IMPROVING THE ABILITY OF SMKN 1 BUKITTINGGI STUDENTS MAJORING IN GEOMATICS ENGINEERING TO USETHE GLOBAL NAVIGATION SATELLITE SYSTEM (GNSS)

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ABSTRACT: This research aims to improve the skills of GNSS usage by students in Geomatics EngineeringDepartment of SMKN 1 Bukittinggi. Training on the use of GNSS will be conducted using the latest GNSS device owned by the school. The students will be taught about the operation and programming of GNSS devices, as well as methods of analyzing the data generated. After the training, the students will be evaluated through tests and field projects. The results show that most students initially have a limited understanding of GNSS and difficulty in using GNSS devices. The improvement of this ability has positive implications for the preparation of students in facing the increasingly complex demands of the job market. The ability to use GNSS is becoming more important in various fields such as construction, mapping, surveying, precision agriculture, and environmental monitoring. Students who have been well trained in the use of GNSS will have a competitive advantage in seeking employment or pursuing further education.

Keywords: GNSS, SMKN 1 Bukittinggi, training

1. INTRODUCTION

School is a place that functions to manage and achieve student education and learning in order to achieve the desired benefits and is a good place to improve students' intelligence and attitudes and skills in dealing with everyday life problems [1-3]. Vocational High Schools (SMK) aim to produce students who are ready to face the world of work as tough and competitive professionals, but do not rule out the possibility that student skills can continue at a higher level.

Vocational high schools play an important role for the government in developing quality human resources. In vocational high schools (SMK), students choose courses based on the potential and skills that people master [4-7]. SMK is the first place for students torecognize basic concepts in broader practical science. The curriculum in SMK must refer to the National Work Competency Standards (SKKNI). Among the existing majors, there is a geomatics engineering major that requires competence to use the Global Navigation Satellite System (GNSS). Global Navigation Satellite System (GNSS) has become an essential technology in many fields, including geodesy and mapping. The utilization of GNSS has a vital role in determining the coordinates and position of a point on the earth'ssurface, and can be used in a variety of contexts such as mapping surveys, navigation, and monitoring landform changes. Therefore, the ability to utilize GNSS is very important forstudents who major in Geomatics Engineering. [8-9] notes that Vocational High School students have great potential in developing knowledge and technology. Along with the increasing need for measurement technology in determining increasingly crucial positions, it is only natural that Vocational High School students need to understand, know, and learn the various technological applications of measurement and mapping tools. This will encourage them to develop their knowledge and skills beyond the scope of their school learning.

The application of GNSS is not simple and requires specialized skills. Currently, there are still many students in the Geomatics Engineering Department at the assisted vocational schools who face difficulties in using GNSS effectively. To overcome this situation, an effective and efficient learning program is needed. The

AssistedVocational School referred to here is the Assisted Vocational School of the Remote Sensing Technology Study Program, namely SMKN 1 Bukittinggi.

This research aims to improve the skills of GNSS usage by students in the Geomatics Engineering Department of SMKN 1 Bukittinggi. As stated by Fadly in LP2M Unila Proceedings (2018), Vocational High School students, especially those majoring in surveying and mapping/geomatics, are prospective mapping operators or surveyors.

It is hoped that the results of this study can provide solutions and suggestionsto teachers and students in the Geomatics Engineering Department of Assisted Vocational Schools in West Sumatra to improve students' ability to use GNSS. Training on the use of GNSS will be conducted using the latest GNSS device owned by the school. The students will be taught about the operation and programming of the GNSS device, as well as methods of analyzing the resulting data. After the training, the students will be evaluated through tests and field projects.

2. METHOD

The implementation method of Improving the Ability of Vocational Students Assisted by the Geomatics Engineering Department of West Sumatra in Using GNSS can be done with the following steps:

1) Identification of training needs includes the following activities: a. conduct a training needssurvey of students' ability to use GNSS at SMKN 1 Bukittinggi. b. identify competencies that must be possessed by students of SMKN 1 Bukittinggi majoring in geomatics engineering in using GNSS. c. determine the duration and schedule of training in accordance with student needs.
2) Preparation of a training module that covers thetheory and practice of GNSS usage.
3) Preparation of facilities and infrastructure includes: a. preparing GNSS equipment needed for training. b. preparing instructors who have competence and experience in using GNSS.
4) Implementation of training activities carried out include: a. conducting initial orientation and opening of training. b. students will be given theoretical and practical material on the use of GNSS. c. students will make a report on the results of GNSS measurements that have been carried out and present the results.

5) Evaluation of training results to determine the success of students in using GNSS by conducting pretests and posttests.

