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Evaluation of implementation practices of industrial field on revitalization of the vocational educational institution in the industrial revolution 4.0

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Abstract. The purpose of this study is to revitalize at the Vocational Education Institution (VEI), Engineering Faculty, Medan State of University (EF-MSU). The revitalization carried prepare graduates to compete in globally in the 21st century and the industrial revolution 4.0. One of the programs the VEI is an integrated collaboration with the Business and Industrial World (BIW). The implications of the collaboration between EF-MSU and BIW can be done by the practice of the industrial field (PIF). The output of this research is to form an integrated PIF management model between EF-MSU and BIW and the implementation of PIF becomes more effective. The evaluation of the implementation PIF with the CIPP models (Content, Input, Process, and Product) developed by Stufflebeam. Research subjects were respondents who were related to PIF, namely: students, supervisors, program study leaders, and BIW parties. The stages of the research were starting from the preparation of instruments, determining the source of data (research subjects), conducting a survey about BIW, establishing cooperation with BIW (making MoU), and conducting several focus group discussions (FGD). The FGD is carried out in the context of developing PIF guidelines, which include: planning, implementation, mentoring, reporting and evaluation PIF. The data analysis technique was descriptively and qualitatively. The results showed that the management of PIF at EF-MSU, in general, needed improvement. The form of cooperation undertaken by EF-MSU with BIW in the implementation of PIF is still normative and partial. There is a unit that manages of PIF at EF-MSU. Based on the results of data analysis, it requires a unit of PIF management at EF-MSU, so that the implementation of PIF more planned and effective.

Introduction

Vocational education has a mission of preparing a generation that is ready for work and professionals. Higher education programs in Indonesia include academic education (bachelor, master, and doctoral), professional/specialist education and vocational education (diploma). In vocational education, there are two levels of education, namely vocational secondary education and vocational higher education.

Medan State of University (MSU) is one of the educational institutions of education which has the task and role of producing a workforce ready as diploma level and at the same time producing prospective professional teachers and can be teaching in vocational high education. For this, every study program at the Engineering Faculty (EF) of MSU prepares an educational curriculum that is oriented to market needs and work funding. EF-MSU is a faculty that has a mission to produce graduates who are ready to use in filling jobs according to the needs of the business and industrial world (BIW).

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To prepare graduates who are ready to work by market and BIW needs, one of the subjects in each study program at EF-MSU is the practice of industrial field (PIF) Subjects. PIF courses aim to bridge the theoretical material with the practice on the field. The purpose of the PIF subjects is an effort to equip students of field experience in the practical learning out-classroom and laboratory. Through the PIF, students are expected to understand the problems of BIW and be able to provide alternative solutions to solve them. Furthermore, through PIF the students have real experience with all types of work and obstacles in BIW.

Implementation of PIF were involving EF-MSU with PIF. Based on the results of observations, there are several obstacles in the implementation of PIF, including 1) difficulties in choosing where PIF conduct, 2) PIF are relatively far from EF-MSU, 3) the number of students is not comparable with the number of eligible PIF, 4) less synchronous (in accordance) between PIF schedule with BIW readiness, 5) student discipline in implementing PIF, and 6) students understanding in preparing reports and maintaining the contents of PIF report.

According to the results of research by Dika Ayu A and Ali Wafa (2016), found that the obstacles in the implementation of PIF are: lack of debriefing or orientation, administrative constraints, difficulty in finding agencies, and inaccurate reasons for choosing agencies[1]. The problems faced by students in implementing PIF are there is no clear work schedule, the work is not as expected, the lack of the role of the supervisor. Problems after the implementation of PIF are the guidelines for the preparation of the final report are unclear, students do not prepare a synthesis of the problem, and no performance/competency test is carried out[2].

Based on observations and research, the objectives of PIF at EF-MSU haven't been maximally achieved[3]. To find out the root of the problem and solutions to solving PIF EF-MSU, a study was conducted. Research on evaluating the implementation of PIF is carried out aimed at producing a policy to be able to reduce the obstacles in implementing PIF at EF-MSU. Through policies on the PIF program so that the implementation of PIF runs optimally, so students have the knowledge and skills that are by market and BIW needs. Thus EF-MSU graduates become graduates who are ready to work and professionals according to their field of expertise.

