A New Approach of Students' Industrial Field Experience Program in the Digital Age

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Abstract: This study aimed to investigate the need for developing an Industrial Field Experience (IFE) program model based on the Industrial Revolution 4.0 in the the Faculty of Engineering of UNP (Universitas Negeri Padang). The study was conducted among lecturers who had guided students as well as students who had returned from IFE. Data were collected from questionnaire distributed and analyzed using IBM SPSS Statistic version 25 and Excel graph program. The results showed the shortfalls of the IFE Program and improvements that could be implemented such as: establishing a collaboration or partnership between colleges and industries so that students have an easier time to find a IFE destination; improving akama web that is currently used for IFE administration purpose by adding necessary quality-of-life features and conducting an initial meeting between supervisors and industries in order to achieve the expected IFE competencies according to the curriculum. The performance of IFE for 6 months will be better when industry inputs are taken into account. Devising a Learning Plan that describes the position and activity needed students and Monitoring and Evaluation of supervisors are important to assess student performance and build a good relationship with industries. Student evaluations and assessments are not only carried out based on academic competence but also based on soft skill competencies which are in line with the skills that students must have in the Industry 4.0-based 21st century. The new Industrial Field Experience approach will answer the problem of mismatch between the world of education and the industrial world regarding expected competencies.

Keywords: Industrial Field Experience (IFE), competecy, curriculum, students, industry, soft skill, Industrial Revolution 4.0

1. Introduction

Industry 4.0 is a significant phenomenon where all systems implemented in various sectors are based on technology, including the education sector (Harususilo, 2018). Some of these systems are Internet of Things (IoT), Big Data, Technical Assistance (Robotic), Artificial Intelligence, and Disruptive Innovation. The obvious consequence is the shift of resources from humans to machines (robotic). With the internet network, classroom learning process between educators and students is no longer absolute due to the rising prevalence of e-learning. To enrich their knowledge, students no longer only rely on material from lecturers but also by surfing in cyberspace.

In the Law No. 12 of 2012, the Ministry of Education and Culture facilitates higher education institutions to realize the national goals of education through Merdeka Belajar-Kampus Merdeka (Independent Study - Independent Campus) policy, implemented in order to realize an autonomous and flexible learning process in higher education so as to create an innovative, non-restrictive learning culture in accordance with student needs (Belajar & Merdeka, 2020). This policy aims to improve the link and match with the business world and industry, as well as to prepare students for the working world from the very beginning. Higher education institutions are required to be able to design and implement innovative learning processes so that students can achieve optimal learning outcomes in aspects such as attitudes, knowledge and skills, to meet the demands of the flow of change and the need to link and match with the business and industrial world.

One primary policy of Merdeka Belajar-Kampus Merdeka (Freedom to Learn-Independent Campus) program is that students are given the liberty to take several credits outside the study program. The credits in question can be taken for learning outside and inside the campus. Learning activities outside the campus include internships/work practices, projects in villages, teaching at schools, student exchanges, research, entrepreneurial activities, independent studies/projects, and humanitarian projects, all of which must be guided by lecturers. Independent campus policy is expected to provide contextual field experience and improve student competency in a complete package and work readiness.

One learning activity outside the college is internship/work practices or Industrial Field Experience (IFE). The IFE program at Universitas Negeri Padang (UNP) has long been implemented, especially in the Faculty of Engineering (FE). Students are required to carry out IFE organized by the Industrial Relations Unit (IRU) of FE of UNP with the purpose of improving knowledge, skills and attitudes of students in technology/vocational field through direct involvement in various activities in the industry (UNP, 2016). During the implementation of IFE, students will apply, strengthen and demonstrate theories they have learned in class and put them into practice in real work settings, with aspects of preparation, safety, accuracy and work steps. Students carry out the IFE during the fifth semester by making use of their break. The implementation of IFE in each department of Universitas Negeri Padang has been in accordance with the National Qualifications Framework (QNF), to which the determination of academic education graduates' competencies, vocational education, and professional education are oriented. Civil Engineering students carry out IFE at stakeholders, namely construction contractors and consultants, with the ultimate goals of; a) After the completion of IFE the students are expected to have acquired knowledge and experience as an executor in the construction industry and; b) After the completion of IFE, the students are expected to have acquired knowledge and experience as a supervisor in the construction industry. Students that are about to carry out IFE will be provided with prerequisite and provision courses. From the results of the study at the Civil Engineering department of FE of UNP, it was known that the IFE-oriented prerequisite courses for students has been adequate as preliminary knowledge for first-hand involvement in the industry (Yustisia, 2017).

