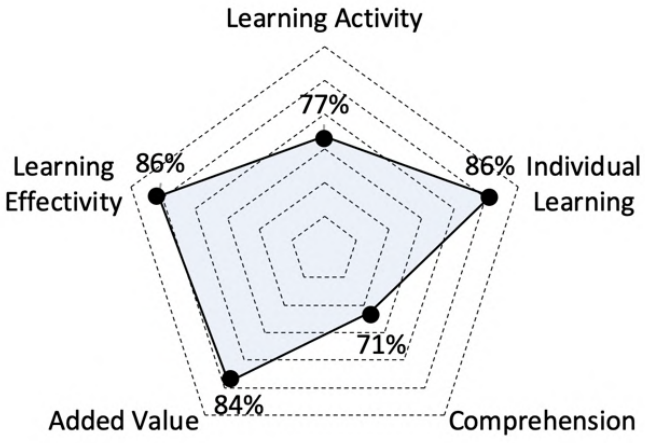

Figure 3. Perception of E-portfolio Learning Process Indicators

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The aim of using e-portfolio is to increase student learning activities. Still, the fact shows that with only 77%, students feel that this tool does not encourage activity, especially in exploring material from various sources. Perhaps, this condition, due to students' lack of awareness of the e-portfolio function, can easily collect knowledge artifacts (papers, videos, pictures, sounds). Even though if students can use e-portfolios as a tool to gather knowledge from various sources, these activities will increase their learning capacity (Thibodeaux et al., 2017, p. 7). This condition ultimately affects students' perceptions of indicators of comprehensive learning outcomes. Students feel that the e-portfolio has not been able to gain extensive knowledge, which is shown by the percentage of perceptions of only 71%.

This research can also obtain the information that students gave a positive perception of e-portfolios in generating new ideas. However, there are three indicators in this factor that are perceived as unfavorable by students.

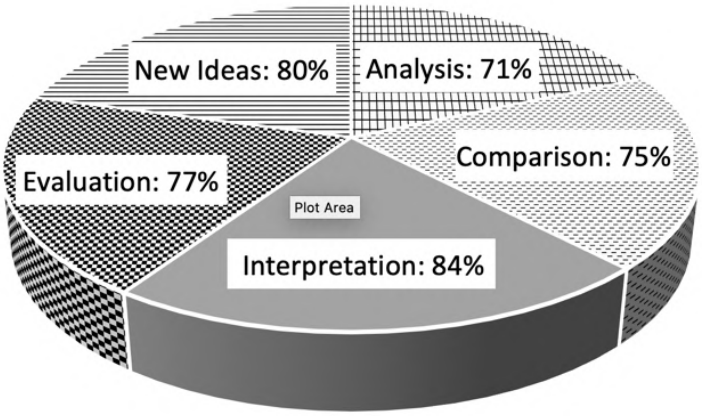

Figure 4. Perception of E-portfolio New Ideas Indicators

Referring to Figure 4, students feel they cannot use e-portfolios as a tool for conducting analysis, comparison, and evaluation. Perhaps, this condition is due to students not having sufficient opportunities to practice high-order thinking skills. Students should obtain skills like this through discussion activities. However, based on the observation of the e-learning web page, the discussion is just a response to meet the requirements for attending lectures, not intensive analysis, comparison including evaluation activities. Besides, most e-portfolio content descriptions are knowledged kind, so it cannot provide practice to increase high-order thinking skills. On the other hand, students perceive that e-portfolios are good to interpret the concepts learned and develop new ideas.

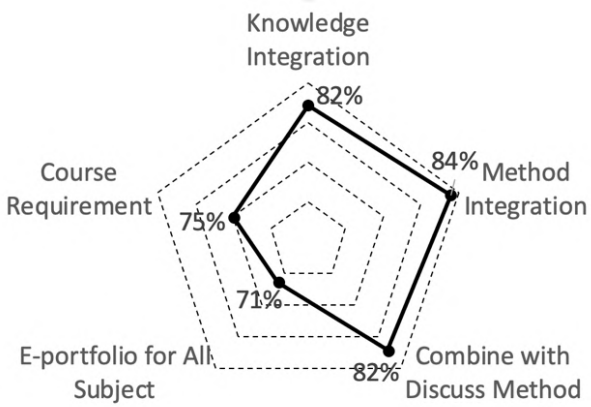

Figure 5. Perception of E-portfolio Learning Integration Indicators

In the factor of Integration of Learning, this study found that students gave a positive perception of the ability of e-portfolios as a tool that can combine knowledge from various sources. They also consider that effective e-learning is not sufficient if supported by discussion method only, so

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combining the discussion method with e-portfolio assignments increases learning effectiveness. However, this study also found that two indicators did not get a good perception, as in Figure 5.

By only getting a score of 71%, this study shows that students are still unwilling to use e-portfolio learning tools for all the subjects they follow. This condition happens because students consider that e-portfolios are just a requirement for attending lectures only, not yet perceived as a useful tool to improve learning outcomes.

According to Table 2, this study's results are relatively similar to Macias research outcomes. For all aspects except Student-Teacher Interaction, this study gives a score on that aspect of 82%, far exceeding the previous research score of only 63% (Macias, 2012, p. 506). This result is rational because, in previous studies, e-portfolio assignments were given in a Project-based Learning scenario, where teacher involvement was very little. In this study, the e-portfolio task was embedded in an online discussion method that involved many lecturers interacting with students, so that this aspect score was high. This study also found that e-portfolio assignments are suitable for both undergraduate and postgraduate students, such as previous and this study results.

Compared to previous research, for Generating New Ideas, this study gave a score of 77.5%, which is almost the same as the score produced by Chang et al. (2018, p. 36) of 77.4%. The fundamental difference between this study and previous research is the analysis used. Previous studies have tried to find the correlation between Generating New Ideas and the attitude of sharing knowledge factors. In contrast, this study tries to describe the perception level only of Generating New Idea as one of the e-portfolio response factors.

For the Learning Integration factor, this study obtained an average score of 78.9%. The results are sufficient to view that students have a good perception of the e-portfolio as the bridge for connecting outside knowledge with the course material. However, when viewed from the factors, there is a low perception. As explained earlier, one of the interpretations of Figure 1 is that students perceive that the e-portfolio assignment only fulfills the course requirements. This accident is also happening to students abroad, such as in Scholz et al. (2017, pp. 143-144). That research compares the learning outcomes of students who perceive e-portfolio activities as part of the learning assessments and other groups with opposing views. Meanwhile, this study is limited to exploring the e-portfolio indicator's perception as a medium for integration learning.

By referring to Table 2, the self-assessment factor obtained a score of 82.1%, show that e-portfolios provide a perfect perception in helping self-assessments. The other studies indicate the same results; e-portfolios are very helpful as a self-reflection media (Morreale et al., 2017, p. 19; Slepcevic-Zach & Stock (2018, p. 291). However, a research by Buyarski et al. (2017, p. 54) has shown different results. They have found that the self-assessment factor only obtained a score of 40.5%. This result is presumably because the scoring rubric refers to ideal educational goals and critical thinking that new students cannot fully understand.

Overall, this research has shown that e-portfolio assignments embedded in the online discussion method provide a good perception, especially for vocational teacher students. E-portfolios can be used effectively in teacher training (Totter & Wyss, 2019, p. 69), can support systems related to teacher certification (Fuglik, 2013, p. 15), and can be a systematic tool to assess critical points of competence teacher students (Korhonen et al., 2019, p. 57).

CONCLUSION

This research has revealed that e-portfolio assignments combined with discussion methods in e-learning provide positive student perceptions. Students see that e-portfolio is a learning tool that can increase learning effectiveness, provide useful feedback, help make self-assessments, increase lecturer, and student interaction. The results also show that students consider the e-portfolio a tool that is easy to use, useful, systematic, motivating, and sufficient to improve learning outcomes. This study gives teachers recommendations for enhancing the e-portfolio based on the Wiki application to increase its practicality, be interesting to see, and be more helpful in self-assessment. Another suggestion is to improve methods combined with e-portfolios in providing training in high order thinking skills. Efforts to enhance e-portfolio performance for growing student awareness in the use of these tools as learning media also need to be pursued.

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BUILDING INTERDISCIPLINARY RESEARCH GROUP FOR VOCATIONAL COLLEGE UNIVERSITAS GADJAH MADA

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Abstract

This research aimed to form a collaborative research and research group in the Department of Languages, Arts and Culture Management, Vocational College of Universitas Gadjah Mada (Departemen Bahasa, Seni, dan Manajemen Budaya or DBSMB). This research is essential for considering DBSMB's needs in developing applied products as a result of interdisciplinary research. On a broader scale, vocational education institutions outside UGM can see an overview of the multidisciplinary research process that has been carried out. The research group was formed in the Culture and Tourism Center, which was based on a functional perspective of organizational functions. The exploratory method was carried out by observation, interview, and literature study. Interviews were conducted with informants consisting of the head of the Teaching Industry Learning Center (TILC), head of study programs, secretary of study programs, and lecturers at DBSMB. The results showed that each lecturer at DBSMB had different research interests. Lecturers' research interests had several intersections that could be made into collaborative research groups. The central theme of culture and tourism could accommodate research collaborations from lecturers in the study programs of Record Management, English, Tourism, Korean Language, and Japanese Language. The challenges in the formation of the research group came from internal factors (communication, funding, and infrastructure) and external factor (collaboration with industry, policy differences, administrative procedures, and interests in research). This research was expected to contribute to the formation of a research group in other vocational education institutions and affect the improvement of vocational graduates' quality and scientific development.

Keywords*: research group, collaboration, vocational education*

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INTRODUCTION

Education and capacity building for human resources always become an issue to be discussed in Indonesia. One of the issues is vocational education, which is expected to meet the increaseingly diverse needs of the industry. In addition, it was stated by the President of the Republic of Indonesia (Ihsanuddin, 2019) that vocational education and training must be improved so that they can identify their goals. The arising problem of vocational education is how to adjust (link and match) with the industrial world. Triyono (2017, p. 2) explained that vocational education must adjust to the work field's needs, which leads to a more flexible vocational education, which can adapt quickly to changes.

Significant changes in vocational education are needed because of the rapid changes in industry and community demands due to developments in information technology. The work field in the recent days and the future have shown the tendency to use various digital devices; a very rapid change of both goods and services industry work field has begun with the industrial revolution 4.0 (Triyono, 2017, p. 2). Historically, the concept of industry 4.0 was first conceived by the German government (Shamim et al., 2017, p. 1), which promoted digitalization or computerization projects to increase German government revenues. Practical implications arise for vocational education, especially the availability of quality human resources who are able to adapt and have skills according to the current development. Shamim et al. (2017, p. 2) show that the challenges of Industry 4.0 are related to the need for continuous innovation and learning, depending on individual and organizational abilities.

More complex demand in vocational education requires serious effort, which involves various elements. Some of the efforts are by strengthening the relationship with the industries, developing sufficient infrastructure for learning activities, improving the education system, and preparing lecturers for innovative teaching and learning. Related to infrastructure, Sudira (2017) revealed that vocational education could be held in classrooms, workshops, laboratories, studios, or teaching factories. Furthermore, for bringing it closer to the real world, it looks better to have it conducted in business centers, edotels, technoparks, hospitals, clinics, fields, agriculture, livestock centers, fisheries, industrial places, work, business world, sports field, community, and so on. Provision of these learning facilities is not an easy effort but requires a struggle to improve the quality of vocational education in Indonesia.

The typical learning process is no longer relevant to vocational education. Sudira (2017) explains the concept of TVET (Technical and Vocational Education Training) that is important designed to develop the full potential of students to have work insight, work technical skills, employability skills, and carry out self-transformation towards changing demands on the new work world. Moreover, the employability skills themselves are split into five basic categories covering basic soft skills, analytical skills, digital and technical skills, core marketing skills and customer insight skills (Gregorio et al., 2019 p. 257). In a learning process, these skills are deemed crucial as they are viewed as well as the indicators for the quality of training (Espinoza et al., 2020, p. 8) and as foundation of career success for someone in a long term (Blokker et al., 2019, p.182). The development of the learning process must be supported by a learning center and laboratory to meet the challenge and demand of industry 4.0. Project-based independent learning, which is carried out in a learning center, can sharpen students' skills. This innovation needs sufficient infrastructure supports and human resources as the drive. The further objective of increasing students' skills and creating products is not easily achieved. Thus, the available human resources are expected to collaborate to answer the challenge in vocational education.

Vocational College Universitas Gadjah Mada has designed infrastructure improvement and lecturer readiness based on the problems and challenges in vocational education. In the infrastructure aspect, Vocational College UGM planned the construction of TILC (Teaching Industry Learning Center) in 2018. TILC has several centers of excellence which are aimed at a learning center and to strengthen the relationship (link and match) with the industries. TILC project has broader aims to improve the graduates' quality, become a new source of financing, as well as create more students' involvement in the issues in the field. Those are in line with what should be done by higher education as explained by Sackey et al. (2017, p. 50) that educational institution is similar to

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learning factories in terms of the contextualization by providing real-world experiences to four-sided wall learning space. At last, such institution are believed to be the right requirement to build e network between industrials and academic/research actors (Mavrikios et al., 2018, p. 5), and at some points, it brings the right learning environment needed (Mavrikios et al., 2019, p. 402) by bringing a multidisciplinary learning (Jooste et al., 2020, p. 379). Some laboratories built are essential assets for Vocational College UGM, which will be used for product and scientific development in the future.

The adequate infrastructure must be in line with the readiness of the human resources, which in this context refers to the lecturers. The lecturers are expected to suit themselves with the character of vocational education and adapt to a fast-changing environment. Some new competencies which must be mastered are teaching design, teaching and learning guidance, research on teaching content, research on teaching methods, career and interpersonal relationship guidance, management support for school and class, cooperation (Ye-weon Jeon et al. in Triyono, 2017, p. 4).

One of the critical collaborations which can be a foundation to run TILC programs is research collaboration. The research collaboration will encourage the development of knowledge and the creation of products to be used by the market. The collaboration can involve interdisciplinary studies, and in the future, it is expected to involve practitioners. On a broader scope, collaboration can also bring more benefits to answer the demand of the industries and the problems in society (Mann et al., 2020, p.447). The real-world problem's complexity cannot be solved only with one field. Thus, TILC is needed as a medium to bridge the researchers so that they can solve problems in society. It is also stated in a report by National Academies (2005, p.40) as follows.

> *Interdisciplinary thinking is rapidly becoming an integral feature of research as a result of four powerful "drivers." The inherent complexity of nature and society, the desire to explore problems and questions that are not confined to a single discipline, the need to solve societal problems, and the power of new technologies.*

In the beginning stage, the researchers focused on the initiation of the research group in the Department of Languages, Arts and Culture Management (*Departemen Bahasa, Seni, dan Manajemen Budaya* or DBSMB), Vocational College of Universitas Gadjah Mada (UGM), which was a tourism and culture center. The tourism and Culture Center was designed in order to accommodate interdiscipline research for the lecturers in the department, which covered the study programs of D3/D4 Records and Archives Management, D3/D4 English, D3/D4 Tourism, D3 Korean Language, and D3 Japanese Language. The mapping of research interest and research group initiation became an essential step in designing the learning center to facilitate interdisciplinary research. Such interdisciplinary research offers much benefit for knowledge integration (Ávila-Robinson & Sengoku, 2017, p. 40) and collaboration skills (Soto et al., 2013, p. 2154; Zuo & Zhao, 2018, p. 745).

Stakeholders initiated the formation of a research group in the learning center being designed (TILC) at the department and faculty level. This new learning center was expected to be used to develop knowledge and products. The creation of appropriate products and skills development based on the problems in the field could be done based on collaboration. The initial problem that the researchers were trying to reveal was related to the research interests of lecturers in the scope of the DBSMB at Vocational College UGM. The design of group research could be carried out later by the department to develop a new learning center, namely the tourism and culture center. Interdisciplinary research collaboration, of course, presented specific opportunities and challenges. Understanding the opportunities and challenges of collaborative practices in the tourism and culture center could maximize opportunities and minimize undesirable things due to external challenges.

This research is expected to contribute to the planning of the teaching industry at the department level so that the Tourism and Culture Center can be used to the maximum extent possible for product and scientific development. In a broader aim, it can be used by policymakers in the academic realm to prepare human resources in the teaching industry learning center in the future. Therefore, the teaching industry learning center will be seen as infrastructure, but are filled with quality human resources from various fields of study which are appropriate to their abilities and capacities in solving problems in the field.

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RESEARCH METHOD

This research used the exploratory study approach by using a mixed research method between empirical research and development. The focus of exploratory research is to obtain ideas and understanding of a problem so further research can be carried out and more directed (Hermawan, 2014, p. 82). The research setting was carried out at the Department of Languages, Arts and Culture Management (DBSMB), Vocational College of Universitas Gadjah Mada. Lecturers' research data and road map of their research interest was used to see the compatibility between teaching industry learning center needs and interdisciplinary research. This type of research has not much developed in the education field. An exploratory approach was then chosen to answer problems that have not been much studied before (Cohen et al., 2007).

The data used in this study included primary and secondary data. The primary data needed are research interest, the needs of study programs, and the Culture and Tourism Center. The secondary data needed are the data which have been previously documented, related to the research theme.

Data collection was done by several techniques, namely observation, interviews, and literature study. In-depth interviews were done to the research informants. The selected informants were the head of Vocational College's TILC, secretary of study programs of Records and Archives Management, English, Tourism, Korean Language, and Japanese Language as well as lecturers in DBSMB. The activities were done to explore the potential of each study program, including human resources, scientific development, facilities, and infrastructure, as well as potential collaboration. After that, a mapping was created to know the needs and various competencies to support the development of a cultural and tourism center. Focus Group Discussion involved the head and secretary from five study programs in DBSMB.

RESULTS AND DISCUSSION

The research group, which was designed by the researchers of this study, was formed based on several things, namely research interest, the direction of study program development, department development flow, and the design of the Teaching Industry Learning Center (TILC). In the smallest scope, which was individuals, the researchers tried to map research interests among lecturers in each study program. At the level of study programs, a road map for developing study programs was needed to clarify skills and academic development plans and needs which needed to be accommodated. At the department and faculty level, preparation of collaboration patterns needed to be designed to prepare funding and project support. There were needed for the implementation of programs to improve the skills and academic abilities of the academic community in a vocational college.

Research Map Interest

Groups are complex and dynamic systems (Berdahl & Henry, 2005, pp. 19–38). The initiation of a research group is not a simple work to do because it is related to building relationships among the individuals within the group. Some of the researchers had studied research group, including others Berdahl and Henry (2005), Cummings and Ancona (2005), and National Academies (2005).

National Academies (2005, p. 152) explained the factors related to the formation of the research group, which are the complexity of the existing problems in science and social studies, the need to explore the correlations of various branches of knowledge, and the need to solve social problems and stimuli to generative technology. The real-world problems can be used to bridge the collaboration of lecturers in the scope of department or vocational college.

Furthermore, Berdahl and Henry (2005) have reviewed the problems of the research group. Berdahl and Henry (2005, pp. 19–38) focused on several perspectives: psychoanalytic, social identity, communications, functional, developmental, systems, nonlinear dynamics, socioevolutionary, power conflict, and feminist perspectives. These perspectives can see several ways and methods which become the foundation of group formation.

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The psychoanalytic perspective explained that "humans are by nature 'group-ish'" and that group processes have biological bases (McLeod, Polley, and Geller in Berdahl & Henry, 2005, pp. 19–38). This perspective sees that group formation is a natural process where each experiences the dynamics of the problem in the group.

The second perspective is social identity (Hogg et al. in Berdahl & Henry, 2005, pp. 19–38), which is the process of group formation based on social identity. Further, it is explained by Berdahl and Henry (2005) that "this results in intercourse differentiation and intra-category assimilation." Inter-category refers to groups, whereas intra-category refers to individuals. It means that individuals adjust between goals and knowledge possessed (intra-category), so individuals need groups that can achieve them together (inter category).

The next perspective is a communication perspective that sees "how group members use symbols to construct interpretations of their group experience. It also focuses on how groups and their members are products of this symbolic activity" (Frey & Sunwolf in Berdahl & Henry, 2005, pp. 19–38). Therefore, language and symbols of information exchange are essential to be able to form and support groups.

Apart from the many perspectives which underlie group formation, the researchers used a functional perspective in the initiation of a research group in DBSMB. It was based on the perspective of organizational goals in group formation. It is in line with Cummings and Ancona (2005, p. 109), who tried to describe "how relevant the functional perspective is for understanding task-performing groups in organizations today." A functional perspective believes that the group will form properly according to ability, knowledge, and also the members who can work well. Conceptually, Wittenbaum et al. in Cummings and Ancona (2005, p. 107) defined the functional perspective as a normative approach to describing and predicting group performance that focuses on functions of inputs and processes. The use of functional perspectives for the research group formation focuses on organizational functions. However, it cannot ignore the right of each lecturer to conduct research based on their interests. Therefore, the designed research group still considered the research interests and expertise of lecturers in the DBSMB.

A project-based education system that is carried out in the learning center with the support of existing research groups is expected to contribute by solving complex vocational education problems. The demands for qualified products, services, and skills can be more natural to be fulfilled if the individuals within the organization collaborated with various parties. It is relevant to the statement of Kyvik and Reymert (2017, p. 950) that "... two or more people can do better work than if they work independently". Collaboration for vocational education can involve scholars, practitioners, as well as social institutions which have common interests. Further, supporting the statement, Beck et al. (2017, p. 535) stated that pitches might include (a) research interests and expertise, (b) selecting papers, slides, and tutorials, and also (c) common questions that each collaborator should answer.

Research interests and expertise of each lecturer became an essential foundation in the formation of research groups in the Culture and Tourism Center under the Department of Language, Arts and Cultural Management. Based on research interest data from 48 lecturers, the themes of lecturer interest are presented in Table 1.

Table 1. Research Themes by Lecturers and Study Programs

Study Program	Number of Lecturers and Interest
D3 Tourism/D4 Travel Business	13 lecturers with 28 research themes
D3 Archival Science/ D4 Records and Archives Management	9 lecturers with 21 research themes
D3/D4 English	17 lecturers with 31 research themes
D3 Korean Language	3 lecturers with 4 research themes
D3 Japanese Language	6 lecturers with 10 research themes

Based on the data in Table 1, in the D3 Tourism study program and D4 Travel Business, there were 28 themes of research interest from 13 lecturers. The research topics chosen were related to tourism, culture, culinary, management, and marketing. In D3 Record Management and D4 Archives and Records of Information Management, there were nine lecturers with 21 themes of re-

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search interest. The research topics were related to record management (dynamic and static), preservation of cultural collections, information security, and the use of technology in record management.

In the language cluster, there were D3 English, D4 English, D3 Korean Language, and D3 Japanese Language. Meantime, In D3 and D4 English, there were 31 themes of research interest from 17 lecturers. The topics studied include English, learning experiences, culture, tourism, and linguistics. In the D3 Korean Language study program, the chosen themes included culture, social economy, drama studies, and linguistics. The D3 Japanese Language study program was interested in the topics of culture, education linguistics, history and colonization of Japan.

The research topics of each lecturer in 5 study programs had a relationship with one another. This part of the research interest could be the basis for forming group research and fostering collaboration. Figure 1 presents research topics that could be collaborated based on the data of lecturers' research interest.

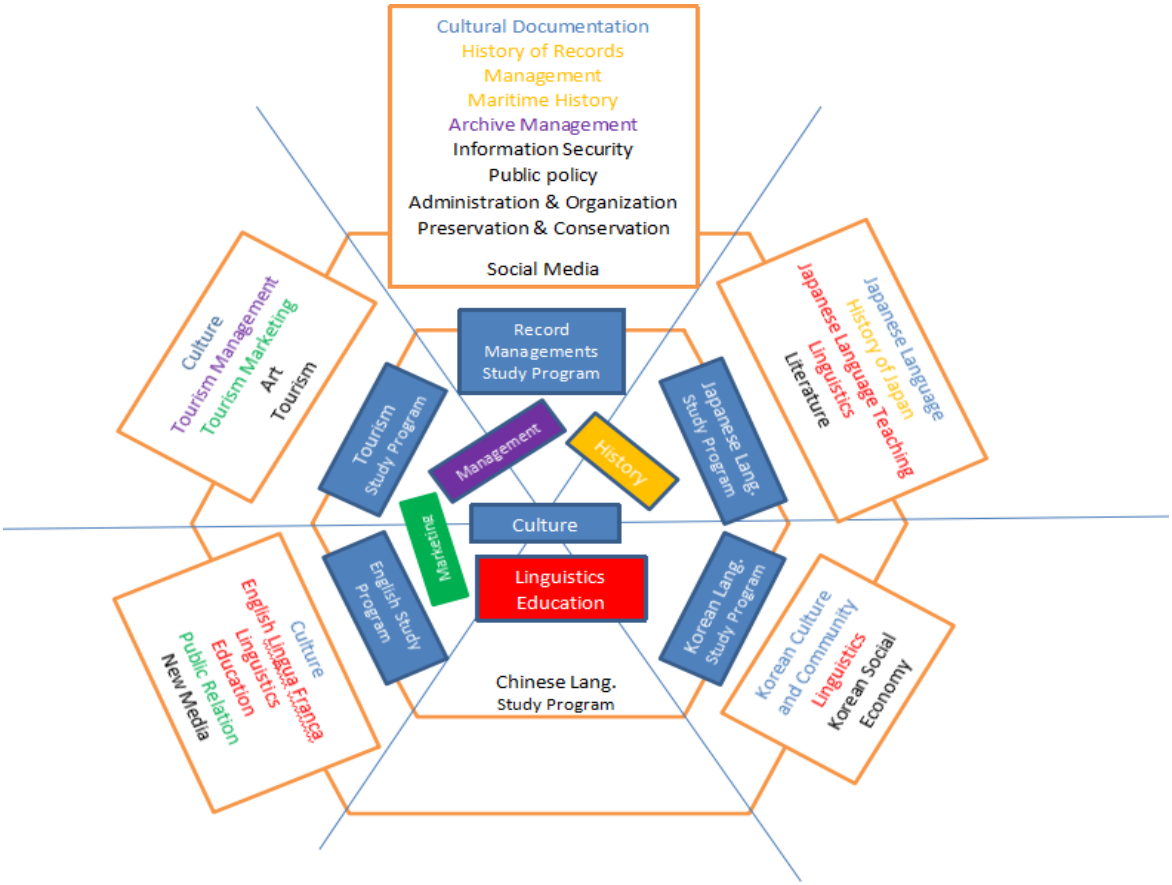

Figure 1. Potential Collaboration Based on Research Interest

Based on the potential collaboration data in Figure 1, several topics could become a collaboration between lecturers across departments. Culture-related topics (marked in blue), could be collaborated by five study programs in the department. Themes related to linguistics could collaborate between English, Korean Language, and Japanese Language study programs. There were several intersections of topics among study programs, including history, management, and marketing. Historical themes could collaborate between Japanese Language and Record Management study programs. Management topics could be carried out by Tourism and Record Management study programs. Marketing themes could collaborate between Tourism and English study programs.

Being reviewed based on the form, research collaboration could be done by lecturers across study programs as well as a research collaboration between lecturers and students. Collaborations that were carried out both vertically and horizontally were expected to be accommodated by the

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new learning center, the Culture and Tourism Center. This form of collaboration was also explained by Kyvik and Reymert (2017, p. 952) that "collaboration can be a hierarchical relationship, like the one between a professor and a doctoral student, or a mutual relationship between two or more colleagues of equal status." More detail overview of the collaboration form is shown in Figure 2.

