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Internet of Things Workshop at SMK Darussalam Tarogong Kaler Garut

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Abstrak/Abstract

SMK Darussalam Tarogong Kaler (SMK Darussalam) has a vision of "Forming creative, innovative, noble, responsible, and able to participate in global society". To help realize the vision and mission of SMK Darussalam, the graduates must be competent in accordance with their respective fields of expertise and skills. Currently, the direction of industrial or community needs for technology is in the field of IoT (Internet of Things). The implementation of IoT in Indonesia currently has enough opportunities. The potential of IoT is believed to be very large and is a business in the future. The above conditions are an opportunity for Darussalam Vocational School to have competence in the field of networking and IoT. Opportunities for teachers and students of SMK Darussalam to design systems that are supported by IoT devices.
Kata kunci: Worksship, Internet of Things

1. INTRODUCTION

Pendahuluan menguraikan latar belakang permasalahan yang diselesaikan, isu-isu SMK Darussalam Tarogong Kaler (SMK Darussalam) has a vision of "Forming creative, innovative, noble, responsible, and able to participate in global society". Based on this vision, Vocational High School Darussalam carries out the mission of "Producing qualified and professional experts in their fields" and "Producing graduates who are able to compete in the world of work & the business world". To help realize the vision and mission of SMK Darussalam, the graduates must be competent in accordance with their respective fields of expertise and skills (Kemdikbud, 2020).

SMK Darussalam has 1 (one) expertise program, namely Computer and Network Engineering. The Computer and Network Engineering Expertise Program promises a skill competency for students. These competencies include being able to design computer networks including their implementation, and being able to understand advanced computer network systems and the technologies they support.

Currently, the direction of industrial or community needs for technology is in the field of IoT (Internet of Things). The implementation of IoT in Indonesia currently has enough opportunities. Group Head Regional Accounts Indosat Ooredoo, Fuli Humaeroh said that IoT is an important platform in supporting Indonesia 4.0 (Permana, 2018). The potential of IoT is believed to be very large and is a business in the future. As for the IoT market itself, I Gusti Putu Suryawirawan as Special Staff to the Minister of Industry for Investment and Inter-Agency Relations, explained that he would target the fields of smart cards, digital television, fiber optics, lighting (energy saving), solar panels, and communication technology. He said the government would encourage these sectors to be able to compete in the industrial era 4.0.

The use of Information technology (IT) covers a wide range of fields from communications to energy. Scientific work (Ruiz-Martinez & Esparcia, 2020) uses computer networks for inter-village communication. The use of computer program for efficient data transmission is discussed in (Liu et al., 2021a) (Liu et al., 2021b). Network analysis for communications on the battlefield is discussed in (Hess, 2019). Computer programs can be used to perform weather analysis (Mohandes et al., 2021). The use of computer networks for underwater communication can be seen in (Delphin Raj et al., 2020). Seismic wave modeling using mathematical equations and optimization

algorithms can be seen in (Nuha et al., 2021). In addition, deep learning is used for network traffic estimation (Abbasi et al., 2021) (Chen et al., 2021). From these papers, it can be concluded that IT plays an important role in human life.

The above conditions are an opportunity for Darussalam Vocational School to have competence in the field of advanced computer network systems and the technologies they support. This supported technology is IoT. Opportunities for teachers and students of SMK Darussalam to design systems that are supported by IoT devices. Even when making an IoT product or system, at the same time teachers and students can gain new knowledge.

2. METHOD

2.1 Main Issues

SMK Darussalam needs to provide additional knowledge and skills, especially in the field of networks and microcontrollers through IoT. SMK Darussalam needs to add insight into the development of existing IT products. Students need an introduction to some knowledge that can be applied to IoT, such as creating IoT application programs or security in IoT. In addition, students also really need to strengthen the fundamentals or theory of IoT as a provision of practical skills in the laboratory.

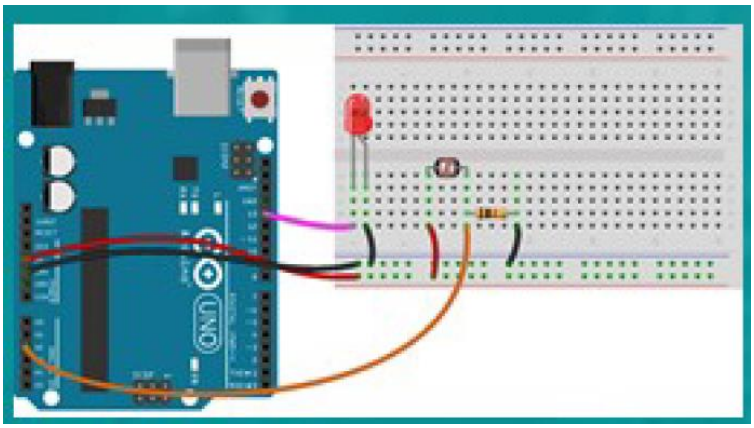

Figure 1. IoT devices

2.2 Proposed Solution

Schools need to develop insight into IoT both from a theoretical and practical perspective. From the theoretical side, students will be given material on the definition of IoT, the application of IoT in various fields, IoT infrastructure, IoT programs/applications, and IoT security. To accommodate theoretical learning needs, IoT training modules are provided. From a practical point of view, a microcontroller is provided for practice and simulation as one of the main IoT devices and mentoring will be provided for the learning process both in theory and practice.