During IFE, students have the chance to experience the actual working world where they will apply their theoretical knowledge alongside the practical knowledge they experience in the field (Teichler & Teoh, 2006). The desired results of IFE are relevance to the student's field of study which will later improve their professional skills and competency development in future careers (Azodo, 2018). In several cases, students who have done IFE will improve their academic performance and the industry will immediately recruit them once they graduate (Blicblau, Nelson & Dini, n. d.). This is in line with the conclusion stated by Muhson's et al. (2012) that the importance of building a network with both private and government agencies aims that graduates can be absorbed into the working world. Similar to the results of Murnomo (2010) and Sutrisno & Ixtiarto's (2016) studies arguing that vocational education developed refers to the demands of the working world, establishing cooperation and partnerships with the ever-growing business world and industrial world in the community. The results of the above studies prove that the implementation of the link and match program is very much determined by the cooperation between schools and industry so that it can support student competencies to be able to compete in the working world. IFE greatly affects student's soft skills. This was discussed in Mohamed, Abd & Rajab's (2012) study stating that industrial training improves and/or expand student's ethical awareness. In their study, Mader, Mader & Alexander (2017) revealed naturally-arising positive impacts and the process of confidence-building so that students become very excited about the projects they are working on. For the demands of the job market, apart from academic skills, the most important competencies are teamwork skills, communication, problem-solving, leadership and critical thinking (Golich, Haynes & Kreidler, 2018).

Reflecting on the implementation of IFE so far, there are several obstacles facing the students, supervisors and organizers that interfere with the implementation of the IFE program. There were cases of student applications rejected by the industry and students not yet finding a IFE destination, which resulted in a prolonged study period. For IFE locations, more students did it in West Sumatra than outside West Sumatra due to cost problems. At the student monitoring and evaluation stage, employer complaints with IFE students was reported, such as: students were not active and did not participate in field activities or students did not understand the basic knowledge in solving problems on the field (Yustisia, 2017). A report was also received that several students were sent home before their IFE period was overdue to indiscipline. During the completion of the IFE report, it was found that many students failed to complete the program on time.

As of now, the IFE of the Faculty of Engineering of UNP is managed by the IRU (Industrial Relations Unit) where for IFE purposes, students can register on the Information System (IS) web at akama.ft.unp.ac.id. In akama IS, students can register for IFE coaching, register companies where IFE is, get field supervisors and finally, and obtain a letter of assignment to carry out IFE. This information system itself is far from perfect because it lacks in features. To date, students are looking for an IFE destination company on their own and wasting much time looking for an IFE place that matches their fields of expertise. Akama IS also does not provide accounts for IFE supervisors, meaning that when students carry out their IFE, the lecturers cannot coordinate with their mentored students and the company. As stated by Kramer-Simpson (2018), monitoring will run well with the collaboration between the two coordinators, namely academic coordinators and industrial supervisors. Subsequent activities after the completion of IFE are also nowhere to be found in the akama IS, including counselling in making reports and examinations with the supervisor to get an IFE score.

Therefore this research was carried out to explore the need for a development model for the IFE program that applies the internet of things under the Industrial Revolution 4.0.