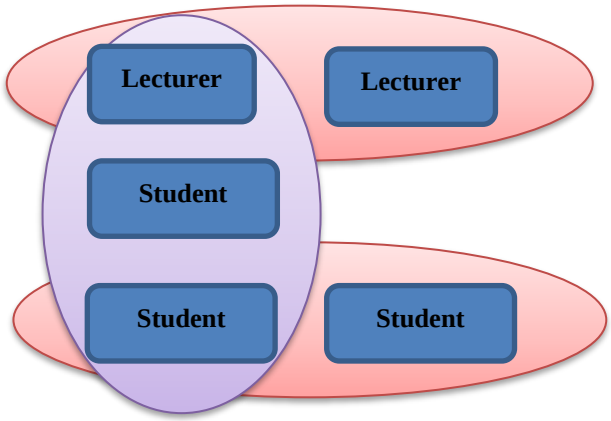

Figure 2. Form of Collaboration

Vertical and horizontal forms of collaboration related to product manufacturing projects and research projects could be a driving force for programs in the TILC's Culture and Tourism Center. Collaboration could be carried out between lecturers in research, service, and product development projects. Also, students' collaboration in doing specific tasks could be done in the teaching industry learning center. Vertical collaboration between lecturers and students could also be done to develop a branch of study.

Research Group Road Map

Internal collaboration, which was designed in Culture and Tourism Center and consisted of lecturers, students, and staff, could form a formal research group. Formal research groups have been introduced in all fields as subunits within departments (Vabo et al. in Kyvik & Reymert, 2017, p. 953). The formal form of the research group was adjusted in the direction of the development of study programs, departments, vocational colleges, and Universitas Gadjah Mada. It was in line with the principles from a functional perspective, namely "shared goals; group composition and norms; group culture, external environment." The study programs in DBSMB has formed several research groups. Table 2 presents the research group road map in DBSMB.

Table 2. Research Map of Study Programs

No	Study Programs	Research Group	Collaboration
1	Tourism	Halal tourism	Active
		Traditional food	Not yet
		IT of Tourism	Not yet
		Edu-Ecotourism	Active
		Art and Culture Commodification	Not yet
2	Records Management	Documentation of Culture	Not yet
		IT-based Record Management	Not yet
3	English	Business communication	Not yet
		Culture Management	Not yet
		Media	Not yet
		Applied Linguistic	Not yet
		English Language Teaching	Not yet
4	Korean Language	Translation and interpreting for professional	Not yet
5	Japanese Language	Language for professional/ workplace	Not yet

Source: Focus Group Discussion with the management of Study Programs and PPM Manager

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The research result in Table 2 shows that there were 14 research groups from five study programs. It indicated that the awareness in forming a research group for the development of knowledge had been built at the level of study programs. The problem of existing research groups was that there were only two groups that collaborated actively with other study programs, namely *halal* tourism and the commodification of art and culture.

Research and product development, which would be covered by the Culture and Tourism Center, were based on lecturers' research interests and the direction of study program development. Figure 3 shows the results of group research analysis which could be developed by the Culture and Tourism Center.

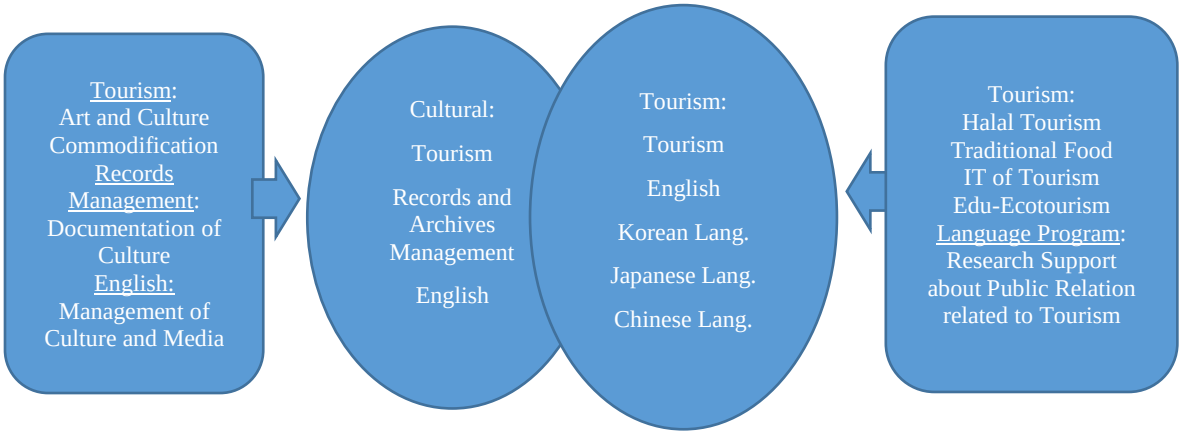

Figure 3. Research Group in Tourism and Culture Center

According to Figure 3, the research group could be divided into two major groups, namely, cultural and tourism groups, which could be developed in Culture and Tourism Center. These two groups were then supported by some study programs based on the research interest of the lecturers. The teaching industry learning center was indeed prepared to answer the demands in the fields, especially related to culture and tourism.

Challenges and Opportunities for Research Group in University

Research collaboration in vocational education had its challenges and opportunities. It could be seen from the internal and external aspects of the university. From a subjective aspect, the challenges came from creating excellent communication to support group work, infrastructure; as well as funding and facilities. The challenges came from building collaborative research with the industries, differences in policies, administrative procedures, and research interest from the external aspect.

The first internal challenge was related to the flow of communication. It was undeniable that differences in scientific backgrounds, and perspectives in the use of theory as well as methodology often caused problems in internal groups. Therefore, Beck et al. (2017, pp. 540–541) suggested functional interactions at the beginning and during research collaboration in order to help to improve the quality of understanding among each member of the study group.

Second, related to the availability of facilities, infrastructure, and funding in the research group, Vocational College of UGM tried to build a new teaching industry learning center that would be used for interdisciplinary research. It is a significant step to facilitate research activities. However, the construction of facilities and infrastructure must ideally be adjusted to the needs of the research group in it. In addition, future sources and funding mechanisms must also be formulated. It is caused by research needs and rewards for researchers (National Academies, 2005, p. 105).

The next challenge came from the outer side, which was building collaboration with external parties (both universities and industries). It is vital for future development because interdisciplinary research will involve many professionals, including practitioners, scientists, and people from the social organization. Figure 4 is a description of collaboration that can be built with external parties.

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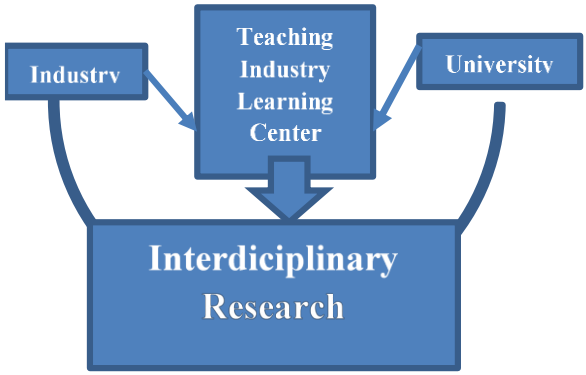

Figure 4. Collaboration with Industries in the Future

Figure 4 showed the collaboration, which can be developed with the industries in the future. In the future, the industries can assist universities in funding as well as provide facilities and infrastructure. Along with the current opportunities, the next challenges were differences in bureaucracy, policies, and interests between lecturers and practitioners in the industries. It is in line with National Academies (2005, pp. 88–89) that cultural differences - a set of customs, shared values, understandings, and relationships that develop discipline or unit - slow the communication and cooperation underlie interdisciplinary research. Although collaboration between lecturers and industry practitioners could be done, the perspective of their interests may differ. Lecturers were more focus on academics (teaching to produce publications), while industry practitioners adjusted to the need of their organizations, which was product development to make a profit.

CONCLUSION

Teaching Industry Learning Center was a project developed by the vocational college based on the movements of each research group to collaborate with agencies and industries outside the university actively. The Department of Language, Arts formed the group research initiative, and Cultural Management to support the faculty and university's vision and mission (functional perspective). Although it focused on the interests of the vocational college, the researcher could not ignore each lecturer's research interests, who would be a vital driving force in the collaboration (with students, fellow lecturers, and industry practitioners). Each lecturer in the department has different research interests but had an intersection of similarities between several themes. The similarity of themes that could be collaborated was based on interviews and data collection from 48 lecturers in the Department of Language, Arts, and Cultural Management.

It was not easy to formally established a research group because the formation must be adjusted to the research interests of lecturers (at the individual level), the direction of the development of study programs, faculties, and universities (at the institutional level) to the interests of the wider community. Therefore, the Culture and Tourism Center was expected to accommodate researchers following market needs. Cultural themes, including the commodification of art and culture, cultural documentation, and cultural and media management, could collaborate among researchers in Records Management, Tourism, and English study programs. In addition, research themes related to tourism can be collaborated by researchers from Tourism, English, Korean Language, and Japanese Language study programs

Research groups that have been proposed at the department level surely had their challenges in its management. The internal challenge was how to make existing research groups work well in the future. Therefore, it required proper management, which involved research groups (communication management) and institutions (facilities, infrastructure, and funding). The external challenge was how to embrace external parties (including industry) to collaborate with universities. Later challenges would come later related to differences in policies, administrative procedures, and research interests. However, industrial involvement could create opportunities in producing joint products, providing infrastructure, and learning experiences for the academic community.

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Through this research, the researchers tried to initiate a research group at the department level, which will be used later to develop a culture and tourism center. As an initial effort, further research is needed to be related to research groups in other departments and faculties at the university and mapping collaboration with industry. In addition to the things used for research development, several things related to the budget, the fulfillment of facilities to the clarity of mechanisms, and administrative processes need to be better designed. It is expected that existing research groups can be empowered to carry out applied research and will not encounter significant technical obstacles.

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WORK ETHICS PROFILE OF VOCATIONAL COLLEGE STUDENTS IN INDONESIA

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Abstract

This study aims at describing the work ethics profile of Vocational College Students in Indonesia. Work ethics is an important indicator of human resources quality, and also an element of employability skills, that must be owned by students of Vocational College as working-age population. There are four main dimensions in work ethics: commitment, integrity, professional attitudes, and hard work. It is descriptive research on self-evaluation survey. It uses a Likert scale with five response options, ranging from 1 (never) to 5 (always). The respondents were determined using cluster sampling and convenience sampling. They are from four vocational colleges based on the three regions in Indonesia: College A (representing Western Indonesia colleges), College B and C (from Middle Indonesia), and College D (in Eastern Indonesia). This geographical perspective is used to get a profile of Vocational College students' work ethics regionally and nationally. The study concludes that there is no major difference among the self-evaluation results of work ethics in Western Indonesia, Middle Indonesia, and Eastern Indonesia (the mean scores of the four dimensions in four colleges range from 3.89 to 4.54). The study concludes that integrity is in the highest rank among other dimensions. The one that takes place in the second position is commitment, except the one in College C. It is consecutively followed by being professional (except College C since its being professional is in the second place). The last is hard work. This profile signals positive support towards the demographic dividend for the development of the country.

Keywords: *vocational college, work ethics, commitment, integrity, professional attitude, hard works*

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INTRODUCTION

In 2030-2040, Indonesia is predicted to face demographic dividend (Ministry of National Development Planning/National Development Planning Agency, 2017). According to United Nations Population Fund (UNFPA) (2016),

> *"the demographic dividend is the economic growth potential that can result from shifts in a population's age structure, mainly when the share of the working-age population (15 to 64) is larger than the non-working-age share of the population (14 and younger, and 65 and older)."*

In that period, the number productive-age population in Indonesia is foreseen to reach 64 percent of the predicted total number of Indonesian population, which is 297 million people (Ministry of National Development Planning/National Development Planning Agency, 2017). Joko Widodo, as the President of Indonesia in his speech in a DPR-RI and DPD-RI joint session to celebrate the 74th Indonesian Independence Day, stated his optimism on the demographic dividend as a bonus leap for the advancement of the nation. Thus, all stakeholders focus on developing the quality of the human resource and on using many new methods related (Aivanni, 2019).

Thus, education plays an important role in preparing the human resources. Joko Widodo also mentioned that high education graduates should be competitive regionally and globally. Indonesian human resources should be competitive by possessing some characters, like hardworking, honest, collaborative, creative, having the ability to problem solving, and entrepreneurial. Besides, it is also important to become competitive by mastering the emerging skills to fulfill the emerging jobs and develop emerging business innovatively (Cabinet Secretariat of the Republic of Indonesia, 2019).

Since the students in high education belong to the working-age population, high education needs to enhance or maintain this competitiveness. It can be done by developing the work ethics of the high education students. This is in line with the statement of Wahyuna (2013, p. 30) that the inculcation of work characters or work ethics for vocational students is an important effort in producing students to be able to compete and succeed in their work. Work ethics education done explicitly and implicitly is believed to be able to prepare graduates to adapt more quickly to the working environment, and able to contribute positively and optimally for the company where they work.

According to Kasasbeh et al. (2014, p. 271), work ethics is a framework that regulates the behaviour and actions comprehensively related to company culture, values, and systems. In determining it, the stakeholders play a crucial role. Sinamo (2005) mentions that work ethics is a positive behaviour rooted in a basic belief together with commitment towards comprehensive work paradigm. Sinamo (2005) also states that if a person or group in an organization adheres to a good working paradigm, believes, and commits to the work paradigm, it will foster their good work attitude and behaviour. Through the aforementioned understandings, it is concluded that work ethics is attitude, behavior, and/or fundamental view based on the norm, which is believed by individuals, that encourage individuals to act as best as possible and achieve optimal results.

Work ethics has been a concern for many years because the work ethics is believed to contribute to one's performance and to make a person to be able to survive in the workforce (Boatwright & Slate, 2002; Salahudin et al., 2016). The first study of the work ethics was done by Max Weber in 1904-1905 (Woehr et al., 2007), followed by Goldstein and Eichorn in 1961 with Protest Ethic Scale and Blood in 1969 with the Pro-Protestant Ethic Scale (Miller et al., 2002; Modrack, 2008), and Petty in 1993 and the collaboration between Petty and Hill in 1995, 1996, and 2005 also dominated journals related to the work ethics, which are about measuring instruments named Occupational Work Ethic Inventory (Park & Hill, 2017). In addition, van Ness et al. (2010) also developed similar research to compare work ethics dimensions of graduates of three-year diploma program and undergraduate program and of the professionals. It is mentioned that there is no noticeable difference between the two groups.

This study focusses on the discussion of work ethics profile of the students in vocational colleges in Indonesia. It will be based on the preliminary study done by Soelistiyowati et al. (2017) through field observations and interviews. The dimensions included in the work ethics are commitment, integrity, professional attitudes, and hard work (Soelistiyowati et al., 2018).

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Commitment is a crucial part of the company. Without the strong commitment of any related member, the company will not develop (Johnson et al., 2010). Commitment is part of the work ethics and is divided into four main components (Meyer & Herscovitch, 2001): strong desire to serve and being loyal to the company (membership focus), willingness to provide the best for the company (performance focus), willing to complete the task and responsibilities and exceed the target commitment, and willing to accept a greater responsibility (commitment to organizational change).

The next dimension of the work ethics is integrity. Monga (2016) describes integrity as a person's courage and consistency in doing something right, without hesitation, to meet the norms and standards in accordance with the prevailing norms. McFall (1987) mentions that integrity is a fairly complex concept that contains firm attitude to hold and apply the belief even in situations that may conflict with the belief. Corruption is an example of act that is opposed to integrity because in integrity there is consistent honesty over time. Honesty, as explained by Ahearne (2011), covers aspects such as saying according to facts, not distorting facts, and free from manipulation of messages both in speech and deed. In this study, integrity includes the ability to uphold the working principle, uphold truth in accordance with the code of ethics, and the ability to keep themselves free from corruption. A person with integrity will keep a mutual agreement, not violate work rules, maintain the company's good name, and not violate the profession code of ethics by not manipulating anything in its work for personal benefit and not accepting anything that is not his right.

The next dimension of work ethic in this research is a professional attitude. Some research mentions that the working world requires professional attitudes such as broad mastery over the areas of work, the ability and willingness of workers in providing excellent service, and being responsible of the work (Czerw & Grabowski, 2015; Kleckner & Marshall, 2014; Haserot, 2008). Someone is said to master the field of work well when he has the knowledge, experience, and intelligence in analyzing a problem. As for excellent service, it is interpreted as orientation in good, fair and high quality service to everyone and eager to do improvement. Then, the attitude of being responsible for his work includes the willingness of a person to finish his job and not manipulate anything in the work so as to reduce the quality of his work.

The fourth dimension of the work ethic in this study is hard work. When doing a focused group discussion (FGD) with the stakeholders, the stakeholders from some companies said that someone needs to work in any working condition, which means that someone is expected not to complain in any situation, nor is he easy to give up; but rather, he is to keep looking for solution of a problem. The hard work expected to be owned by workers in a company also includes the ability to make priorities so that the steps taken in completing the work can be more systematic, effective, and efficient (Soelistiyowati et al., 2017). That condition may occur if a person has strong motivation, confidence, positive mental attitude, hope of success, self-discipline, and persistence (Haddon, 1999; Hallowell, 2002). The last thing in hard work is a time discipline. The ability to set time is an important aspect in hard work (Sharma & Rai, 2015). Sharma et al., (2017) state that effective time management makes one avoid the stress that arises, and can exceed the targets.

In addition, great work ethics as an element of employability skills has been recognized for long becomes essential part of vocational education and in other contexts. Accordingly, it is necessary to provide basis and environment for vocational education in which the students are able to display their work ethics and further improve their employability skills (Park & Hill, 2017).

Arfandi (2013) in his research, describing the relevance of the graduate competencies (of Diploma 3 Civil Engineering) with the competencies needed in the world of work, reveals that the required graduate competencies for technical skills is 47.37% and the work skills (employability skills) is 58.21%. It indicates that employability skills are valued higher than technical skills. The employability skills are more on the aspects of communication, initiative and courage, effort and teamwork ability, problem solving ability, positive thinking, ability to adapt, continuous learning, and working safely (Arfandi, 2013; Fitriyanto & Pardjono, 2019).

Isaias and Issa (2014) state that the training process for developing professional attitudes in the workplace in every academic activity is needed. Besides, education that is work-oriented focusing on technical skills and employability skills mastery is meaningful to economic development sustainability in the 21st century (Esposto & Meagher, 2007 in Pusriawan & Soenarto, 2019). Students also need ongoing feedback so they can see their achievements and to help them understand

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which parts need improvement. Thus, it is necessary to look for students' work ethics profile before they graduate. This research is expected to acquire students' work ethics profile, as an element of employability skills in Indonesia which can be used to determine strategic step in improving the quality of human resources to support the demographic dividend for the country's development.

RESEARCH METHOD

This study aims to describe the profile of work ethics of Indonesian vocational college students as part of working-age population in Indonesia. It uses a descriptive method using sample from some vocational colleges (under universities) or polytechnics in Indonesia consisting of one college from Sumatra Island (hereinafter referred to as College A), two colleges from Bali Island (hereinafter referred to as College B and C), and another one from Sulawesi Island (hereinafter referred to as College D). The sample for the survey was determined using the combination of cluster sampling and convenience sampling. Dividing population of vocational colleges or polytechnics students in Indonesia based on geographical perspective into three regions (Western, Middle, and Eastern Indonesia) reflects the cluster sampling done in this research. This study uses those clusters considering that the data can represent the profile of Indonesian students' work ethics regionally, in which the whole data can represent the national profile. Then, convenience sampling was done in determining the samples of each cluster. This method was used due to lack of resources to cover all universities or polytechnics in each cluster. In addition, 392 students were involved as the respondents for the survey, consisting of 109 College A students, 82 College B students, 100 College C students, and 101 College D students. They are majoring English language, accounting, informatics management, computer engineering, and statistics. They are projected to work in the related fields.

The survey was conducted using questionnaire. This instrument was to measure work ethics profile of those vocational colleges and/or polytechnics students which contains self-evaluation (44 questions) that are grouped into 13 indicators. Those indicators are classified into four dimensions; i.e. Commitment (four indicators), integrity (three indicators), being professional (three indicators), and hard work (three indicators). It uses Likert scale with following response options; 1 means never, 2 is rarely, 3 means sometimes, 4 is often, and 5 for always.

Self-evaluation, or called as self-rating or self-assessment, is utilized since it is more efficient than rating by others. Conelly and Ones (2010) (as cited in Kyllonen, 2013, p. 21) state that rating by others is "more accurate, less biased, and more predictive of future outcomes" compared to self-rating. However, difficulties in finding the capable person to rate, some excessive judgements, and different standards between raters can be weaknesses of rating by others. Therefore, this study employs simple self-rating scale (Likert scale) mentioned before. The research participants, i.e. the students in some vocational colleges/polytechnics, were asked to measure themselves in terms of their levels of commitment, integrity, being professional, and hard work.

Before it was conducted, some steps were done to check its validity and reliability. After the construct of the instrument was developed, it was empirically tested in some enterprises in all three regions in Indonesia and the results were discussed in an FGD. Then, it was revised and checked by a psychometrist and two psychologists using Delphi technique. They assessed the instrument and offered some feedbacks towards it. Afterwards, responses from 206 graduates of the Vocational College of Universitas Gadjah Mada were analysed for the next validity and reliability check.

The validity of the instrument construct was checked using *Partial Least Square* (PLS) with Smart PLS 2.0 M3. The result says that all 44 items are valid. Moreover, the score of the composite reliability is >70, thus all the dimensions are reliable. Subsequently, the data were collected using the questionnaire to 392 respondents. Descriptive statistics were engaged to analyze the data. Then, the data were presented descriptively.

RESULTS AND DISCUSSION

In this research, the work ethics profile of vocational college or polytechnic students in Indonesia are described in four different dimensions, namely commitment, integrity, being professional, and hard work. The data of the score of each dimension, the indicator of the dimensions,

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and the item of indicators from four different colleges are presented in Table 1, Table 2, Table 3, and Table 4. Those scores are obtained from the mean of the response of the respondents in each college, and they are presented to provide the profile of the students.

Table 1. Commitment Dimension

Indicator	Item	A			B			C			D		
Strong desire to serve and be loyal to the company (membership focus)	1	4.34	4.15	4.27	4.39	4.27	4.41	4.10	3.88	3.93	4.49	4.49	4.50
	2			4.30			4.45			4.08			4.52
	3			3.58			3.65			3.45			4.15
	4			4.44			4.59			4.06			4.76
Focus on Performance, to provide the best for the company (performance focus)	5		4.63	4.70		4.62	4.70		4.34	4.45		4.61	4.75
	6			4.56			4.52			4.20			4.50
	7			4.62			4.63			4.37			4.58
Focus on targets, and diligently complete the tasks and responsibilities thoroughly and beyond the target (Goal Commitment)	8		4.41	4.63		4.42	4.60		4.15	4.40		4.43	4.68
	9			4.24			4.24			3.96			4.22
	10			4.37			4.43			4.09			4.38
Willing to accept greater responsibility, in accordance with company policy changes (Commitment to Organizational Change)	11		4.25	4.28		4.29	4.39		4.09	4.14		4.45	4.55
	12			4.35			4.43			4.14			4.58
	13			4.14			4.05			3.99			4.21

The mean scores of the commitment in those four colleges are between 4.10-4.49. It is based on the criteria adapted from Sudijono (2009, p. 175), 1.00-1.89 is 'irresponsible', 1.90-2.69 is 'not committed', 2.70-3.39 is 'fair', 3.40-4.19 is 'committed', and 4.20-5.00 is 'very committed'. It indicates that students are committed and very committed to their work. By being committed, workers can comply with the work standards, achieve the maximum results, and maintain the work and output quality (Hamidah, 2012, p. 360). The commitment is put in details into membership focus (four question items), performance focus (three question items), goal commitment (three question items), and commitment to organizational change (three question items). In College A, indicator that needs more attention is the first indicator, which is membership focus, particularly for question item number three. It is related to their commitment to keep working in the present company although they get some offer to work in other companies. Moreover, Colleges B and C face similar situation dealing with students' strong desire to serve and be loyal to the company. College D needs to maintain their commitment, since they are considered very committed in all commitment indicators.

Table 2. Integrity Dimension

Indicator	Item	A			B			C			D		
Firmly adhere to work principle	14	4.52	4.47	4.17	4.54	4.54	4.32	4.32	4.26	4.01	4.54	4.56	4.34
	15			4.58			4.60			4.34			4.70
	16			4.65			4.71			4.43			4.63
Uphold the truth in accordance with the code of ethics	17		4.48	4.69		4.54	4.70		4.33	4.43		4.54	4.64
	18			4.65			4.59			4.46			4.59
	19			4.28			4.45			4.21			4.47
	20			4.30			4.44			4.22			4.48
Anti-corruption	21		4.61	4.53		4.53	4.41		4.36	4.31		4.52	4.47
	22			4.71			4.61			4.43			4.57
	23			4.59			4.56			4.33			4.53

Table 2 shows that all respondents from four colleges always show integrity seeing that the mean scores of this dimension from all colleges are above 4.20, in which the score range (rarely: 1.00-1.89; occasionally: 1.90-2.69; sometimes: 2.70-3.39; often: 3.40-4.19; and always: 4.20-5.00)

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is adapted from Sudijono (2009, p. 175). Always showing integrity is interpreted as students have moral quality. Huberts (2018, p. 3) said that "integrity is seen as the quality of acting in accordance or harmony with relevant moral values, norms, and rules". They firmly adhere to work principle by (14) obeying the work principles of the company in any such circumstances, (15) keeping a mutual agreement, and (16) feeling ashamed for violating work rules. They also defend the truth in line with the code of ethics. They (17) avoid doing actions that could defame company's good name, (18) will not do anything that violates the company's code of ethics, (19) are honest in speech and deed, and (20) keep the promise. Moreover, the students are anti-corruption. They (21) do not manufacture anything for personal benefit, (22) do not take what was not their right, and (23) refuse to accept something not right. However, College A and C students can maximize item number 14. By doing so, they can be more focused and productive since they always adhere the work principles.

Table 3. Being Professional Dimension

Indicator	Item	A			B			C			D		
Mastering the field of work	24	4.33	4.10	4.22	4.36	4.00	4.04	4.15	3.90	3.93	4.40	4.18	4.20
	25			4.17			4.11			4.01			4.19
	26			3.91			3.84			3.76			4.16
Providing excellent service	27		4.44	4.43		4.48	4.40		4.23	4.16		4.49	4.57
	28			4.50			4.61			4.21			4.56
	29			4.47			4.62			4.38			4.53
	30			4.34			4.29			4.16			4.30
Responsible for work	31		4.41	4.57		4.57	4.67		4.28	4.34		4.49	4.63
	32			4.59			4.60			4.38			4.57
	33			4.08			4.43			4.13			4.26

Referring to the score range (not professional: 1.00-1.89; less professional: 1.90-2.69; quite professional: 2.70-3.39; professional: 3.40-4.19; very professional: 4.20-5.00) which is adapted from Sudijono (2009, p. 175), the good result of the third dimension, being professional, exist in the four colleges. The mean scores of College A, B, and D are consecutively 4.33, 4.36, and 4.40. This means that the students are very professional, in terms of being responsible of their job, ability to give their best of their job, and the ability to give excellent service. Meanwhile the students of College C assess themselves as professional. In general, these students are able to master the field of their work, provide excellent service, and responsible for their work.

Among those ten assessment items, as shown in Table 3, there is a similarity that item number 26 gets the lowest score. This phenomenon happens to all colleges. The reasons could be that the students need to foster their skills further, over time, to be able to do the tasks well and smoothly. When they master particular skills, they will be called as competent in that particular field, and this usually takes time for the students to get the sense and habits. Professionalism is mostly measured with competency-based standard (Butter & Hermanns, 2011, p. 32).

