THE EFFECT OF INSTRUCTOR PROFESSIONAL
COMPETENCE OF TRAINING SKILLS SIMULATOR IN
MARITIME VOCATIONAL EDUCATION

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Abstract

This study aims to determine the effect of the instructor's professional competence in the simulator training skills of cadets of SMK Pelayaran Tayu. One of the competencies that must be possessed by an instructor / educator is professional competence, professional competence of instructors is the ability of educators who can adapt to the development of shipping technology and be able to transfer knowledge that needs to be mastered by students by involving technology according to the demands of the world of work. This study uses a qualitative descriptive approach with the type of correlational research. The research population is the Simulator Instructor, the Head of the Simulator and the cadet of SMK Palayaran Tayu. All were taken as respondents (population research) in this study. Data collection techniques used rating scale questionnaires, semi-structured interview observations and documentation with qualitative descriptive methods. The results of the study based on the questionnaire recapitulation of the professional competence level of the instructors in the good category, the skill level of the cadet simulator training in the fairly good category. The instructor's professional competence affects the cadet simulator training skills, the better the instructor's professional competence, the higher the cadet simulator training skills.

Keywords*: *Instructor Professional Competence; Simulator Training Skills.

I. INTRODUCTION

Vocational education and training at the secondary and higher education levels need to equip graduates with more general skills, namely life and career skills, learning and innovation skills, and the ability to utilize information, media, and technology[1]. With the rapid development of information technology in the maritime industry, especially shipping technology where navigation equipment on the bridge and in the engine room has been modernized in such a way using automation and digitization technology. Automation and digitization of equipment on board the ship can assist seafarers in carrying out guard duties on board, so that every aspect of the development of technology used on ships, aids and training facilities applied on ships must also be introduced into the maritime vocational education system in order to improve competence of seafarers along with technological advances in the field of shipping[2], [3], [4], [5].

A competent shipping officer must be able to carry out a series of tasks both when operating the ship in normal conditions and in unexpected emergency situations and be able to make the right decisions, make priorities, and be able to work together in a team effectively. This requires a learning environment that is able to realize the situation as it actually is. Therefore, the use of simulators is considered appropriate to provide a learning model where the three elements of learning knowledge, skills, and behavior can be integrated through learning experiences[6], [7], [8].

By optimizing the use of simulator learning media as a training medium, it is hoped that maritime vocational education in Indonesia in particular will be able to face the challenges of the digital era as an effort to prepare competent and quality graduates in the shipping field. Simulator training can run optimally and quality is influenced by four interrelated elements in the learning. The four elements are simulator equipment, training

programs, students, and instructors/lecturers[9], [10], [11], [12].

In order to the learning objectives with the simulator to run optimally, the four elements must be fulfilled, the instructor's role as the manager of the training program activities is the largest. The expected competence or ability of the instructor is to have managerial and individual abilities in planning, organizing, implementing and evaluating all activities related to learning in the simulator[13].

Simulator instructors must have professional competencies and be able to transfer the knowledge that students need to master by involving technology according to the work demands of students. The instructor is a key factor in the success of the simulator learning program, along with the shift in the model from teacher centered to learner centered, the role of the instructor also shifts from the ruler of the entire learning process to become a facilitator, manager, organizer, guide, motivator, evaluator, and even has a psychological role in mentoring14, [15].

Field observations show that in general the simulator conditions in maritime vocational education in Indonesia are in good and proper condition and are modern, complete with facilities and infrastructure that support the learning process, as well as the enthusiasm of students during learning activities. So in an effort to develop cadet simulator training skills and remember the important role that instructors must have as education implementers. So it is necessary to conduct research regarding the influence of the instructor's professional competence on the simulator training skills of cadets of shipping vocational education, especially in terms of the instructor's professional ability in simulator training.

II. LITERATURE REVIEW

A. Professional Competence of Instructors

Professional competence of instructors is the ability of educators who can adapt to the development of shipping technology, simulator instructors have an important role in developing student competencies. Simulator instructors must meet professional competence[16].

The simulator instructor must be able to prepare and deliver the program assigned to him and verify that the learners at the end of the program have met the learning objectives. The competencies needed by instructors are: having knowledge and experience related to teaching materials, having technical operational simulator skills, being able to remove barriers between instructors and students, having an attitude as a teacher good, and being able to assess students in using simulators and the results of simulator activities[17], [18], [19].

In full, the professional skills that simulator instructors must possess are as follows: able to explain learning objectives and training needs; turning learning objectives and training needs into a learning program; designing learning programs and related materials; ignore the possible limitations of the simulator used; convey the details of the learning program, fulfill the program objectives that have been made; using a simulator to meet learning objectives, assessing students in using the simulator and the results of simulator activities[5].

