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Use of geoel ectric practicum module for physics education students

Use of geoelectric practicum module for physics education students

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Abstract. The purpose this research development geoelectric module in supporting material of Earth and Space Science lectu Method this research used Research and Development. The design research that includes analysis, design, development, imple ntation, and evaluation. The subject of this study where student of physics education on Program Studi Pendidikan Fisika, UIN Sunan Gunung Djati. Feasibility of geoelectric module on expert search result and field practitioner. The result show that the geoelectric module meet the standard of the feasibility aspect of the teaching concept.

1. Introduction

Selection of learning methods in accordance with the conditions of students is needed by a lecturer for learning to run effectively and smoothly. One method of learning that is widely developed is the practicum method.

The practicum method is a way of delivering the subject matter by giving students the opportunity to practice skills as an application of the knowledge they have learned before. According to Hegarty-Hazel as quoted Lazarowitz & Tamir, practicum is a form of practical work that resides in an environment tailored to the goal that students participate in a planned learning experience and interact with equipment to observe and understand the phenomena [1]. This practicum method is also called laboratory method. With laboratory method, lecturer can use various objects in helping the practitioner to experiment. In general, the practicum can be interpreted as part of a scheduled and structured course, where the student will have real experience to improve understanding of a theory and understand certain skills related to a knowledge or a subject and be done inside or outside laboratory.

According to Suparno, practicum activities can be distinguished into guided / planned practice and free practicum [2]. Practical activities are guided by experimenting and finding, the whole process has been designed by teachers / lecturer. In addition, more students are required to think independently, how to assemble and tool. The success of practicum activity is supported by several factors, one of them is by the practice manual that is practicum module.

Modules are part of teaching materials that are packed intact and systematic, in which there is a set of planned learning experience designed to assist students in mastering specific learning objectives [3]. According to H. Furqan, modules are urgently needed in practicum activities, as well as guides can also be designed to direct students able to work with scientific measures [4]. The practicum used in this study is a geoelectric practicum that supports one of the materials in the Earth and Space Sciences

lecture. Geoelectric is one of the geophysical methods by applying the concept of electricity to the earth problem. Geoelectric measurements aim to obtain an overview of subsoil and the presence of ground and mineral water at some depth [5].

Based on the above explanation, it is necessary to study the feasibility of geoelectric practicum module to be used as a practical guide for Physics Education students who take the subject of Earth and Space Sciences.

2. Methods

The method used in this research is Research and Development (R & D) which aims to produce a product in the form of module [4]. According Sugiyono, this method can be used to develop or validate the products used in education and learning [6].

This was a Research and Development (R&D) study following the instructional system design with Analysis Design Development Implementation Evaluation (ADDIE) model to determine the feasibility of the geoelectric practice module [7].

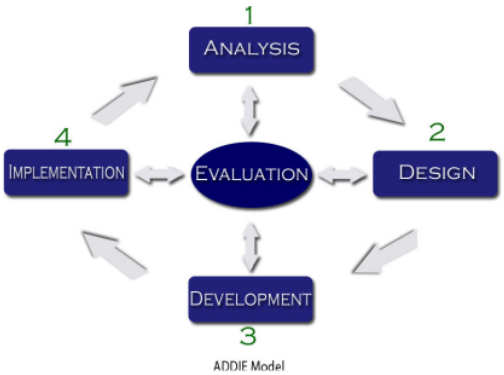

Figure 1: ADDIE model- adopted from Spark Wikis [8].

Analysis is viewed from the necessity of knowledge about the environment, especially about the earth that is realized with field practicum activities. The design is reviewed from the manufacture of geoelectric practice modules. Development by creating a module with drawings that support a theory with an attachment on specific software work steps related to practicum activities. Implementation by creating a validation questionnaire to determine the feasibility of the module. And the last research is measured through the evaluation of formative evaluation in the form of questionnaire.

3. Result and Discussion

This practicum module contains the basic theory of geoelectric including formulas for geometry factors and electrode configurations used when taking data to the field. In addition, there are procedures for using and taking field data. Finally, there is an assignment for the practitioners. The instruments of this research are validation questionnaires by expert of learning media, expert of learning material and field practitioner used to determine the feasibility of the geoelectric practicum module.

MODUL
GEOLISTRIK

Oleh

Rana Danya A.
Haekal Putra
Cece Solihin

UNIVERSITAS ISLAM NEGERI SUNAN GUNUNG DJATI
BANDUNG
2018

Modul Fisika Bumi
PENGUKURAN DAN ANALISIS GEOLISTRIK

1 TUJUAN

1. Memahami prinsip dasar geolistrik tahanan jenis konfigurasi Wenner & Schlumberger
2. Mengetahui sebaran nilai resistivitas batuan dan lapisan tanah pada lokasi penelitian
3. Mengetahui struktur bawah permukaan tanah lokasi penelitian.

2 TEORI DASAR

Metoda geolistrik tahanan jenis (Resistivity) merupakan salah satu metode geolistrik yang sering digunakan dalam survei geofisika untuk eksplorasi yang relatif dangkal (30-150 m), diantaranya digunakan dalam eksplorasi sumber mata air, identifikasi kondisan struktur bawah permukaan dan juga dapat digunakan sebagai pendukung eksplorasi bahan-bahan tambang. Dalam aplikasi eksplorasi, metode geolistrik (Resistivity) dapat memberikan informasi yang tidak mungkin diberikan oleh metode lain (Adhi, 2007).

