Assessment of the Effectiveness of Airfield Lighting System Practical Learning for Students at the Higher Education

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Abstract. Airfield lighting practicum learning at the Makassar Aviation Polytechnic for now still uses the manual method where the cadets when doing the practicum have to go to Sultan Hasanuddin Makassar Airport to see the equipment and the equipment cannot be changed or opened because it is active equipment and its position is in airside airport where not just anyone and can go at any time to the equipment, the purpose of this research is to measure the effectiveness of learning airfield lighting practicum manually where in this case what we measure are tools, permits and media and learning materials, based on an analysis conducted on 47 cadets of the airport technology study program, The results obtained from all students stated that 21.30% said it was very lacking, 360.20% said it was lacking, 29.80% said it was enough, 10.60% said it was good and the remaining only 2.10% said it was very good, Therefore it was concluded that learning airfield lighting at the Makassar Aviation Polytechnic had not been effective.

Keywords: Airfield Lighting System · Learning Effectiveness · Practice

1 Introduction

Airport Technology has learning outcomes, namely Airport Mechanical Technicians, Building and Runway Technicians, and Airport Electrical Technicians, where the graduate profiles must be able to operate, and maintain electrical speciality in navigation lighting [1], mechanical, building, and runway equipment according to standard operating procedures and applicable regulations, one of the navigation equipment flight that must be mastered is airfield lighting system [2].

An airport lighting system (ALS) is a visual landing aid that assists and serves aircraft taking off, landing, and taxiing so that they can move efficiently and safely. This facility consists of unique lights, which provide visual signals and information to pilots, especially when pilots are about to land or take off. These visual signals and information are provided by adjusting the configuration, color, and intensity of the light from these

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particular lights. In general, when landing or taking off, pilots rely more on looking outside the plane than looking at the instruments in the cockpit of their plane.

Teaching and learning activities for subjects related to ALS, ALS is a system of lights of different colors and purposes intended to assist in the takeoff, landing, and overland movement of aircraft in different weather conditions [3]; cadets must carry out practicum activities, where practicum activities carried out in learning can develop many skills, both physical skills and social skills [4]. Implementation of practicum activities can be a means for students to practice applying science process skills [5].

Based on field observations at the Makassar Aviation Polytechnic for courses that teach about ALS where cadets do a practicum with limited equipment available at the Makassar Aviation Polytechnic where security equipment, practicum equipment, equipment for practicum and measuring instruments used are also special measuring instruments which must be borrowed from airport technicians and in carrying out practicum cadets must have to go to Sultan Hasanuddin Makassar airport to see first-hand the equipment where this equipment cannot be changed or opened because it is energized equipment and its position is located on the air side of the airport where not just anyone can go to the equipment at any time where to go to the airside of the airport the cadets need permission from air traffic controllers [6].

Based on this background, the researcher sees the need for a study on airfield lighting practicum, how practical it is, how effective it is, where this study will focus on practicum tools, practicum media, practicum materials, and permits for practicum learning of airfield lighting in the field [7].

2 Method

The method we use in this study is to use a questionnaire method using Google form media where the respondents are airport technology study program cadets who are already in semester six because they have received subjects about airfield lighting systems, where there are two classes, namely airport technology batch VIII and airport technology batch VIII A cadets with a total of 47 cadets and this research was conducted in July 2022, the discussion of this research was carried out qualitatively with descriptive explanations where in this exploration by asking questions on the Google form which includes:

a. The adequacy of existing learning media;
b. Practical equipment can be used according to the maximum;
c. The availability of measuring instruments for airfield lighting practicum;
d. Availability of tool kits for airfield lighting practicum;
e. Availability of safety equipment in practice (helmets, vests, safety shoes and gloves).

3 Results and Discussion

In the world of practicum education, it is a beneficial learning model and the development of science process skills as processes and products. Science process skills needed to be developed through direct experience as a learning experience and realized when the activity occurs; however, under certain conditions, the practicum learning model

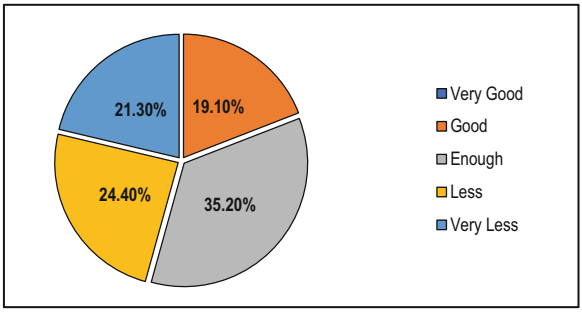

Fig. 1. The Percentage of Adequacy of Learning Media

often experiences obstacles in its implementation. In this study, the team measured the effectiveness of the airfield lighting system learning practicum at the makassar aviation polytechnic.

