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ASSISTANCE IN SHIP MACHINERY LEARNING TI IMPROVE THE COMPETENCE OF ENGINE CADETS

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ABSTRACT

Ship machinery competence is a fundamental requirement for engine cadets as future marine engineers. However, learning challenges such as limited practical experience, uneven understanding of machinery systems, and lack of structured mentoring may hinder competency development. This community service program aims to improve the competence of engine cadets through assistance in ship machinery learning at Akademi Maritim Belawan. The program was implemented through theoretical training, hands-on practice, technical mentoring, and learning evaluation. The results show an improvement in cadets' understanding of ship machinery systems, operational skills, and awareness of engine room safety. This program demonstrates that structured learning assistance in ship machinery effectively enhances the competence and work readiness of engine cadets in maritime education.
Keywords: Community Service, Ship Machinery, Engine Cadets, Maritime Education, Technical Competence

INTRODUCTION

Maritime education plays a strategic role in preparing qualified human resources to support the shipping industry. One of the essential competencies required for engine cadets is mastery of ship machinery systems, including operation, maintenance, and safety procedures. These competencies are crucial to ensure safe, efficient, and reliable ship operations.

At Akademi Maritim Belawan, ship machinery courses are delivered according to the maritime curriculum. However, differences in cadets' learning backgrounds, limited opportunities for intensive practice, and insufficient mentoring often result in varied levels of understanding and skills among engine cadets. These conditions may affect their readiness for sea practice and future professional duties.

Therefore, assistance in ship machinery learning is needed to strengthen cadets' competencies through an integrated approach combining theory, practice, and technical mentoring. This community service program aims to support the learning process and enhance the technical competence of engine cadets.

PROBLEM IDENTIFICATION

Based on observations and discussions with lecturers and cadets, several problems were identified:

1. Uneven understanding of basic ship machinery concepts among engine cadets.

2. Limited practical skills in operating and maintaining ship machinery systems.
3. Lack of structured and continuous technical mentoring during learning activities.
4. Low confidence of cadets in applying machinery knowledge in practical situations.
5. Limited application of engine room safety standards in learning practices.

These problems indicate the need for a structured assistance program to improve learning effectiveness and competency development.

METHODOLOGY

Target Participants

The target participants of this community service program were engine cadets of Akademi Maritim Belawan who were enrolled in ship machinery and marine engineering courses.

Implementation Methods

The community service program was conducted using the following methods:

1. **Theoretical Training**
   Training sessions were conducted to strengthen understanding of ship machinery systems, including main engines, auxiliary engines, fuel systems, cooling systems, lubrication systems, and engine room safety procedures.
2. **Practical Learning Activities**
   Cadets participated in hands-on practice in ship machinery laboratories and workshops, focusing on basic operation, inspection, and maintenance procedures.
3. **Technical Mentoring**
   Continuous mentoring was provided by lecturers and instructors to guide cadets in understanding machinery functions, troubleshooting basic problems, and applying standard operating procedures.
4. **Evaluation**
   Program effectiveness was evaluated through pre-tests and post-tests, observation of practical performance, and feedback from cadets.

RESULTS AND DISCUSSION

The implementation of the community service program resulted in several positive outcomes:

1. **Improved Conceptual Understanding**
   Cadets demonstrated a better understanding of ship machinery principles and system integration after participating in the assistance program.
2. **Enhanced Practical Skills**
   Practical abilities related to machinery operation and routine maintenance showed noticeable improvement.
3. **Increased Safety Awareness**
   Cadets exhibited greater awareness of engine room safety standards and proper work procedures.
4. **Improved Work Readiness**

The assistance program increased cadets' confidence and readiness for sea practice and professional maritime work.

These results indicate that learning assistance combining theory, practice, and mentoring is effective in improving ship machinery competence. The findings align with maritime education standards that emphasize competency-based learning and practical experience.

CONCLUSION

The community service program on assistance in ship machinery learning at Akademi Maritim Belawan successfully improved the competence of engine cadets. Through theoretical training, practical activities, and technical mentoring, cadets enhanced their knowledge, skills, and safety awareness. Structured learning assistance is an effective approach to supporting competency development and work readiness in maritime education. Continuous implementation of similar programs is recommended to sustain and further improve learning outcomes.

RECOMMENDATIONS

1. Conduct ship machinery learning assistance programs on a regular basis.
2. Integrate simulation-based learning to complement practical training.
3. Strengthen collaboration with the shipping industry to enrich cadets' practical experience.
4. Align learning activities more closely with STCW competency standards.

REFERENCES

International Maritime Organization (IMO). (2017). *STCW Convention and Code*.

Taylor, D. A. (2018). *Introduction to Marine Engineering*. Elsevier.

Rawson, K., & Tupper, E. (2019). *Basic Ship Theory*. Butterworth-Heinemann.

Ministry of Education, Culture, Research, and Technology of Indonesia. (2021). *Vocational Higher Education Standards*.