

Trends of Vocational Education and Training Research in Building Construction Engineering

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Abstract— Research that has been done by building engineering students as a thesis tends to choose a theme that has been widely researched before. This research aims to find out the trends of vocational education research in the field of engineering building including trends of theme research and trends of methodology research. This research used descriptive quantitative research methods with a library research approach. Data collection techniques using documentation. Data analysis techniques are used in content analysis. The results of this study show the trends that have occurred in vocational education research in the field of building engineering in 4 universities, then obtained the trend of vocational education research themes and research methodology trends: 1) The theme of vocational education research in the field of building engineering is in high demand is the theme of teaching and learning with a percentage score of 47%, 2) The research method in demand is Research and Development with a percentage score of 31%, 3) Interesting research subjects are learners with a percentage score of 58%, 4) The data collection technique in demand is a questionnaire with a percentage score of 36%, and 5) The data analysis technique of interest is descriptive statistical analysis with a percentage score of 67%.

Keyword: *Vocational Education and Training Research, Building Engineering Education, Thesis*

INTRODUCTION

Research plays an important role to develop science and technology (Arifin 2020). Competition to develop science and technology requires every college to continuously strive to create new strategies by creating innovation, research, and community service to advance the nation. Research is a planned activity using procedures in collecting data, analyzing data, and concluding results in the form of facts used to solve problems and to find new knowledge (Charitas, Prahmana, and Kusumah 2016; Maknum 2017; Rinaldi and Mujianto 2017). According to Cahyana (2021), Jakarta State University is an Educational Institution of Education (LPTK) and also acts as a university participating in national development and in the direction of applying the vision of clearly choosing the field of research in the field of education and non-education. Furthermore, non-educational research has conducted investigations showing that the challenges in the industrial world are growing due to advances in science and technology. In educational research conducted has fostered the importance of tolerance for cultural diversity. Research in the field of education and non-education has its characteristics

that are inseparable from the research umbrella that refers to the master plan of research to serve as the basis for the selection of research themes. The research umbrella is the main research theme which is then divided into small groups consisting of several research subtheme (Admin FIP 2011; Cahyana 2021; Wulandari and Astuti 2013). Vocational education research is one of the flagship themes that need to be studied more widely. Vocational education research is an activity carried out systematically and theoretically, to examine phenomena that occur in the field of vocational education, issues found in the field of vocational education in the form of teaching planning, vocational education systems or programs, developing technology-based learning media, vocational school teachers and vocational education curriculum (Langenkamp et al. 2018; Rauner and Maclean 2008; Zhao and Rauner 2014). Vocational education research is required to produce a chain of innovation aimed at giving birth to policies, development, and improvement of the quality of vocational education systems, development and application aimed at improving the competence of expertise, namely soft skills and hard skills of learners in vocational schools that can be useful in the community environment (Cahyana 2021). Vocational

education research has been conducted one of them in the Building Engineering Education Study Program. This is done in line with the Building Engineering Education Study Program to form graduates of prospective teachers in the field of qualified and competent Building Engineering expertise. Vocational education research that has been done is a student thesis that is compiled to complete the study period. This has been affirmed at every college requiring every student to research by areas of expertise that meet the standards of scientific writing order. Vocational education research that has been done is a student thesis that is compiled to complete the study period. This has been affirmed at every college requiring every student to research by areas of expertise that meet the standards of scientific writing order.

In practice, students tend to research by choosing a research theme based on a theme that has been widely researched before. This is evidenced by table 1 data. vocational education research in The Building Engineering Education Study Program of Jakarta State University.

Table 1. Student Research Data of Building Engineering Education Study Program in Jakarta State University

Research Theme	Years			Score	Percentage
	2018	2019	2020		
Non Education	47	49	33	129	65%
Vocational					
Curriculum	2	1	0	3	1%
Teaching and Learning	7	5	4	16	8%
Research and Development of learning media	7	25	12	44	22%
Research Competencies and Expertise	3	2	0	5	3%
Research Colleges and Vocational Schools	1	2	-	3	1%
Total				200	100%

Based on the table above, the tendency of students to conduct non-educational research with a percentage of 65%. It is less relevant to the purpose of the Building Engineering Education Study Program which results in a bachelor's degree of education. Vocational education research tends to examine the theme of learning media with a percentage of 22%. If the trend of selecting this research theme continues, then research in the field of education will occur research that is not innovative for the future. This tendency occurs because there is no socialization about the research umbrella based on the Research

Master Plan of The State University of Jakarta in the Building Engineering Education Study Program of The State University of Jakarta which can be used as a reference for students to determine the theme of vocational education research. the tendency will have an impact on the decline of students' skills in conducting research (Pujianto and Suyoso 2011).