Table 4. Hard Work Dimension

Indicator	Item	A			B			C			D		
Eager to work in any condition	34	3.89	3.90	3.79	4.08	4.18	4.12	3.93	3.92	3.97	4.07	4.19	4.01
	35			4.24			4.50			4.19			4.53
	36			3.68			3.93			3.61			4.04
Able to make priorities	37		3.70	3.72		3.87	3.88		3.78	3.74		3.80	3.71
	38			3.47			3.62			3.65			3.66
	39			3.91			4.12			3.96			4.01
Time Discipline	40		4.00	3.98		4.15	4.06		4.03	4.16		4.15	4.29
	41			3.70			3.99			3.83			3.90
	42			4.24			4.22			4.17			4.36
	43			4.05			4.28			4.02			4.07
	44			4.06			4.20			3.97			4.14

Referring to Table 4, there are three indicators that explain hard work. First, the students should eager to work in any condition. Then, they need to be able to make priorities. The last is discipline. Students of College A and C reveal that they perform their hard work more through their

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time discipline and they need more effort in making priority. Meanwhile, College B and D share the similar pattern that their students, in term of hard work, are prominent in willing to work in any situation. On the other hand, they need more support to be able to make priority. From those result, ability to make priorities becomes the center of improvement effort. Overall, they often perform hard work dimension (rarely: 1.00-1.89; occasionally: 1.90-2.69; sometimes: 2.70-3.39; often: 3.40 - 4.19; and always: 4.20-5.00 - adapted from Sudijono (2009, p. 175)). The students' hard work is part of their success-oriented effort (Hamidah, 2012, p. 362).

The results of the aforementioned discussion are summarized in Figure 1. It is clear that integrity of the students in those four colleges is in the highest rank among other dimensions. The one that takes place in the second position is commitment, except the one in College C. It is consecutively followed by being professional (except College C since its being professional is in the second place). The last position is hard work. There is no significant difference among the four dimensions in four colleges which ranges from 3.89 to 4.54.

Figure 1. Profile of Work Ethics Dimensions in Each University

Figure 1 shows that students' work ethics profile in Western, Middle, and Eastern Indonesia reveal similar pattern. There is no inequality among the regional profiles. Thus, the aggregate results can be considered as national profile.

The profile is potential to reinforce economic growth in Indonesia. This statement is supported by some statements of the previous researchers. Inglehart (1997) and Inkeles and Smith (1974) (as cited in Weniger & Bigley, 2019, p. 5494) say that work ethic can contribute to economic growth. They predict that work ethic is correlated with Gross Domestic Product (GDP) per capita and Gross National Income (GNI) per capita. In addition, the result of the latest research done by Weniger and Bigley (2019, p. 5495) is in line with the previous research saying that "work ethic has a relationship with economic growth", that is a longitudinal research conducted in the past three decades using World Values Survey administered in 80 societies around the world in three batches: 1990/1995, 1995/2000, and 2000/2005. Thus, this study reconfirms the previous research.

CONCLUSION

In general, students in College A, B, C, and also D, considered as working-age population in Indonesia, often and always perform work ethics in their daily life. The students are reported to show enthusiasm in working, and strive to perform best by giving excellent service. The students are said to have dignity to work with the best results and give their best to finish the task given ahead of time, with satisfactory results.

There is no major difference among the students' self-evaluation results of work ethics in Western, Middle, and Eastern Indonesia. They all show a certain level of expected work ethics. The profile supports Indonesian President's optimism of demographic dividend to develop the country.

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The implication is that the colleges in Indonesia need to continue training work ethics to the students, either explicitly or implicitly. In line with that, the vocational college students need to maintain their work ethics when they really come to the working world so that they perform well and paid well. Moreover, the authors or other researchers can use this information as the basic data to have future studies related to work ethics profile of workers in a particular sector or gap of work ethics profile between eras. It is strongly suggested to have more respondents to get more generalized results that represent the geographical clusters.

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DEVELOPING ROBOT TRANSPORTER LEARNING MEDIA TO LEARN MICROCONTROLLER

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Abstract

Learning media play a role in bridging the interaction between the teacher and students. Using learning media can help students to understand the material delivered by the teacher more efficiently. Al Kholiliyah, a Vocational High School in Bangkalan, Indonesia, still lacks interactive learning media to motivate students in learning. The robot transporter as an interactive learning medium can be applied to solve the lack of learning media that engage students in learning. The purpose of this study is to analyze the validity of the robot transporter as learning media, to analyze the validity of the learning plan (a syllabus, a lesson plan, a student worksheet) of robot transporter learning media, and to analyze the student response of the usage robot transporter learning media. The validation results of the robot transporter learning media show that the value of the validity is 3.89, categorized as very valid. The validity of the syllabus is 3.78, categorized as very valid, the validity of the lesson plan is 3.88, categorized as very valid, and the validity of the student worksheets is 3.89, categorized as very valid. The results of student responses show that there are two responses: strongly agree and 28 responses with the category of agree. Based on the robot transporter validity, the learning plan validity, and the student response, it can be concluded that the robot transporter can be used in the teaching and learning process.

Keywords*: robot transporter, learning media, validation, microprocessor*

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INTRODUCTION

The learning media as a part of the communication process holds an important role in the teaching-learning process. Learning media play a role in bridging the interaction between the teacher and students. The interaction with learning media helps students to understand the learning material delivered by the teacher more effectively (Sadiman, 2010). While listening to learning material, sometimes, there are various explanations that students cannot understand very well. Thus, more interactive learning material is needed. For example, when the teacher teaches the basics of electronics, then he/she uses learning media such as visual diagrams, photos, videos, or the prototype of the object, students will be able to capture the presented material very well (Mayer, 2001).

The development of learning media is one of the steps to improve the education system. Learning media is defined as tools that help during the teaching and learning process (Apriyus et al., 2020). Learning media has a broad scope, including people, material, or study, that creates a situation where students can acquire knowledge, skills, or attitudes (Daryanto, 2010). The form of learning media can consist of hardware, such as computers, TVs, projectors, and the software used on these hardware devices (Baharuddin & Daulay, 2017; Sarwandi et al., 2019). In other words, learning media can be used to generate thoughts, feelings, attention, abilities, and skills of students, thus encouraging the learning process (Suryani & Agung, 2012).

SMK Al Kholiliyah, a private vocational high school in Bangkalan, East Java, Indonesia has problems in the teaching-learning process in microcontroller subject, namely in the lack of learning media, students' low motivation and learning outcomes in learning microcontroller because of the subject's difficulty level. Microcontroller subject aims to provide knowledge and skills for students that can be applied to society. Meanwhile, in the basic competitions of microcontroller subject, students are expected to be able to make a simple application program and demonstrate the program. Thus, proper learning media that can help to solve those problems are needed. The use of proper learning media can help students gain their learning motivation (Haryawan & Prayogo, 2017).

Robot is a medium that can attract students' attention, motivate students to learn new things about robots, and can be used for interactive learning (Lee et al., 2012; Sena & Howard, 2019; Lanz et al., 2019). Most robot's main components are electronic circuit components which function to move the robot, communicate with users, and execute computer programs implanted in the robot (Baba, 2020; Li et al., 2018; Negri, et al., 2019). In the learning process, students can use electronic circuit components to learn about their functions and how they work in robots. One type of robot that has simple components and can be used for learning in the class is the transporter robot. The transporter robot consists of several parts, namely a robot driving wheel, a clamp to pick up objects, and a microcontroller module. These parts can be used for learning some learning materials.

Teachers of SMK Al Kholiliyah recommended choosing the robot transporter as learning media because it has some advantages such as simplicity of robot design, the components are mostly easy to get and helping students to understand how to assemble a robot. This research studied robot transporter using microcontroller based on android applications. The robot transporter as learning media was used as a tool for students to learn the subject of a microcontroller to ease them to understand it. If their understanding of the microcontroller improves, then their learning outcome also increases. Based on that description, the purposes of this research are to analyze the validity of robot transporter learning media, to analyze the validity of the learning plan of robot transporter learning media, and to evaluate students' response to the usage of robot transporter learning media.

RESEARCH METHOD

Research Design

This research was to develop and to analyze the robot transporter as a learning medium and to analyze the validity of the learning plan and students' responses. The research and development (R&D) method was used since it has detailed steps to develop a product and testing the validity, practicality, and effectiveness of the product appropriate with the objective of this research. The R&D method used has some steps: potential and problems, data collection, product design, design validation, design revision, product testing, product revision, and product implementation.

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The subjects of this research were the students of SMK Al Kholiliyah, a private vocational high school in Bangkalan Indonesia. The number of students in the Department of Industrial Electronics Engineering at SMK Al Kholiliyah for class XII was 80 students. The samples were randomly selected from several students majoring in Industrial Electronics Engineering. The selection was random and did not differentiate between class and sex in sampling. The sample experimental class consisted of 30 students who were willing to participate.

The researchers made observations to the class X TEI 1 at SMK Al Kholiliyah. Observation results showed that the problem in that class was the lack of media to teach and learn in a microcontroller subject. Thus, developing learning media that can attract students' intention to learn microcontroller is needed. The robot transporter became an option to be a potential learning medium to attract students' intention and to motivate students because of its attractiveness. The data were collected using some instruments. Then, these instruments were used to obtain students' responses and to get the validity of the transporter robot learning media and the validity of the learning plan.

Research Procedures

The procedure of this research was started with creating the robot transporter as learning media. The development of the robot transporter was based on the needs of the teaching-learning process at SMK Al Kholiliyah. Before being implemented in the class, the robot transporter, and the learning plans that guide the teaching-learning process were validated by three experts. After getting validation and making revisions according to the experts' suggestions, then the robot transporter and learning plan can be implemented in the classroom. The next procedure was to measure the students' responses toward the usage of the robot transporter. This procedure was done to find out how big the role and benefits of the robot transporter were after applied in the class.

Product Design

This research built the robot transporter as learning media. Figure 1 shows the electronic parts of the robot transporter. This robot transporter consists of some electronic parts such as Bluetooth module, DC source, microcontroller ATMega8, and DC motor module. The Bluetooth Module acts as a medium communication between the ATMega8 Microcontroller on the transporter robot side and the side of the Android Smartphone user. The DC source supplies electricity to the ATMega8 Microcontroller and the DC Motor Module. The ATMega8 microcontroller contains some computer programs to move the robot transporter and also to move the robot clamp according to user commands controlled via an Android Smartphone. The DC motor module functions to drive two motors according to the computer programming from the ATMega8 microcontroller.

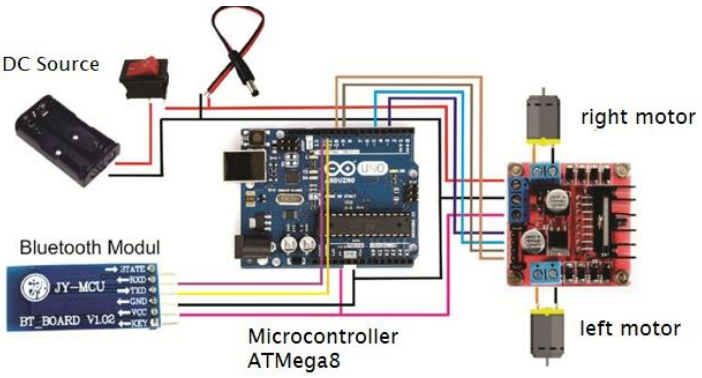

Figure 1. Electronic Parts of Robot Transporter

Figure 2 shows the software application of Bluetooth remote control installed on Android Smartphone. When the software application opened, the main menu appears and activates the Bluetooth to make a connection between the robot transporter and the Android Smartphone. After the Bluetooth is connected, each button on the software application can be used by sending instructions that are processed in the microcontroller to move the robot transporter or to clamp a thing. This ro-

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bot transporter consists of three main parts, namely a part to move the robot, a part of the main body, and a part of the clamp robot. Figure 3 shows the robot transporter as a learning media.

Figure 2. Display Bluetooth RC Controller on Smartphone

Figure 3. The Robot Transporter

Instruments

Design Validation and Design Revision

The next step was to develop some instruments to assess the validity of the robot transporter, whether it was valid or not. Three experts were selected based on their expertise to assess the validity of the robot transporter. The instruments compiled consist of the validation instrument of robot transporter, the validation instrument of robot transporter learning plan (syllabus, lesson plans, and student worksheets), and the validation instrument of student response. Table 1 shows the validation instrument of the robot transporter. This instrument consists of three constructs, namely content (eight indicators), feature format (nine indicators), and language (five indicators).

Table 1. Validation Instrument of Robot Transporter

No.	Aspect / Indicator
Content	
1	The learning material suitability with learning objectives.
2	Suitability with students' thinking level.
3	Completeness of the learning material.
4	Learning material accuracy.
5	Learning material is organized based on its structure.
6	The material depth is based on its structure.
7	The material suitability with the level of student development.
8	The connectivity between the ongoing material with the previous material.
Feature Format	
9	Using harmless materials
10	Easy material for assembly
11	Tools are functioned according to the program
12	Software is easy to obtain
13	Software is easy to operate
14	The spare part is easy to obtain
15	The components compatibility with the material
16	The presence of a Bluetooth feature
17	The tool can function normally
Language	
18	Language is easy to understand.
19	Language according to general guidelines for Indonesian spelling.
20	The language used can explain the material presented.
21	Language suitability.
22	Language in learning materials is communicative.

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Table 2 presents the validation instrument of the syllabus. This instrument consists of 11 constructs, such as the identity of the education unit/school, subject identity, class/education level, main competencies, basic competencies, indicator, subject matter, learning, assessment, time allocation, and also learning resources. Therefore, the total number of indicators for all constructs is 30 items.

Table 2. Validation Instrument of the Syllabus

No.	Assessment Indicators
The Identity of the Education Unit/School	
1	The identity of the education/school unit exists and is written clearly.
Subject Identity	
2	Subject identities exist and are written.
Class/Education Level	
3	Classes are written clearly and according to the level of education
Main Competencies	
4	There are four main competencies for spiritual, social, knowledge, and skills competencies.
5	The main competencies are written.
Basic Competencies	
6	Basic competencies are written clearly and following the subjects being taught
7	There are a pair of basic competencies that meet the demands of the main competencies of the knowledge dimension and skills dimension.
8	Basic competencies according to the abilities of students.
Indicator	
9	Indicators following the objectives to achieve basic competencies.
10	Indicators are following the cognitive and psychomotor levels of students
11	Indicators can be measured as evaluations.
12	Indicators are written clearly.
Subject Matter	
13	Relevant and following the subjects being taught
14	Includes all indicators to be achieved
15	The subject matter is written clearly
Learning	
16	Implement a student-centered learning model.
17	Apply a scientific approach.
18	Implementing the 5E learning cycle (Engagement, Exploration, Explanation, Elaboration, and Evaluation).
19	Written clearly.
Assessment	
20	Using test and non-test assessment techniques as an evaluation.
21	Assessment can measure affective, cognitive, and psychomotor aspects.
22	Assessment is objective.
23	The way the assessment is written clearly.
Time Allocation	
24	Following the material taught
25	Following the abilities of students
26	Written clearly, 45 minutes per meeting
Learning Resources	
27	Relevant and following the abilities of students
28	Able to achieve the demands of the syllabus indicators
29	Covers all the material taught
30	Learning resources and references are written

Table 3 presents the validation instrument of the robot transporter lesson plan. This validation instrument consists of eight constructs, such as lesson plan identity, indicator formulation, formulation of learning objectives, learning methods and scenarios, media and learning tools, learning materials and learning resources, authentic assessment, and also sentences and grammar. The total number of indicators for all constructs is 31 items.

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Table 4 shows the validation instrument of the robot transporter's students' worksheets. This validation instrument consists of six constructs, namely student worksheet identity, indicator formulation, formulation of learning objectives, instruction procedure, main aspects of student worksheets, and sentences and grammar. The total number of indicators for all constructs is 25 items.

Table 3. Validation Instrument of Robot Transporter Lesson Plan

No.	Assessment Indicators
Lesson Plan Identity	
1	There are educational units, classes, semesters, expertise programs, subjects, or subject / sub-theme themes, number of teaching in the classroom.
Indicator Formulation	
2	The suitability with basic competencies.
3	The suitability of the use of operational verbs with the competence being measured.
4	The suitability with the characteristics of students.
5	The suitability of the formula with the measured aspects.
6	The suitability of the formulation with aspects of knowledge and skills.
Formulation of Learning Objectives	
7	The learning objectives are in line with the basic competencies and core competencies in the syllabus.
8	Demanding students to high order thinking.
9	The objectives refer to the competency achievement indicators.
10	Learning objectives contain aspects of ABCD (Audience, Behavior, Conditions, and Degree).
Learning Methods and Scenarios	
11	Conformity with learning objectives.
12	Apply a learning model and a student-centered learning approach.
13	Learning activities include all indicators of competency achievement.
14	There are details of the activities of learners such as observing, asking, gathering information, associating, and communicating.
15	Learning activities have an introduction, a subject matter, and a closing.
16	Suitability of time allocation for preliminary activities, subject matter activities, and closing activities with material coverage.
Media and Learning Tools	
17	Conformity with learning objectives and indicators.
18	Conformity with student's characteristics.
19	Relevant and communicative.
20	Conformity with the characteristics of students
Learning Materials and Learning Resources	
21	Relevant and following learning objectives.
22	Includes all indicators to be achieved.
23	Following the abilities of students
24	The teaching material description is sequential.
Authentic Assessment	
25	Conformity of forms, techniques, and instruments with competency achievement indicators.
26	The suitability of forms, techniques, and instruments of competency assessment of attitudes, knowledge, and skills.
27	There is an answer key for the assessment and an assessment rubric.
28	Divergently and train students to high order thinking.
Sentences and Grammar	
29	Easy to understand.
30	No contain a double meaning
31	Sentences and grammar are according to general guidelines for Indonesian spelling.

Table 5 shows the students' response validation instrument. This validation instrument consists of three constructs: language (six indicators), writing format and systematics (six indica-tors), and content quality (three indicators). The total number of indicators for all constructs is 15 items.

Validation of robot transporter was done by three experts consisting of two lecturers from Universitas Negeri Surabaya and one teacher from SMK Al Kholiliyah. The validator's assessment of the robot transporter refers to the indicators on the validation sheet with the assessment criteriaas follows (Akbar, 2013): 1 = not valid; 2= less valid; 3 = quite valid; 4= valid; and 5= very valid.

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Table 4. Validation Instrument of Robot Transporter Students Worksheet

No.	Assessment Indicators
Student Worksheet Identity	
1	There are: educational units, classes, semesters, expertise programs, subjects or subject / sub-theme themes, number of teaching in the classroom
Indicator Formulation	
2	The suitability with basic competencies.
3	The suitability of the use of operational verbs with the competence being measured.
4	The suitability with the characteristics of students.
5	The suitability of the formula with the measured aspects.
6	The suitability of the formulation with aspects of knowledge and skills.
Formulation of Learning Objectives	
7	The learning objectives are in line with the basic competencies and core competencies in the syllabus.
8	Demanding students to high order thinking.
9	The objectives refer to the competency achievement indicators.
10	Learning objectives contain aspects of ABCD (Audience, Behavior, Conditions, and Degree).
Instruction Procedure	
11	Suitability of experimental design.
12	The experimental design presented is clear and easy to understand.
13	The suitability of the stages of planning the experiment with the development of students' knowledge.
14	The stages of planning experiments in the worksheets can help improve student learning abilities.
Main Aspects of Student Worksheets	
15	The correctness of the content/material.
16	Suitability of the task with the order of the material.
17	Provide a role to encourage students to find concepts/procedures independently.
18	Feasibility as teaching material.
19	The availability of cognitive and psychomotor worksheets.
20	The availability of an answer key for cognitive worksheets and answer keys for psychomotor worksheets.
21	The availability of tools and materials needed for practical materials.
Sentences and Grammar	
22	Suitability of sentences with students' level of thinking.
23	The simplicity of sentence structure.
24	No contain a double meaning
25	Sentences and grammar are according to general guidelines for Indonesian spelling.

Table 5. Validation Instrument of Student Response

No.	Assessment Indicators
	Language
1.	Readability
2.	Grammatical correctness
3.	The accuracy of the sentence structure
4.	Use of language effectively and efficiently
5.	The language used is communicative
6.	The suitability of grammar with the age of the student
	Writing Format and Systematics
1.	Clarity of writing in instructions for filling student responses
2.	Clarity of writing in student opinions indicators on the components asked in student response questionnaire
3.	Clarity of writing in the novelty indicator for the components asked in the student response questionnaire
4.	Clarity of writing in the indicator of the ease with which students understand the components asked in the student response questionnaire
5.	Clarity of writing in student interest indicators in the components asked in the student response questionnaire
6.	The clarity of writing in the activity indicators carried out by the lecturer/teacher is related to the components asked in the student response questionnaire
	Content Quality
1.	The correctness and appropriateness of the description contents of statements in student response questionnaire
2.	The feasibility of a student response questionnaire as a learning tool
3.	The suitability of the assessment criteria with the statements description in the student response questionnaire

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Quantitative descriptive was used to analyze data from the validation result. The analyzing done by quantifying the average score of the validators assessment. This average score transformed into the assessment category as shown in Table 6 (Riduwan, 2012).

Table 6. Category of Instrument

Score	Category
$3.6 \leq P \leq 4$	Very Valid
$2.6 \leq P < 3.6$	Valid
$1.6 \leq P < 2.6$	Less valid
$1 \leq P < 1.6$	Not valid

RESULTS AND DISCUSSION

Finding

Robot Transporter Validation Results

Three experts validated this robot transporter as learning media for microcontroller subjects. The validation results were analyzed using descriptive quantitative analysis. The quantitative analysis is carried out by calculating the average value given by the validators. Table 7 shows the validation results of the robot transporter as learning media. The first validator gives a score of 3.84, the second validator gives a score of 3.12, and the third validator gives a score of 3.57. The average score from all validators is 3.51. In the category aspect, this score is a valid category.

Table 7. Validation Results of Robot Transporter

No.	Experts	Assessment	Category
1	Expert 1	3.84	Very Valid
2	Expert 2	3.12	Valid
3	Expert 3	3.57	Valid
	Average	3.51	Valid
	Category Aspect		Valid

Learning Plan Validation Results

In this research, the learning plan consists of three parts such as syllabus, lesson plan, and student worksheet. The validation of this learning plan was carried out by three experts. From Table 8, it can be shown that the average score of the syllabus is 3.78 and this score in the category aspect is very valid. The average score of the lesson plan is 3.88 and this score in the category aspect is very valid. The average score of the student worksheet is 3.89 and this score in the category aspect is very valid.

Table 8. Validations Results of Robot Transporter Learning Plan

No	Experts	Learning Plan		
		Syllabus	**Lesson Plan**	**Student Worksheet**
1	Expert 1	3.60	3.85	3.96
2	Expert 2	3.85	3.84	3.85
3	Expert 3	3.88	3.94	3.87
	Average	**3.78**	**3.88**	**3.89**
	Category Aspect	**Very Valid**	**Very Valid**	**Very Valid**

Student Response Results

Based on the average score of participants, the categorization is as follows (Riduwan, 2003): (1) scale 1 with a range of 0.00 to 1.33, then the category is Disagree; (2) scale 2 with a range of 1.33 to 2.33, the category is Enough; (3) scale 3 with a range of 2.33 to 3.33, then the category is Agree; and (4) scale 4 with a range from 3.33 to 4.00, the category is Strongly Agree. Table 9 shows the results of the student response.

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Table 9. Student Response Results

No	Questions	Average Score	Category
1	The learning media based on the transporter robot is very interesting.	3.33	Strongly Agree
2	The learning media based on the transporter robot is very efficient.	3.23	Agree
3	The learning media based on the transporter robot can encourage learning.	3.30	Agree
4	The learning media based on the transporter robot can encourage imagination	3.27	Agree
5	The learning media based on the transporter robot can create new things in microcontroller programming subjects by doing practical work.	3.13	Agree
6	The learning media based on the transporter robot can make students active independently in reasoning knowledge.	2.97	Agree
7	The learning media based on the transporter robot can make students active in questioning activities.	2.97	Agree
8	The learning media based on the transporter robot can make students easily understand the basic concept material in microcontroller programming subjects.	3.27	Agree
9	The learning media based on the transporter robot can make students easily simulate basic concept material in object-oriented programming subjects.	3.13	Agree
10	The learning media based on the transporter robot can make students learn seriously.	2.87	Agree
11	The learning media based on the transporter robot can make students serious in paying attention to the media.	3.27	Agree
12	The learning media based on the transporter robot very effective in helping students understand learning.	3.13	Agree
13	The learning media based on the transporter robot is very potential in understanding learning.	3.28	Agree
14	Students better understand the basic concept material in microcontroller programming subjects with the learning media based on the transporter robot.	3.30	Agree
15	Students prefer to learn basic concept material in microcontroller programming subjects with the learning media based on the transporter robot.	3.40	Strongly Agree
16	Students increase their knowledge in microcontroller programming subjects after using the learning media based on the transporter robot.	3.27	Agree
17	Students increase their skills in microcontroller programming subjects after using the learning media based on the transporter robot.	3.07	Agree
18	Teachers and students are more interactive in microcontroller programming subjects after using the learning media based on the transporter robot.	2.97	Agree
19	Students are more creative after using the learning media based on the transporter robot.	2.67	Agree
20	The learning media based on the transporter robot make students actively ask questions in microcontroller programming subjects.	2.83	Agree
21	The learning media based on the transporter robot allows students to share knowledge with friends.	3.13	Agree
22	The learning media based on the transporter robot allows students to share experiences with friends.	3.17	Agree
23	The learning media based on the transporter robot make students able to answer teacher questions.	3.07	Agree
24	The learning media based on the transporter robot is more interesting to use.	3.23	Agree
25	The learning media based on the transporter robot can make students more enthusiastic in learning.	3.10	Agree
26	The learning media based on the transporter robot can make student learning outcomes in the cognitive domain on basic concept material higher than before.	3.07	Agree
27	The learning media based on the transporter robot can make student learning outcomes in the psychomotor domain on basic concept material higher than before.	3.13	Agree
28	The learning media based on the transporter robot can make students have active discussions between students and teachers.	2.67	Agree
29	The learning media based on the transporter robot can improve student learning outcomes in the cognitive domain on the subject of basic concepts in microcontroller programming subjects.	3.20	Agree
30	The learning media based on the transporter robot can improve student learning outcomes in the psychomotor domain on the subject of basic concepts in microcontroller programming subjects.	3.10	Agree

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Table 9 shows that for 30 questions for the students there are two responses with the Strongly Agree category and 28 responses with the Agree category. This shows that the transporter robot as learning media able to attracts students to use it in the teaching-learning process in microcontroller subjects.

Discussion

The research results show that the validation results of the transporter robot as learning media are in the category valid. This is supported with the results of the student responses for question numbers from 1 to 4 and question numbers from 18 to 25 related to the attractiveness of the learning media after the students used the robot transporter. The category of student responses to those questions is 'agree'. This condition is supported by Deiniatur (2019) and Chen et al. (2020) that new media can also make students enthusiastic in following the teaching and learning process in the classroom. This is also in line with the research conducted by Haryawan and Prayogo (2017) which reveals that the use of Arduino-based microcontroller teaching materials can help students gained their learning motivation for microcontroller subjects.

The results of experts' validation for the learning plan consist of the syllabus, the lesson plan, and the student worksheets are in the category valid. Thus, during the process of using learning media, students gave good responses to follow the instructions from the teacher based on the syllabus and the lesson plan. This is shown by the student's response to answer questions from number 10 to 13 that related to the ease of transfer of knowledge using the transporter robot learning media. The category of student responses to those questions is 'agree'. According to Apriyus et al. (2020), learning media can lead to the interconnection between users and learning media with mutual influence and mutual action and reaction between them in helping to convey learning material. According to Budiharto et al. (2017), learning media in the form of robots can be used to learn basic mathematics in elementary students. Learning with robots also provides entertainment for elementary students, so that mathematics lessons become more interesting for elementary students to learn.