To focus the research and this paper, the formulation of the problems discussed are: 1) How is the administration, implementation and assessment of PIF on EF-MSU students 2) How are the PIF competencies in each study program at EF-MSU 3) What is the role of the supervisor and study program / faculty in the implementation of PIF in every study program at EF-MSU. The purpose of this paper is to produce a set of proposals and policy programs regarding the implementation of PIF at EF-MSU.

The purpose of the PIF course is to provide students with field experience as a form of practical learning outside of lectures in the classroom and the laboratory. The objectives of the PIF courses include: 1) identifying the ins and outs of problems in BIW and alternative solutions, 2) giving real experiences about everything that happens in BIW, 3) enriching the insights between theory and practice in the field, 4) knowing the procedures how to carry out work, organizational structure and management of BIW, make a report of the results of the practice while in the field.

According to Chess A and Bambang S (2016) stated that industrial work practices are quality control of students/students, whether they have met the competencies as required by the industry, whether they have met the principle of linkage and accuracy (link and match) of the program with industry[4]. The implementation of PIF is to carry out public relations functions (public relations) for educational institutions, will provide a positive outlook through students who have good attitudes and abilities during carrying out an internship, or vice versa negative views occur if the attitudes and abilities of students are not good. Internship can also play a role as graduate marketing, or other partnership activities with industry such as research, community service and so on, all of which must benefit each other.

Educational evaluation is a must. The demands for educational evaluation are so high that educators must believe that they live in a generation of evaluations. It is important to realize that one of the responsibilities of educators is to evaluate their activities. So it is not only student activities that

are evaluated but also the activities of educators and other matters relating to education. One important component in planning a program is to state in advance its objectives, both general goals and desired specific goals[5]. In terms of program evaluation, several models can be used. To find out the effectiveness and level of achievement (progress/level of success) of a program of activities, especially teaching or education programs. The concept of evaluation is often equated with evaluation, although some other terms such as assessment, scoring, and judgment are also often translated as valuations[6]. The purpose of program evaluation is to obtain accurate and objective information from a program [7].

The model applied in the evaluation of the PIF program at EF-MSU is a model developed by Stufflebeam namely the CIPP model which is an acronym for Context, Input, Process, and Product. The CIPP model includes four types of decisions, namely (1) planning decisions, which influence the selection of objectives, (2) structuring decisions, which establish optimal strategies and procedural designs for the achievement of objectives set from planning, (3) implementing decisions, which include implementation and improvement of the design, method or strategy that has been selected, and (4) recycling decisions, which determine whether the PIF program at EF_MSU is repeated, changed or stopped. The evaluation of the CIPP model refers to evaluations including 1. Context evaluation. Context evaluation, including analysis of street vendor's problems related to the weaknesses and strengths of certain objects to complete the improvement or progress of the implementation of PIF in EF-MSU. 2. Input Evaluation. Input evaluation includes an analysis of problems related to how the use of existing resources in PIF at EF-MSU, alternative strategies that must be considered for something sustainable PIF program as an effort to obtain better street vendor planning from the current street vendor procedures. 3. Process Evaluation. Process evaluation is used to determine the compatibility between planned PIF programs and those that occur at EF-MSU. 4. Product Evaluation. Product evaluation is used to compare the results obtained with the objectives contained in the PIF program. Product evaluation is an effort to measure and interpret the results achieved from PIF that apply in education.

Research Methodology

This research was carried out at EF-MSU and BIW where the PIF is. This research was conducted in May - October 2019. This type of research is an evaluative study using the Stufflebeam approach, namely the CIPP evaluation. The data to be obtained in this study are in the form of qualitative and quantitative data. Qualitative data in the form of information about the process and implementation of PIF by EF-MSU students, such as administrative processes, determining the location of PIF, the implementation of PIF and PIF's reports. Quantitative data in the form of descriptive information about the quality of reports, student competencies, and the effectiveness of the implementation of PIF.