Vocational education research has also been conducted in the Building Engineering Education Indonesia University of Education, the distribution of vocational education research themes that have been researched as thesis evidenced in table 2.

Table 2. Student Research Data of Building Engineering Education Study Program in Indonesia University of Education

Research Theme	Years			Score	Percentage
	2018	2019	2020		
Non Education	3	0	0	3	3%
Education					
Curriculum	0	0	0	0	0%
Teaching and Learning	18	35	15	68	57%
Research and Development of learning media	0	4	3	7	5%
Research Competencies and Expertise	5	24	7	36	30%
Research Colleges and Vocational Schools	3	3	0	6	5%
Total				120	100%

Based on table 2 shows that vocational education research in Building Engineering Education Study Program has been conducted at Indonesia University of Education period 2018 - 2020. The data above shows that vocational education research that has been conducted tends to choose the theme of teaching and learning with a percentage of 57%. This can be seen the difference in tendencies that occur by comparing table 1 and table 2.

Vocational education research in the Building Engineering Education Study Program that has been analyzed above comes from the student thesis. Thesis is a compulsory course that must be completed in order to get a bachelor's degree aimed at being able to provide planning and improve science through scientifically conducted research that refers to the development of science (Pujianto and Suyoso 2011; Sari and Asmendri 2020). Thesis preparation is done by collecting data in laboratories, libraries, and the field. This is done to analyze a growing phenomenon.

Based on the National Accreditation Board of Higher Education (BAN-PT) it is known that 15 universities have building engineering education study programs. The diversity of thesis results and the use of methods used there are trends that have occurred. The phenomenon is interesting to be concerned how the trend that has occurred in the thesis of building engineering education students. Student thesis that has been researching related vocational education needs to be analyzed to find out the trends that have occurred so that it is known the diversity of research themes that are most in-demand and themes that have not been noticed much by students.

METHODOLOGY

This research was conducted at the Building Engineering Education Study Program, Faculty of Engineering, Jakarta State University. This research aims to find out the trends that have occurred in vocational education and training research in the field of building engineering include trends of vocational education and training research themes and trends of research methodology.

In this study, the research used descriptive quantitative research methods with a library research approach. The population in this study is a thesis of a student with vocational education and training research in building engineering for the period 2016 – 2020 at 4 universities: 1) Jakarta State University, 2) Yogyakarta State University, 3) Indonesia University of Education, 4) Sebelas Maret University. The samples of this research are 208 theses taken with proportional stratified random sampling.

Based on the National Accreditation Board of Higher Education (BAN-PT) it is known that there are 15 universities that have building engineering education study programs. In this study used 4 universities to be researched related to vocational education research trends. The reason for the 4 universities above based on a thesis repository with open access.

This research used data collection techniques is documentation, data analysis techniques are used content analysis and descriptive statistical analysis. Content analysis is used to create inferences and identify phenomena from previously known data include document, book, advertisement, and electronic media (Hsieh and Shannon 2005). The content analysis on thesis is divided into five parameters including : 1) Vocational education research theme, 2) Research methods, 3) Research subject, 4) Data collection techniques, 5) Data analysis techniques. In this study there is a flowchart as follows :