As previously mentioned that student worksheet is in the valid category, thus, students can practice and study the learning material of microprocessors through student worksheets. It is supported by student responses for questions number 26 to 30 which contain learning material of microprocessors in the worksheet. Students' responses to those questions are categorized 'agree'. The use of robots as learning media can help students to understand learning material with significant results. According to Ziaeefard et al. (2017), the use of robots can be used to learn STEM in precollege students where learning outcomes show significant results. The results of this study were also in compatibility with research by Akashiba, et al. (2017). It stated that learning applications for collaborative teaching using robots, laptop PCs, sensors, teachers, and students developed with PRINTEPS shown that the implementation of lessons carried out in science classrooms runs well.

CONCLUSION

The validation results of the robot transporter in the microcontroller subject shows the value of the validity of media quality is 3.89 with the category of very valid. The values of validity on the learning plan that consists of the syllabus, the lesson plan, and the student worksheets are as follows: the syllabus score is 3.78, the lesson plan score is 3.88, and the student worksheets score is 3.89. All these scores are categorized as very valid based on Table 6. For student responses result is category agree. Thus, it can be concluded that the robot transporter can be used in the learning microprocessor. It can be seen that the development of the robot transporter can increase the learning motivation of students majoring in Industrial Electronics Engineering, Al Kholiliyah Vocational High School, Bangkalan, Indonesia.

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DEVELOPING KOPAJA.ID AS A FUN ONLINE LEARNING IN GENERAL TAX CONDITIONS TOPIC

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Abstract

Kopaja.id as online learning had developed in 2019, and KOPAJA is an acronym for "Kompas Pajak Ajaib" which means magically direct taxes. It is also expected to provide a fun learning for students. This research is to provide an online fun learning to students who want to learn tax anytime and anywhere. This research is follow-up research using the research and development (R&D) method to reach the Technology Readiness Level (TRL) for applied research. The development of an application system has been carried out based on a website with the address https://kopaja.id which can be accessed and used for learning from taxation courses. User testing with the Perceived Usability Website instrument was developed by Wang and Senecal. The research sample is from 55 students of DIV Public Sector Accounting, Department of Economics and Business, Vocational College, Universitas Gadjah Mada. The test results show that the website system is functioning correctly, and user ratings show that the website has easy navigation, speed of access, and is comfortable to explore. However, interaction with users is still not optimal. The result of self-measurement on the achievement of Technology Readiness Level reaches TRL 6 in 1-9 scale.

Keywords*: online learning, kopaja, general tax conditions, taxation*

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INTRODUCTION

Literacy is an individual's ability to process information and knowledge for life skills (Kamus Besar Bahasa Indonesia, 2016). The digital era is full of information via the internet; a student is required to be a proactive learner and a lecturer who also provides active and effective teaching. Literacy between students and lecturers must be built together in synergy in the process of teaching and learning activities in class. This is influenced by the role of computer technology and information that has developed rapidly so that the term digital literacy becomes a necessity that will happen. Digital literacy means the ability to understand and use digital information (Gilster, 1997). Bawden (2001) states that fluency in digital literacy is reflected in the ability to read and write using online sources and the ability to select relevant sources for assignments, synthesizing information into coherent messages that can be conveyed to others.

Online learning will generate digital literacy for students and lecturers in universities. Research on online learning has been conducted by Kuntarto (2017) for the Indonesian language subject in the undergraduate program. Online learning models can increase student absorption of the course material, with an increase of more than 81% compared to using only face-to-face learning models. Online learning has provided new experiences that are more challenging than conventional learning models. Therefore, online learning can also be used for other subjects such as Taxation. The Ministry of Research, Technology and Higher Education has developed SPADA which stands for *Sistem Pembelajaran Daring* in Indonesia, or an Indonesian Online Learning System, one of which is online learning to include (inclusion) tax awareness in subjects at school and courses on campus (Direktorat Jenderal Pembelajaran dan Kemahasiswaan Kementerian Riset, Teknologi, dan Pendidikan Tinggi, 2019). Meanwhile, Aghni (2020) has presented an online learning module on tax administration for teacher education programs in positions in deepening the field of accounting and finance studies.

The online module consists of digital material modules, instructional videos, presentation media, and other reading sources, and ends with a formative and summative test. The online learning module is useful for improving the quality of teachers in teaching students. In 2019, Kopaja.id online learning has been developed with the address https://kopaja.id which is complementary to the simulation props for the types and tax rates of KOPAJA which have received a Copyright certificate from the Ministry of Law and Human Rights of the Republic of Indonesia with recording number 000153144 dated 6 August 2019. KOPAJA is an acronym for *Kompas Pajak Ajaib* which means magical taxes compass; online learning kopaja.id is also expected to provide magical and fun directions. Innovations have been made in the development of kopaja.id version 1 by providing online practice questions and obtaining direct value information. However, there are still some obstacles, including kopaja.id which is still static, there is no admin panel so it cannot be updated, and the material is limited to central taxes and local taxes. The kopaja.id version 1 page is still static and does not have an admin panel as evidenced by the material components on the page that are only limited to material uploaded by the system developer.

Previously, a self-assessment had been carried out for the level of technology readiness still at Technology Readiness Level (TRL) 2, namely at the technology application level. Therefore, it is necessary to carry out further research for the development of kopaja.id as a means of online learning on the topic of general tax provisions with a fun concept with the goal of reaching TRL 6 in 1-9 scale. The development of kopaja.id version 2 will use instructional systems from Dick et al. (2009) so that online learning outcomes on general tax provisions can be achieved effectively. How to compile an effective online learning concept on the topic of general tax provisions through online media kopaja.id? How to build a kopaja.id prototype version 2 so that learning online about general tax provisions becomes fun? This research is expected to be able to make kopaja.id reach TRL level 5 and can be used for accounting vocational students in learning general tax provisions in a more enjoyable manner accompanied by online question practice. Providing an alternative to effective online learning media with the Dick and Carey instructional design system (D'Angelo et al., 2018) and testing user acceptance through instruments developed by Wang and Senecal (2007).

The term fun online learning, as elaborated in Kamus Besar Bahasa Indonesia (2016), is started with learning, which is a process, way, and act of making learning, whereas online means

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being in a network, connected via computer networks, the internet, and so on. From the meaning of this term, it can be interpreted that online learning is a learning process using an internet network through the media of computers, sophisticated cellphones, and so on. Thorne (2003) explains that online learning is learning that uses multimedia technology, virtual classes, video, voice messages, e-mail and conference calls, animated online text, and online video streaming. Cox (2019) reveals that there are ten ways to make learning fun by (1) creating simple scientific experiments: simple scientific experiments before introducing new concepts using graphs can allow students to predict what will happen during the experiment; (2) allowing students to work together; (3) using hands-on activity involves students in digging up information by asking questions, doing activities and finding, collecting data and analyzing and making conclusions on a material/concept; (4) giving students to do brain rest: giving students pause to do learning activities will make learning more successful; (5) inviting students to take field trips: teachers are teaching students by inviting students to a certain place or object outside of school to learn things that are obtained in class and see the outside world. Students can relate the concept to everything seen during the field trip; (6) making review time enjoyable: students are often in a state of depression when they hear the word review, so it is necessary to create a pleasant review; (7) incorporating technology into classroom materials: technology can make learning fun; (8) creating fun learning: learning centre can give students the ability to work together, and learn together; (9) teaching according to students' abilities: each student has a different type of intensity, so it is necessary to teach with attention to students' abilities; (10) limiting rules in class: many rules and expectations can hinder the learning process.

Kamus Besar Bahasa Indonesia (2016) defines that fun is making fun; rejoice; arouses pleasure; satisfying; captivate; feeling happy (satisfied and so on) about; like. From the various explanations of the previous literature, it can be concluded that fun online learning can be defined as the process, method, and action for learning that arouses pleasure through multimedia/computers/internet networks.

D'Angelo et al. (2018) explain that the Dick and Carey instructional system consists of nine stages elaborated as follows. (1) Identification of instructional goals setting: The expected objectives of instruction after studying the material with needs analysis by knowing the experience of students as learners when they experience difficulties when learning, analyzing people who are working in the scope of content being developed, and other parties related to the objectives of learning instruction. (2) Carrying out an instructional analysis: This instructional analysis is associated with the definition of learning outcomes from the definition of Bloom et al. (1956) with cognitive, psychomotor, and affective/behaviour components, knowledge, comprehension, application, analysis, synthesis, and evaluation. (3) Learner analysis and context: Analysis of learner targets and learning contexts will be carried out by taking into account previous skills, prior knowledge of a topic, behaviour towards the context and mode of delivery, academic motivation, educational levels and abilities, learning preferences, and group characteristics. (4) Writing performance achievement goals: Performance outcomes should include three parts as follows: (a) condition, which means a description of the capabilities that have been identified with the tools and resources needed to achieve the capability, (b) behaviour, which means a description of expertise including action, content, or concept, and (c) criteria, which mean an acceptable description of performance. (5) Development of assessment instruments: After the performance achievements have been determined, then developing an assessment instrument from each individual. The main emphasis is on the types of abilities described with the goals that have been set. (6) Development of an instructional strategy: Instructional strategies are a variety of teaching and learning strategies which can take the form of group discussions, independent reading, practicum, and others. Strategy development needs to consider the goals, motivation and characteristics of learners, learning objectives, assessment requirements, and performance context. (7) Development and selection of instructional materials: The materials contain material, for example, student workbooks, activity guides, problem scenarios, reference lists, or computer simulations. When in this stage, instructional materials should still refer to the performance achievement stage and the assessment instrument. (8) Designing and carrying out a formative evaluation: Dick et al. (2005) define formative evaluation as the acquisition of data and information while providing instructions that can be used to review the effectiveness of instructions. Examples of formative evaluation can be in the form of questionnaires, student obser-

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vations, note analysis, interviews, self-assessments, short quizzes, and discussions. (9) Designing and carrying out summative evaluations: Dick et al. (2005) define summative evaluation is the collection of data and information while providing instructions that can be used to review the overall effectiveness of instructions. Summative evaluation measures several performance achievements. The difference between formative and summative evaluation is that formative evaluation can identify improvements needed during the process of learning. In contrast, summative evaluation places more emphasis on identifying strengths and improvements after the learning process ends.

General tax conditions are contained in Law no. 6 of 1983 which has been amended by Law of the Republic Indonesia No. 28 of 2007 and Law of the Republic of Indonesia No. 16 of 2009. The general tax conditions in Indonesia explain information regarding to the meaning of tax, tax review from various aspects, tax functions, tax collection principles, taxpayer identification number, company's taxes, tax obligations, tax revocation. In addition, the general tax conditions are also study definition, function, place of payment and deposit, the deadline for payment or deposit, tax notification letter both the definition, function, settlement procedure, correction, type, the deadline for submission, the extension of a time period. Besides that, general tax topic includes tax reporting, sanctions for being late and not submitting tax report, tax assessment letters, tax bills, coercive letters, examinations, investigations, coercive letters, objections, appeals, reconsiderations, confiscation and auction, and prevention and hostage-taking (Law of the Republic of Indonesia No. 28 of 2007; Law of the Republic of Indonesia No. 16 of 2009).

RESEARCH METHOD

The research method uses research and development (Research and Development). This method is a method used to produce products from the process of problem identification, data collection, product design, product manufacturing, and product testing (Sugiyono, 2015). The research design uses a waterfall approach as presented in Figure 1.

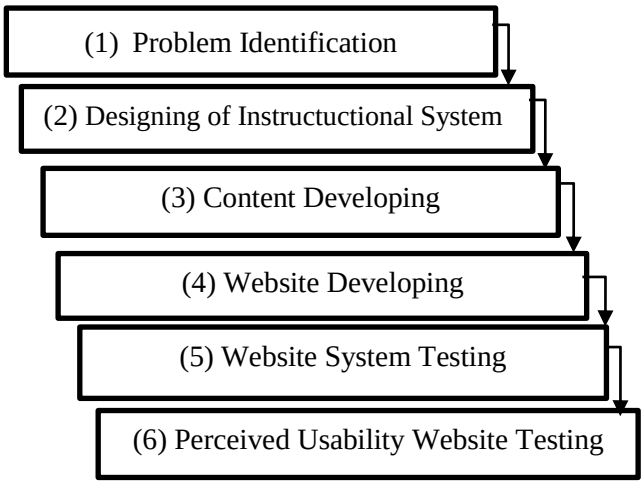

Figure 1. Waterfall Approach

Stage 1 is identifying problems on the kopaja.id version 1, which has been developed in 2019. The second stage is designing an instructional system referring to the Dick and Carey system (D'Angelo et al., 2018). The third and fourth stages are preparing the content of the General Tax Conditions, and designing version 2 of the kopaja.id by fixing the problems in kopaja.id version 1. The fifth stage is testing the page, whether there is a system malfunction of each menu in kopaja.id. The last stage is testing the user acceptance using an instrument developed by Wang and Senecal (2007). The questionnaire instrument will also be tested using validity and reliability. Testing the questionnaire instrument must meet the validity and reliability test. Testing was carried out with SPPS version 21. Testing the validity using the Pearson correlation, reliability testing was done by looking at the Cronbach's Alpha value.

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RESULTS AND DISCUSSION

The first stage of problem analysis on the kopaja.id learning website version 1 shows that the website is still static, and there are limited learning materials on central taxes and local taxes. The Indonesian Institute of Accountants - the Compartment of Educator Accountants or *Ikatan Akuntan Indonesia Kompartemen Akuntan Pendidik* (IAI KAPd) (2015) has compiled a national standard of education for accounting vocational education, one of the achievements of the Diploma IV Public Sector Accounting learning in the aspect of special knowledge: "*14. Mastering theoretical concepts in depth on tax regulations relevant to individual and corporate taxpayers".*

Therefore, kopaja.id version 2 creates an admin panel so that it can be done updating the material and adding menus according to the needs of users of Accounting vocational students. In order to fulfill the learning achievements of special knowledge for Diploma IV (DIV) Public Sector Accounting students, it is necessary to make general conditions on taxation as material for students to master theoretical concepts in depth on tax regulations relevant to individual and corporate taxpayers.

The second stage is the design of the Dick and Carey instructional system, with nine stages as follows. (1) Identification of instructional goals: Determination of expected instruction objectives after performing an identification a need analysis by conducting interviews with two taxation lecturers of the Department of Economics and Business, Vocational Collage, Universitas Gadjah Mada (UGM), Yogyakarta, Indonesia, who have tax consultant certification. The interview material was focused on general tax conditions and conducted at August 17, 2020, through online/virtual interview. Recommendations from the two experts were divided into 13 materials, namely: tax concepts, taxpayer identity number, taxable entrepreneurs, tax payments, tax assessments, tax returns, invoices, accounting and tax audits, tax investigations, compulsory letters, objection, appeal and review, confiscation and auction, and prevention and taking of hostages. (2) Carrying out an instructional analysis: Analysis of instructional material by looking at the learning outcomes of DIV Public Sector Accounting graduates based on national education standards for accounting vocational education that have been compiled by Ikatan Akuntan Indonesia Kompartemen Akuntan Pendidik (2015). (3) Learner analysis and context: The target of learners is public sector accounting vocational students so that the context developed is in accordance with the taxation course syllabus. (4) Writing performance achievement goals: The writing of written learning performance achievements in each material designed will be uploaded in the General Tax Conditions menu at kopaja.id version 2 with an address that can be accessed anywhere and anytime at https://kopaja.id. (5) Development of assessment instruments: The assessment instrument uses the tax question exercise menu according to the material being developed. The assessment instruments are divided into two types; that can be accessed by a regular and premium user. (6) Development of an instructional strategy: Kopaja.id users can do an ability test with a menu of practice questions and quizzes in real-time so that it attracts users' attention to learn. The value of the practice questions is displayed live. (7) Development and selection of instructional materials: The thirteen general tax conditions are adjusted to the learning outcomes, and the material is taken from tax regulations in force in Indonesia and tax books. (8) Designing and carrying out a formative evaluation: It is carried out by providing practice questions for each material and accompanied by discussion so that students as users can find out the right and wrong answers. (9) Designing and carrying out summative evaluations: Its evaluation is carried out by providing a quiz menu specifically for premium users with easy, medium, and difficult quiz categories.

The third stage is the preparation of content or material to be uploaded, both in the form of taxation material, as well as tax questions and discussions. Quiz questions for summative evaluation consist of three types of easy questions, medium questions, and difficult questions. Sudjana (2017) explains that the proportion of problem difficulty levels can use the 3-4-3 model, which means that there are 30% easy items, 40% medium items, and 30% difficult items. The fourth stage is that the development of the page is divided into two, namely the first is the creation of an admin panel which functions to facilitate administrators of the kopaja.id page to manage and update taxation materials, questions, and quizzes. The system is equipped with the management of sample questions, practise questions with their discussion and tax quizzes. The system will also be useful

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for optimizing data collection and data capture that can be used as material for evaluating the future development of kopaja.id. The second is the development of the kopaja.id page for user activity from the side of regular members and premium members of kopaja.id. The main difference between regular member users and premium members lies in the tax quiz, which can only be accessed by premium member users. The fifth stage is testing the page in terms of the admin panel system and interface.

Based on system testing for both the admin panel system and the interface that the system can run according to its function. The sixth stage is user testing with the Perceived Usability Website instrument developed by Wang and Senecal (2007). This instrument was developed to determine the extent to which users of the online tax learning page through https://kopaja.id can easily access the page and can interact easily and effectively. There are 15 questions with three dimensions (navigation, speed, interaction, and behaviour) with 7 Likert scales. The sample of user research is from 55 students of DIV Public Sector Accounting, semester three and above, Department of Economics and Business, UGM Vocational School. The choice of third-semester DIV students and above is because these students have already received taxation courses. Testing was carried out on October 27, 2020, using online.

Table 1. Respondent Participation Rate

Respondent Participation	**Rate (%)**
Number of Public Sector Accounting DIV Students Class of 2019 and 2020	72
Students Who Filled the Questionnaire	55
Respondent Participation Rate	**76**

Table 1 shows that the response from the respondents was very good with a research participation rate of 55 students (76% of the study sample. Based on the demographic data of respondents, it is shown that the age of the respondent is at least 18 years old, and at most 25 years old, and the average age is 20 years. Meanwhile, the average GPA of Public Sector Accounting DIV students for semester 3 and above is 3.6 from a scale of 4.0. This shows that students have high academic abilities. User testing refers to the Perceived Usability Website instrument developed by Wang and Senecal (2007) as presented in Table 2.

Table 2. User Testing Instruments

Dimensions	**Question Items**
Navigation (N)	
N1	I am very easy to complete the tasks I want to complete on the Kopaja.id website.
N2	I find the Kopaja.id website easy to use
N3	I find it very easy to find the information I want on the Kopaja.id website menu.
N4	I find it easy to learn how to use the Kopaja.id website
Speed (S)	
S1	The speed of information provided by the website is fast enough
S2	Information can be displayed quite quickly
S3	The Kopaja.id website can be accessed quickly
S4	The material pages on the Kopaja.id website can be downloaded quickly
Interaction (I)	
I1	The Kopaja.id website provides customization facilities
I2	The Kopaja.id website makes me a unique person and can respond to my specific needs
I3	The Kopaja.id website provides content / menus that can be changed individually
I4	The Kopaja.id website provides adequate feedback to assess the progress of my assignments (practice questions and quizzes) at Kopaja.id
Attitude (A)	
A1	The Kopaja.id website makes it easy for me to establish a relationship with the Public Sector Accounting DIV Study Program, DEB, Vocational School, UGM
A2	I am satisfied with the services provided by Kopaja.id
A3	I feel comfortable when exploring the Kopaja.id website

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Testing the questionnaire instrument must meet the validity and reliability test. The test was carried out with SPPS version 21. The following are the results of the validity and reliability testing. Validity testing using the pearson correlation shows that 15 questions from the four dimensions of navigation (N1-N4), speed (S1-S4), interaction dimensions (I1-I4), and behavioral (A1-A3) are valid because the significance value <0.05. Cronbach's Alpha value is 0.9330 so it can be concluded that the instrument is reliable.

Respondents' Assessment of the perceived usefulness of the Kopaja.id resulted easy navigation ability to complete assignments (74.2% of students agree with average scale 6.32 if navigation in Kopaja.id is easy), speed of information speed 84.4% of students agree 6.19 with average scale agree if kopaja.id can be accessed quickly), interaction and customization facilities 77.6% of students with average scale agree. 5.52. Behavioral organizational institutional relationships 81.1% of students with average scale agree 6.23 if users are comfortable and satisfied with kopaja.id.

From the results of testing the Perceived Usability Website by 55 users as respondents, the interaction dimension received the lowest assessment (average score of 5.52) compared to the dimensions of navigation, speed, and behaviour. The kopaja.id page does not yet have a menu for direct interaction with users such as realtime chat boxes so that users can respond to specific needs.

CONCLUSION

Kopaja.id development on the topic of general tax provisions has thirteen materials that can meet the learning achievements of special knowledge for DIV Public Sector Accounting students following the national standards of Indonesian vocational education. Besides, the test results of the panel and interface systems show that the system is proper and functioning correctly. From the user side, the perceived assessment when using the Kopaja.id page as online tax learning provides comfort in studying taxes and has access speed, easy navigation. However, in terms of interaction from users to learning pages, it is not optimal. Meanwhile, the results of independent measurement for technology readiness have reached TRL 6.

The development of online learning media is suitable for use in the public as a learning medium. Users give recommendations such as, provide simulation material for making tax-payer identity number or NPWP which stands for *Nomor Pokok Wajib Pajak*, filling tax report as material for particular skills, discussion menu, and provide video materials for visual learners. Subsequent development research can meet user needs in the interaction dimension.

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THE EFFECTIVENESS OF THE APPLICATION OF ARTICULATE STORYLINE 3 LEARNING OBJECT ON STUDENT COGNITIVE ON BASIC COMPUTER SYSTEM COURSES

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Abstract

This study aimed to determine the effectiveness of applying learning objects based on Articulate Storyline 3 on student cognitive competence in the Basic Computer System course in the Informatics Engineering Education Study Program at the Ganesha University of Education. This type of research was descriptive quantitative with a pre-experimental research design involving one experimental class. The populations used in this study were all semester 1 students of the Informatics Engineering Education study program in the Basic Computer Systems course in the odd semester of the 2020-2021 academic year. Random sampling was using a simple random sampling technique. The average pretest result was 57.12, and the posttest average is 79.81. The paired pretest-posttest t-test resulted in the Sig. equal to 0.000, which indicates that there is a significant difference in the average pretest and posttest results. The percentage of student responses to the learning model is 64.19. This shows that self-confidence in learning objects based on Articulate Storyline 3 on student cognitive abilities "Very Practical". The results of the N-Gain value showed a proportion of 60%. It can be said that the application of learning objects based on Articulate Storyline 3 has a significant effect on the cognitive abilities of the students, cognitive ability increases quite effective, and the category of student response is very positive.

Keywords*: learning objects, articulate storyline, basic computer system*

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INTRODUCTION

The learning system in the industrial era 4.0 makes it easier for people to access learning information. Easy access to learning information cannot be separated from the use of network technology and information technology. One of the many ways to utilize network technology and information technology for the development of learning systems in university is online learning for higher education. The initiator of this system is the Ministry of Education and Culture of the Republic of Indonesia. Since 2014 the Directorate of Learning and Student Affairs, the Directorate General of Higher Education has developed the Online Learning System or *Sistem Pembelajaran Daring* (SPADA) program. The Indonesian SPADA program is basically an implementation of Law of the Republic of Indonesia Number 20 of 2003 concerning the National Education System, Law of the Republic of Indonesia No. 12 of 2012 concerning Higher Education, and the Regulation of the Minister of Education and Culture No. 109 of 2013 concerning the Implementation of Distance Education in Higher Education. The Regulation of the Minister of Education and Culture Number 109 of 2013 states that one of the scope of distance education is at the courses level. One of the goals of the Indonesian SPADA program is to increase equitable access to quality learning in Higher Education. According to Mustofa et al. (2019), the online learning in higher education has a positive contribution to suppressing disparities in the quality of higher education institutions in Indonesia. The online lecture system provides a more comprehensive understanding than conventional systems, because the material is displayed digitally and in an animated form.

Universitas Pendidikan Ganesha (Undiksha) is one of the public universities in Bali Province that has implemented distance education, and is currently implementing an online learning system (SPADA) organized by the Ministry of Education and Culture of the Republic of Indonesia. Several courses in the Informatics Engineering Education Study Program have implemented this online learning system, one of which is the Basic Computer System course. Basic Computer Systems is a course that must be taken by students of Information Engineering Education at the beginning of the study period. The Basic Computer Systems course studies materials related to hardware, software, operating systems, open source, and maintenance of hardware and software. Based on the results of observations during the lecture process, conventional media were still used in the lecture process. The term conventional is used in the sense that the learning medias presented are still limited to physical object, learning materials are displayed using the PowerPoint application, and learning objects are taken from the internet. It has implications on the way the lecturer delivers the material using the designed learning media. The media made by lecturers is less integrated, less interactive in terms of use and distribution, and does not get enough attention by students. The results of the observations showed that students were less interested in using the given object. Undiksha already has a place to accommodate its learning object called Undiksha e-Learning. However, the objects in the course are less interactive and poor quality in terms of packaging. Learning objects are still dominated by Portable Document Format (PDF) files, which only convert document files into digital files. This is not enough to produce quality learning objects. An innovative learning media is needed to improve the content contained in Undiksha's e-learning so that it can fulfill the objectives of the Indonesian SPADA Program.

It was found that during the learning process both online and offline in the Basic Computer System course shows that the student response to learning material is low, as indicated by the low average pretest score. Some problems that occur during the learning process in the classroom include: (1) the low enthusiasm of students in participating in learning activities on basic courses in computer systems, so the learning process becomes less effective; (2) students' lack of understanding of the basic knowledge of computer systems so that it impacts the learning process of other subjects that are still related to basic course material of computer systems; and (3) students have lack of understanding of cognitive aspects and skills in learning the basic material of computer systems in the classroom. In an effort to solve some of the above problems, a substantial effort is needed in order to strengthen the cognitive abilities students in the Basic Computer Systems Course.

Based on these problems, the solution that can be offered is to use appropriate technology in developing learning objects. The developed learning objects must have interactive, collaborative, and integrative characteristics. There is application called Articulate Storyline 3. Articulate Story-

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line is a software that can be used to make presentations. Having the same functionality as Microsoft Power Point. Articulate Storyline has several advantages so that it can produce more comprehensive and creative presentations. This software also has features such as timeline, movie, picture, character and can be distributed to various web-based e-learning platforms. This application offers many conveniences in creating learning objects in the form of simulations, quizzes, drag-and-drop interactions, screen recordings, and many other e-learning objects that allow interactions between lecturers, objects, and students. Articulate Storyline 3 can be used to create learning objects that present information in an innovative and interactive format.

Articulate storyline helps digital-based learning modern designers. Darmawan (2016) states that Articulate Storyline is an application supported by simple smart brainware with interactive tutorial procedures to help users format CDs, personal web, and word processing, through templates published both offline and online. According to Pratama (2018), Articulate Storyline is a software that is used as a medium for presentation or communication. It is a multimedia authoring tool used to create interactive learning in the form of a combination of images, text, sound, graphics, video, and animation (Amiroh, 2019, p. 2). The publication of the Articulate Storyline project results is in the form of web-based media that can be run on various devices such as tablets, laptops, and smartphones. Based on the advantages of the articulate storyline application, it is suitable, especially for improving cognitive abilities of the students in basic computer systems courses.

Student competence in the Basic Computer System course in terms of cognitive aspects must increase at the end of the learning process. Cognitive abilities will shape the intellectual abilities and personality students. The structure of cognitive processes in Bloom taxonomic dimension consists of knowledge (C1), understanding (C2), application (C3), analysis (C4), evaluation (C5) and creating (C6) (Krathwohl, 2002, p. 214). The cognitive processes are classified from the simple level of knowledge to the level of creating. Therefore students need to explore and practice their cognitive abilities because cognitive abilities result from thinking activities as the controlling center of human activities.