Sources of data in this study are students and agencies involved in the implementation of PIF at EF-MSU. Research subjects are students, supervisors, heads of study programs and BIW parties. To obtain data from research subjects, several methods and data collection tools are used. Research data collection methods carried out such as tests, observations, interviews, and questionnaires. While the tools used are assessment sheets, checking documentation, interview guidelines and questionnaires. The stages and research procedures that will be carried out starting from the socialization activities for PIF supervisors, preparation of research instruments in the form of questionnaires, observation sheets, and interview sheets, and FGD on guidelines and implementation, guidance and assessment of PIF. FGD activities carried out at EF-MSU involving all research subjects.

The data analysis model in this study follows the concept given by Lodico, Spaulding, & Voegtle [8]. Based on the data analysis model, this research uses the following stages of data analysis: 1) organizing the data and examining the data carefully, 2) re-checking the data, 3) carrying out further data processing. Researchers describe, summarize, and organize coding that contains categories that are more specific and differentiated from other categories, 4) conduct a final analysis, make interpretations and conclusions containing the results of research findings

Research Results and Discussion

The source of data in this study are students who carry out street vendors in every study program at EF-MSU. Student data obtained as many as 39 people from 6 study programs.

Based on data obtained from instruments filled in by students about the PIF administration process carried out at EF-MSU as in Table 1. Of the 5 types of questions presented about PKL administration, the lowest average score occurred in Building Engineering Education (BEE) study programs and the highest occurred in Mechanical Engineering Education (MEE) study programs. But overall the average score of PIF administration at EF-MSU was 3.25. This shows that the quality of PIF administration services conducted at EF-MSU still needs to be improved.

Table 1. Average Quality Score of PIF Administration Based on Study Program

No	Study Program	Total Score	Mean Score
1	BEE	182	3,03
2	EEE	84	3,36
3	MEE	121	3,46
4	AEE	84	3,36
5	CE	86	3,44
6	FE	77	3,08
	Total	634	3,25

Based on Table 1, when reviewed for each type of administration service, the lowest is the PIF location search for EF-MSU students with an average score of 2.62. At this time the search for locations of PIF in several study programs at EF-MSU is still done by students themselves. As a group students sign various PIF projects or locations to submit applications to be accepted to carry out PIF. This resulted in the implementation of PIF in each group and each study program at EF-MSU was very varied. Based on the data obtained from students, they hope that the PIF location search will be carried out by the Faculty or other units, so students will immediately conduct PIF according to a fixed schedule. In context, the implementation of PIF needs to be reviewed both in terms of competencies, administrative processes, and management units.

Data obtained from BIW states that students implement PIF full time and must follow the rules that exist in the company. Before carrying out PIF, students should already have basic competencies following the study program. For example, for BEE study programs, before PIF students must have basic competencies about the world of construction and property. The competency is obtained from some basic courses in BEE study programs. So before PIF, BEE students must pass basic construction and property courses such as engineering mechanics, engineering drawing, project management, budgeting, building construction, concrete construction. Likewise with other study programs in EF-MSU. Students who take PIF need to pay attention to the requirements set, both in terms of the number of credits and the courses that pass. Likewise, the accuracy of the place and location of PIF for each study program.

The results showed that the implementation of PIF at EF-MSU had not been managed systematically and under control. These results are obtained that the implementation of PIF undertaken by EF-MSU students still has not occurred good communication between EF-MSU with the BIW where PIF takes place. Deeper, there has not been intensive and structured communication between EF-MSU and BIW, both in terms of student placement, PIF schedules and competencies achieved in PIF. These results indicate that there needs to be a good form of collaboration between EF-MSU and BIW which is the place for the implementation of student PIF. Furthermore, there are various study programs in the implementation of PIF at EF-MSU. A place or street vendor can also be received from several different study programs. For example in a building construction project, then the project can be done PIF student building engineering / civil engineering and electrical engineering study programs. To facilitate the coordination of EF-MSU with BIW, it is necessary to form a

unit/coordinator in charge of PIF. The coordinator, who deals with all forms of cooperation and placement of PIF students in various BIW.

