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DEVELOPMENT OF PROJECT-BASED LEARNING TEACHING MATERIALS OF THE RESEARCH RESULTS STUDY COURSE TO IMPROVE STUDENTS' ABILITIES IN COMPILING SCIENTIFIC WORKS

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ABSTRACT

This research is aimed at developing project-based learning teaching materials in research results study courses to improve students' abilities in compiling scientific work. This research is developmental research using a modified Research and Development (R & D) model. This research is limited to the preliminary study stage, which includes literature study, field survey, initial product preparation followed by validation of product by experts (expert judgment) and product revision. The teaching materials developed consist of the lesson plan, student activity sheets, and assessment of project product. The research data were analyzed descriptively quantitatively. The research results showed that the teaching materials developed, namely the lesson plan, student activity sheets, and assessment of project product were categorized as very valid, with an average validity score of 3.80, 3.81 and 3.66, respectively. Thus, these teaching materials can be implemented in learning research results study courses to improve students' abilities in compiling scientific work.

Keywords: *teaching materials, research results study course, scientific works.*

INTRODUCTION

The 21st century is a century that began with economic globalization which hit all countries in the world, taking place so rapidly, simultaneously and pervasively. According to Gates and Hemingway, the new millennium is marked by a new era called the era of velocity or the era of smart technology, where information, decisions and actions will take place at the speed of thought (Arryanto, 2004). Globalization and free trade, such as AFTA, AFLA, and APEC, have encouraged the formation of free trade and tight competition in goods and services. The strength, resilience and national competitiveness of a nation or country are no longer determined by the wealth of its natural resources, but are more determined by the ability, creativity and skills of its human resources. Therefore, education must be able to play a role in improving the quality and relevance of graduates to face global challenges in the industrial era 4.0. (Yahya, 2018).

The very rapid development of science and technology has greatly influenced the pattern of society's demands on the education system, especially in Higher Education Institutions. The existence of this system is increasingly being challenged to be able to adapt to developments and changes in society's needs, both on a national and global scale. Efforts to improve the quality, quantity and relevance of education continue to be carried out although until now the results have not been fully realized. In order to improve the quality of education, various innovations have been carried out both in the aspects of learning methods, learning models or approaches, and curriculum. Globalization which has hit all nations in the world today makes demands for improving the quality and perfection of the education system increasingly unavoidable (Tilaar, 1999).

Based on Indonesian Government Regulation no. 37 of 2022, State University of Surabaya was designated by the government as a Legal Entity State University (LESU) starting from 20 October 2022 (Peraturan Pemerintah RI, 2022). As a LESU, State University of Surabaya is obliged to develop an internationalization program. This program also supports the achievement of the 8th main performance indicator for higher education which has been determined by the Directorate General of Education and Culture of the Ministry of Education and Culture, namely the International Standard Study Program (Dirjendikti Kemendikbud, 2019).

The Doctoral Program of Science Education (DPSE) is one of 7 doctoral programs at State University of Surabaya, which was founded on 15 September 2010. This study program has been accredited by BAN-PT with a very good level based on Decree No. 10630/SK/BAN-PT/Akred/D/IX/2021. Since its founding in 2010, the DPSE has received a good response from the community. Most of the alumni of the DPSE work as lecturers, both in state and private universities, and others as lecturers at Education and Training Centers, as well as teachers in schools. Many alumni have gained trust from

the institutions where they work, for example as rector, vice rector, dean, vice dean, heads of study programs, heads of institutions/schools, heads of quality assurance institutions, and so on (Suyatno, *et al*., 2023).

In order to support Unesa's internationalization program, the Science Education Doctoral Study Program has applied for ASIIN international accreditation and on 22 March 2024, the DPSE received international accreditation from ASIIN. International accreditation is very important because it can have a positive impact on the academic community because if a university already has international accreditation, then the university will definitely get a plus score from BAN-PT (Yusra, 2023). The benefits of international accreditation are gaining higher education recognition, foreign lecturers can teach at universities, the quality of higher education can be further improved, and recognized by the Ministry of Education and Culture (Kepmendikbud, 2020). The DPSE is also preparing to accept foreign students. Thus, all courses in the DPSE must be prepared in English.

Therefore, this research is very important to carry out in an effort to produce teaching materials for one of the subjects in the DPSE, namely the Study of Research Results, which has been reviewed and validated by experts. The Research Results Study course is a priority because it is a course given in the first semester and provides a very important basis for students to immediately discover the novelty of their dissertation research plans and train students' abilities in compiling scientific work. The teaching materials that will be developed include lesson plan, student activity sheets, assessment of project product. The problem that will be resolved through this research is what is the validity of the teaching materials for the Research Results Study course which were developed based on the results of expert judgment.

METHODS

This type of research is development research using a modified Research and Development (R & D) development model (Sukmadinata, 2019). There are 3 stages in R & D research, namely the preliminary study stage, model development and model testing stage. This research is limited to the preliminary study stage, which includes literature study, field survey, initial product preparation followed by product validation by experts (expert judgment) and product revision of teaching materials that have been developed. The teaching materials developed include lesson plan (LP), student activity sheets (SAS), assessment of project product (APP) (Tim, 2024; Tim DTPTP, 2024; Prastawa, 2021; Arikunto, 2021)

Research activities are carried out in the following stages: (1). The research team prepares a research schedule starting from the preparation stage to the research results reporting stage. (2).The research team developed teaching materials in the form of lesson plan, student activity sheets,

assessment of project product.. All teaching materials are prepared in two languages, namely Indonesian and English. (3). The Research team carried out validation of the teaching materials that had been developed, followed by FGD activities to discuss the validation results. (4). The research team revised the input for improvements submitted by the validator. (5). The research team prepares the final manuscript of the teaching materials for the Study of Research Results course and proposes copyright. In addition, the research team prepared articles to be published in international conference.