B. Simulator Training Skills

Simulator training skills are interaction activities between instructors and students and reciprocal communication that takes place in educational situations to achieve learning objectives. Simulator training skills must be possessed, mastered and applied in simulator activities (training). Simulator training can provide increased knowledge, skills and proficiency in various levels of responsibility from normal ship operations to emergency conditions on guard duty. Training with simulators can transfer the competencies gained in learning to real-life situations [20], [21].

The skills required by navigators for ship operation can generally be divided into technical and non-technical skills. Technical skills refer to knowledge of ship operations such as navigation, engines, propulsion, cargo handling, maintenance and radio communications. Technical skills can be defined as specific and can also change every few years due to fundamental changes in ship design and technological advances. For example, knowledge of the use of various bridge equipment such as: Electronic Chart Display Informaton System (ECDIS), Global Positioning System (GPS), Radar, Automatic Radar Plotting Aid (ARPA), Automatic Identification System (AIS) has become essential for today's navigators. Skills related to navigational means in the past and knowledge about them have become obsolete or present only as basic knowledge (eg use of sextant to gain position) in competency assessment. The future technical competence of the navigator will depend on the development of new navigation technologies and their subsequent adaptation by ships. Non-technical skills in research literature related to navigators: (1) situational awareness (2) task division management (3) decision making (4) communication and (5) leadership. The first three skills fall under the sub category of "cognitive skills" and the remaining 2 are classified as "interpersonal (social) skills"[22], [23], [24]. [25].

III. RESEARCH METHODOLOGY

Research on the effect of professional competence of productive instructors on cadet simulator training skills in maritime vocational education uses a qualitative descriptive method. This research was conducted at SMK Pelayaran Tayu, Pati Regency, Central Java Province on cadet simulator training.

The subjects of this research are productive instructors and cadets of simulator training participants at SMK Pelayaran Tayu.

The research variable is the object or what is the point of attention of a study [26]. The variables that will be revealed in this study are the independent variable and the dependent variable. The independent variables include the instructor's professional competence, namely the ability in academic mastery that is taught integrated with his teaching ability as well as having academic competence perceived by cadets with indicators (1) having knowledge and experience related to teaching materials; have an attitude as a good teacher; (2) have technical operational simulator skills; (3) (4) able to eliminate barriers between instructors and students; (5) able to assess students in using the simulator and the results of simulator activities.

The second variable is the dependent variable covering cadet simulator training skills which include aspects of skills in (1) situational awareness; (2) the management of the division of tasks; (3) decision making; (4) communication and (5) leadership. The focus of this research is to analyze descriptively the influence of the instructor's professional competence on simulator training skills with purposive sample analysis in the form of data presentation in the form of graphs.

The data collection technique begins with distributing questionnaires filled out by cadets of SMK Pelayaran Tayu who use a simulator in the productive learning process, where 25 cadets are taken randomly from each class to fill out the questionnaire as a sample. The results of the descriptive analysis and the questionnaire data recapitulation were then interpreted in graphical form.

Data collection techniques in the form of observations were carried out in the SMK Pelayaran Tayu simulator during simulator training, with research variables namely the instructor's professional ability or competence in the form of having an attitude as a good teacher, having simulator operational technical skills, having knowledge and experience related to teaching materials, being able to remove obstacles. Between instructors and students, able to assess students in using the simulator and the results of simulator activities. During the observation, the researcher was directly involved in productive learning activities in the form of training in the simulator.

The interview technique used is a semi-structured interview in the form of an interview by asking structured questions related to the instructor's professional competence, then one by one is deepened in extracting further information. This interview is based on unlimited questions (unbound) answers. This interview was conducted with productive instructors at SMK Pelayaran Tayu. Data collection is done by recording through a mobile phone. The researcher acts as the main instrument in this study by using an analytical guide to accommodate research data. The documentation technique is carried out every time an observation is held in the training in the simulator.

IV. RESULT AND DISCUSSION

A. Research Results

To see the tendency of the influence of professional competence of productive instructors on cadet simulator training skills, criteria are used based on the opinion of Chabib Thoha (2001: 100) and then grouped into categories in Table 1 as follows:

Table 1 Score Range and Category

No	Range	Score Category
1	Score Mi + (1.5 SD)	Very good
2	Mi + (0.5 SD) = Score < Mi + (1.5 SD)	Good
3	Mi - (0.5 SD) = Score < Mi + (0.5 SD)	Fairly Good
4	Mi - (1.5 SD) = Score < Mi - (0.5 SD)	Poor
5	Score < Mi - (1.5 SD)	No good