2. Method

This study was a cross-sectional study because of its extensive datasets with considerable cases and relationships between variables. The case is the stages in the IFE while the variable is the RI 4.0-based IFE Program. The considerable number of cases and variables were what enabled the cross-sectional analysis between many cases and variables (Sosioligis.com, 2018). This study was conducted in March 2020 on students and lecturers at Universitas Negeri Padang (UNP), to analyse the levels of need for the development of the IFE program model at UNP.

2.1 Population and Sample

The population of this study was Civil Engineering students of UNP who had completed IFE program and lecturers who had been a supervisor of IFE. Samples were taken from students who had just completed IFE program in July-December 2019 semester and were taken using the random sampling technique.

2.2 Instrument

The data collection was performed by using questionnaire. The questionnaire used was devised based on indicators of IFE stage variables taken from various references. Students and lecturers were asked to choose one out of four answer choices available, while for the last 1 question the respondents were asked to provide inputs for the IFE program. The questionnaire contains the activities carried out at each stage of the IFE and the rules that students must obey. During the trial stage, the questionnaire was tested for the validity and reliability of the question items. Then improvement and refinement were made to the question items which were then used at the research stage using purposive sampling technique. This technique was used to examine the validity and reliability of the question items.

2.3 Data Collection Procedure

The data were collected by the means of two procedures: (1) a questionnaire that was distributed to all respondents simultaneously. The respondents spent around 30 minutes to answer the questions; (2) the questions were divided into 2, namely 30 items of closed questions and 1 item of open question. The closed questions revolved around the needs of the IFE program stages while the open question requested inputs from the respondents for the success of the IFE program.

2.4 Data Analysis

The data were analyzed using IBM SPSS Statistic version 25 software and Excel graph program and qualitative interpretation. The data from the questionnaire utilized percentage number calculation, and the data from the open question were presented qualitatively since it depended on the respondents' responses.

3. Findings and Discussion

The summary of the need analysis of IFE Program is presented in the following Table 1:

Table 1 - The summary of the need analysis

IFE Stage	Criteria	Objective of the Question
Pre-IFE	Strong point	To identify the strong point found when arranging IFE
	Weak point	To identify the drawback/weak point found when arranging IFE
	Expectation	To identify expectations/needs from the IFE arrangement process
During IFE	Strength	To identify the strong point found during the performance of IFE
	Weak point	To identify the drawback/weak point found during the performance of IFE
	Expectation	To identify expectations/needs for a successful IFE
Post-IFE	Strong point	To identify the strong point found after the performance of IFE
	Weak point	To identify the drawback/weak point found after the performance of IFE
	Expectation	To identify expectations/needs after the performance of IFE