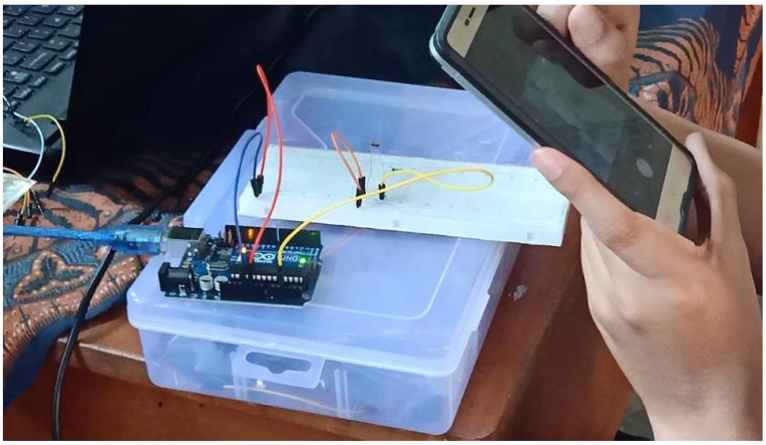

Figure 2. Device realization

2.3 External Target

The outputs of this community service are as follows, namely:

1. Training modules and practical tools. The training module contains material on IoT which includes the theory and basic concepts of IoT as well as the implementation of IoT using a microcontroller device and a WiFi module. The module can be seen in Figures 1 and 2.
2. IoT training activities with lecturers as material providers as shown in Figure 3. The training participants are teachers and students of SMK Darussalam majoring in computer and network engineering. Demonstration activities for IoT products were also carried out, as well as evaluation of training activities (brainstorming and assignments).

(a)

(b)

Figure 3. IoT Workshop by Lecturer

3. Publication of activities on the Telematics KK website so that the publication website can be accessed publicly as shown in Figure 4.
4. Activity videos documenting workshop activities.

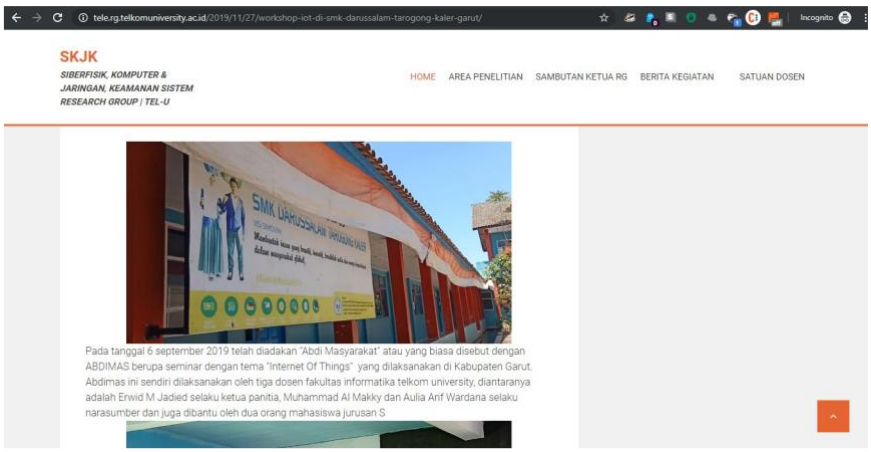

Figure 4. Publication of Activities Through Website

2.4 Implementation Method

The form of this community service activity is training, demonstration, IoT practice at SMK Darussalam. The following are the stages of the activities carried out:

1. Coordination of training materials. At this stage, the community service team will determine the scope and depth of the material and determine the supporting tools used for demonstration and practice.
2. Making training modules from material that has been discussed with partners.
3. Purchase of practice support devices.
4. Testing, simulation and evaluation of modules to ensure that the training modules are appropriate for the level of vocational secondary students.
5. Implementation of training activities at SMK Darussalam.
6. Evaluation of training activities in the form of brainstorming and assignments.

7. Evaluation of community service activities and report generation.

Figure 5. Workshop participants

3. RESULTS AND DISCUSSION

In general, participants felt that the community service carried out was useful and beneficial as shown in Table I. The target community (Figure 5) asked for the community service time to be increased because only a few days was not enough. The target community also requested that there be a follow-up of this community service to a wider level and scope.

Table I. Assessment of Activities

Assessment of Activities	**The number of each factor that matters**				**Assessment of Activities**
	Strongly disagree	**Don't agree**	**Agree**	**Strongly agree**	
1. according to purpose	0	0	11	29	40
2. according to need	0	0	10	30	40
3. time to meet needs	0	5	17	18	40
4. friendly, fast response	0	0	15	25	40
Amount	0	5	73	122	
%	0%	3%	37%	61%	
Total % agree+strongly agree				**97.5%**	

4. CONCLUSION

From the theoretical side, students will be given material on the definition of IoT, IoT implementation, IoT infrastructure, IoT programs or applications, and IoT security. To accommodate theoretical learning needs, IoT training books and modules are provided. From the practical side, a device for practice is provided and a microcontroller as one of the main IoT devices and mentoring of the learning process is carried out both

in theory and practice. The results of the training showed that the trainees felt the benefits with more than 97% of the participants agreeing or strongly agreeing with the positive impact of the training.

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