The data collection technique used in this research is a validation technique (expert judgment). This technique is used to determine the validity of the teaching materials that have been developed for the Research Results Study course. The data analysis technique used in this research is an analysis of the validity of teaching materials for the Study of Research Results course. All data was obtained using a validation sheet which had been assessed by 3 experts (validators). The validation score given by the validator is categorized using a Likert scale. The validation data were analyzed using quantitative descriptive analysis by calculating the average value given by the validator (P). The scores are then explained qualitatively by interpreting them according to the criteria in Table 1.

Tabel 1. The validation score of teaching materials (Riduwan, 2012)

Interval score of validation	*Category*	*Descriptionn*
$3{,}6 \leq V \leq 4$	Very valid	Can be used without revision
$2{,}6 \leq V \leq 3{,}5$	Valid	Can be used with minor revision
$1{,}6 \leq V \leq 2{,}5$	Less valid	Can be used with major revision
$1 \leq V \leq 1{,}5$	Not valid	Can not be used

The quality of the teaching materials that have been developed is determined based on the validation scores resulting from the validator's assessment. Validation data were analyzed using quantitative descriptive analysis.
The assessment agreement between validators is calculated based on the similarity of the values given by three validators using the formula:

$$\textit{Percentage of Agreement} = \left(1 - \left[\frac{A-B}{A+B}\right]\right) \text{ x } 100\%$$

Descripsion:
A= Highest score of validator
B= Lowest score of validator
An instrument is said to obtain assessment agreement if the percentage of agreement obtained is ≥ 75% (Borich, 1994)

RESULTS AND DISCUSSION

The learning materials in the form of a Lesson plan, Student activity sheets, and assessment of project product had been validated by three validators who are experts in the field of science education. Validated aspects include content validity, construct validity and language validity. The validation results of the teaching materials are presented in Table 2-4.

Tabel 2 The validation results of lesson plan of result research study course

Teaching materials	*Type of validity*	*Average scor of validation*	*Category*	*PA (%)*	*Category*
Lesson plan	Content	3.82	Very valid	94.71	Reliable
	Construct	3,.77	Very valid	95.28	Reliable
	Average score	3.80	Very valid	94.50	Reliable

Tabel 3. The validation results of student activity sheets of result research study course

No	*Teaching materials*	*Type of validity*	*Average scor of validation*	*Category*	*PA (%)*	*Category*
1	Student's activity sheet-1	Content	3.91	Very valid	97.27	Reliable
		Construct	3,83	Very valid	95.23	Reliable
	Average score		3.87	Very valid	96.25	Reliable
2	Student's activity sheet-2	Content	3.85	Very valid	95.91	Reliable
		Construct	3,78	Very valid	92.05	Reliable
	Average score		3.81	Very valid	93.98	Reliable
3	Student's activity sheet-3	Content	3.76	Very valid	93.19	Reliable
		Construct	3.72	Very valid	92.05	Reliable
	Average score		3.74	Very valid	92.62	Reliable
4	Student's activity sheet-4	Content	3.81	Very valid	94.55	Reliable
		Construct	3.83	Very valid	95.23	Reliable
	Average score		3.82	Very valid	94.89	Reliable
Total of average score			3.81	Very valid	94.44	Reliable

Tabel 4. The validation results of assessment of project product of research study course

No.	*Teaching materials*	*Type of validity*	*Average scor of validation*	*Category*	*PA (%)*	*Category*
1	Assessment of project-1	Content	3.84	Very valid	95.23	Reliable
		Construct	3.76	Very valid	93.64	Reliable
		Language	3.84	Very valid	95.23	Reliable
	Average score		3.82	Very valid	94.70	Reliable
2	Assessment of project-2	Content	3.50	Very valid	90.47	Reliable
		Construct	3.67	Very valid	90.47	Reliable
		Language	3.50	Very valid	90.47	Reliable
		Average	3.56	Very valid	90.47	Reliable

		score				
3	Assessment of project-3	Content	3.50	Very valid	90.47	Reliable
		Construct	3.67	Very valid	93.64	Reliable
		Language	3.67	Very valid	95.23	Reliable
	Average score		3.61	Very valid	93.11	Reliable
4	Assessment of project-4	Content	3.67	Very valid	95.23	Reliable
		Construct	3.56	Very valid	90.47	Reliable
		Language	3.67	Very valid	95.23	Reliable
	Average score		3.63	Very valid	93.64	Reliable
Total of average score			3.66	Very valid	92.98	Reliable

Based on the validation results from three expert validators in the field of science education on three kind of teaching materials, namely lesson plan, student activity sheets, and assessment of project product can be satetd that all teaching materials obtained an average score of 3.80, 3.81. and 3.66, respectively, with very valid categories valid ($3.6 \leq V \leq 4.0$) (Riduwan, 2012; Wulandari, *et al*, 2013; Susanah, 2019). Thus, all teaching materials developed can be used in learning process of the Research Results Study course. The average percentage of agreement between the three validators in validating three teaching materials were 94.50%, 94.44%, and 92.98%, respectively. Thus, the all teaching materials are categorized as reliable because the percentage of agreement is $\geq 75\%$ (Borich, 1994). All validators stated that all teaching materials developed could be used with minor revisions, including improvements to the writing system and several sentences of the assessment rubric that needed to be clarified so that they were in line with the learning indicators.

CONCLUSION

Based on results of data analysis can be concluded teaching materials developed, namely the lesson plan, student activity sheets, and assessment instruments of project product were categorized as very valid, with an average validity score of 3.80, 3.81 and 3.66, respectively. Thus, these teaching materials can be implemented in learning process of research results study courses to improve students' abilities in compiling scientific work.

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