3.1 Descriptive Statistic

This section discusses descriptive statistic and percentage analysis of each aspect of the need analysis. From the descriptive analysis, the values of weight of each question in the IFE stages were obtained, as presented in the Figure 1 and Figure 2. The figure explains the percentage of respondents' answers on the y-axis, while on the x-axis the question items. The responses of the students and lecturers were then processed as presented in below Figures:
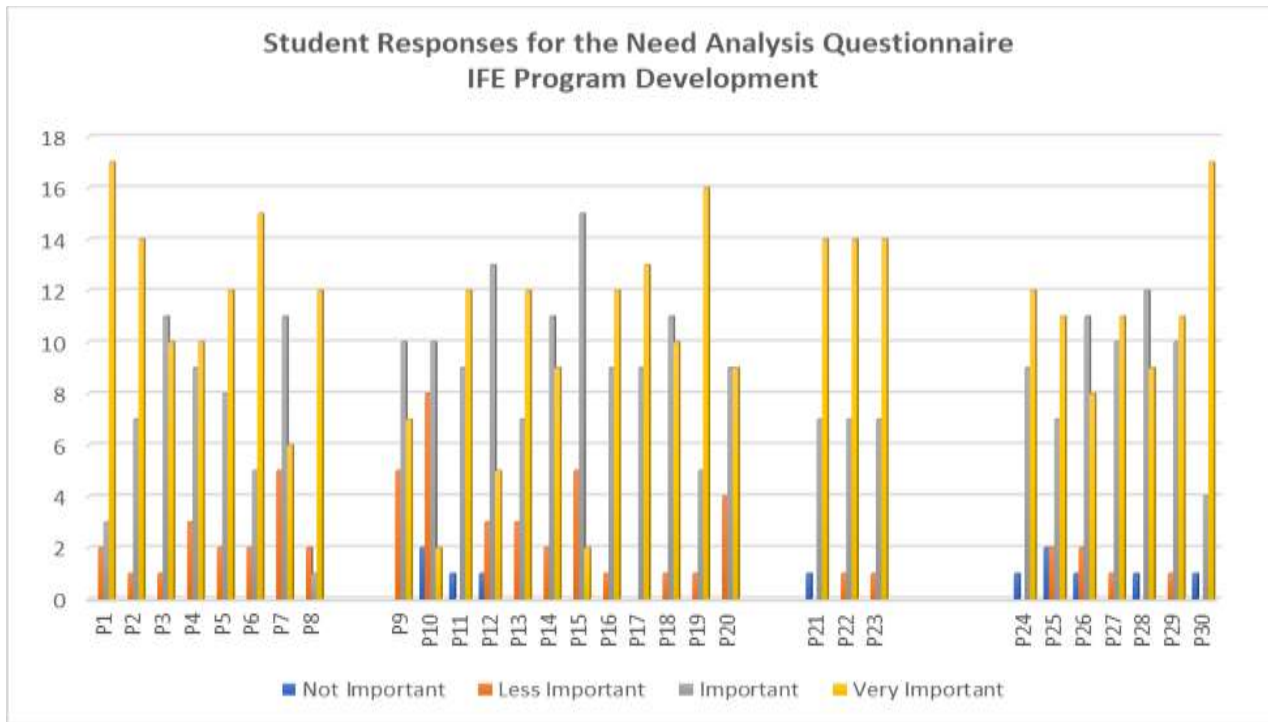

Fig. 1 - The chart of students' responses for the need analysis questionnaire of the IFE program development
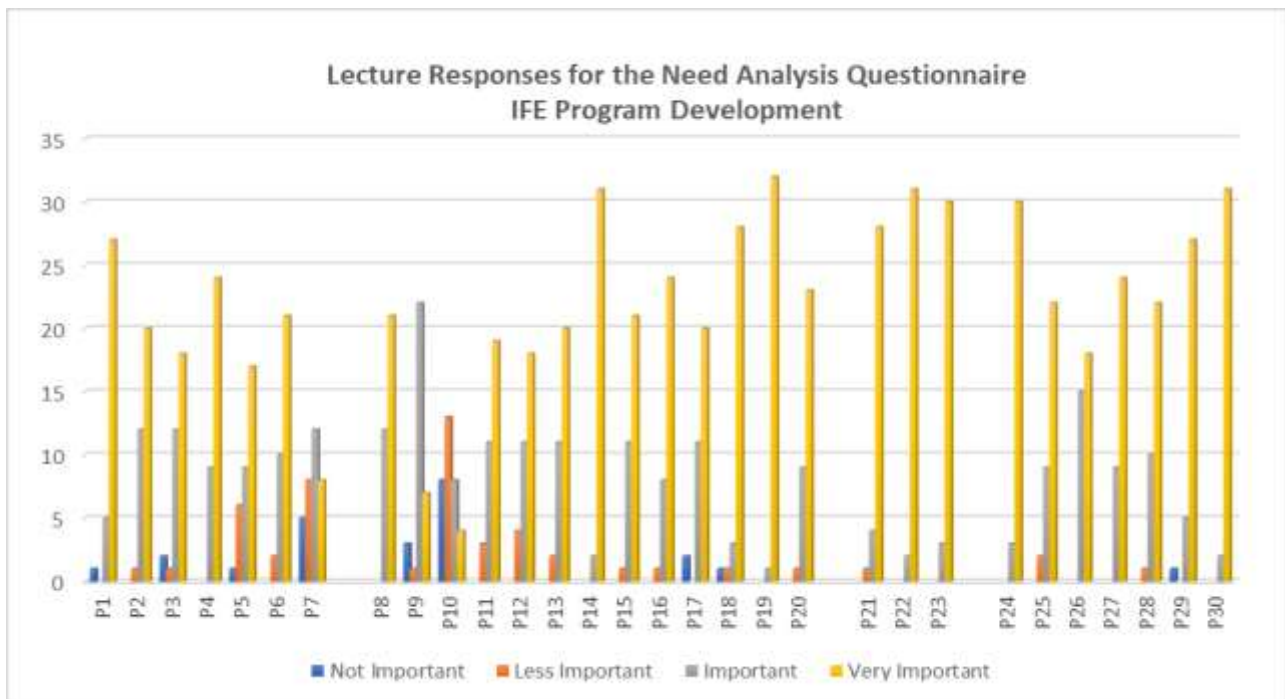