3.1 The Adequacy of Learning Media

In implementing the practicum airfield lighting system factor, the adequacy of learning media is one of the essential supports, and media literacy needs to encompass critical skills [8] because, without sufficient learning media, learning will take place less efficiently.

Respondents who filled out the form were airport technology cadets, totaling 47 people out of 47 who filled out the form, and there were 21.30% who filled out very little. 23.40% said it was lacking, 35.20% said it was enough, and only 23.40% said it was sufficient for the availability of existing learning media. Therefore, it can be concluded that in practicum learning, airfield lighting is not optimal regarding the adequacy of learning media. This conclusion implies that the educational institution responsible for providing the practicum learning experiences related to airfield lighting may need to re-evaluate the learning materials and tools provided to ensure they are adequate and effective. This could involve increasing the quantity or quality of learning media, providing additional training and support for cadets, or exploring new technologies and tools to enhance the learning experience (Fig. 1).

From the results of these respondents, it can be concluded that in practicum learning, airfield lighting is not optimal in the adequacy of learning media.

3.2 Practical Equipment Can Be Used Following the Maximum

In using valuable equipment, in this case, airfield lighting equipment, cadets must use the practice equipment directly so that they are accustomed and trained to handle it later in the field, although they need digital literacy and digital learning, too, for better study [9]. In this case, we also ask respondents to fill out a form for using valuable equipment (Fig. 2).

After filling out the form, the results were obtained, namely, 29.80% said it was significantly less, 40.40% said it was less, 25.50% said it was enough, and only 4.30% said it was good.

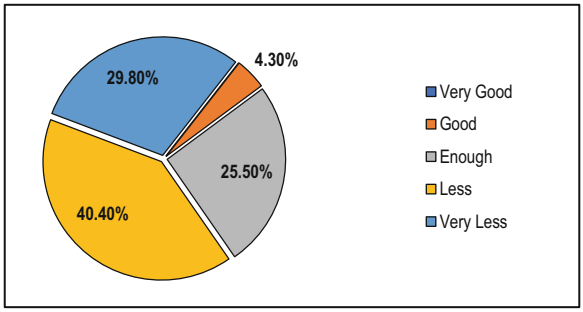

Fig. 2. The Percentage of the Effectiveness of the Use of Equipment.

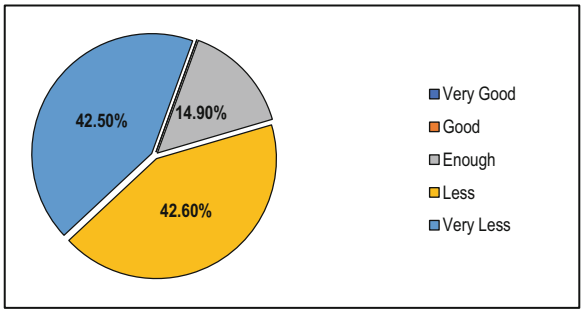

Fig. 3. The Percentage of Available Measuring Instruments

From the students' assessment of valuable equipment, it can be concluded that most practical equipment use is lacking.

3.3 Availability of Measuring Instruments for Airfield Lighting Practicum

When doing airfield lighting practicum, students are expected to be able to use and read measuring instruments [10]; in filling out the form, we will measure the availability of measuring tools for airfield lighting practicum (Fig. 3).

The results of filling out the form regarding the availability of measuring tools for practicum airfield lighting were that of the 47 students who filled out the form were that 42.60% stated that it was very lacking, and 42.60% stated that it was lacking. Only 14.90% stated that it was sufficient, so it can be concluded that the availability of measuring instruments for practicum is lacking.

3.4 Availability of Tool Kits for Airfield Lighting Practicum

When carrying out airfield lighting learning practicums, the need for a tool kit is primary because, without a tool kit, students cannot carry out airfield lighting practices to the fullest. Here, we filled out the form by 47 students and got the following results (Fig. 4).

After filling in by the cadets, the following results were obtained: 46.80% of students stated that it was very lacking, 38.30% of students stated that it was lacking, and only

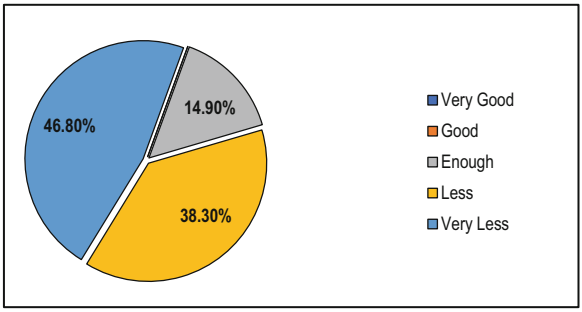

Fig. 4. The Percentage of Tool Kit Availability

14.90% stated that it was sufficient so that it can be ascertained that the availability of tool kits in airfield lighting learning is less than what is needed.