Higher Order Thinking Skills (HOTS) oriented learning needs to be developed because it can be used as a tool to improve the learning quality and the quality of graduates. According to Burhan and Arifin (2020), the objective of learning is to attain the maximum achievement conforming to the objective. Students should have excellent cognitive abilities and are expected to have a good impact on the surrounding environment. The ability of knowledge and understanding of the basic computer systems course is useful in the daily life of students. With application and analysis skills, students are expected to contribute to the environment they live in and if there are problems related to informatics or computer engineering, they solve those problems. The ability to evaluate and create are needed in providing solutions that are relevant to the development of the computers or informatics in the future.

RESEARCH METHOD

This study used a descriptive quantitative method with a Pre-Experimental design, namely the One-Group Pretest-Posttest Design. This study only involved one experimental class without a control class. This design compares the conditions before and after of the treatment, namely comparing the pretest value with the posttest value. The research design can be seen in Table 1.

Table 1. Experimental Research Design One-Group Pretest-Posttest

Group	Pretest	Treatment	Posttest
Experiment	O_1	X	O_2

The stages of research activities are designed based on the design in Table 1. The first stage of this experiment is to provide a pretest to students. The next stage is to provide treatment to students in the experimental group in the form of the application of learning objects based on Articulate Storyline 3 on student cognitive in the Basic Computer Systems course. The experimental activity stage ended by providing a posttest and a response questionnaire to the implementation of the treatment.

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The variables in this study are independent variables and dependent variables. The independent variable is the learning object based on Articulate Storyline 3. The dependent variable is the cognitive abilities of students in basic computer systems courses. In addition, the population in this study were all students in semester 1 of the Informatics Engineering Education study program in Basic Computer Systems courses in the odd semester of the 2020-2021 academic year totaling four classes with a total of 105 students. Furthermore, sample was taken using simple random sampling technique, obtaining Class B as the sample for the experimental group, namely 26 students.

The research instruments used in this study were tests and questionnaires. The test instrument was used to measure students' pedagogical abilities at the pretest and posttest. The form of the test used is objective questions consisting of 30 multiple choice questions done with e-learning aids. Indicators on the question are made by considering the level in the Bloom taxonomy, so the test questions can measure student competencies according to the learning outcomes of their subjects. The questionnaire instrument was used to see student responses on the learning object media based on Articulate Storyline 3 applied during the research. The indicators in the questionnaire were arranged to see the level of implementation and usefulness of the learning object used as the independent variable. The questionnaire consisted of 15 statement items related to the implementation and usefulness of learning objects based on Articulate Storyline 3. The instrument used Likert scale with a range of values as follows: (1) 4 for SS (strongly agree); (2) 3 for S (agree); 2 for TS (disagree); and a value of 1 for STS (strongly disagree). The questionnaire also provides a column for comments and suggestions regarding the implementation of the independent variable treatment.

Data on initial pedagogic abilities of the students were obtained through a pretest. Data on pedagogic ability after the independent variable treatment were obtained through a posttest. Based on these data, data analysis was then carried out to see whether or not there was a significant effect/ difference on the dependent variable before and after the independent variable was treated. In addition, the pretest and posttest scores are also used to see the effectiveness of learning as a result of the treatment of the independent variables.

Hypothesis testing of the effect of independent variables on the dependent variable was carried out using the Paired Sample T-Test. This test is used to compare the posttest results to the pretest results. The assumption test required before carrying out the hypothesis test is the normality test, using the Shapiro-Wilk test. Paired Sample T-Test Hypothesis test can be carried out if the data is normally distributed. If the data is not normally distributed, the hypothesis test is carried out using non-parametric statistics in the form of the Wilcoxon test. Hypothesis testing and assumption tests were carried out with the help of SPSS 17. The Ho from this study is that there is no significant difference on average cognitive abilities of the students between the pretest and posttest.

The effectiveness of using the learning model can be seen: (1) the results of student responses to learning objects based on Articulate Storyline 3 and (2) the results of the calculation of the N-Gain value. The data analysis technique used in the questionnaire results was descriptive analysis. This analysis is used to see the effectiveness of the learning model based on the level of its implementation and usefulness. The results of this analysis are the percentage of the overall response of each student related to the treatment of the independent variables. The formula for calculating the percentage score uses the ideal mean (Mi) and the ideal standard deviation (SDi). The mean ($\bar{x}$) of student response scores was then categorized using the guidelines presented in Table 2.

Table 2. Criteria for Grouping Student Responses

No.	Interval	Category
1	Mi + 1.5 SDi $\leq \bar{x}$	Very Positive
2	Mi + 0.5 SDi $\leq \bar{x} <$ Mi + 1.5 SDi	Positive
3	Mi – 0.5 SDi $\leq \bar{x} <$ Mi + 0.5 SDi	Less Positive
4	Mi – 1.5 SDi $\leq \bar{x} <$ Mi – 1.5 SDi	Negative
5	$\bar{x} <$ Mi – 1.5 SDi	Very Negative

The level of effectiveness can be calculated from the N-Gain value. The formula for calculating the N-Gain value can be seen in Formula (1). In addition, the criteria for the N-Gain value can be seen in Table 3.

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$$N - Gain = \frac{Posttest\ score - Pretest\ score}{Maximum\ score - Pretest\ score} \quad (1)$$

Table 3. The Criteria for the Gain (Hake, 1999)

Gain Index	Interpetation
$g > 0.70$	Effective
$0.30 < g < 0.70$	Quite Effective
$g \leq 0.30$	Less Effective

RESULTS AND DISCUSSION

Previous research has produced learning designs. The previous design was developed in the form of a program code using Articulate Storyline 3 (AS 3) as the main medium for learning media. The Dashboard display of learning objects based on Articulate Storyline 3 in the Basic Computer Systems course can be seen in Figure 1, and the Menu display is presented in Figure 2.

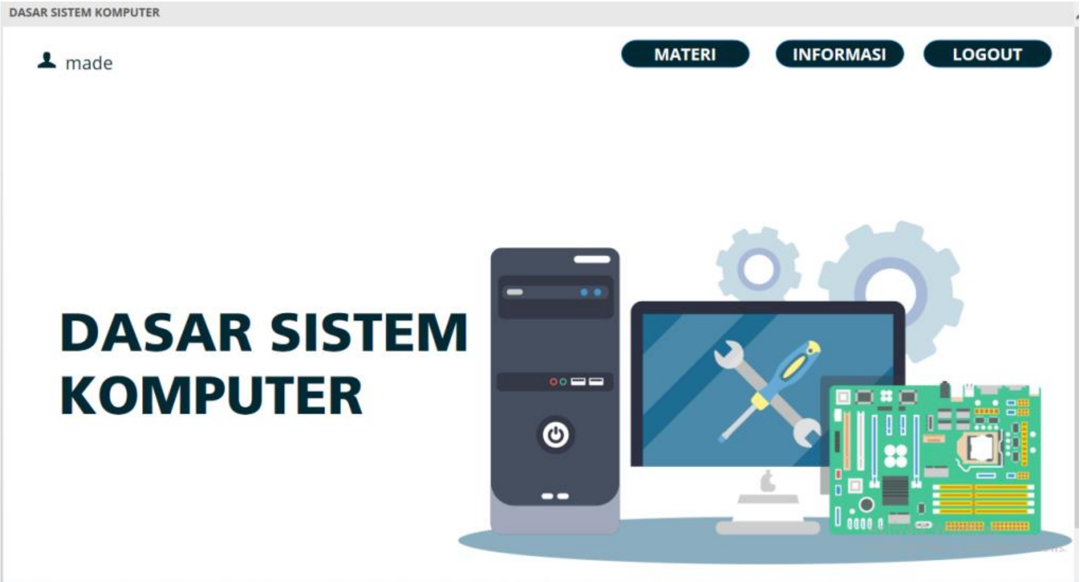

Figure 1. AS3 Learning Object Dashboard of Basic Computer Systems

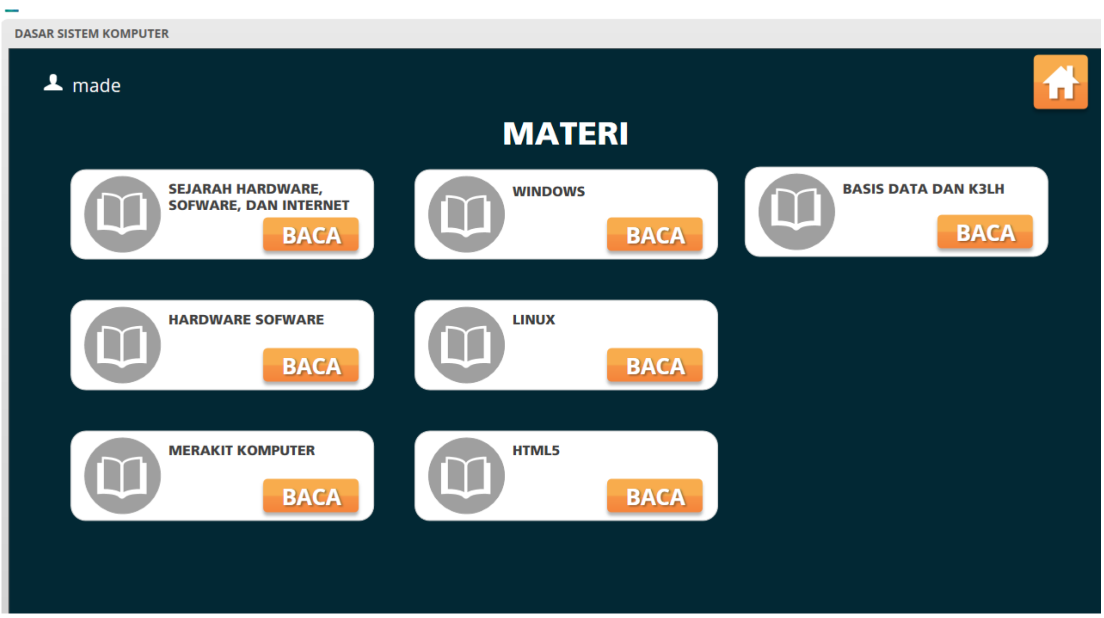

Figure 2. Menu Display of Basic Computer System Materials

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This study aims to determine the effectiveness of learning objects based on Articulate Storyline 3 on student cognitive of the 26 students in the Basic Computer System subject in the Informatics Engineering Education Study Program, Ganesha University of Education. Based on the experimental results, it produces two types of data, including: (a) the results of the pretest and posttest of the students and (b) the results of the student response questionnaires. The data is then processed using descriptive and inferential statistics to see the effect and effectiveness of the application of learning objects based on Articulate Storyline 3.

Effect of Application of Learning Objects

This experimental research begins with a pretest activity and ends with a posttest activity, using 30 objective questions. The results of the two tests are then processed using descriptive and inferential statistics to determine the effect of the independent variable on the dependent variable. The data contained in Table 4 is the result of descriptive statistical calculations from the results of the pretest and posttest scores.

Table 4. Descriptive Statistical Data of Pretest and Posttest Results

	N	Minimum	Maximum	Mean	Std. Deviation
PreTest	26	40	75	57.12	11.504
PostTest	26	65	95	79.81	9.325
Valid N (listwise)	26				

In Table 4, it can be seen that the pretest mean is lower than the posttest mean. This shows that descriptively there is a difference in the average value of cognitive abilities of the students at the pretest and posttest after the treatment of the application of learning objects based on Articulate Storyline 3. However, this has not shown a significant effect on the application of learning objects based on Articulate Storyline 3 on increasing the cognitive abilities of the student. Furthermore, to determine the significant influence between the two variables, hypothesis testing was carried out using paired sample t-test on the results of the pretest and posttest.

Hypothesis testing can be carried out if the research data is normally distributed. Normally distributed data can be seen from the Normality Test. In this calculation, the researchers used the Shapiro-Wilk Normality Test. The results of the Normality Test can be seen in Table 5.

Table 5. Shapiro-Wilk Normality Test Results

Group	Statistic	Df	Sig.
Pretest	0.934	26	0.095
Posttest	0.944	26	0.169

The results of the normality test in Table 5 show the Sig. for the pretest group of 0.095 and the Sig. for the Posttest Group of 0.169. Because the Sig. of the two groups is > 0.05, it can be concluded that the data on cognitive abilities of the students for the pretest and posttest is normally distributed, so that the statistical test can be continued by conducting hypothesis testing using paired sample t-test. The results of the paired sample t-test between the pretest and posttest values can be seen in Table 6.

Table 6. Result of Pretest dan Posttest t-test

	t	df	Sig. (2-tailed)
Equal variances assumed	-7.813	50	0.000
Equal variances not assumed	-7.813	47.947	0.000

Based on Table 6, the Sig value, from the results of the paired sample t-test between the pretest and posttest students, the pedagogical ability shows a value of 0.000. In the paired sample t-test, if the value is Sig. <0.05, then Ho is rejected and Ha is accepted. The calculation results show the value of Sig. 0,000 <0.05, it can be ascertained that Ho is rejected, and Ha is accepted, so the

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hypothesis taken is that there is a significant difference average between the cognitive abilities of students at the pretest and posttest, which means that there is an effect of implementing learning objects based on Articulate Storyline 3 on cognitive abilities of the students in the Basic Computer Systems Course.

Students experience an increase in cognitive concepts after learning the material of Basic Computer Systems using learning objects based on Articulate Storyline 3. The concept improvement is in accordance with the results of research conducted by Setyaningsih et al. (2020) which concludes that interactive learning media based on Articulate Storyline can improve motivation and learning outcomes of students.

Other relevant research related to the application of interactive multimedia based on Articulate Storyline gave the same results. Previous research by Rafmana et al. (2018) produced similar conclusions, namely that there was a significant effect that interactive multimedia based on Articulate Storylines was valid, practical and having a potential effect on increasing the student learning outcomes motivation. Likewise, Pratama (2018) indicates that there is an increase in the achievement of cognitive learning outcomes and student learning motivation using Articulate Storyline learning media.

Effectiveness of the Application of Learning Objects

The effectiveness of the application of learning objects based on Articulate Storyline 3 on cognitive abilities of the students is measured from the results of the response questionnaire and the gain value. The response questionnaire is used to see the effectiveness based on the responses given by students to the applied learning object based on Articulate Storyline 3. Meanwhile, the gain value is used to determine the effectiveness of the application of learning objects based on Articulate Storyline 3 which is applied based on the results of the pretest and posttest scores.

The Student Response Test Activity using a response questionnaire was done to 26 students who had previously studied learning objects based on Articulate Storyline 3. The average results of student response scores were categorized using the guidelines in Table 7.

Table 7. Criteria for Classifying Student Responses

No	Interval	Category
(1)	(2)	(3)
1	$60 \leq 64.19$	Very Positive
2	$50 \leq 64.19 \leq 60$	Positive
3	$40 \leq 64.19 \leq 50$	Less Positive
4	$40 \leq 64.19 \leq 30$	Negative
5	$64.19 < 30$	Very Negative

After being converted into the response categorization criteria table, the results of student responses was at the average of 64.19 which is categorized as "Very Positive" qualification range. This shows that the success of learning objects based on Articulate Storyline 3 on student cognitive abilities is already in the criteria of "Very Practical" as evidenced by the results of comments on the questionnaire given such as the joy and motivation of students in using learning objects based on Articulate Storyline 3 and student interest in using learning objects based on Articulate Storyline 3 in the learning process. Based on the results of the response, the students' understanding in the basic course of Computer Systems in terms of cognitive aspects must increase at the end of the learning process. Expectations from the increasing cognitive abilities will shape the intellectual abilities and personality of the students themselves.

In addition to be used in the comparative test to determine the significant effect of learning objects based on Articulate Storyline 3, the pretest and posttest scores in this study were also used to see the effectiveness of learning objects based on Articulate Storyline 3 based on the increase in test scores. Effectiveness is determined based on the calculation of the N-gain value of average pretest and posttest scores of the 26 students. The results of the calculation of the gain value can be seen in Table 8.

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Table 8. Result of Gain Score Calculation

Pretest Mean	Posttest Mean	Gain Score	Percentage
57.12	79.81	0.60	60%

Based on the results of the pre-test and post-test analysis, it was obtained an increase in value of 22.69 from the results of the pre-test score of 57.12 to the result of the post-test score of 79.81. The graph of the average pre-test and post-test results can be seen in Figure 3.

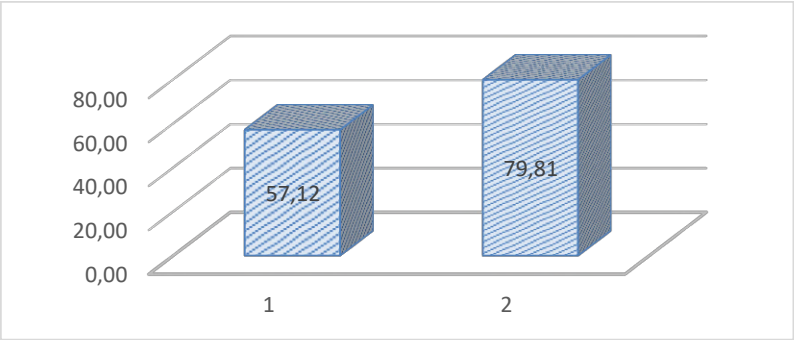

Figure 3. Graph of the Result Pre-test and Post-test

After determining the amount of the increasing value, then the calculation is done to get N-Gain or Normalized Gain, the results obtained from the N-Gain calculation are 0.60 with a percentage of 60%, so that the rate of post-test enhancement is categorized as "Quite Effective" which refers to Table 3. Based on the results obtained, the learning object based on Articulate Storyline 3 has been able to improve cognitive abilities the students in Basic Computer Systems Subjects.

Based on the results obtained, the learning object based on Articulate Storyline 3 has been able to improve the cognitive abilities of students learning outcomes and is effective for use in the learning process of Basic Computer Systems. According to Mudjijo (1995), practicality refers to the level of ease of use as well as the implementation and management of the interpretation of the results. Based on the results of the implementation evaluation, it can be concluded that the learning object based on Articulate Storyline 3 in the Basic Computer System course has met the product quality criteria, namely validity, effectiveness and practicality.

Remembering knowledge will help students in building new knowledge as a cognitive or knowledge strategy process. The analysis showed that the N-Gain calculation based on the pretest posttest test was 60%. Thus, based on the criteria, it is quite effective. Although the criteria is quite effective, the ability of the students to remember must be further improved. The ability to remember, according to Anderson et al. (2001), is a mental cognitive process in retrieving the required knowledge from long-term memory. Recall knowledge is needed to develop meaningful learning processes, solve problems and develop knowledge to the level of understanding and application.

The ability of the students to understand the concept of the basic computer system is seen from the results of the questions given. There are ten multiple choice questions that measure understanding with indicators of achievement in understanding hardware, software and Windows and Linux operating systems. Understanding is a process of thinking and learning to understand. According to Winkel (2004), understanding includes the ability to grasp the meaning of the material being studied. This ability can be used to describe the main content of a reading, change the data presented in a certain form to another form, such as mathematical formulas into words, make predictions about trends that appear in certain data, such as in graphs.

Based on the Bloom Taxonomy dimension, the ability to apply is at the C3 level. The ability to apply is namely implementing and using procedures in certain situations (Krathwohl, 2002). The ability to apply is applied to six questions with indicators of explaining the concept of database and health and safety. The ability to apply can be improved by applying learning objects based on Articulate Storyline 3 in the learning process. The measurement of the ability to analyze is applied to the indicator explaining the meaning of interaction as many as six items. The problem of analyzing

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ability is given to students in the form of a narrative text related to assembling computers. Based on the results of the analysis, it shows that the ability to analyze is moderate. This can be caused by the inability to link the practicum with the theory of hardware software and Work Safety with the questions being made, so it requires a more in-depth study but the available time is insufficient. In addition, the application of learning strategies is not in accordance with the learning material and there is no habituation to develop cognitive abilities in terms of limited practical hardware installation and lack of practical tools.

CONCLUSION

Based on the results of the research and data analysis, the following conclusions can be obtained. First, there is a significant effect of the application of learning objects based on Articulate Storyline 3 on cognitive ability in the Basic Computer Systems course. Second, the application of learning objects based on Articulate Storyline 3 is effective to improve the cognitive abilities of the students in the Basic Course of Computer Systems. This conclusion is supported by: (a) The percentage of student responses to the application of learning objects is 64.19 with the qualification "Very Positive". This shows that the success of learning objects based on Articulate Storyline 3 on cognitive abilities of the students is already in the criteria of "Very Practical"; (b) The percentage of the N-Gain value is 60%, which indicates that the learning object is quite effective in improving the cognitive abilities of students in the Basic Computer Systems Course.

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THE RELEVANCE OF AUTOTRONIC ENGINEERING COMPETENCE AT VOCATIONAL HIGH SCHOOL TO THE WORLD OF WORK

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Abstract

This research aims to reveal: (1) the competencies profile of autotronic engineering at vocational high school; (2) the competencies profile of autotronic engineering required by the world of work; and (3) the description of relevance between the competencies profile of autotronic engineering at vocational high school and the competencies profile of autotronic engineering required by the world of work. This research was quantitative research with survey method. This research used descriptive analysis as a data analysis method. The results of this research are as follows. (1) There are 13 competency items in Support of Autotronic System cluster taught at vocational high school and required by the world of work, with a percentage of 81% out of 85% (irrelevant). (2) There are 34 competency items in Engine Management System cluster taught at vocational high school and required by the world of work, with a percentage of 70% out of 67% (relevant). (3) There are 44 competency items in the Chassis Management System cluster taught at vocational high school and required by the world of work, with a percentage of 70% out of 60% (relevant). (4) There are 37 competency items in the Comfort, Safety, and Information Technology cluster taught at vocational high school and required by the world of work, with a percentage of 52% out of 63% (irrelevant). (5) There are four competency items in the Vehicle Control System Cluster taught at vocational high school and required by the world of work, with a percentage of 27% out 59% (irrelevant).

Keywords*: autotronic engineering, vocational high school, world of work*

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INTRODUCTION

"The world of work is cosntantly changing and must always change because of the dynamic process of human life" (Sudira, 2016, p. 68). Every individual will surely encounter problems in meeting various kinds of life necessities. Therefore, humans then develop technology to help themselves meet each of their needs effectively and efficiently. The development of the technology also changes the characteristics of the world of work in which their technologies are applied. Indeed, it is proper to say that the dynamic needs of human life can change the characteristics of the world of work. In addition, Rojewski (2009, p. 19) believes that

> *"unprecendented changes in work, family, community, and political life in the twenty-first century−fuelled by myriad phenomena such as globalisation, market deregulation, the world-wide influence of capitalism, and a need for knowledgeable workers skilled in information technologies−confront people in every region of the world of the world".*

However, changes in characteristics of the world of work have major influence on other aspects of human life as well, that is the need for relevant competencies to the changes. Sudira (2016, p. 67) states "characteristics changes in the world of work have a direct implication on the need for developing work competencies". Lucas et al. (2012, p. 38) define competency as "the capability to perform and use knowledge, skills, and attitudes…". MacKenzie and Polvere (2009, p. 63) define competency as "the individual's demonstrated capacity to perform, i.e. the possession of knowledge, skills, and personal characteristics needed to satisfy the special demand or requirements of particular situation". Thus, competency is individual ability to perform to perform particular tasks and duties to the standard of performance expected in the workplace, applying all relevant skills, knowledge, and attitudes consistenly over time in the required workplace situations (International Labor Organization, 2015, p. ix).

Yet, there are few differences between competence and compe-tency. Norton (1997, p. 285) explains that

> *"(1) competence is achievement of the knowledge, skills, and attitudes required by worker in order to perform a given occupational task; while (2) competency is a description of the ability one possesses when they are able to perform a give occupational task effectively and efficiently".*

"Competence refers to a person's capacity while competency refers to specific capabilities" (Zhao, 2014, p. 169). In addition, Sanghi (2007, p. 8) differentiates between competence and competency, as in Table 1.

Table 1. Differences between Competence and Competency

Competence	Competency
Skill-based	Behaviour-based
Standard attained	Manner of behaviour
What is measured	How the standard is achieved

Competences are packages of competencies, consisting of three components, i.e.: (1) knowledge; (2) attitude; and (3) skill, to perfom a given occupational tasks effectively and efficiently. Gagnon (2009, p. 2699) describes both of them as "Integrated collection of knowledge, know-how, know-how-to-be, and know-how-to-live-together that can be mobilized when needed, both successfully for others and for oneself, throughout life".

Technical and Vocational Education and Training (TVET), as a type of education closely related to the world of work, has responsibilities and roles in developing competencies relevant to the world of work. Hollander and Mar (2009, p. 41) state "TVET is concerned with the acquisition of knowledge and skills for the world of work". Sudira (2016, p. 69) states that one of the ways to develop competencies relevant to every change in the world of work is to use the learn, re-learn, and unlearn method. The meaning of the method is to know and learn what is still needed and must be learned, which means to learn competencies still relevant and useful, and to not learn competencies that are no longer relevant and useful. This is in line with Rojewski (2009, p. 19) who states

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"Technical and Vocational Educaion and Training (TVET) are particularly challenged to develop, adapt or redesign strategies to address the needs of workers and society".

The presence of Vocational High School as one of the formal channels TVET institutions in Indonesia is a sign that the development of the world of work in Indonesia is going well. Besides, UNESCO-UNEVOC (2015, pp. 6-8) states that formal TVET system in Indonesia is divided into two levels: (1) 'Senior Technical and Vocational Secondary School', or in Indonesia it is called *Sekolah Menengah Kejuruan* or 'SMK'; and (2) 'Higher Education', that are divided into five kind of institutions: (a) Academy; (b) Higher School; (c) Polytechnic; (d) Institute; and (e) University. According to international literatures, SMK is also called 'Senior Technical and Vocational Secondary School' (UNESCO-UNEVOC, 2015, p. 6), 'Vocationalized Secondary Education' (Lauglo, 2009, p. 2295), 'Vocational High School' (Newhouse & Suryadarma, 2009, p. 5), etc. Lauglo (2009, p. 2295) defines SMK as "curriculum which remains overwhelmingly general or academic in nature, but which includes vocational or practical subjects as a minor portion of the students' timetable during the secondary school course".

One of the developments in the world of work that is happening rapidly in Indonesia is in the field of automotive engineering, especially in the vehicle electronics system sector, which came to be known as the autotronic engineering subsector.

> *"Just as phones got smart, so will cars. They won't quite think, but they will respond and remind. Cars on the road are being equipped with danger-warning applications, traffic information services, and host of infotainment features and increasingly safety features as well"* (Advanced Industries, 2013, p. 14).

Robert Bosch GmBH (2007, p. 10) explains that "the amount of electronics in the vehicle has risen in recent years and is set to increase yet further in the future". Autotronic engineering is a combination field of work that combines automotive engineering with electronic engineering.

As a response to the development of autotronic engineering, the Ministry of Education and Culture through its decision in 2008 opened the Autotronic Engineering Major as a part of the Automotive Engineering Study Program. Furthermore, Na (2014, p. 109) states:

> *"... not only the TVET system allow individuals to enter the labour market with improved vocational capacities but also maintains job creation, promotes one's career development or even helps individuals to land in a better job. In other words, the TVET system is closely interconnected to employment. In particular, to respond to rapidly changing technology, re-training of employees or training to boost their capacities have recently been increasing. In accordance with it, the TVET system has recently been carried out in the field, reflecting the increasing number of the system users, rapid changes in the industries, etc., and education training institutes have been emphasized autonomy and cooperation with industries".*

This program once was categorised into the Electronic Engineering Study Program because it has electronic engineering materials as its fundamental knowledge. However, in 2016, TOTR Major was officially determined in the category of Automotive Engineering Study Program through the Decree of the Director General of Primary and Secondary Education of the Ministry of Education and Culture Number 4678/D/KEP/MK/2016 concerning the Vocational Secondary Education Competence Spectrum, due to the realm of the world of work for Autotronice Engineering Major is in automotive engineering.

