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Jobsheet Validity of Analog and Digital Electronics Practicum Based on Proteus 8 Professional Software

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ABSTRACT

This study aims to determine the validity level of analog and digital electronics practicum jobsheets based on proteus software. This research is a type of research and development or R&D using the 4-D development model. The 4-D development model has four main stages including define, design, develop, and disperse. However, basically this is limited only to the develop stage. The instrument used in this research is a validity questionnaire. The validity test was carried out by expert lecturers and lecturers in analog and digital electronics courses. Then, the primary data of validity results were analyzed using a Likert scale. Based on the research, the validity test results were obtained by 90% and included in the very valid category.

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Keywords: Validitas, Jobsheet, praktikum elektronika analog dan digital, proteus 8 professional, 4-D models

1. INTRODUCTION

Learning outcomes are benchmarks that are easily controlled to determine the success of a lesson [1]. Learning outcomes are influenced by several factors including internal, external, and instrumental [2]. Instrumental factors that affect learning outcomes include curriculum, program structure, facilities and infrastructure, learning media, and the role of the teacher [3]. Teaching materials used in learning are in the form of information sheets, handout worksheets, operating sheets, jobsheets, and modules [4]. Print media used in learning can be in the form of jobsheets or guides [5]. The jobsheet contains directions or work steps related to learning [6].

Based on the results of observations on lecturers supporting analog and digital electronics practicum courses and students, it can be seen that there are several obstacles in the learning process including (1) Insufficient practical tools for each student which causes practicums to be carried out in groups; (2) the length of time needed by students to make circuits so that many of the students cannot try to make circuits by themselves; (3) The existence of a Padang State University Chancellor's Circular Number 6307/UN35/AK/2020 concerning campus activities in January-June 2021 as part of the Covid-19 precautions [7], where learning activities will be carried out online using e-learning.

With this notification letter and in line with other problems, there are several obstacles experienced by lecturers in preparing material because the existing jobsheets are still manual which requires students to do face-to-face practicum on campus.

Based on the description above, the authors innovated to conduct research "Proteus 8 Professional Software-Based Jobsheet Development in Analog and Digital Electronics Practicum Courses". So, the purpose of this research is to make a Jobsheet based on Proteus 8 Professional Software for Analog and Digital Electronics practicum courses that are valid, practical and effective using an educational system for analog and digital electronics courses at the Department of Electrical Engineering, Padang State University.

2. LITERATURE REVIEW

Proteus 8 Professional software is a series of electronic software that assists designers in developing and simulating electronic circuits [8]. This software has 2 uses, the first is called ISIS (Intelligent Schematic Input System), namely as software for schematic drawing programs and can be simulated, while the second is called ARES, which is useful for designing printed circuit board (PCB) drawings. ISIS (Intelligent Schematic Input System) is designed as a tool to describe or design schematic electronic circuits according to international standards. Proteus 8 Professional software is suitable for circuit simulation later [9].

Proteus 8 Professional software offers a more complete selection of components starting from passive components, types of switches/relays, transistors, types of buttons/buttons, programmable ICs (microcontrollers), SCRs, amplifier ICs, FETs, digital ICs, and memory ICs [10]. Then the Poteus 8 Professional software is equipped with complete measuring tools such as an oscilloscope, voltmeter, ammeter, frequency generator and signal analyzer [11]. The completeness of the features offered makes the ISIS Proteus 8 Professional software one of the best electronic simulation software [12].

3. EXPERIMENTAL

This type of research is research and development or R&D with a 4-D development model. The 4-D development model has four main stages including the define, design, develop and disseminate stages. This study aims to determine the validity level of analog and digital electronics practicum jobsheets based on proteus 8 software. Jobsheet validation was carried out to measure the validity level of analog and digital electronics jobsheets developed [13]. The data collection instrument uses primary data obtained directly from the validator. The validator consists of two electrical engineering lecturers. Validity test results were analyzed using the Linkert scale with ditactic requirements, construction requirements, technical requirements and language requirements [14].

1) Data validity analysis technique using a Likert scale-based validation questionnaire was carried out in the following stages.

2) Each is assessed with a Likert scale of 1-5, the higher the score in that category, the better the variable indicators in the validity questionnaire [15].

3) Add up each validator's score for all validators.

4) Next, the value of validity is given using the formula below.

$$NA = \frac{X}{Y} \times 100\% \ (1)$$

Description:

NA = Total point

X = Number of score

Y = Maximum score

The level of achievement can be sorted based on the validity category based on the results of the obtained validity score. [16].

Tabel 1. Validity Level

No	Achievement Level (%)	Category
1	81 - 100	Very Valid
2	61 – 80	Valid
3	41 - 60	Enough Valid
4	21 - 40	Less Valid
5	0 - 20	Not Valid

4. RESULTS AND DISCUSSION

The results of the study are in the form of worksheets based on Proteus 8 software for valid Analog and Digital Electronics practicum courses. Data validity test results can be seen in Table 2 below.

Tabel. 2 Validity Test Analysis

	Indicator	Validator 1	Validator 2	Rata-rata
1	1	5	5	5
	2	4	5	4,5
	3	5	5	5
	4	5	5	5
	5	4	5	4,5
	6	5	5	5
	7	5	5	5

2	8	5	5	5
	9	5	5	5
	10	5	5	5
3	11	3	5	4
	12	3	5	4
	13	3	5	4
	14	3	5	4
	15	3	5	4
	16	5	5	5
4	17	4	5	4,5
	18	4	5	4,5
	19	5	5	5
Score Acquisition		81	95	88
Maximum Score		95	95	95
Validity Point		0,8526	1	0,9263
Achievement Level		85,26	100	92,63
Category		Very Valid	Very Valid	Very Valid

Based on the table above, the validation value of validator 1 is 85.26% with a very valid category and validator 2 is 100% with a very valid category. So that the average validation result is 92.63% which is included in the very valid category. After the jobsheet validation results have been obtained, the jobsheet is corrected according to the suggestions the validator gave. The details of the validator's assessment of each aspect can be seen in table 3 below.

Tabel 3. Analysis of Validity Test Results

NO	Validation Points	Criteria Value	Criteria Value
1	Didactic Terms	85%	Very Valid
2	Construction Terms	100%	Very Valid
3	Technical Requirements	83%	Very Valid
4	Language Requirements	93%	Very Valid
Average		90%	Very Valid

Based on the table above, a validation value of 90% is obtained with very valid criteria.

5. CONCLUSION

Based on the results of the study it can be concluded that the Jobsheet for Analog and Digital electronics practicum based on the Proteus 8 software developed has a validity level of 90% and is included in the very valid category..

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