1) Instructor's professional competence variable

Based on criteria the range of scores and categories above in the instructor's professional competency simulator training is determined by several aspects which are summarized in the following graph:
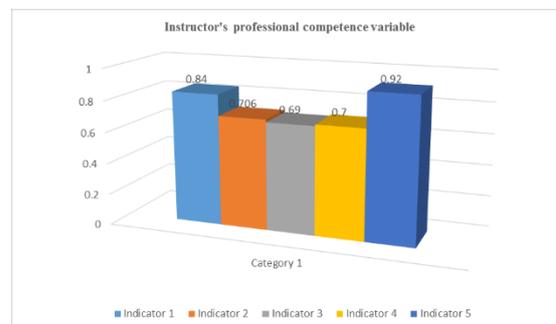

Figure 1. Instructor professional competence variable

Based on the results of data analysis, indicator 1, which is having an attitude as a good teacher, is in the score range of 0.84, indicator 2 have technical operational simulator skills within a score range of 0.706, indicator 3 has knowledge and experience related to teaching materials in a score range of 0.69, indicator 4 is able to eliminate barriers between instructors and students is in a score range of 0.7, and indicator 5 is the instructor's ability to assessing students in using the simulator and the results of simulator activities are in the score range of 0.92.

2) Simulator training skill variable

The simulator training skill level includes several aspects including indicator 1 situational awareness within the score range of 0.78, indicator 2 management of division of tasks within a score range of 0.56, indicator 3 decision making within a score range of 0.86, indicator 4 communication in a score range of 0.52 and 5 leadership indicators in a score range of 0.68. The results of data processing are then interpreted in graphical form as follows:
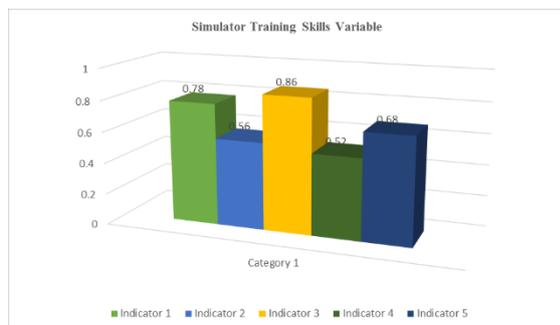

Figure 2. Simulator Training Skills Variable

B. DISCUSSION

A good instructor's professional competence will improve the skills of cadets in simulator training. The level of professionalism of the instructor itself involves aspects in the form of having knowledge and experience related to teaching materials, having technical operational simulator skills, the ability to assess and evaluate students in using simulators and the results of simulator activities, having an attitude as a good teacher, being able to remove barriers between instructors and students learners.

The results of the analysis of the assessment of the professional competence of the instructors are generally in the good category. With aspects of knowledge and experience related to teaching materials are in a good category as evidenced by the instructor's ability to discuss simulator training materials in detail and clearly, deliver materials training sequentially and according to the applicable curriculum, deliver training materials clearly and easily understood, can answer cadets' questions in simulator training correctly and the explanations are related to the experience of the instructor in the field so that it is easy to understand.

Based on the results of interviews and field observations of the knowledge and experience of instructors related to teaching materials, they are in a good category, this is evidenced by the delivery of material carried out by the instructors which is very clear and easy to understand, the skills of the instructors in conducting training and setting of equipment and simulator training scenarios are highly programmed and looks familiar, although the findings in the field show that some cadets pay little attention to the simulator training process, which is one of the inhibiting factors for the training process.

This is in accordance with the theory that the first competency that must be possessed by instructors is to have mastery of knowledge and experience related to teaching materials. This mastery becomes the basic foundation for teaching skills. What is meant by the ability to master the subject matter according to Wijaya (1982) is the ability to know, understand, apply, analyze, synthesize, and evaluate a number of knowledge skills taught. There are two things that are important in mastering the field of study material, namely 1) Mastering the field of study material and the school curriculum including reviewing the curriculum material in the field of study, reviewing the contents of the textbooks in the field of study concerned, carrying out the activities suggested in the curriculum of the field of study concerned. And the second is 2) Mastering the deepening/application of the field of study such as studying relevant science, studying the application of the field of science into other fields of science (for certain study programs) and learning how to assess the curriculum of the field of study.

Based on the results of the assessment of the technical skills aspects of the simulator operations, they are in the good category, this is evidenced by the results of observations and findings in the field which show that the instructors are able to operate the equipment and program the simulator training scenarios in accordance with the existing SOPs properly. Although in guiding the cadets to familiarize themselves with the functions of the equipment and its work system, it has not yet achieved optimal results, because the findings in the field indicate a lack of human resources for simulator technicians so that they are not optimal in accompanying training activities and there are some cadets who neglected the instructor's instructions when the training process in the simulator takes place. This is in accordance with the theory that operational simulator technical skills describe the instructor's skills in designing, organizing and managing learning resources, in order to achieve an effective and efficient teaching atmosphere. The types of abilities that instructors must possess include setting up simulator training scenarios for teaching and creating a conducive teaching and learning climate.