Hence, the Automotive Engineering Study Program is based on the Regulation of the Director General of Primary and Secondary Education of the Ministry of Education and Culture Number 06/D.D5/KK/2018, which states that the Competence Spectrum of Vocational High School/Islamic Vocational High School has seven majors, namely: (1) Automotive Light Vehicle Engineering (ALVE); (2) Motorcycle Business and Engineering (MBE); (3) Heavy Equipment Engineering (HEE); (4) Automotive Body Engineering (ABE); (5) Autotronic Engineering (AE); (6) Automotive Maintenance Management and Engineering (AMME); (7) Automotive Torque and Energy Conversion (ATEC).

Since its opening in 2008 until 2019, the establishment of AE Major in vocational schools is arguably not going well. Learning material that is combination between electronic engineering and

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automotive engineering makes AE Major quite difficult to absorb and understand completely by students in quite short time (three years). In addition, referring to the car actual condition, the practice unit that is needed for Teaching and Learning Process (TLP) is fairly sophisticated and certainly requires a significant amount of cost for the SMK to be able to have it for learning purposes.

For the Central Java region, compared to other majors that focus on cars as well, such as ALVE Major and ABE Major, AE Major has the least number of SMK that holding the major. The data recorded on the site of SMK Main Data (Regulation of the Director General of Primary and Secondary Education of the Ministry of Education and Culture Number 06/D.D5/KK/2018, 2018) are presented in Table 2.

Table 2. Automotive Engineering SMK in Central Java

Majors	SMK Status		Number of SMK
	Public	Private	
ALVE	**100**	**423**	**523**
MBE	58	349	407
HEE	1	3	4
ABE	**12**	**19**	**31**
AE	**6**	**12**	**18**
AMME	4	2	6
ATEC	-	-	-
Total			989

One of the SMK that have difficulty in implementing and applying AE Major into TLP is SMK Ma'arif Salam located in Magelang Regency. SMK Ma'arif Salam is the only SMK that runs AE Major in the entire City and Regency of Magelang. SMK Ma'arif Salam is located at Citro Gaten Street, Salam, Salam District, Magelang Regency, Central Java, 56484. SMK Ma'arif Salam has five majors, as presented in Table 3.

Table 3. Majors at SMK Ma'arif Salam

Name of SMK	Majors	Status
SMK Ma'arif Salam	ME	A
	ALVE	A
	MBE	Not accredited yet
	AE	**Not accredited yet**
	AVE	B

The AE Major was first established at SMK Ma'arif Salam in 2013 and has graduated students four times, in 2016, 2017, 2018 and 2019. During the implementation since 2013, AE Major at SMK Ma'arif Salam experienced very fluctuating statistics in student admission and graduation. Data from SMK Ma'arif Salam tracer studies show that AE Major in 2016 graduated 42 students and in 2017 graduated 25 students. There is a big difference between the number of first graduates in 2016 and second graduates in 2017. Then, one of the vocational teachers responsible for the New Students Admission Program (NSAP), said that in the 2018/2019 academic year only 15 students registered out of 33 available quota and in 2019/2020 only 25 out of 36 available quota.

The issue was responded by one of AE Major teachers at SMK Ma'arif Salam. He stated that not many people knew and understood what and how the essence of autotronic engineering actually was. So far, the knowledge of ordinary people about the field of automotive engineering is more inclined to the ALVE Major. Even the teachers who teach at AE Major itself also did not fully know and understand the autotronic engineering in depth and thoroughly. Their educational background from college were ALVE Major. However, due to the needs of teachers, they needed to teach in AE Major, they were given training to be able to teach in AE Major optimally.

Each student in grade XII always goes through the Competencies Examination (CE) at the end of even semester, including students of AE Major at SMK Ma'arif Salam. The researchers observed when SMK Ma'arif Salam held CE for students of grade XII AE Major. The researchers were given the opportunity to observe the implementation of CE directly from close quarters, even

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had time to give advice and assessments to students of grade XII AE Major who underwent the CE. From the observations, the level of competence of students of grade XII AE Major at SMK Ma'arif Salam were at the following levels: (a) drawing electronic wiring of autotronic system units; (b) assembling electronic wiring on a practice board; (c) conducting analysis and diagnosis of car condition using scantool.

Besides, referring to Indonesia's National Work Competencies Standard (INWCS), Core Competencies and Basic Competencies (CC & BC), and Indonesia's National Qualification Framework (INQF) Schematic of Autotronics Engineering as the chosen guidelines of the application of competencies in TLP at SMK Ma'arif Salam, the competencies that must be mastered and completed by AE Major students are not just these three competencies. However, the competencies that must be completed by students of the AE Major SMK Ma'arif Salam also include maintenance, analysis, diagnosis, repairing, drawing and assembling the wiring, as well as the ability to read, understand, and then translate data generated by diagnostic aid tools in autotronic system.

An AE Major teacher said the condition of the infrastructure for practicing owned by the AE Major at SMK Ma'arif Salam (ed. 2017 to 2019) is still far from the actual conditions of the workplace. Therefore, with these conditions, AE Major at SMK Ma'arif Salam is still not able to apply all the competencies recorded in the competency guidelines, especially CC and BC of AE Major, optimally. The AE Major at SMK Ma'arif Salam have to sort out and choose which items of the autotronic engineering competence can be applied optimally with such conditions, based on the Decree of the Director General of Primary and Secondary Education of the Ministry of Education and Culture Number 330/D.D5/KEP/KR/2017 concerning the Core Competencies and Basic Competencies, the guidelines containing competency points specifically intended for use in TLP of SMK/ MAK.

At the end of 2017, SMK Ma'arif Salam changed its status from Referenced SMK to Profession Certification Body-P1/*Lembaga Sertifikasi Profesi-P1* (LSP-P1). The status certainly demands SMK Ma'arif Salam as a whole to fix and improve every aspect in shortages. One way that could be done was the relevance method, which not only affects the quality of TLP but also can have a positive impact on the quality of practice infrastructures and graduates. The relevance process was done periodically according to changing characteristics in the world of work. Thus, through this research, the researchers intend to reveal the implementation of the relevance of Autotronic Engineering competence at SMK Ma'arif Salam to the world of work. It is expected to reveal the gap between autotronic engineering competencies taught at SMK Ma'arif Salam and autotronic engineering competencies required by the world of work.

The researches about relevance of SMKs majors in the automotive engineering field to the world of work are generally conducted mostly not on AE Major, such as Priyatama and Sukardi's (2013) research on ALVE Major, Jatmoko's (2013) research on ALVE Major, and Yudantoko and Arifin's (2016) research on ABE Major. As known and studied, there has been no study that discusses the relevance of AE Major with the world of work yet, especially in Indonesia. Most studies related to AE Major discuss the development of learning media, analysis of the availability of practice infrastructures, or the application of learning models, like in Fatullah and Ismara's (2018) research, Santoso's (2015) research, or Said et al. (2016) research.

RESEARCH METHOD

This research was conducted with a quantitative approach employing a descriptive research method. "The aim of quantitative research is to collect explanation about how significant the hypotheses as already formulated answers" (Indrawan & Yaniawati, 2016, p. 51). Therefore, this study aims to reveal the following variables: (1) the profile of autotronic engineering competencies that is taught at SMK Ma'arif Salam; (2) the profile of the autotronic engineering competencies required by the world of work; (3) the description of relevance between the profile of autotronic engineering competencies taught at SMK Ma'arif Salam and the profile of autotronic engineering competencies required by the world of work.

This research was carried out at SMK Ma'arif Salam and in ten car workshops, namely: Bona, GaMa, Hyundai, KIA, MADINA, Mercedes-Benz, Mitsubishi, Mot-Tronic, Suzuki, and

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Toyota. The study was conducted in more than one month from mid-November to the end of December 2019. The research subjects in this study were three teachers of AE Major at SMK Ma'arif Salam and ten representatives from the ten different workshops. The ten workshop representatives are the Head of Mechanics, Head of Workshop, Service Advisor, Service Manager, and Workshop Owner.

The used data collection methods were unstructured interviews, observations, and document studies, while the used research instrument was a Guttman Scale checklist questionnaire (0 and 1). The checklist questionnaire was made from the items of autotronic engineering competencies that were originated from a combination of SKKNI, KI and KD, and the KKNI Scheme of Autotronic Engineering, and were developed using Anderson's revised Bloom Taxonomy as its foundation. The checklist questionnaire divides competency points into three clusters, as follows: (1) Support of Autotronic System (SAS); (2) Engine Management System (EMS); (2) Chassis Management System (CMS); (3) Comfort, Safety, and Information Technology (CSIT); and (5) Vehicle Control System (VCS).

The instrument validity was conducted only by expert validity, because the items were taken from the standard competency guidelines. The result of expert validity states that the instrument was valid and ready to use. Instrument reliability was carried out with the help of the IBM SPSS 23.0 program and the results were obtained as presented in Table 4.

Table 4. Reliability Test Result

No	Cluster	Alpha Value
1	SAS	0.843
2	EMS	0.974
3	CMS	0.988
4	CSIT	0.986
5	VCS	0.970

Referring to Table r with the number of n as many as 13 people, then the alpha value of Table r is 0.576. Then, it indicated that all the competencies clusters of autotronic engineering and research instruments are reliable. The data analysis method used was comparative descriptive analysis technique with the help of IBM SPSS 23.0 and Microsoft Excel 2019 programs. Data analysis was performed in order to obtain the frequency distribution of competency items per cluster and frequency distribution of percentage items of competency per cluster. Because the Guttman Scale instrument only has two answer options (0 and 1), the mean value of the percentage of competency items per cluster was used as the middle value and the separator of the competency item status obtained.

RESULTS AND DISCUSSION

Results

Support of Autotronic System (SAS) Cluster

In the SAS cluster, there are 13 competency items that are taught in the TOTR Major of SMK Ma'arif Salam and are required by the world of work out of 16 competency items required by the world of work, with the relevance percentage 81% out of standard 85%. Then, the SAS cluster is stated to be relevant. Table 5 shows the description of the SAS cluster competency items that are taught in the AE Major at SMK Ma'arif Salam and required by the world of work. Details of these competency items are presented in the form of a Pie diagram, shown in Figure 1.

There are 13 competencies of SAS Cluster that are taught at SMK Ma'arif Salam and required by the world of work. There are two competencies of SAS Cluster that are taught at SMK Ma'arif Salam but not required by the world of work. There are three competencies of SAS Cluster that are not taught at SMK Ma'arif Salam but required by the world of work. There are eight competencies of SAS Cluster that are not taught at SMK Ma'arif Salam and not required by the world of work.

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Table 5. Detail of SAS Cluster Relevance

No	Core Competencies	Basic Competencies
1	Using diagnostic aid tool 'multimeter' for autotronic engineering work	• Identifying diagnostic aid tool 'multimeter' for autotronic engineering work • Understanding multimeter operate procedur • Maintaining multimeter • Operating multimeter • Callibrating multimetr • Analysing multimeter measurement result
2	Using diagnostic aid tool 'scantool' for autotronic engineering work	• Using diagnostic aid tool 'scantool' for autotronic engineering work • Understanding scantool operating procedure • Operating scantool • Analysing scantool measurement result
3	Using diagnostic aid tool 'oscilloscope' for autotronic engineering work	-
4	Electric and Electronic Fundamentals for Automotive (EEFA)	• Identifying EEFA wiring components • Understanding EEFA wiring work principles • Reading EEFA wiring diagram

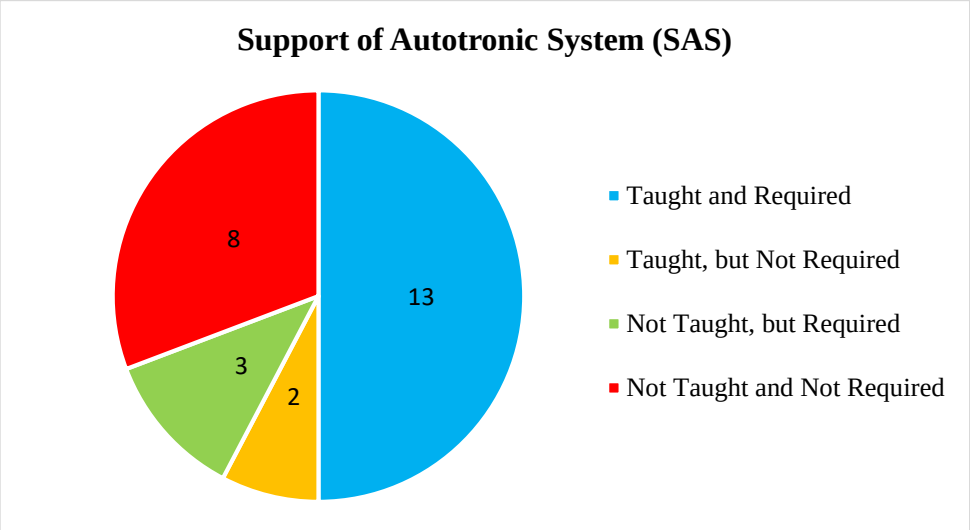

Figure 1. The Relevance of SAS Cluster

Engine Management System (EMS) Cluster

In the EMS cluster, there are 34 items of autotronic engineering competence that are taught in the TOTR Competency of SMK Ma'arif Salam and are required by the world of work out of the 49 competencies that are required by the world of work, with the relevance percentage of 70% from the 67% standard. Then, the EMS cluster is stated to be relevant. Table 6 shows a breakdown of the EMS cluster autotronic engineering competencies that are taught in the AE Major at SMK Ma'arif Salam and are required by the world of work. The details of these competency items can be presented in the form of a Pie diagram, as shown in Figure 2.

There are 34 competencies of EMS Cluster that are taught at SMK Ma'arif Salam and are required by the world of work. There are five competencies of EMS Cluster that are taught at SMK Ma'arif Salam but are not required by the world of work. There are 15 competencies of EMS Cluster that are not taught at SMK Ma'arif Salam but are required by the world of work. There are 36 competencies of SAS Cluster that are not taught at SMK Ma'arif Salam and are not required by the world of work.

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Table 6. Detail of EMS Cluster Relevance

No	Core Competencies	Basic Competencies
1	Electronic Control Ignition System (ECIS)	• Identifying unit components • Understanding the working principles and the function of unit components • Taking care of units and unit components • Repairing damage to the unit • Analyze symptoms of unit damage • Diagnosing damage to the unit • Testing unit work
2	Electronic Starter Control System (ESCS)	• Identifying unit components • Understanding the working principle and the functions unit component • Drawing a series of units • Taking care of units and unit components • Repairing damage to the unit • Analyzing symptoms of unit damage • Diagnosing damage to the unit • Testing unit work
3	Gasoline Engine Management System (GEMS)	• Identifying unit components • Understanding the working principles and the function of unit components • Repairing damage to the unit • Analyze symptoms of unit damage • Diagnosing damage to the unit • Testing unit work
4	Diesel Engine Management System (DEMS)	• Identifying unit components • Understanding the working principles and the function of unit components • Repairing damage to the unit • Analyze symptoms of unit damage • Diagnosing damage to the unit • Testing unit work
5	Emission Control System (ECS)	• Identifying unit components • Understanding the working principles and the function of unit components • Repairing damage to the unit • Analyze symptoms of unit damage • Diagnosing damage to the unit • Testing unit work
6	Electronic Control Valve System (ECVS)	-
7	Variable Cylinder Management System (VCMS)	-
8	Hybrid Powertrain System (HPS)	-
9	Electric Vehicle Powertrain System (EVPS)	-
10	Cruise System Control (CCS)	• Identifying unit components • Understanding the working principles and the function of unit components

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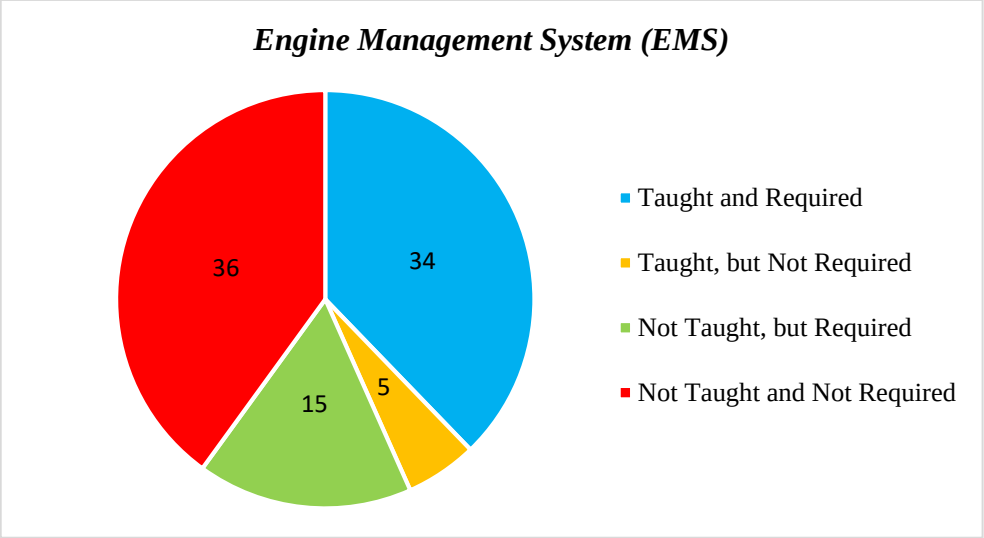

Figure 2. The Relevance of EMS Cluster

Chassis Management System (CMS) Cluster

In the CMS cluster, there are 44 items of autotronic engineering competencies that are taught in the AE Major at SMK Ma'arif Salam and are required by the world of work from 63 items of competence that are required by the world of work, with the relevance percentage of 70% of the 60% standard. Then, the CMS cluster is stated to be relevant. Table 7 shows a breakdown of the points of the CMS cluster autotronic engineering competency that is taught in the AE Major at SMK Ma'arif Salam and is required by the world of work. The details of these competency items are presented in a Pie Diagram as shown in Figure 3.

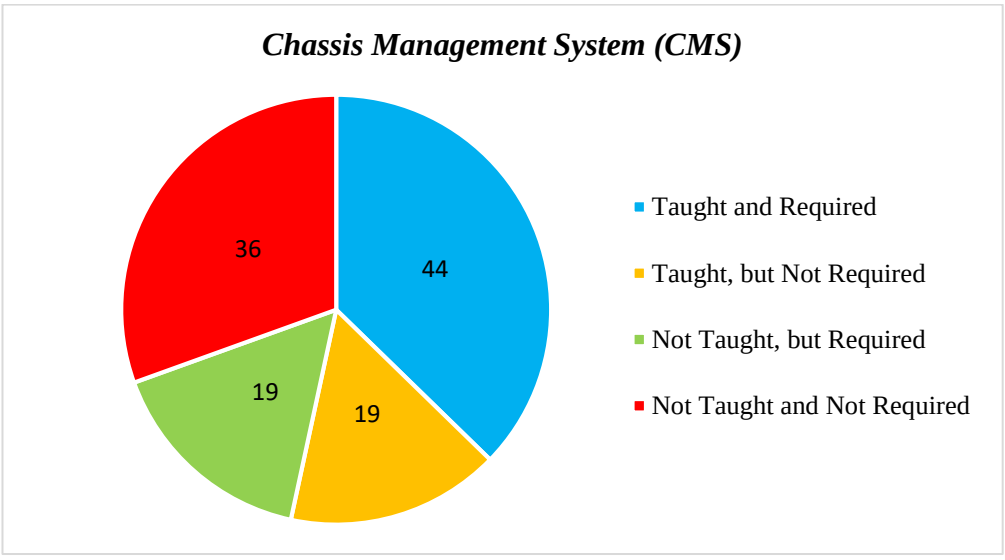

Figure 3. The Relevance of CMS Cluster

There are 44 competencies of CMS Cluster that are taught at SMK Ma'arif Salam and are required by the world of work. There are 19 competencies of CMS Cluster that are taught at SMK Ma'arif Salam but are not required by the world of work. There are 19 competencies of CMS Cluster that are not taught at SMK Ma'arif Salam but are required by the world of work. There are 36 competencies of CMS Cluster that are not taught at SMK Ma'arif Salam andare not required by the world of work.

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Table 7. Detail of CMS Cluster Relevance

No	Core Competence	Basic Competence
1	Anti-lock Brake System (ABS)	• Identifying unit components • Understanding the working principles and function of unit components • Taking care of units and unit components • Repairing damage to the unit • Analyze symptoms of unit damage • Diagnosing damage to the unit • Testing unit work
2	Traction Control System (TCS)/Anti Slip Regulation (ASR)	• Identifying unit components • Understanding the working principles and function of unit components
3	Electronic Brake-force Distribution (EBD)	• Identifying unit components
4	Electronic Stability Program (ESP)	• Identifying unit components • Understanding the working principles and function of unit components • Repairing damage to the unit • Analyze symptoms of unit damage • Diagnosing damage to the unit
5	Hill-start Assist Control (HAC)	-
	Hill Descent Control (HDC)	-
6	Electric Parking Brake (EPB)	• Identifying unit components • Understanding the working principles and function of unit components • Taking care of units and unit components • Repairing damage to the unit • Analyze symptoms of unit damage • Diagnosing damage to the unit
7	Electro-Hydraulic Power Steering (EHPB)	• Identifying unit components • Understanding the working principles and function of unit components • Taking care of units and unit components • Repairing damage to the unit • Analyze symptoms of unit damage • Diagnosing damage to the unit
8	Electric Power Steering System (EPSS)	• Identifying unit components • Understanding the working principles and function of unit components • Taking care of units and unit components • Repairing damage to the unit • Analyze symptoms of unit damage • Diagnosing damage to the unit • Testing unit work
9	Electronic Control Automatic Transmission (ECATS)	• Identifying unit components • Understanding the working principles and function of unit components • Taking care of units and unit components • Repairing damage to the unit • Analyze symptoms of unit damage • Diagnosing damage to the unit
10	Electronic Control Transaxle System (ECTS)	-
11	Electronic Control Suspension System (ECSS)	• Identifying unit components • Understanding the working principles and function of unit components • Taking care of units and unit components
12	Active Camber Control System (ACCS)	• Identifying unit components • Understanding the working principles and function of unit components

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Comfort, Safety, and Information Technology (CSIT) Cluster

Table 8. Details of CSIT Cluster Relevance

No	Core Competencies	Basic Competencies
1	Car Entertainment System (CES)	• Identifying unit components • Understanding the working principles and the function of unit components
2	Climate Control System (ClCS)	-
3	Power Windows System (PWS)	• Identifying unit components • Understanding the working principles and the function of unit components • Caring for units and unit components • Repairing damage to the unit • Analyze symptoms of unit damage • Diagnosing damage to the unit • Testing unit work
4	Power Door (open/close) System (PDS)	• Identifying unit components • Understanding the working principles and the function of unit components • Analyze symptoms of unit damage
5	Power Sunroof System (PSRS)	-
6	Electronic Mirror System (EMrS)	• Identifying unit components • Understanding the working principles and the function of unit components • Caring for units and unit components • Analyze symptoms of unit damage • Diagnosing damage to the unit • Testing unit work
7	Electronic Control Seat System (ECTSS)	-
8	Electronic Control Pedal Adjusment System (ECPAS)	-
9	Park Assist Control System (PACS)	• Identifying unit components • Understanding the working principles and the function of unit components
10	Auto Wash Wiper Control System (AWWCS)	• Identifying unit components • Understanding the working principles and the function of unit components
11	Lighting Control System (LCS)	• Identifying unit components • Understanding the working principles and the function of unit components
12	Central Door Lock System (CDLS)	• Identifying unit components • Understanding the working principles and the function of unit components • Caring for units and unit components • Repairing damage to the unit • Analyze symptoms of unit damage • Diagnosing damage to the unit • Testing unit work
13	Alarm & Immobilizer System (AIS)	• Identifying unit components • Understanding the working principles and the function of unit components
14	Supplemental Restraint System (SRS) Airbag & Safety Belt	• Identifying unit components • Understanding the working principles and the function of unit components • Diagnosing damage to the unit
15	Tire Pressure Monitoring System (TPMS)	-
16	Panel Instrument System (PIS)	-
17	Navigation System (NS)	-
18	Multifunction Information Display (MID)	-

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In the CSIT cluster, there are 37 items of autotronic engineering competencies that are taught in the AE Major at SMK Ma'arif Salam and are required by the world of work out of 71 competencies that are required by the world of work, with a relevance percentage of 52% from the 63% standard. Thus, the CSIT cluster is said to be irrelevant. Table 8 shows a breakdown of the points of the CSIT cluster autotronic engineering competencies that are taught in the AE Major at SMK Ma'arif Salam and are required by the world of work. Details of these competency items are shown in Figure 4.

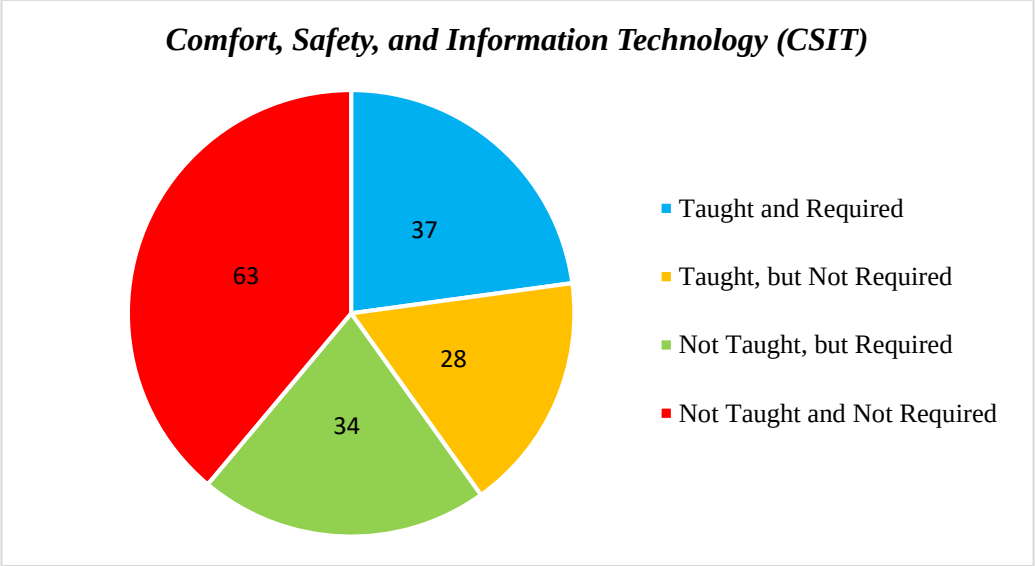

Figure 4. The Relevance of CSIT Cluster

There are 37 competencies of CSIT Cluster that are taught at SMK Ma'arif Salam and are required by the world of work. There are 28 competencies of CSIT Cluster that are taught at SMK Ma'arif Salam but are not required by the world of work. There are 34 competencies of CSIT Cluster that are not taught at SMK Ma'arif Salam but are required by the world of work. There are 63 competencies of CSIT Cluster that are not taught at SMK Ma'arif Salam and are not required by the world of work.

Vehicle Control System (VCS) Cluster

In the VCS cluster, there are 34 items of autotronic engineering competence that are taught in the AE Major of SMK Ma'arif Salam and are required by the world of work out of 49 competencies that are required by the world of work, with the relevance percentage of 27% from the 59% standard. Then, the VCS cluster was claimed to be relevant. Table 9 shows a breakdown of the VCS cluster autotronic engineering competencies that are taught in the AE Major at SMK Ma'arif Salam and are required by the world of work. Details of these competency items are presented in Figure 5.