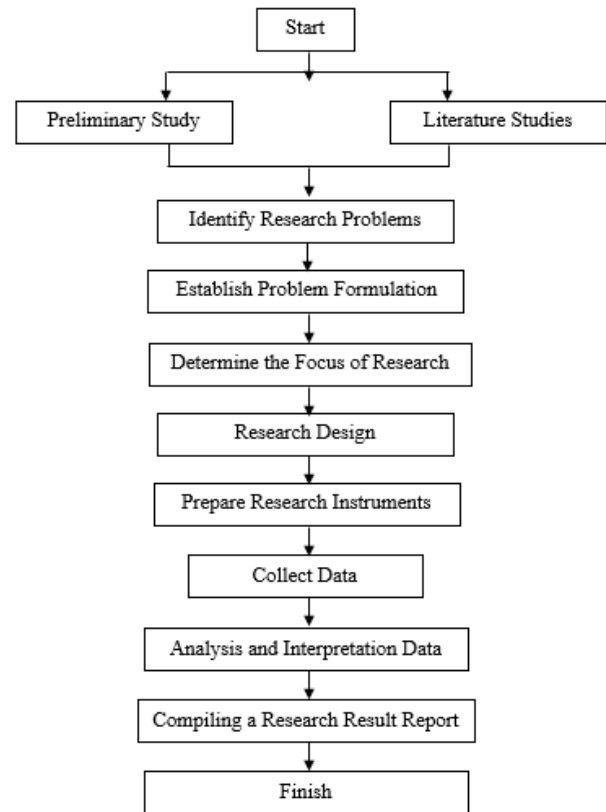


Figure 1. Research Methodology Flowchart

In this study, the first step is carried out preliminary studies and literature studies to find out in depth the phenomenon that is happening related to vocational education research trends. Then make identification of research problems, this is done to do data collection so that the issues that are happening can be clearly outlined. Create a research design so that research is structured and systematic so that no steps are left behind. The next step, making research instruments and determining the parameters to be studied related to vocational education research trends.

RESULT AND DISCUSSION

The results of this research are aimed at knowing the research trends of vocational education from 4 universities: 1) Jakarta State University, 2) Yogyakarta State University, 3) Indonesia Education of University, 4) Sebelas Maret University.

A. Description of Data Based on Vocational Education Research Theme

Table 3. Trends of Vocational Education Research Theme

No.	Research Theme	Score	Percentage
1	Curriculum Research	5	2%
2	Teaching and Learning Research	99	48%

3	Research and Development of learning media	71	34%
4	Research Competencies and Expertise	23	11%
5	Research Colleges and Vocational Schools	10	5%
Total		208	100%

Based on Table 3. it can be known that vocational education research in the field of building engineering in the period 2016 - 2020 is dominated by the theme of teaching and learning research with a percentage score of 48%. It means that college students have mastered a lot of materials related to teaching and learning that have been learned during college so many students do this research. This theme has also examined how learning materials, learning methods, learning strategies and learning evaluations can improve learning outcomes and improve the quality of learning. This trend can also be interpreted that the trend of research themes that have occurred is still centered on themes that have been widely researched before. While on the research theme of curriculum at least researched with a percentage of 2%. It means that there are still many college students who do not understand the curriculum. It can also be known in the Study Program of State University of Jakarta there are no courses that study the curriculum, so the curriculum theme population is still small.

B. Description of Data Based on Research Methods

Table 4. Trends of Research Methods

No.	Research Methods	Score	Percentage
1	Research and Development	65	31%
2	Classroom Action Research	26	13%
3	Survey	33	16%
4	Correlational Research	32	15%
5	Experiment	39	19%
6	Evaluation	13	6%
Total		208	100%

Based on table 4. It can be known that the trends have occurred in use of research methods are dominated by research and development methods with a percentage of 31%. While in the evaluation research methods is least used with a percentage of 6%. It means that the research conducted by students is more interested in developing by adopting the help of technology to make new innovations to help students cognitive problems. The use of research and development methods is carried out as an effort to overcome the

problem of delivering learning materials to be easier to understand during learning process.

C. Description of Data Based on Research Subject

Table 5. Trends of Research Subject

No.	Research Subject	Score	Percentage
1	Vocational High School Students	120	58%
2	College Students	48	23%
3	Vocational High School Teachers	4	2%
4	Vocational High School	8	4%
5	College	27	13%
Total		208	100%

Based on Table 5. It can be known that the trend of vocational education research subjects in the field of building engineering is vocational high school learners with a percentage of 58%. This can be interpreted vocational education research that has been conducted is aimed at improving the learning outcomes of learners in vocational schools as well as improving the quality of learning. Research subjects that are rarely used for research are found in teachers with a percentage of 2%. This can be interpreted that the teacher is a research subject that is less desirable to college students in research that has been done in the field of building engineering.