3.5 Availability of Safety Equipment in Practice (Helmets, Vests, Safety Shoes, and Gloves)

To maintain the safety and security of the students in carrying out the airfield lighting practicum [11], the cadets must use security equipment; from filling in, which was carried out by 47 students, the following results were obtained for the availability of safety equipment (Fig. 5).

From the results of the form, 29.80% said it was very poor, 51.10 said it was lacking, 17 said it was enough, and only 2.10% said it was good, so it can be concluded that the safety equipment used in the practicum is lacking.

The safety equipment utilized during the airfield lighting practicum is inadequate. It is, therefore, necessary for educators and policymakers to prioritize the provision of appropriate safety equipment in order to ensure that students can participate in practicum activities safely and without fear of injury. Implementing additional safety measures may also be necessary to minimize the risk of accidents and promote a safe learning environment for all cadets.

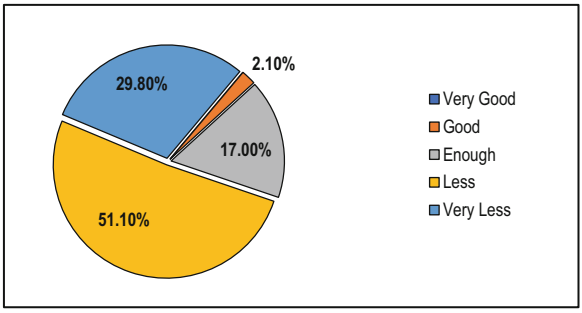

Fig. 5. The Percentage of Availability of Safety Equipment in Practice.

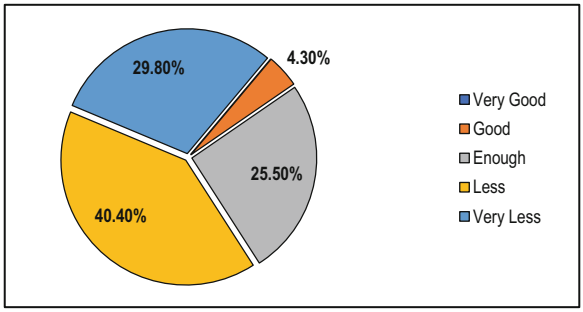

Fig. 6. The Percentage of the Effectiveness of the Use of Equipment.

3.6 Practical Learning Effectiveness

In practicum learning we try to measure the effectiveness of practicum learning, and the following results are obtained from all who enter input in the form (Fig. 6).

After conducting a survey of cadets regarding the effectiveness of the practicum, it was found that 29.8% said it was very lacking, 40.40% said it was lacking, 25.50 said it was enough, and 4.30% said it was good and none said it was very good.

From the survey results, the results for the adequacy of the existing learning media almost stated that it was lacking; namely, 85.10% stated that it was lacking practicum tools that could be used according to a maximum of 70.20% stated that it was lacking, and only 25.50% stated that it was sufficient, for the availability of measuring instruments for airfield lighting practicum 83.10% said it was lacking and only 14.90% said it was enough and from the aspect of the availability of tool kits for airfield lighting practicum 85.10% said it was lacking and only 14.90 said it was enough, from the availability of safety equipment in practice (helmets, vests, safety shoes and gloves hands) 80.90% said it was lacking and only 17% said it was enough and finally from Practical Learning Effectiveness 71.20% said it was lacking and only 25.50% said it was enough.

In this study, the researchers sought to collect data from cadets on the availability of learning media, valuable equipment, toolkits, and safety equipment in practicum learning. Following the completion of the study, the results indicate a lack of adequate resources available for cadets. These findings align with the conclusions of previous studies conducted by other researchers. To address this problem, a potential solution that has been identified is the use of virtual media for conducting practicums. Virtual media provides a safe and effective means of conducting practicum activities that can be accessed anytime. This approach offers several potential benefits, including increased access to learning materials, improved safety, and enhanced opportunities for collaboration and communication among cadets.

Overall, the results of this study highlight the need for improvements in the availability of learning resources and equipment for cadets in the context of practicum learning. Educators and policymakers should carefully consider the potential benefits of using virtual media as a solution to these challenges to ensure cadets have access to the best possible learning experiences.

4 Conclusion

Based on the research that has been carried out in the airfield lighting practicum activities carried out by students at the Makassar Aviation Polytechnic, it is concluded that from several criteria questions submitted to cadets, the results show that in terms of the adequacy of learning media, valuable equipment can be used following the maximum, the availability of measuring instruments for practicum airfield lighting, the availability of tool kits for airfield lighting practicum, the final result that we can catch is that the subject practicum on airfield lighting is not effective and efficient so it is feared that the ability of cadets to absorb knowledge is not optimal.

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