Table 9. Details of VCS Cluster Relevance

No	Core Competencies	Basic Competencies
1	Electric Control Unit (ECU) System	• Identifying components • Understanding work principle • Measuring components electric scale • Diagnosing troubles
2	In-Vehicle Networking System (IVNS)	-
3	Fundamental Control System for Automotive (FCSA)	-
4	Developing & modifying Vehicle Control System (VCS)	-

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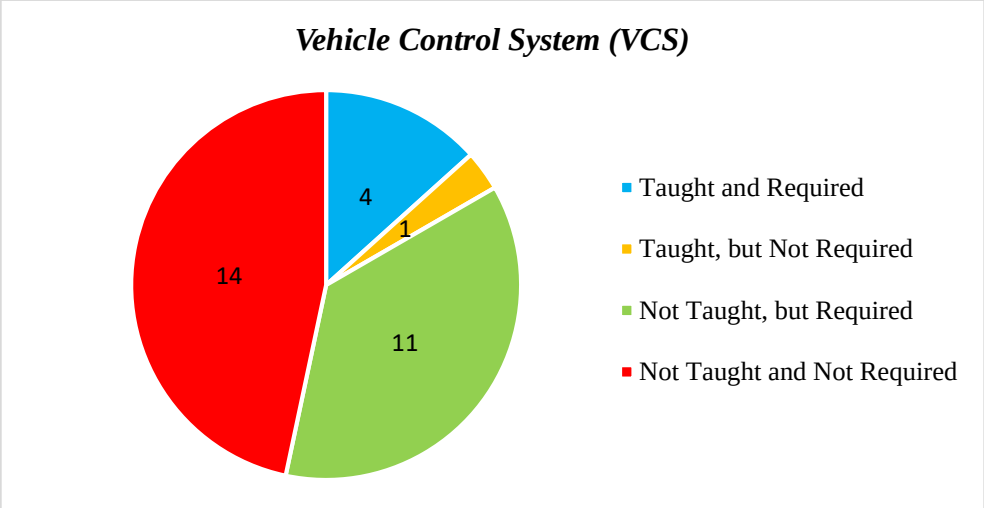

Figure 5. The Relevance of VCS Cluster

There are four competencies of VCS Cluster that are taught at SMK Ma'arif Salam and required by the world of work. There is one competency of VCS Cluster taught at SMK Ma'arif Salam but not required by the world of work. There are 11 competencies of VCS Cluster that are not taught at SMK Ma'arif Salam but required by the world of work. There are 14 competencies of VCS Cluster that are not taught at SMK Ma'arif Salam and not required by the world of work.

Discussion

The competency items in the 'not taught' category does not mean that they will not be taught onward, but one of the AE Major teachers said that the current condition of the SMK Ma'arif Salam (red. 2017-2020) does not allow the competency items that should be taught, to be taught optimally. So do the competency items in the 'not required' category, according to respondents from Suzuki Sleman and Mitsubishi Sleman, there are some competency items that are too high and difficult to master optimally by 'fresh graduates' from SMK AE Major. Thus, at the workshop of the Brand Holder Sole Agent (BHSA), the mechanic candidates will be given training to adjust the characteristics of the place they work later.

CONCLUSION

Based on INWCS, CC & BC, and the INQF Schematic of Autotronic Engineering, the competency items of autotronic engineering are divided into five groups, as follows: (1) Support of Autotronic System (SA); (2) Engine Management System (EMS); (3) Chassis Management System (CMS); (4) Comfort, Safety, and Information Technology (CSIT); and (5) Vehicle Control System (VCS). Then, based on the results of the questionnaire checklist data analysis, each cluster containing 26, 90, 117, 162, and 90 competency items, obtained the following results.

At the profile of autotronic engineering competencies at SMK Ma'arif Salam, the items of competency taught there are: (1) SAS cluster of 15 competency items; (2) EMS cluster of 39 competency items; (3) CMS cluster of 63 competency items; (4) CSIT cluster of 65 competency items; and (5) VCS cluster of 5 competency items. At the profile of the autotronic engineering required by the world of work, the competency items required by the world of work are: (1) SAS cluster of 16 competency items; (2) EMS clusters of 49 competency items; (2) CMS cluster of 63 competency items; and (3) CSIT cluster of 71 competency items; and (5) VCS cluster of 15 competency items.

Furthermore, the results of the description of the relevance between the profile of autotronic engineering competencies at SMK Ma'arif Salam and the profile of autotronic engineering competencies required by the world of work, are: (1) in SAS cluster, 13 competency items are taught in Autotronic Engineering Major at SMK Ma'arif Salam and required by the world of work; (2) in EMS cluster, 34 competency items are taught in Autotronic Engineering Major at SMK Ma'arif

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Salam and required by the world of work; (3) in CMS clusters, 44 competcny items are taught in Autotronic Engineering Major at SMK Ma'arif Salam and required by the world of work; (4) in CSIT cluster, 37 competency items are taught in the Autotronic Engineering Major at SMK Ma'arif Salam and required by the world of work; and (5) in VCS cluster, four competency items are taught in Autotronic Engineering Major at SMK Ma'arif Salam and required by the world of work.

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THE INFLUENCE OF PARENTING, SELF-EFFICACY, AND ENTREPRENEURIAL INTEREST TOWARD THE LEARNING MOTIVATION OF CREATIVE PRODUCTS AND ENTREPRENEURSHIP OF CULINARY MANAGEMENT VOCATIONAL SCHOOL STUDENTS

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Abstract

This study aims to reveal the effects of (1) parenting, (2) self-efficacy, (3) entrepreneurial interest, and (4) parenting, self-efficacy, and interest in entrepreneurship simultaneously on the motivation to learn creative products and entrepreneurship in class XII vocational school of Catering Services Department in Magelang. This research is ex-post facto research. The research population was 201 students of the Catering Services Department from two vocational schools in Magelang. The sample consisted of 127 students who were taken using the proportional random sampling technique. The data analysis technique used descriptive analysis and regression analysis. The results showed that: Parenting, self-efficacy, and interest in entrepreneurship were able to predict learning motivation with an effective contribution to parenting (5.15%, high category); self-efficacy (3.63, low category); interest in entrepreneurship (32.80%, very high category). The coefficient of determination (R2) is 0.416 (41.6%), which means that 41.6% of students' motivation to learn creative products and entrepreneurship in class XII of the Catering Services Department are influenced by parenting, self-efficacy, and interest in entrepreneurship, while the remaining 58.4% is influenced by other variables that are not examined in this study.

Keywords*: interest in entrepreneurship, learning motivation, parenting, self-efficacy*

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INTRODUCTION

Adolescence is a transitional period from childhood to adulthood, that is, children do not want to be treated as children, but physically they cannot be said as adults. Adolescence may be a defenseless period, particularly the issue of juvenile delinquency. The causes of juvenile delinquency include heredity, identity problems, community influence and family experiences. As an illustration within the case of a young battle in Magelang, approximately 40 vocational students were included in a brawl (Fitriana, 2019). This case should be a family concern, how to reduce juvenile delinquency at this time with legitimate care.

The role of parents is crucial. Based on Law of the Republic of Indonesia No. 23 of 2002 article 26 concerning Child Protection, that parents have the obligation and responsibility to care for, nurture and educate, protect children, foster children according to their abilities, talents and interests and prevent child marriages. The role of parents can be well-applied if the parental care has a good influence too, especially in the children's development. One of the problems which is currently being debated in some research that focuses on family matters is how to attain optimal parenting in educating children. One of the positive supports that can be given by the family is to motivate the children, particularly to provide motivation in learning.

According to Oyeku et al. (2014) in a research article about the influence of family, motivation and personality towards entrepreneurial interest through self-efficacy reveal that the variable that can foster motivation or interest is self-efficacy (Kurniawan, et al., 2016, p. 100). Self-efficacy is a person's belief to accomplish the task. Self-efficacy is influenced by the conceptual factors such as education and past experiences. The level of efficacy will affect a person's enthusiasm; the low level of efficacy considers someone incapable to do something around him whereas someone with high level of efficacy in any situation will try hard to overcome the challenges (Ghufron & Risnawita, 2012, p. 76). The level of student's success depends on the enthusiasm and motivation (self-efficacy) within the students themselves. This will have a huge impact in learning process, when the learning motivation is high then the learning outcome will be high too, however if the learning motivation is low, the learning outcome will be low. Self-efficacy has an effect on entrepreneurial interest, research revealed by Farida and Nurkhin (2016, p. 273).

The interest arises when someone has the feeling of like and dislike to do the accomplished task. Interest is not carried from birth, interest is influenced by physical factors, psychological factors and environmental factors. The interest to be researched is the level of entrepreneurial interest of the XII graders vocational school in Magelang. The way to foster entrepreneurial interest is by developing within them an interest in entrepreneurship. With an interest in them, students are encouraged to learn knowledge related to entrepreneurship for the better. It is expected that students will have self-awareness and enthusiasm to foster entrepreneurial attitudes.

The entrepreneurial interest from the respondents, especially students of class XII Catering Services Department in Magelang, which is one of the tourist cities that is quite crowded with tourists. Business opportunities in the culinary field are the main attraction, so this is a very good opportunity to develop. This research is expected to draw a clear picture of how to see the influence of parenting, self-efficacy or students' self-confidence as well as their inner interests so that they can have the learning motivation, especially entrepreneurial learning and creative products of XII graders of Catering Service Department in Magelang.

Parenting

Parenting is a style of taking care applied by parents in various ways and understandings. The definition of parenting based on Indonesian Dictionary is the process, method, action, and parenting style. Meanwhile, Masud Hoghughi, Professor of the Faculty of Psychology, University of Hull America in Nefrijanti (2018) assumes that parenting is a relationship between parents and children that is multi-dimensional and can grow steadily and it also includes a variety of activities with various goals, namely, the child can develop optimally and survive well, therefore, parenting style includes physical care, emotional care and social care.

According to Baumrind (1971) in Santrock (2007, p. 167), parenting has four styles formed from two dimensions: dimensions of responsiveness and demandingness. This parenting style is

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also popularized by Marcoby and Martin (1983) in Sutanto and Andriyani (2020, p. 108), including: (a) *authoritarian care*, where the child must obey all the rules set by the parents. Parents will apply high discipline to their children. (b) *Permissive care*, where parents give complete freedom to their children, without giving any rules to family members, including children. (c) *Democratic/ authoritative care*, where parents act as the determinants of rules, but children are still given the opportunity to know and understand the rules that have been made by parents. (d) *Neglect*, that is, parenting style that is too indulgent, where parents are not very involved in the child's life. Pradani (2017) in Sutanto and Andriyani (2020, p. 15) claims that parents should apply the positive parenting style. Parental care is said to be positive when parents can think positively about their children. This type of parenting will foster self-concept and positive thinking in children. Negative parenting style is parenting style that often performs negative actions in parenting, for example hitting, ignoring, humiliating oneself, being unfair, and so on. The characteristics of positive parenting style according to Faber (1980), Hansen (1982), Jams (1985), and Gordon (2000) in Sunarty (2015, pp. 17-24) are reasonable parents, encouraging parents, con-sistent parents and responsible parents. According to González et al. (2016), with positive parenting, parents show the better control as shown by quarrels, fights, and reprimand against children decreased significantly.

Self Efficacy

The definition of self-efficacy according to Bandura (1997, p. 3) is a belief about the ability to organize and take a series of actions needed to achieve their beliefs. Meanwhile, according to Woolfolk (2007) in Marini and Hamidah (2014), self-efficacy is a person's assessment of himself or his level of confidence regarding how much his or her ability to do a certain task to achieve certain results. There are four sources of self-efficacy: (1) *mastery experience*, it will foster self-efficacy in oneself, while failure can be overcome with certain efforts that can strengthen self-motivation if someone can find meaning from the experience. (2) *Vicarious experience* is the experience of the success of others with comparable abilities in doing tasks that will increase individual self-efficacy. (3) *Verbal persuasion* is more directed by providing advice and guidance so it can increase confidence in one's abilities. (4) *Physiological state* is a physical tension in a stressful situation, seen as a sign of incapacity due to weakening of individual work. In addition, self-efficacy is divided into three dimensions: (1) *level*, related to the level of difficulty experienced by individuals in completing tasks, with different ability limits for each individual; (2) *strength*, related to strength or belief about the abilities that people have - weak expectations are easily shaken by unsupportive experiences, while steady expectations will encourage individuals to stay in higher dimensions; (3) *generality*, related to the broad field of behavior where individuals feel confident in their abilities.

Entrepreneurial Interest

The definition of interest, according to Slameto in Marini and Hamidah (2014, p. 201), is that there is a feeling of preference and interest in something or an activity, without being asked. According to Winkel and Hastuti (2004), it is a rather sedentary tendency for someone to feel attracted to a certain field and feel happy to be involved in various activities in that field. Daryanto (2012, p. 7) believes that entrepreneurship is an effort to create added value by combining sources through new and different ways to win the competition. Meanwhile, according to Zimmereal (2008) in Wijaya (2017, p. 21), an entrepreneur is someone who creates a new business by facing uncertainty and risk to achieve profits and business growth by identifying significant opportunities and using the required resources.

Entrepreneurial interest is the desire or interest and ability of students in entrepreneurship, especially the students of XII grade of Catering Services Department in Magelang. According to Meredith in Marini and Hamidah (2014), there are six characteristics of entrepreneurship: having self-confidence, being task-oriented, courageous to take risks, socializing with others, innovative and creative and future-oriented. These interests will grow when there is motivation. Learning motivation needs to be cultivated as an effort to support learning, especially learning entrepreneurship and creative products. Learning motivation is students' willingness in the learning process, especially in entrepreneurship lessons and creative products. Learning creative products and entrepre-

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neurship is a learning process in creating new ideas as a form of business in a new work that is occupied. There are many factors that can influence the interest in entrepreneurship, one of which is developing entrepreneurship education and teachers as role models for building interest in entrepreneurship, as indicated by a research conducted by San-Martín et al. (2019). This is in line with research disclosed by Iwu et al. (2019) which also explains that entrepreneurship education can influence entrepreneurial interest in South Africa. Entrepreneurial interest is a very important part of building learning motivation which is also related to entrepreneurship education.

Entrepreneurial interest is generally influenced by (1) the ideals and aspirations of students, in this case the aspirations will strengthen motivation; (2) abilities coupled with student desires; (3) the student's condition is good (physically and mentally healthy) so that it is easy to focus attention in learning; and (4) students' environmental conditions will increase children's interest or enthusiasm in learning. Therefore, this study aims to reveal the effects of: (1) parenting, (2) self-efficacy, (3) interest in entrepreneurship, and (4) parenting, self-efficacy and interest in entrepreneurship simultaneously on the motivation to learn creative products and entrepreneurship in class XII vocational school of Catering Services Department in Magelang.

RESEARCH METHOD

This study is an ex-post facto research, since it only reveals the symptoms that occur as they were and reveals the factors that influence the independent variable on the dependent variable. This research is a descriptive correlational study according to the problem with a quantitative approach.

Research Setting

This research was conducted on February 2020 till April 2020. The research subjects were XII graders of vocational school of Catering Service Department in Magelang, namely, *Sekolah Menengah Kejuruan* (SMK) Negeri 3 Magelang and SMK Pius X Magelang.

As shown in Table 1, the research population was 201 students from grade XII of Catering Service Department in Magelang. The sample in this study was 127 students collected using proportional random sampling technique, where each school with a diverse number of respondents was tested based on the extent of the number of respondents in each of these schools (Sugiyono, 2017, p. 120). The determination of the number of samples was based on Isaac and Michael's table at an error rate of 5%.

Table 1. Population Data and Research Sampling

Schools' Name	Population	Sample
SMK N 3 MGL	108	68
SMK Pius X MGL	93	59
Total	201	127

This study used questionnaires and document review as the data collection techniques. The questionnaire with the consideration that the number of respondents was quite large and spread across several schools in Magelang was used. The validity test used content validation and construct validity. Reliability test was using Alpha Cronbach formula. The instrument can be said to be reliable if the Cronbach Alpha coefficient is greater than 0.70 (Mardapi, 2008, p. 125).

The data analysis technique used descriptive analysis and regression analysis. Descriptive analysis provided an overview of the data seen from the mean, median, mode, standard deviation, maximum, minimum, range using SPSS 20.0 for windows software to be analyzed.

RESULTS AND DISCUSSION

Parenting

The results of the parenting analysis show that 20 students (15.7%) were in the very high category, 65 students (51.2%) were in the high category, 36 students (28.3%) were in the low cate-

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gory, and six students (4.7%) had a very low category. In term of the parenting variable, the mean (105.59) result of the descriptive analysis is compared to the category distribution, so the mean parenting lies in the high value range. Thus, it is stated that the respondents' parenting is in the high category. The results of data analysis illustrated by the frequency histogram is shown in Figure 1.

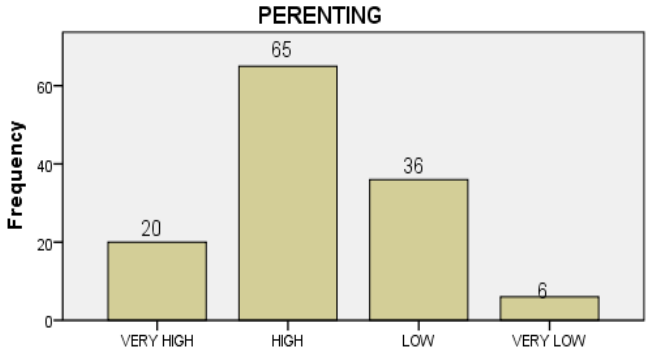

Figure 1. Parenting Frequency Histograms of XII Grade of Catering Service Department of Vocational School Students in Magelang

The high parenting tendency implies that parenting style has provided positive motivation in learning. This support includes examples of exemplary action, being consistent with responsibility and obeying common provisions, positive habituation, and building communication with children without violence. This parenting has a good impact on children, so they are motivated to learn well. This research is supported by previous research conducted by Delima and Usman (2019). This study confirms that there is a positive and significant relationship between interest in learning, parental attention and learning motivation towards student achievement in class XI SMA in Jakarta. It is also in line with the research revealed by Kaukab (2016, p. 72) that parental involvement positively increases children's learning motivation for the better.

Self Efficacy

The results of the self-efficacy data analysis show that there were 18 students (14.2%) in the very high category, 37 students (29.1%) in the high category, 46 students (36.2%) in the low category and 26 students (20.5%) in very low category. The mean value of 46.51 results of descriptive analysis is compared with the distribution of categories, so self-efficacy lies in the range of values in the low category. Thus, it is stated that the self-efficacy of the respondents is included in the low category. The results of data analysis illustrated by the frequency histogram presented in Figure 2.

Figure 2. Histogram of Frequency of Self Efficacy of XII Grade of Catering Service Department of Vocational School Students in Magelang

The tendency of self-efficacy from the respondents has a low category, meaning that the belief students have is less confident in their ability to motivate themselves, especially in term of learning, confidence in self-strength and self-ability to motivate learning with all the challenges

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that exist. In addition, Bandura (1997) argues that the characteristics of individuals who have high self-efficacy are the individuals feel confident that they feel able to deal effectively with the events or situations they are facing, are diligent in completing tasks, believe in their own abilities and perceive difficulties as a challenge. The results of this study reveal that the average student still did not have the confidence to motivate themselves, especially in terms of learning. This study supports the previous research conducted by Robih et al. (2017) that self-efficacy significantly affects learning motivation. It is also in line with Kuo et al. (2017, p. 131) who assert that "students with higher levels of research self-efficacy also tend to have higher research productivity".

Entrepreneurial Interest

The results of data analysis on entrepreneurial interest showed that there were 68 students (53.5%) in the very high category; as many as 44 students (34.6%) in the high category; as many as 13 students (10.2%) in the low category and two students (1.6%) in the very low category. The mean (51.00) result of the descriptive analysis compared to the distribution of categories lies at a very high value. Thus, it can be stated that the interest in entrepreneurship among the respondents is in the very high category. The results of data analysis illustrated by the frequency histogram are presented in Figure 3.

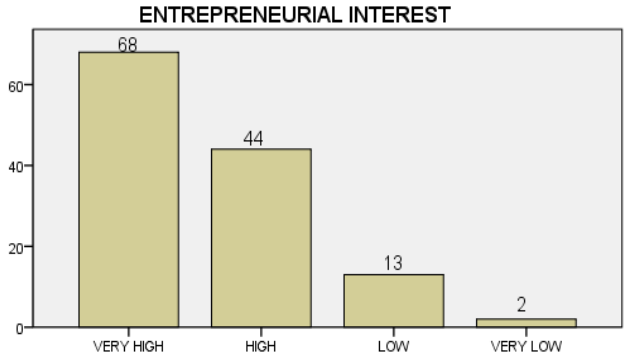

Figure 3. Histogram of Frequency of Entrepreneurial Interest in XII Grade of Catering Service Department of Vocational School Students in Magelang

The tendency of very high interest in entrepreneurship from the respondents has very high curiosity about entrepreneurship and willingness to be entrepreneurial. This study supports the previous research conducted by Widjaja (2019). It is also in line with research conducted by Nurmaliza et al. (2018, p. 43) which confirmed that entrepreneurship education and the family environment have a positive and significant influence on entrepreneurial interest. The influence of interest in entrepreneurship in this study is learning motivation, where in addition to learning motivation, entrepreneurship education also has a role in developing interest.

Learning Motivation

The results of the data analysis on entrepreneurial learning motivation and creative products showed that there were two students (1.6%) in the very high category; as many as 17 students (13.4%) in the high category; as many as 90 students (70.9%) in the low category and 18 students (14.2%) in the very low category. The mean value (52.12) of the results of the descriptive analysis compared to the distribution of categories lies in the low value range. Thus, it can be stated that the motivation to learn entrepreneurship and the creative products of respondents is in the low category. The data analysis is illustrated through the frequency histogram, presented in Figure 4.

The low tendency of motivation to learn entrepreneurship and creative products from the respondents means that they are lacking, in terms of students' lack of knowledge, less desire and curiosity, encouragement of the need and persistence in learning entrepreneurship and products creative is also lacking.

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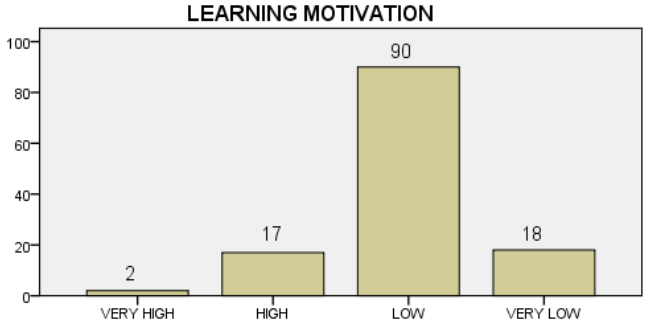

Figure 4. Histogram of Frequency of Entrepreneurship Learning Motivation and Creative Products of XII Grade of Catering Service Department of Vocational School Students in Magelang

Results of Hypotheses

The results of the first hypothesis test with simple regression analysis showed that the parenting variable had an effect on the motivation to learn entrepreneurship and the creative products of the respondents. The results of data analysis show that the significance value is as large as 0.000 <0.05 at the 5% significance level. The results of the analysis also show that the correlation value (r) is positive, which is 0.403, so it can be stated that the parenting variable has a positive effect on entrepreneurial learning motivation and creative products of the respondents. This is in line with the research conducted by Delima and Usman (2019). The results of this study confirm that there is a positive and significant influence between classroom learning, parental attention, learning motivation, and learning outside the classroom using a mentor at SMK Jakarta, the effect is 82.7%. Parenting in the family is a key element in motivating children's learning as well as shaping their personality traits. Motivation to learn will grow along with the parenting patterns that are applied. Positive parenting according to Sutanto and Adriyani (2020, p. 23) is care that is based on love, mutual respect, and stimulates children's growth and development. One example of giving rewards to children who get good grades, this is one way to motivate children to learn.

The results of the second hypothesis with simple regression analysis indicate that the self-efficacy variable has a positive effect on the motivation to learn entrepreneurship and the creative products of the respondents. It can be read from the results of data analysis that the significance value is 0.000 <0.05 at the 5% significance level. The results of the analysis also show that the value of the correlation coefficient (r) is positive, which is 0.454, so it can be stated that the self-efficacy variable has a positive effect on the learning motivation of the respondents. Someone who has high self-efficacy will also have high learning motivation. A research by Robih et al. (2017) show that self-efficacy affects the motivation to learn office automation skills for class X administrative competence at private vocational schools in North Surabaya. Self-efficacy is a belief in yourself, when you do not have confidence in yourself, you cannot achieve your existing desires.

The results of the third hypothesis test with simple regression analysis show that the variable interest in entrepreneurship has a positive effect on the motivation to learn entrepreneurship and the creative products of the respondents. It can be read from the results of data analysis that the significance value is 0.000 <0.05 at the 5% significance level. The results of the analysis also show that the correlation coefficient (r) is positive, which is 0.626, so it can be stated that the Entrepreneurial Interest variable has a positive effect on entrepreneurial learning motivation and creative products of the respondents. Entrepreneurial interest grows because of inner motivation, Hurlock (1978) in Farida and Nurkhin (2016, p. 277) emphasizes that interest is a strong motivation to learn. With the interest in entrepreneurship, students are able to work independently by creating their own jobs. According to Widjaja (2019, p. 46), there is a significant influence between learning motivation and interest in entrepreneurship in XYZ school, West Jakarta. It is also in line with a research conducted by Hutagalung et al. (2017, p. 345) showing that partially, the variables of entrepreneurship education and family environment (care) have a positive value and have a significant impact on students' entrepreneurial motivation.

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The results of the multiple regression analysis show that parenting (parenting), self-efficacy, and interest in entrepreneurship have a positive effect together on entrepreneurial learning motivation and creative products of the respondents. This can be read from the results of the F test which shows a value of 29.183 compared to the value of 2.68 at the 5% significance level. The results of the analysis also show that the value of the correlation coefficient (r) is positive, which is equal to 0.416, thus, it can be stated that parenting variables, self-efficacy and interest in entrepreneurship have a positive effect on the learning motivation of the respondents.

CONCLUSION

Based on the results of data analysis and the discussion previously presented, there are four conclusions in this study. Partially that: (1) parenting has an effective contribution of 5.18% in the high category, (2) self-efficacy has an effective contribution of 36.22% in the low category, (3) interest in entrepreneurship has an effective contribution of 53.54 % is in the very high category, (4) motivation to learn entrepreneurship and creative products has an effective contribution of 70.87% in the low category.

Based on the results of the hypothesis test, it can be concluded as follows: there is a positive and significant influence of parenting on entrepreneurial learning motivation and creative products, with the correlation coefficient (rx1, y) is 0.403 and $p < 0.05$; There is a positive and significant effect of self-efficacy on motivation to learn entrepreneurship and creative products, with a correlation coefficient (rx2, y) of 0.454 and $p < 0.05$; there is a positive and significant effect of interest in entrepreneurship, there is motivation to learn entrepreneurship and creative products, with the correlation coefficient (rx3, y) is 0.626 and $p < 0.05$; and there is a positive and significant effect together from parenting (parenting), self-efficacy, interest in entrepreneurship, there is entrepreneurial learning motivation and creative products with a correlation coefficient value (Rx1, x2, x3, y) is 0.645. The strong influence of parenting variables, self-efficacy and interest in entrepreneurship is indicated by the magnitude of the R2 value, namely 0.416. Thus, it can be said that the effective contribution of the three independent variables to student learning motivation is 41.58%.