D. Description of Data Based on Data Collection Techniques

Table 6. Trends of Data collection techniques

No.	Data collection techniques	Score	Percentage
1	Interview	47	12%
2	Questionnaire	143	36%
3	Observation	78	19%
4	Documentation	76	19%
5	Test	58	14%
Total		402	100%

Based on table 6. It can be known that the trend of data collection techniques is questionnaire with a percentage of 36%. It means that students are more interested in collecting data using responses from respondents. The collection is done by providing statements or questions to the research subject to obtain the needs of the research data, then analyzed to answer the problem formulation. In the use of data collection techniques, the use of interviews is least

used at 12%. This shows that this technique is less desirable to collect data on research that has been done by students.

E. Description of Data Based on Data Analysis Techniques

Table 7. Trends of Data analysis techniques

No.	Data analysis techniques	Score	Percentage
1	Qualitative Data Analysis	12	5%
2	Descriptive Statistical Analysis	145	67%
3	Inferential Statistical Analysis	60	28%
	Total	217	100%

Based on table 7. It can be known that trend data analysis techniques are descriptive data analysis techniques with a percentage of 67%. This show that analysis technique is most in demand by students to be used as an analysis technique by decrypting the results of research. Descriptive analysis techniques are performed by performing median, mode, mean, percentile, desil, and percentage calculations. In the analysis technique there is qualitative data analysis with a percentage of 6%. This is interpreted that this analytical technique is less desirable for college students to use as an analysis technique on thesis that has been done by students in the field of building engineering.

Based on the results of research related to vocational education research trends, it can be known that the selection of vocational education research themes that students raise as thesis is still centered on the most researched themes of the previous generation. This can be seen from the trend of theme selection that has occurred dominated by research and teaching themes with a percentage of 48%. This trend resulted in the spread of themes from 4 universities is still uneven. Meanwhile, there are still many themes with issues that can be raised as research themes such as curriculum, teaching and learning identification, vocational school quality management, identification of vocational school facilities and infrastructure, development of competence and expertise of learners through training and development of teaching materials, learning models and vocational school education systems.

It is known that vocational education research in the future will be widely researched related to technology development. This is in line with the results in the research and development of learning media in the period 2016 - 2020 has increased. This means that

vocational education learning in the future will use a lot of blended learning models so that there will be a lot of learning that uses technology to help learners understand learning. This is in line with Zubaidah (2018) opinion that research and development needs to be done to solve the cognitive problems of learners and the development that can be done can be in the form of learning models and vocational education systems.

On the aspect of vocational education research subjects that have been studied it can be known that the research subject is dominated by vocational high school learners. This means that the research that students have done is aimed at improving the quality of learning that must be achieved by learners from cognitive, affective and psychomotor aspects. This is in line with Priyono (2008) statement that the study subjects are participants, informants, communities, and respondents who are targets of research where they have goals to achieve.

Vocational education research trends that have occurred in the period 2016 - 2020 can have a direct and indirect impact. In the indirect impact aspect, if the selection of themes continues to be centered on one theme, namely teaching and learning research then this topic will be saturated. This is supported by the statement Siyoto & Sodik (2015) if the tendency continues to decrease the skills of students in conducting research. This means that with this thing known it is necessary to make efforts that can make the diversity of the theme of vocational education in the field of building engineering emerge. Then the impact that can be received by educational institutions due to the results of vocational education research in accordance with the character of the Study Program, where focusing on education will be able to help improve quality and improve the accreditation of the Study Program. This can be done by publishing the results of vocational education research and choosing the appropriate theme area. The direct impact of the results of this trend can be felt by looking at the results of research, then there is a lot of diversity of vocational education research themes that can be raised for student research. This can be used as a suggestion for the selection of vocational education research themes.

CONCLUSION

Based on the result of research that has been explained in discussion, it can be concluded that trend of vocational education and training research in building engineering for period 2016 – 2020 at 4

universities: 1) Jakarta State University, 2) Yogyakarta State University, 3) Indonesia Education of University, 4) Sebelas Maret University. The conclusion can be drawn:

1. Trend of vocational education and training research themes in building engineering is the theme of teaching and learning research with an percentage score of 47%.
2. Trend of methodology research in building engineering. The research methods that are most in demand is using Research and Development (R&D) with an percentage score 31%, research subject are most in-demand is vocational high school students with a percentage score of 58%, data collection techniques are most in-demand is questionnaires with a percentage score 36%, data analysis techniques are most in-demand is descriptive statistical analysis with a percentage score 67%.

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