Table 2. Average Score of Quality Process of PIF Implementation by Study Program

No	Study Program	Total Resp	Total Score	Mean Score
1	BEE	12	263	3,13
2	EEE	5	105	3,00
3	MEE	7	160	3,27
4	AEE	5	110	3,14
5	CE	5	103	2,94
6	FE	5	114	3,26
	Total	39	855	3,13

The implementation of the PIF process at EF-MSU by students is also not yet maximum. When you see the data in Table 2, the average score of the implementation of PIF is the smallest, namely the Culinary Education (CE) Study Program with a score of 2.94 and the highest in Mechanical Engineering Education (MEE) study program with a score of 3.27. When seen the average process of implementing PIF at EF-MSU with a score of 3.13. If it is examined deeper, then the score is low, if the implementation of PIF is conducted by students every day, namely from Monday to Saturday, the next is the implementation of PIF for 60 working days and conducted in full time (morning to evening). This is included in the implementation of PIF with a weight of 3 SKS, students should be given an assignment (work) by BIW so that the PIF period is more effective in achieving competence. For this reason, it is necessary to communicate with BIW about the implementation technique. The process of implementing PIF needs to be considered especially by the supervisor. With the PIF mentoring process students will be disciplined and by the expected competency schedule

After completing the PIF implementation, students are also required to prepare a report and will be held accountable in front of the examiner. PIF report making aims to describe what students do on the implementation of street vendors and know student understanding with one of the aspects/components that are reviewed following the problems contained in the field. Based on data obtained from students about the process of guidance and report writing for each study program, presented in the following figure.

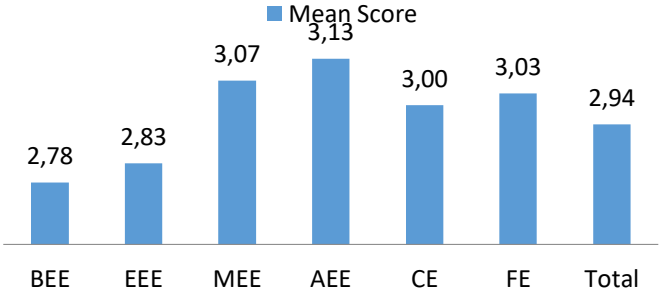


Figure 1. Average Score of Report Writing Guidance Process Based on Study Program

The implementation of the guidance on writing PIF reports conducted at EF-MSU needs to be given good attention. When seen in the data in Figure 1, shows the average score of the implementation of the guidance of PIF report writing the smallest, namely the BEE study program with a score of 2.78 and the highest on the AEE study program with a score of 3.13. When seen the average process of implementing guidance on writing PIF at EF-MSU with a score of 2.94. When examined deeper, then the lowest score in the implementation of the PIF report writing guidance process is the submission of the report title at the beginning of the PIF implementation. So to determine the title of the report, it can run in accordance with the implementation of PIF. This gives an

inclusion that the process of guidance on writing PIF reports can be carried out in line with the implementation of PIF. The supervisors, carrying out the guidance task had begun since the implementation of PIF in BIW.

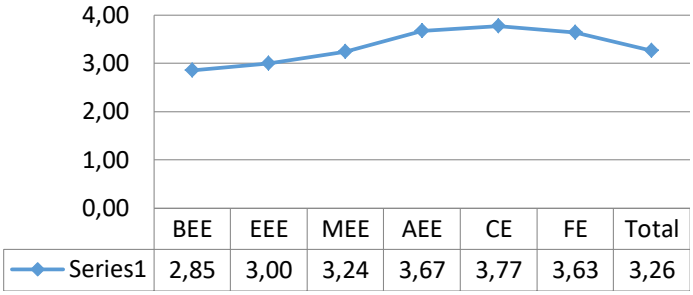


Figure 2. Average Score of Examination Process and Assessment System Based on Study Program