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THE EFFECTIVENESS OF MINDFULNESS TRAINING IN IMPROVING THE SELF-CONTROL OF SPEEDBOAT CREW IN BALI, INDONESIA

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Abstract

This study aims to test empirically the effectiveness of mindfulness training on improving the self-control of the crew of speedboat Company X in Bali, Indonesia. The experimental subjects in the study are 22 people who are in the sea transportation unit. They are divided into two groups, 12 of whom are in the experimental group and 10 in the control group. The data were collected by using a questionnaire with the Likert scale, consisting of 26 items with the reliability level of 0.889. The data processing used different tests. The test results of the average score of Mann-Withney of the experimental group is 16.50, which is higher than the average score of the Mann-Withney of the control group, which is 5.50, and this means that the average score of the self-control of the speed-boat crew members who were treated with mindfulness training is higher than that of those who were not given mindfulness treatment. The result of U = 0.000, Z = -3.974, p (value), Asymp Sig/ significance coefficient <0.05 shows that there is a significant difference in the increase of self-control between the experimental group and the control group.

Keywords*: mindfulness, self-control, speedboat crew, training*

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INTRODUCTION

Bali is an Indonesian island province which is famous for its business and tourism industry. One of the businesses in the tourism sector is sea transportation. PT. X or Company X is one of the many companies engaged in the same business. In order to continue to compete, some companies apply several ways, for example, good service because if the service from the company is good, it will certainly increase financial benefits and a good image for a company.

The incidence of continuous complaints is not expected by any company, because if it is not handled quickly, it will certainly be detrimental to the company. Gufron and Risnawati (2011) believe that self-control is needed by employees engaged in the service sector. Ray (2011) explains more deeply about self-control which focuses on the individual's ability to sort out future actions. If an individual's self-control is low, it means that the individual cannot hold back from doing something, and does not care about long-term consequences. Conversely, individuals with high self-control can refrain from negative things by looking at the long-term consequences.

Tangney et al. (2004) explain that self-control has a large capacity in providing positive changes in people's life so that it will have an impact on their environment. Tangney et al. (2004) also write that there are five aspects of self-control in the work dimension, namely (1) discipline, (2) non-impulsiveness, (3) good habits, (4) work ethics, and (5) consistency.

At Company X, the boat crew are one of the core units related to two activities, namely sea transportation and adventure tourism. In adventure tours, boat crew members are tasked with delivering passengers to tourist attractions; serving; overseeing the safety and completeness of the ship, as well as tourists who are active in games, namely snorkeling, banana boat, and flyboard. Apart from the crew, there are several other positions in the adventure unit, namely tour guide, chef, barista, waiters, office boy, and security. The observation process carried out from 24/12/2017 - 01/02/2018 focused on boat crew members and other adventure employees because the main issue that was stated to be the configuration is that the crew could not control themselves properly.

The researchers found several symptoms of boat crew behavior reflecting that they were not able to control themselves properly. Adjustment between aspects of self-control and field conditions revealed that the crew were not very disciplined, as monitored from one of the crew mwmbers who was often late to work. The crew showed impulsive actions when carrying out field observations, even those actions had become their daily habit.

Some of the habits in the form of impulsive acts were smoking and drinking alcohol while they were in the cabin of a ship with passengers, which, according to company regulations, are clearly not permitted. According to some adventure employees, while carrying out their work, the crew had bad ethics, used bad language, and harassed guests by touching the sensitive parts of their body. Another thing is consistency. When doing their work, the crew were not consistent in terms of preparation, confirmation, and carrying out their main job, namely providing excellent service to guests. This was obvious from the observation process, which showed the company's rating on one of the social media decreased. Several types of complaints by guests in one of these media include the adequacy of ship safety equipment. When the ship's engine died in the middle of the sea and when the passengers asked for a buoy, the crew answered that it was not enough, and this indicated that the preparation or daily checks of passenger safety equipment was not consistently carried out properly. From the five basic aspects stated by Tangney et al. (2004), the facts in the field are revealed that the boat crew at Company X had not been able to control themselves properly.

If the self-control of the boat crew in Company X is good, they should be disciplined; the forms of behavior that reflect this are coming to work on time, being able to withstand the impulsive act of smoking, not having snacks or drinking alcohol while in the ship's cabin, while traveling, as well as during guest supervision. Doing good habits include avoiding harsh speech, being more polite, and having good ethics. Boat crew should prioritize the safety and comfort of guests, and this consistency should be implemented every day, for example, the preparations are always made for ship safety, so that guests are comfortable and have a positive impact on the crew members themselves and the company's rating.

According to Hurlock (2012), there are two factors that can affect self-control: internal and external factors. The internal factors that affect a person's self-control are age and emotional matur-

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ity. The external factors include the effect of environment on self-control. The researchers examined several of these factors, especially the internal one, where there are factors of age and emotional maturity. It is known that the boat crew at Company X are mostly adults, and according to Hurlock (2012), someone can be said to be an adult when they are at the age range of 18-40 years. With their maturity, the crew should have a better awareness of managing their emotion than teenagers do. Sukadji (Dikria & Mintarti, 2016) states there are several techniques that can be used to control oneself, one of which is relaxation. Of the five self-control techniques revealed by the expert, relaxation techniques are thought to be appropriate to improve the self-control of the ship crew at Company X since some of their behavior is a condition which in clinical psychology is called mindlessness, a condition that causes individuals to lose control of themselves and they are unaware of the physical reactions of conscious alarms to both mind and muscles. It is at this point of mindlessness that the individual is often in an unconscious state so he cannot control himself to carry out the process of emotional regulation. According to Yusainy et al. (2018), the process of emotional regulation is closely related to internal factors that can affect a person's self-control.

Along with the development of the industrial world and organizations, an idea emerged to apply a training with the relaxation technique to be applied to employee development in a company. In 2012, several international companies started implementing the training. The training applied with this relaxation technique is called mindfulness. Kabat-Zinn (2012) explains that mindfulness comes from the words mindful and awareness, which means that complete awareness is maintained in the state of reality now, here, and the focus of the mind in the temporary conditions. In recent years, namely in 2015, there was research on mindfulness which is known to increase self-control in women living in Iranian dormitories. Furthermore, research in 2017 found that the mindfulness program improved the self-control of adolescent with online game addiction.

The opposite result was reported by Afandi (2012) who found that mindfulness training based on relaxation techniques with a short meditation method did not affect self-control of the students of Trunojoyo High School in Madura. It was revealed that this happened because the training process was too short and not programmed. With the finding of one study that got different results, the researchers tried not to do the same thing by designing a more programmed and more specific training process so it was expected that it could produce different results whose aim was to improve the self-control of the boat crew of Company X so they can do their job better. Several field events led the researchers to the conclusion that the boat crew at Company X needed interventions related to the development of emotional regulation related to the internal factors of self-control.

From several theoretical studies as well as anthropological studies which explain that mindfulness training has been applied in a company and the results of several studies that mindfulness can improve self-control, the researchers is interested in mindfulness training as an intervention. It is expected that with the implementation of this training, the boat crew who are not disciplined will be more disciplined, able to withstand impulsive desires or actions, aware of being in a work environment so that they are accustomed to serving guests better and are less emotional, and able to be ethical. It is expected that those who are rude at first can be polite, consistent in their work, and avoid negative things that will harm themselves and the company.

RESEARCH METHOD

The research variable is a research concept. The research concept is usually found early by researchers based on the issues and realities of the environment. In this study, there is a concept formulated by the researchers based on the reality in the field, where self-control is the dependent variable and mindfulness training is the independent variable. The independent variable in this study is mindfulness training which can affect the dependent variable, namely self-control.

This research is quantitative in nature. The research model used is the non-equivalent control group design, where before being given treatment, both the experimental group and the control group are given a test, namely a pre-test, with the intention of knowing the condition of the group before treatment (giving training treatment). Thus, although the implementation of this research is laboratory research, this research is field research where the long-term goal after treatment is performance and many variables are related to performance so the researchers use quasi-experiment.

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The researchers consider that several other connected variables will not be fully controlled, and the group in the intervention handling process is not randomized, but rather a problematic subject is selected and the control group cannot be fully controlled by the researchers. Based on the researchers' arguments and reasons, this study used a quasi experimental design, with a non-equivalent control group design model. The research design is described in Table 1, where EG = Experimental Group, CG = Control Group, Y-1 = Experimental Group Pre-Test, Y-2 = Experimental Group Post-Test, Y-3 = Control Group Pre-Test, Y-4 = Control Group Post-Test, and X = Mindfulness Training (Relaxation Treatment).

Table 1. Research Design

Group	Pre-Test	Treatment	Post-Test
EG	Y-1	X	Y-2
CG	Y-3	-	Y-4

To answer the hypothesis in the study, the researchers needed a data analysis method as a guide for processing research data. Analytical activities carried out in this study were using different test analysis methods with statistical processing on the data collected. The statistical calculation method of this study used the IBM Statistics 22 SPSS (Statistical Package for Social Service) program. Initially, this study referred to one of the non-parametric tests, i.e. independent sample t-test, but the data were not normally distributed. Based on Table 1, with the presence of experimental and control groups, whose effect of treatment is measured, the appropriate alternative data processing is one of the statistical tests, namely Mann-Whitney U.

According to Azwar (2010), this research is quasi-experimental research. In this study, the research sample is not established randomly, but based on the pre-test results, in which the subjects with moderate and low categories would be given intervention. The population and sample of the study is 37 boat crew members. The whole population is male who is categorized as adult. The average age of the subjects is around 25 years. A pre-test was administered to see the level of the boat crew's self-control. It was conducted from 20/10/2019 to 27/10/2019, the time of the calculation of the results. There are 15 boat crew members in the low category and ten boat crew members in the medium category in terms of their control of themselves, but in the low category, there are only 12 crew members who agree to follow the treatment process so the total number of the sample is 22.

The research data were taken through several interviews, documentation, and observation, as well as by using a questionnaire. (1) The researchers interviewed several employees to reveal the problems in the work unit. (2) Documentation was conducted to seek information and review field documents to obtain the correctness of field information, including social media documentation. (3) Observations were conduced at the beginning of information search, during the treatment program, and after the implementation of the program on the experimental group. (4) The self-control questionnaire referred to Tangney et al. (2004) aspect reference self-control, with the item reliability index of 0.889.

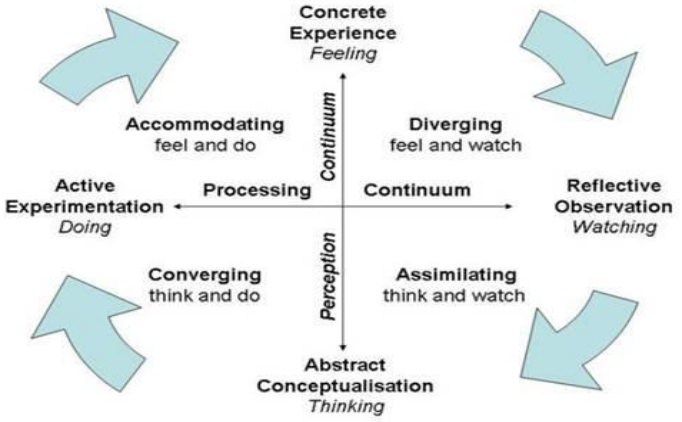

Figure 1. Experiential Learning Cycle

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This experimental research was conducted by giving the core treatment with the concept of a training program called "just a moment of silence". This activity was carried out on 01/11/2019. Each session had a goal, and the implementation stage of giving behavior was divided into two meetings with four sessions. This activity included a short but focused training for 15 minutes each session. The learning method in this training process was experiential learning circles or oftenly called learning cycle. Figure 1 describes the learning cycle. Figure 1 is a learning cycle according to Silberman (2014). In the neuro-linguistic programming (NLP), this learning cycle is often called the debriefing process.

The researchers applied the learning cycle to mindfulness training. There were four activities that were applied at the end of each session, namely (1) concrete experience, where participants were asked to respond to their feelings after participating in the event and the whole event; (2) reflective observation, where participants were asked to make observations about what the crew got so which could be applied to daily activities that are related to the content of the material; (3) abstract conceptualization, which was a stage where the participants carried out an event; (4) active experimentation, where the participants were given the opportunity to actively ask questions in several training processes at each training session related to the material so as to generate an understanding.

Treatment

The researchers determined a treatment that was designed in the learning process, which was in the form of a short relaxation process that was inserted into the learning program. The researchers chose this technique to be applied to the research subject in a brief but systematic manner, taking into account the time limit for boat crew members who had other activities outside of working hours. This concept of relaxation is called “just a moment of silence”. When formulating this concept, the researchers concluded that the dynamics of the theory were based on expert references and previous research related to mindfulness, including five exercises elaborated as follows. (1) Exercise in breathing with acceptance ethics, according to Afandi (2009), can be used to maintain one's self-awareness and improve discipline and consistency. (2) Body detection exercises with trust ethics, in which, according to Vohs and Baumeister (2010), doing hand grip gestures can reduce the intensity of impulsive actions to reduce bad habits in the form of body reflexes. (3) Exercise in realizing sensations with beginers’ mind ethics, which according to Kabat-Zinn (2012), when a person feels a sensation as if an event context is the first thing he feels, can create a different impression. (4) Exercise in opening awareness training, with non-striving and non-judgmental ethics, which according to Kabat-Zinn (2012), can reduce the intensity of a person doing impulsive actions and maintaining ethical processes. (5) Exercise in letting go of desire with the ethics of patience and letting go, which according to Kabat-Zinn (2012), can affect one's self-control, however it is difficult to do because it is related to one's desires, privacy, and human rights, such as a trouma/symptoms of excessive fear that causes a person to refuse to act, a way of speaking that indirectly follows the environment, smoking, and also drinking alcohol. Therefore, there needs to be a desire from the individual himself in order to follow the sustainable routine in carrying out silent activities to release desires.

Figure 2 shows an effect that is produced through several aspects of mindfulness, the linkage of research variables, and the training process. According to Dessler (2015), one of the prerequisites for carrying out a training is to make a specific program design. This debriefing program is carried out in the form of a classroom training method with the concept of experiential learning that was put forward by Silberman (2014) where, starting from the second session, participants are given the opportunity to actively ask questions related to the materials, and the trainer provides explanations so as to generate an understanding. In the third session, the participants were asked to make observations about what the boat crew got for their daily activities from the contents of the material that had been given. In addition, the participants were asked to respond to how they felt after carrying out the activity. Furthermore, at the end of the training session, the participants planned an activity on how the boat crew implement the exercise using one of the materials in the training process.

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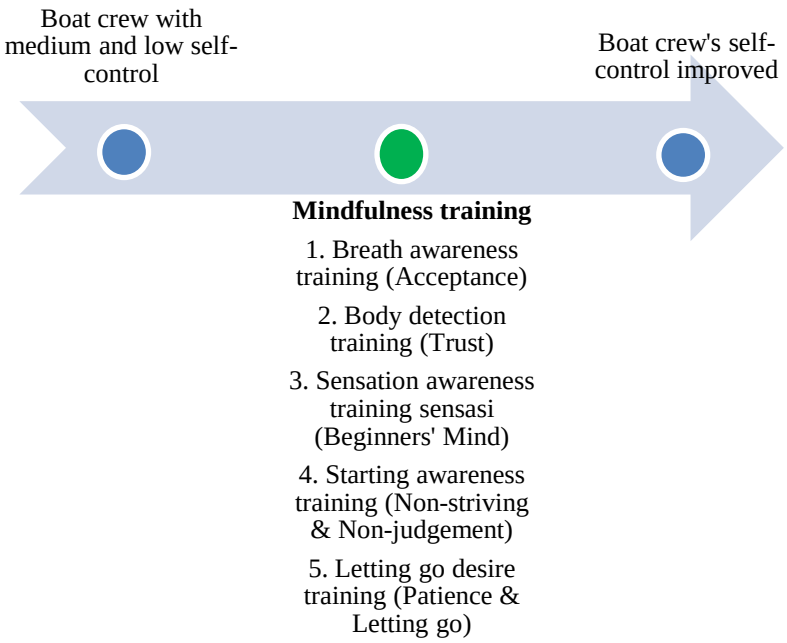

Figure 2. Treatment Effect

After the researchers determined the learning method, drew conclusions, and formulated theoretical dynamics, the training activity took place. The following is the summary of the mindfulness training activities. The 1st meeting of the first training session, namely the opening, was held to break the ice and introduce trainers by the general manager (GM). In the second session, the trainer introduced the mindfulness materials to the experimental participants through video playback to introduce the material and attract participants' attention, followed by material discussion as a basis for introducing the material, and initial role-playing. In this session, a program of silence of being aware of sensations with beginers' mind ethics was carried out, which according to Kabat-Zinn (2012), when a person feels as if an event context were the first thing he feels, it can create a different impression. This activity was carried out so that the crew could change the impression that was previously possibly unpleasant, returned it to a pleasant initial impression so that it affected the consistency and discipline of the crew in their work environment.

Meeting 2 of the third session was the implementation of the core training that is targeted to improve self-control, which referred to the advanced aspects of Tangney et al. (2004). The process in this third session was as follows. (1) The program of silence opened awareness with non-striving and non-judgment ethics, which, according to Kabat-Zinn (2012), can affect consistency and reduce a person's intensity for impulsive actions. (2) A short process of silent breathing used the ethical acceptance of Afandi (2012), which was used to maintain self-awareness of attention to work processes related to the environment and oneself. (3) The silent process of detecting the body with trust ethics was aimed at increasing discipline (related to the reflexes of the body when needing addictive substances), reducing bad habits and controlling desires related to body muscles, one of which was by doing handgrip. According to Vohs and Baumeister (2010), doing handgrip can reduce the intensity of impulsive actions to reduce bad habits in the form of body reflexes. (4) The process of silencing desires with patience ethics and letting go was aimed at all aspects of self-control. Based on the statement by Kabat-Zinn (2012), the exercise of letting go of desire can affect self-control, but it is difficult to do because it is related to a person's desire, privacy, and human rights such as trauma that causes someone to refuse to act, a way of speaking that indirectly follows environment, smoking, drinking alcohol, and the like. Therefore, there needs to be a desire from the individual himself to follow the sustainable routine in carrying out silence activities to release this desire.

The final session was a review session. According to Silberman (2014), the review process is important to determine the participants' understanding of the training material. In this activity, the

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participants were asked questions about how they felt after knowing what mindfulness was and they carried out an abstraction in the form of a plan that the boat crew would do by applying material in their daily lives when circumstances arose that caused emotions related to field conditions. In addition, the trainer's discussion and lecture process were also included in this section of the session to enable the crew to apply the provisions they had received in their daily work.

RESULTS AND DISCUSSION

Results

The statistical calculations of this study refers to one of the independent sample t-tests, but the data are not normally distributed so that the process switches to Mann-Whitney U test. The descriptions of the research statistical test data are described as follows.

Normality Test

This study uses an independent sample t-test, but before it is implemented there must be prerequisites to implement it. According to Azwar (2010), to use the independent sample t-test, it is necessary to know whether the data are normally distributed or not. In Table 2, the results of the research normality test are presented, with data processed using the SPSS IBM 22 application, where DF= Degree of Freedom, and Sig = Significance Value.

Table 2. Result of Normality Test

Shapiro-Wilk	
Df	**Sig.**
37	0.034

Table 2 shows the results of the significance test for normality with the Shapiro-Wilk statistic, showing that the research data used are not normally distributed. The significance value in Shapiro Wilk is 0.034 (<0.05), and this refers to the study using one of the Mann-Whitney U nonparametric tests to test the research hypothesis.

Homogeneity Test

Based on the non-parametric test analysis process, the next assumption test is the homogeneity test. The results show sig = 0.056> 0.05, which means that the two groups in the study have the same or homogeneous variance. Table 3 shows the results of the homogeneity test, where Levene Statistic = Result of Levene Data Processing, df1 = Research Sample, df2 = Statistic Formula Calculation, and Sig = Sinificance Value of Homogeneity. Thus, Table 3 shows the result of statistic processing to meet the requirement of Mann-Whitney assumption test.

Table 3. Result of Homogeneity Test

		Levene Statistic	**df1**	**df2**	**Sig.**
Result	Based on Mean	4.112	1	20	0.056

Hypothesis Result

Table 4 shows the result of statistic data processing in order to test the research hypothesis, where Mean Rank = average score, and Sum of Rank = total of statistic calculation. Table 4 shows the mean rank in the experimental group is 16.50, which is higher than the mean rank of the control group, which is 5.50.This means that the self-control of the boat crew members who got treatment is higher than that of those who were untreated. Although there are differences in the mean value, to find out whether the mean value is statistically significant, it is necessary to look at the results of the overall data processing. If the p-value or Asymp Sig <0.05, statistical data processing can be said to be significant and there is a significant difference between the experimental group and the control group.

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Table 4. Ranks

Group		N	Mean Rank	Sum of Ranks
Result	Experimental Group	12	16.50	198.00
	Control Group	10	5.50	55.00
	Total	22		

Table 5. Statistic Test

	Result
Mann-Whitney U	0.000
Z	-3.974
Asymp. Sig. (2-tailed)	0.000

a Grouping Variable: Method

Table 5 shows the Mann-Whitney U test value of 0.000 and a Z value of -3.974. In this case, Mann-Withney = Result of Mann-W U, Z = Z-score, and Asymp Sig / p (value) = Significance level. This result means that there is a significant difference in self-control improvement between the experimental group and the control group. Furthermore, the p-value or Asymp Sig of <0.05 means that there is a significant difference between the two research groups. Based on the results of the Mann-Whitney U data processing listed in Table 4 and Table 5, there is a significant difference in the mean rank of the experimental group and the control group. Based on the results of data processing, the hypothesis of this study is accepted, in which the increase in self-control of the boat crew members who are given the mindfulness training is higher than the increase in self-control of those who are not given the training.

Results of Training Evaluation

The explanation of the results of statistical processing as described above is one type of evaluation carried out by the researchers, which is often called a behavior scale, which is used to see the differences in behavior between the behaviour before and that after training. Although the research hypothesis is accepted, it is necessary to know the crew's responses to and understanding of mindfulness trainings. In addition to the scale of behavior, there are two additional scales to determine the success rate of treatment, namely the knowledge evaluation scale and the reaction evaluation scale. Both scales in this training program are calculated with a hypothetical score. The result of the calculation of the reaction evaluation scale is presented in Table 6.

Table 6. Result of Reaction Evaluation

Aspect	Item	Result	Category
Training Program	1.5	3.5	Good
Materials	6.11	3.6	
Discussion Process	7.10	3.5	
Trainer	8.9	3.8	
Future Application	2,3,4	3.6	

The evaluation of the reaction assessment based on items is divided into five aspects (score 1 for very unsuitable, score 2 for inappropriate, score 3 for neutral, score 4 for appropriate, and score 5 for very suitable). In this case, the entire research subject is categorized as selecting the 'appropriate' statement in some respects, showing that the whole aspect of the reaction falls into the good category.

The next process is the process of evaluating the subject's knowledge, which intends to determine the progress of the subject's understanding of the material given. Several answers have been prepared, consisting of five statements in which Number 1 is for Don't Understand, Number 2 is for Lack of Understanding, Number 3 is for Sufficiently Understand, Number 4 is for Understand, and Number 5 is for Strongly Understand. Based on the knowledge evaluation questionnaire, the subject is categorized as being quite familiar with the provision of the materials given. The subject's answers to the statements are presented in Table 7.

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Table 7. Result of Knowledge Evaluation

Self-control Aspect	Result	Category
Awareness Opening	3.4	Sufficiently Understand
Letting Go of Desires	3.1	
Breath Awareness	3.3	
Body Appreciation	3.4	
Sensation Feeling	3.3	

The results of the evaluation of knowledge and reactions prove that the researchers' treatment conceptualized through theory and expert opinion, namely "just a moment of silence" received a good response from the boat crew, and was successfully understood by the boat crew at Company X to improve their self-control.

Discussion

At the beginning of the research activity process, a problem was found, namely that one of the work units in Company X, namely the boat crew, became a hot topic of conversation among the employees of Company X, especially in one of their work units, namely the adventure unit. The boat crew were considered unable to control themselves properly. The researchers tried to look for alternative ways that could be used to solve the problems in the company by increasing the boat crew's self-control. Based on the statement by Sukadji (Dikria & Mintarti, 2016), there is a technique called relaxation and is thought to increase self-control and it is evidenced by the application of techniques in several previous studies.

Several previous studies have applied relaxation to the meditation process with a therapy that is often called mindfulness, which was popularized by Kabat-Zinn (2005) and was applied through a training program. According to Widodo (2015), training is a series of individual activities in systematically increasing skills and knowledge so that they are able to have professional performance in their fields. Training is a learning process that allows employees to carry out their current work according to standards.

Based on the reference, a research hypothesis was proposed, namely boat crew members who receive a short relaxation training with reference to the mindfulness aspect have higher self-control than those who are not given mindfulness training. The testing process was carried out starting from the observation interview to the distribution of behavior scales. The results of the behavior scale data processing showed that the implementation of the mindfulness program with the researchers' concept of "just a moment of silence" produced the expected results. The results of data processing concluded that the initial hypothesis of this study was accepted; it was proven that the self-control of the boat crew members who were given mindfulness training was higher than that of those who were not given the treatment.

The previous research by Putri (2016) and Olia and Saeedmanesh (2016) reported similar results, that mindfulness is stated to increase self-control. According to Tang et al. (2015), there are three things that can explain how the mindfulness training process affects a person's self-control, and one of which that can explain is emotional regulation. Emotional regulation is a a person's capacity to control himself and adapt conditions to the emotions that arise. This is in line with what Yusainy et al. (2018) write that in the internal factor of self-control, there is a process of emotional regulation which is very close to mindfulness.

Another similar result is reported in the research conducted by Afandi (2012), although there are differences in methods, subjects and results of research, wherein the results of short mindfulness training do not affect the level of self-control of students in Madura. The researchers argue that several things related to the unaffectedness of the research subject on training are less systematic training programs, methods, and concepts. Thus, the researchers designed a more structured and conceptual mindfulness program. The first activity the researchers undertook to avoid similar results was to determine the learning program, and to do a combination of a sequence of activity schedules as a distraction to avoid burnout during the learning process. Some of these interludes were in the form of video playbacks and short games. Based on the researchers' understanding of

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the theory from experts and references to previous research, it can be concluded that this mindfulness training was a program that could provide provisions for subjects to improve self-control.

According to Ray (2011), if an individual's self-control is low, he cannot control himself in doing something and does not care about long-term consequences. Conversely, individuals with high self-control can refrain from negative things by looking at the long-term consequences. In order to ensure the state of the field, after the training was completed, the researchers made follow-up observations for two weeks. From these observations, it was seen that there was a change in behavior related to the boat crew's self-control.

The following are some of the behaviors seen in the field. (1) Boat crew members who used to be late for work became punctual persons. This indicates that the crew can control themselves to rest early so as not to be late for work. (2) Boat crew members who previously rarely paid attention to the completeness, safety, and security of the ship (K3) are on standby to cross check goods. This form of attitude suggests that the crew can control themselves to focus on their work. (3) The previously rude way to greet passengers became more friendly, and the intensity of speaking harshly decreased when in the cabin of the ship where passengers were present. This attitude suggests that boat crew are currently prioritizing awareness to control themselves while working, thinking long-term about the impact that will happen so that they can organize speech in a better way. (4) Initially, the crew smoked and drank alcohol in the cabin of the ship, but during the follow-up observation activities, none of them was seen smoking anymore in the cabin of the ship. This attitude shows that the crew can control themselves to be addicted to addictive substances even though the intensity is only within the limits of the scope of work, even though outside of working hours the crew still do it. The results of this study indicate that the mindfulness training concept of short relaxation ("just a moment of silence") is proven to be effective, so that the boat crew at Company X can control themselves better.

CONCLUSION

Based on the research findings and discussion, three conclusions can be drawn from this study. (1) The self-control of boat crew members who are given training is higher than that of those who are not given treatment. (2) The training program of "Just a moment of silence" received good reactions from and are sufficiently undersood by the crew. (3) After two-week implementation of the training program, it was proven that the training activities were successful and effective in increasing the self-control of the boat crew at Company X in Bali, Indonesia.

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