3. RESULTS AND DISCUSSION

This training was held for 2 days on July 24- 25, 2023. This activity was carried out by 3 lecturers, 2 instructors, 5 teachers and 54 students of SMKN 1 Bukittinggi Geomatics EngineeringDepartment class XI. The following is the implementation of the activities carried out:

a. Identification of training needs
Based on the results of observations made that teachers have difficulty in implementing GNSS because facilities and infrastructure are not yet available. Limited information update in the use of GNSS is also a limitation in implementing GNSS. Students also do not have prior knowledge about GNSS.

b. After discussion with the school. The team prepared the equipment needed for the training activities, namely GNSS. Coordinate with the training instructor, organize the technical activities that will be carried out.

c. The implementation of this community service activity was carried out with 2 schemes. The first day was the presentation of GNSS basics, the introduction of GNSS tools and how GNSS works. The second day was a practicum, namely measuring the shape, area, angle of the field in the school environment. This is done so that students can clearly know the accuracy of the area needed. The use of GNSS is needed to support the competence of vocational students in the implementation of some teaching materials. Students are also assisted in entering coordinate points from GNSS into Google Earth with the right accuracy.

The results of the activity showed thatmost students initially had a limited understanding of GNSS and difficulties in using GNSS devices. At the beginning of the study, only a small percentage of students were able to use GNSS correctly, while most students felt awkward and confused inoperating the device.

However, after the implementation of a more interactive and practical learning method, there was a significant

improvement in students' ability to use GNSS. Students began to understand the basic concepts of GNSS better, including how this system works and its benefits in mapping and surveying. They also became more skilled in operating GNSS devices, including initial setup and calibration, as well as processing the data generated by the devices.

In addition, there was an increase in students' data analysis skills. This is in line with Kurniawan (2021) The implementation of education in SMK also provides opportunities for students to develop and improve critical thinking skills. They can better interpret data generated by GNSS, identify potential errors, and take corrective action if needed. These are important skills in jobs that involve the use of NSS, such as land surveying, road mapping, and environmental change monitoring.

The improvement of students' proficiency in the use of GNSS after the implementation of effective learning methods shows that this approach is successful. The results of this study are consistent with previous findings showing that learning that is interactive, practical, and relevant to students' needs tends to produce better results in improving technical skills. This increased capability has positive implications for students' preparation for the increasingly complex demands of the job market. The ability to use GNSS is becoming more important in various fields such as construction, mapping, surveying, precision agriculture, and environmental monitoring. Students who have been well trained in the use of GNSS will have a competitive advantage in seeking employment or pursuing further education.

In addition, this effective learning method can also be adopted by other educational institutions that have similar programs. By providing students with opportunities to learn through practical experience and interact with GNSS technology.

d. Delivery of module for GNSS practicum guide to the school. The existence of this module is expected to provide an understanding and implementation of GNSS.

e. Evaluation of training results to determine the success of students in using GNSS by conducting pretest and posttest. Based on research from Dimiter, 2003 pretest-posttest designs are widely used in behavioral research, especially for the purpose of comparing groups and/or measuring changes resulting from experimental treatments. The average score for the prestest was 47 while for the posttest was 65.

This training is very important considering the current needs in the civil construction field, land measurements in addition to using terrestrial measuring instruments have also increasingly used global positioning system (GPS) based measuring instruments (Kaifan, 2023). The results of the pretest and posttest showed an increase in students' abilities. The increase in posteest results is indicated by an increase of 18% from the average score obtained by students.
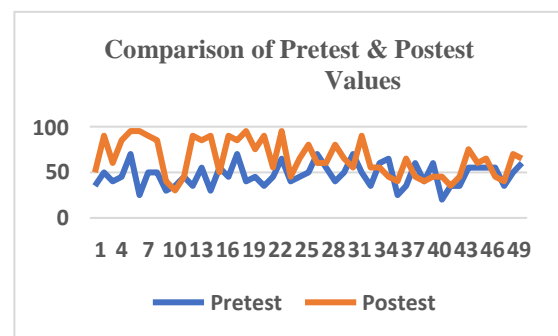

Fig 1. Comparison of Pretest & Postest Values

4. CONCLUSION

The improvement of students of SMKN 1 Bukittinggi majoring in Geomatics Engineering in the use of Global Navigation Satellite System (GNSS) can be achieved through appropriate learning program design, good implementation, and periodic evaluation. The results of this study show that students experienced significant improvements in knowledge, skills, and confidence in using GNSS, which will give them an edge in the world of work in geomatics. This kind of learning program should be continuously improved and adapted to the continuous development of GNSS technology. Peningkatan Pengetahuan Dasar GNSS: Program pembelajaran berhasil meningkatkan pemahaman siswa tentang dasar-dasar GNSS, seperti konsep triangulasi, satelit GNSS, dan prinsip kerja GNSS. Hal ini didukung oleh penggunaan materi ajar yang terstruktur dan simulasi lapangan.

1) GNSS Device Usage Skills: Students experienced significant improvement in GNSS device usage skills. They became more skillful in operating the GNSS device, understanding the measurement protocol, and

addressing technical issues that may arise.

2) GNSS Applications in Mapping and Navigation: Students are able to apply the concepts and skills they learned in practical situations. They can use GNSS for land mapping, movement monitoring, and navigation with higher accuracy.

3) Motivation and Confidence: During the learning program, students also experienced increased motivation and confidence in using GNSS technology. They feel more confident infacing tasks involving GNSS.

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