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Data Visualization Training Using Microsoft Excel for Students of SMP Al-Fajar

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A B S T R A C T

Improvement of the advanced digital era, the ability to understand, process and visualize data has become an important skill needed by the younger generation, especially students. Apart from that, students are agents of change, driving forces for the environment, one of which is the village environment, namely Ciheulang village, in making changes to be better and more technologically literate. The role of students through Community Service (PKM) can create innovation / help the needs of the target community to be more advanced and developed. This activity aims to empower and train students' skills in utilizing technology through Microsoft Excel. The evaluation obtained provides responsive and positive feedback. Based on the evaluation provided, 54.11% of respondents felt satisfied with this training activity.

INTRODUCTION

A. Situation Analysis

The rapid development of digital technology has become deeply integrated into everyday life. Therefore, digital literacy is essential for all members of Indonesian society [1]. Digital literacy should be introduced as early as possible, starting from basic education through higher education. In this way, the benefits of information technology can be enjoyed by all levels of society. However, disparities in the ability to use information technology still exist in Indonesia [2]. Although internet infrastructure has been widely deployed across the country, efforts are still needed to ensure that these facilities are used to support positive and productive activities.

Community service is an institutional activity that applies science and technology (IPTEK) for the benefit of society. It represents one of the pillars of the Tri Dharma Perguruan Tinggi (the Three Pillars of Higher Education), aimed at developing community capacity and accelerating national development. The Tri Dharma consists of education and teaching, research, and community service [3].

Rapid technological progress also influences students' learning patterns and comprehension. The growth of digital-based education encourages students to become more aware of the importance of digital literacy. In line with the educational pillar of the Tri Dharma, the implementation team developed a solution in the form of data visualization training using Microsoft Excel for the academic community. Data visualization helps audiences better understand information and identify patterns that may otherwise be difficult to recognize [4].

Therefore, data visualization training using Microsoft Excel serves as a strategic effort to empower and broaden the perspectives of junior high school students, particularly in Ciheulang Village. This activity is also intended to increase students' awareness of digital literacy. Through this community service program, it is expected that a positive contribution can be made toward educational empowerment.

B. Problem Formulation

Based on the situation analysis, the partner's identified problems are as follows:

1. The partner requires new insights into the effective use of science and technology.

2. The partner expects interactive and engaging methods of outreach and training.

C. Proposed Solution and Expected Outcomes

Based on the problems described above, the proposed solutions are as follows:

1. Training and hands-on practice in data visualization using Microsoft Excel to enable participants to represent data clearly and attractively.
2. Mentoring support through learning modules that guide participants in performing data visualization in Microsoft Excel.

Accordingly, the expected outcomes of this community service activity are:

1. Training and practical experience in data visualization resulting in improved practical skills.
2. A learning module for data visualization using Microsoft Excel.
3. A report documenting the implementation of the Microsoft Excel data visualization training.

PROFILE OF THE PARTNER OR TARGET COMMUNITY

The target partner in this Community Service Program (PKM) is the students of SMP Al Fajar, located in Ciheulang Village. SMP Al Fajar is a junior high school institution serving the local community, where most students come from nearby areas and generally have modest family backgrounds.

The partner was selected based on their need to improve understanding and skills in the use of technology, particularly in processing and visualizing data using Microsoft Excel. These skills are important to support the learning process and to equip students with fundamental competencies relevant to the digital era. Mastery of Microsoft Excel enables users to utilize its features to simplify data analysis processes [5].

Ciheulang Village itself is a developing area with strong potential in the fields of education and technology. However, the level of technology utilization among the community, including students, remains relatively low. Therefore, this community service initiative is expected to have a positive impact by empowering students through technology, preparing them as young agents of change within their community.

IMPLEMENTATION OF ACTIVITIES

To achieve the objectives of this community service program, the activities were carried out through several stages:

1. Preparation Stage

In this stage, a field survey was conducted in Ciheulang Village, specifically at SMP Al Fajar, including discussions with the school principal. The survey aimed to identify and analyze the needs of the students. Based on the survey results, training modules and materials were prepared for the students. The module content included an introduction to data and data visualization, explanations of several types of plots such as bar charts, histograms, line charts, pie charts, and scatter plots, as

well as step-by-step guidance on creating these visualizations using Microsoft Excel.

2. Implementation Stage

This stage represented the core of the program and was conducted over four sessions. During implementation, a limitation in the availability of school computers was encountered. To address this issue and ensure an optimal learning experience, laptops were provided on loan to students as substitutes for unavailable computers. This arrangement allowed students to fully participate in the sessions and gain hands-on practical experience.



Figure 1. Data Visualization Practice

Each session was designed to help students understand the material progressively. In the first session, the team delivered the theoretical material and explained the contents of the training module to the students. In the second session, a simple demonstration was conducted on how to create data visualizations using Microsoft Excel. During the third session, students were divided into small groups of 3–4 members to practice the demonstrated techniques. In the final session, students were given exercises based on the presented material. Those who answered correctly received small rewards from the implementation team. This approach was intended to increase interactivity and student enthusiasm, encouraging active participation throughout the activity.

The following figure shows one example of the exercises provided to the students.



Figure 2. Exercise Given to Students

SURVEY AND FEEDBACK FROM THE PARTNER OR TARGET COMMUNITY

After the implementation of the activity, a survey was conducted to evaluate its effectiveness and collect data related to the execution of the program. The survey covered aspects such as the quality of the delivered material and the implementation process. The detailed results of the survey are presented in the following explanation.

A. Statistical Feedback

In the survey form that we distributed, several questions were included in evaluating the outcomes of the training activities. A total of 17 respondents participated in the feedback survey, with the following results:

1. Participants are satisfied with the training material



Figure 3. Feedback Statistic – 1

2. Participants satisfaction with the activity schedule and duration



Figure 4. Feedback Statistic - 2

3. Participants satisfaction with the clarity of the material



Figure 5. Feedback Statistic - 3

4. Participants satisfaction with the organizers' services



Figure 6. Feedback Statistic - 4

5. Participants interest in the training program



Figure 7. Feedback Statistic – 5

B. Survey Analytics

Based on the survey results, both the training material and the implementation of the Data Visualization Training received positive evaluations, with satisfaction levels exceeding 75%. This indicates that the activity was well understood and effectively absorbed by the participating students. Furthermore, regarding interest in the topic, 100% of the students expressed enthusiasm for learning data visualization using Microsoft Excel. This strong interest may be attributed to their realization that visual representations of data make it easier to understand its meaning.

The students also expressed their hope that similar training programs could be conducted again in the future. Overall, the outreach and training activities received a positive response from both students and teachers at SMP Al Fajar, particularly from the eighth-grade students.

CONSLUSION

The implementation of the activity successfully provided an optimal learning experience for the students despite challenges related to the limited availability of computers at the school. By lending laptops to students as a practical solution, all sessions were able to proceed according to plan. The program was structured in stages, beginning with material presentation, followed by demonstrations, group practice, and evaluation exercises. This approach not only ensured students' understanding of the material but also increased interactivity and enthusiasm, supported using small rewards as incentives.

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