In the aspect of the ability to assess and evaluate students in using the simulator, they are in the good category, findings in the field indicate that instructors are able to become facilitators, managers, organizers, guides, motivators, evaluators, and even have a psychological role in mentoring.

Based on the results of interviews with productive instructors who act as respondents, instructors are able to act as facilitators, managers, organizers, guides, motivators, evaluators, and even have a role psychological in good mentoring during simulator training. This is because simulator

instructors routinely attend training on how to use and operate simulators for the benefit of education and training in schools and are accompanied by technicians during training.

This is in accordance with the theory that the management and utilization of media for training and assessment as well as important learning resources exist for each instructor because of the ability to create stimulating learning conditions so that the teaching and learning process can take place effectively and efficiently so as to create good simulator training process skills from each cadet. There are five types of ability to understand media and learning resources, according to Cece Wijaya (1994), namely 1) Recognizing, selecting and using media. 2) Make simple learning aids. 3) Using and managing the laboratory in the context of the teaching and learning process. 4) Can develop laboratory 5) Use library in teaching and learning process including laboratory learning process.

Based on the data obtained, the results of the assessment of the aspect of having an attitude as a good teacher are in the good category, this is evidenced by the results of observations and interviews which show that productive instructors arrive on time even 10 minutes earlier before the simulator learning begins, to prepare equipment and scenarios simulator training. Respondents, in this case, productive instructors, are able to display good leadership style examples through their role which this time serves as the head of the simulator at SMK Pelayaran Tayu.

In the aspect of being able to remove barriers between instructors and students based on the results of data analysis, they are in the good category. In this aspect, based on the results of observations, productive instructors are able to convey learning objectives by carrying out briefings before the training begins, as well as providing opportunities for each student to express opinions during the training process and end activities with an evaluation of the training process that has been carried out.

Based on the results of the analysis of the second variable, simulator training skills are generally in the good category. In the aspect of situational awareness in the good category, this is evidenced by the results of observations that show cadets with awareness of the situations and conditions that exist in the training are able to carry out observations and use existing facilities and infrastructure properly and carry out tasks according to their respective responsibilities properly. In accordance with standard operating procedures (SOP) without having to be reminded by the instructor until the completion of the training. In the management aspect, the division of tasks is in a fairly good category, this can be seen when observations in the simulator room cadets are able to divide tasks and responsibilities quite well in their

teams/groups before carrying out the training and during the training it shows that group members help each other and cooperate in case of difficulties during the training. The implementation of the training, as well as in the preparation of the interim report, it was also seen that the division of tasks in the working group (team) between group members was quite good.

Based on the results of the data analysis, the skill aspects in making decisions in implementing the training scenario is in the very good category. And aspects of communication skills are in the very good category as well. This is evidenced based on the results of observations and interviews with training participants with accompanying instructors saying that between aspects of decision-making skills and aspects of communication there is a mutually supportive relationship, because in decision making good communication is needed between groups/teams internally and external communication is needed, namely by other parties related to the decision making, for example in this case the bridge team needs communication with other ships in the vicinity, shore stations (VTS) and so on. With the occurrence of excellent communication so that quick and appropriate decisions can be made during an emergency on board.

In the aspect of leadership skills, they are in a good category, this can be seen during observations in the simulator training room playing a role like a guard duty team on a ship. In this simulator training, cadets learn leadership according to the duties and responsibilities above of the actual ship, to carry out the training according to the scenario that has been made until the completion of the training properly, safely and smoothly.

This is in accordance with the theory that the skills required by the navigator for the operation of ships can generally be divided into technical and non-technical skills. Technical skills refer to knowledge about ship operations, while non-skills technicalrelated to navigators according to Sharma (2021) are as follows: (1) situational awareness (2) management of division of tasks (3) decision making (4) communication and (5) leadership. The first three skills fall under the "cognitive skills" sub-category and the remaining 2 are classified as "interpersonal (social) skills.

In general, the level of professional competence of the instructors is in the good category and the skill level of the cadet simulator training is also in the good category. The instructor's professional competence affects the cadet simulator training skills, the better the instructor's professional competence, the higher the cadet simulator training skills.

V. CONCLUSION

From the results of the analysis, it was found that the instructor's professional competence factor showed a good category with an average of 0.77 in the score range of $0.6667 \geq x$, the cadet simulator training skill level showed a good category with an average of 0.68 in the scores range of $0.6667 \geq x$. Thus, from the determinant factors that show a good category and cadet simulator training skills that show a good category, the professional competence of productive instructors affects cadet simulator training skills, the better the instructor's professional competence, the higher the cadet simulator training skills.

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