The implementation of the PIF exam and assessment process at EF-MSU has not yet taken place to the maximum. From the data in Figure 2, it shows the average score of the implementation of the exam and the lowest level of PIF assessment in the BEE study program with a score of 2.85 and the highest in the CE Study Program with a score of 3.77. When seen the average process of carrying out exams and PIF at EF-MSU with a score of 3.26. If it is reviewed more then the lowest score is the time of the examination and assessment of PIF for 90 minutes. This shows that the system of examinations and assessments carried out still needs improvement, both from the assessment system and the weighted scores given. In general, PIF students want BIW to include assessing students. Based on these results it is necessary to conduct a comprehensive review of the PIF' assessment and assessment system. After completing the PIF, students were tested for their competence. The examination process aims to measure the product (output) of the PIF's.

From the data obtained from various sources, it is found that the competencies expected from the PIF are: 1) For the building / civil engineering education study program that is able to identify and analyze various jobs in the field of construction and have alternative solutions to problems in the field; 2) mechanical engineering education study program that is able to adapt to a variety of jobs according to the machining field; 3) electrical engineering education study program that is able to describe various kinds of electrical work in the field; 4) automotive engineering study program that is able to solve various problems in the automotive field especially two and four-wheel vehicles, 5) fashion education study program is able to design and make various fashion models according to consumer demand and 6) Culinary education study program that is able to mix and make a variety of dishes with various materials available. From these results, it can be reviewed with a variety of objectives or competencies of the supporting courses/prerequisites of PIF. This is done so that the goals of street vendors can be achieved and there are not many obstacles in implementing PIF. Then to achieve the competencies that have been outlined, the standards or criteria on which PIF needs to be formulated and communicated with the relevant BIW.

To ensure that the implementation of PIF can run well, and by established standards, it is necessary to empower supervisors. The supervisor is given the task and authority to be able to monitor the implementation of PIF in the field. With this assignment having an impact, students are more focused and following the study material that will be written as a PIF report.

Qualitatively obtained data from various sources about the improvement of street vendors at FT Unimed, specifically, namely: 1) building / civil engineering education study program, namely speeding up the administration process, establishing communication with BIW, simplified exam implementation and questions focusing on the title and discussion; 2) mechanical engineering education study program that is before PIF equips students with mentality, PIF administration is accelerated and establishes cooperation with BIW; 3) electrical engineering education study program

that is collaborating with BIW, PIF administration is accelerated, and manuals are given to students and guidance is carried out by soft copy; 4) automotive engineering education study program that is collaborating with BIW and administration is accelerated, 5) fashion education study program namely report writing system starting from the beginning, street vendors products are presented after street vendors and street vendors are determined from study programs or majors, and 6) Culinary education study programs are places where PIF sought and determined by the study program or department and made an MoU with BIW. From the results of these data, a review of the administration and location of street vendors can be reviewed. In general, all students from all study programs wish that the PIF places are available before the implementation. Then the implementation of street vendors is done fulltime and they come to work at BIW, so they can gain knowledge and hone the skills of students.

Closing

Based on the results of the study it can be concluded that the implementation of these PIF at EF-MSU still needs improvement. The average score of PIF administration at EF-MSU is 3.25, indicating that the quality of PIF administration services performed at EF-MSU still needs to be improved. Students hope that the search for PIF locations will be carried out by faculties or other units, so students will immediately conduct PIF according to a fixed schedule. The average score of the process of implementing PIF report writing guidance at EF-MSU was 2.94. This shows that the process of guiding and determining the title of the report needs to be improved. The score of the implementation of the exam and PIF exam at EF-MSU was obtained with an average score of 3.26. The competence of PIF students is not in line with expectations, because the PIF process is not yet optimal. To improve the competence of PIF students, it is necessary to empower the field supervisor to participate in monitoring the location of PIF. Through the empowerment of supervisors, they also monitor the location of PIF, this also becomes a means to strengthen EF-MSU's relationship with BIW. By improving the implementation of PIF, EF-MSU's mission is to produce graduates who are ready to use in filling jobs according to the needs of the business and industrial world (BIW).

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