Prinsip pelaksanaan survei geolistrik resistivitas adalah mengalirkan arus listrik searah ke dalam bumi melalui dua elektroda arus yang ditancapkan pada dua titik permukaan tanah dan kemudian mengukur respon beda potensial yang terjadi antara dua titik yang lain dipermukaan bumi dimana dua elektroda potensial ditempatkan dalam suatu susunan (konfigurasi) elektroda tertentu. Dari data pengukuran yang didapat yakni beda potensial, kuat arus, dan faktor geometri masing-masing lintasan maka akan diperoleh harga-harga resistivitas semua untuk setiap spasi elektroda yang ditentang (Syamsuddin, 2006).

Dalam perdugaan nilai resistivitas suatu lapisan/batuan, digunakan asumsi-asumsi sebagai berikut:

- Pada bawah permukaan bumi terdiri dari lapisan-lapisan dengan ketebalan tertentu, kecuali pada lapisan terbawah yang mempunyai ketebalan tidak berhingga.
- Bidang batas antar lapisan adalah horizontal.
- Setiap lapisan dianggap homogen isotropis.

Pada pengukuran geolistrik tahanan jenis (resistivitas), biasanya digunakan dua buah elektroda arus C di permukaan. Besarnya potensial pada titik P dipermukaan akan dipengaruhi oleh kedua elektroda tersebut, sehingga pola penjalaran arus yang diinjeksikan serta tegangan yang dihasilkan dari perambatan melewati beberapa lapisan/batuan di bawah permukaan tanah dapat diilustrasikan seperti berikut (**Gambar 1**).

Figure 2. Part of egeoelectric practicum module.

The results of questionnaire data analysis by expert of learning media, expert of learning material and field practitioners are presented in the below picture. Assessment by expert of learning media consists of format, outline and cover module. Assessment by expert of learning material consists of feasibility of language, presentation and content of module. And the last, assessment by field practitioner consists of view, presentation and benefit of using module.

3.1 The Results of Analysis on Questionnaire Module by Expert of Learning Media

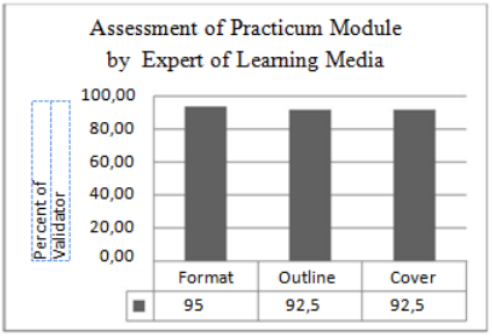

Figure 3. The results of analysis on questionnaire module by expert of learning media.

Based on the above picture above obtained the assessment module by expert of learning media divided into three parts, namely the assessment of the format, outline and cover. The average score given by the media expert on these three sections is over 80%. According Sugiyono the total score of percentage validator perception percentage of more than 80% are in very good criteria. So this module can be used for testing [9].

3.2 The Results of Analysis on Questionnaire Module by Expert of Learning Material

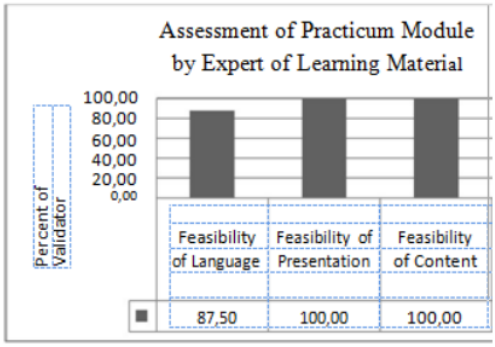

Figure 4. The results of analysis on questionnaire module by expert of learning material.

The validation sheet provided to the expert of learning material includes an assessment to the feasibility of language, feasibility of presentation and feasibility of content. Based on the above picture, the average score given by the material expert on these aspects is in very good criteria. According to Setiawati modules that scored with very good criteria can be used for testing [10].

3.3 The Results of Analysis on Questionnaire Module by Field Practitioner

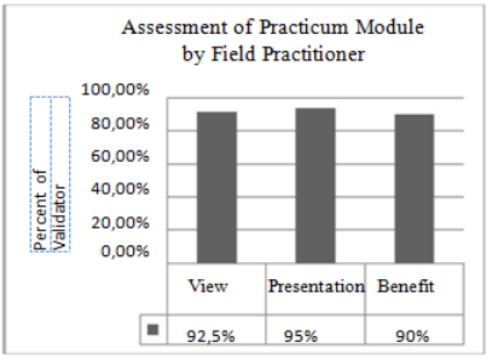

Figure 5. The results of analysis on questionnaire module by field practitioner.

Based on the above picture, the field practitioner's evaluation of the module is divided into three parts. The first assessment is on the module view, the average score obtained is 92.5% and includes very good criteria. The average score gained for material presentation is 95% and includes very good criteria. For an assessment of module benefits, the average score earned is 90% and includes very good criteria. So it can be concluded that the module can be used for test usage.

4. Conclusion

The student capability of management laboratory is affected by readiness to become a professional pre-service physics teacher. Based on the result of this study the student capabilities of management laboratory do not have signification differences and still low in each group subjects. Generally, the lecture programed of management laboratory must be improved to increase the levels of capabilities by the students.

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