Fig. 2 - The chart of student responses for the need analysis questionnaire of the IFE program development

3.2 Pre-IFE Stage (P1-P8)

The university provides web.akama dedicated for all administrative processes related to paperwork and permission for students ready for IFE. Facilities provided include provisioning registration, provisioning implementation, proposal letters of IFE, the appointment of supervisory lecturers and issuance of an IFE letter of assignment. The web.akama was designed to help students until their IFE deployment, after which no further service was provided. The web.akama is currently accessed by students, IFE coordinators and the IRU. Supervisory lecturers and field supervisor have no access in any form to it. It has been suggested that improvements should be made to web.akama, including: expanded utilities that include controlling capability to monitor student attendance in the field and final evaluation after the completion of IFE. It should be redesigned with communication in mind to allow access by students, IFE coordinators, and supervisory lecturers and field supervisors so that in case problems arise in the field, they can be directly discussed via the web. The IFE coaching that has been regularly held so far at the faculty and department levels is very much needed by students because activities in the field are explained in detail (Teoh, 2006). So far, the speakers for the debriefing are only from the UNP academic community, which is not exactly attractive to students. It would be better if the speakers are industry figures/stakeholders who are experienced in certain fields and can explain in real terms the fieldwork that students will have to carry out during an IFE.

Stakeholders also communicate what competencies necessary for the industrial world that students need to possess post-graduation. This is in line with the vocational education planning that is driven by market demand, that is, in case the industry is recruiting, alumni are properly prepared for employment (Kementerian Pendidikan dan Kebudayaan, 2016). The IFE provision attended by stakeholders does not have to be held physically in the real world, since the digital era, virtual meetings are more flexible. Stakeholders have their own matters to attend, which could make them unavailable for a meeting. With a virtual method, they can still deliver important materials anytime anywhere. In obtaining an IFE destination that fits the requirements, students face difficulties if they have to survey the industry on their own. It is not uncommon for students to put off their IFE because they do not get a place. To overcome this, universities need to collaborate with industry so that students can carry out IFE in accordance with industry agreements. It is hoped that IRU will have a mapping of companies in the field of civil engineering related to status and classification to make it easier for students to choose IFE destinations. Information regarding the list of companies for IFE that have collaborated with universities should be found on web.akama. In order for students to be motivated to implement IFE outside West Sumatra or in big cities with larger projects to gain experience in the field of construction technology, it is better if the costs that arise are subsidized by the university because cost constraints are one of the reasons why the rate of IFE outside the province is low.

Some students are confused on what they should do in the field because there is no agreement for tasks they need to execute. Students should make a Learning Plan before they start an IFE, which contains: a description of the position and job during the IFE and the objectives of the IFE, and describes the competencies that students are expected to acquire during the IFE, both technical competence and soft skills. In the early stage, students are expected to prepare several pages of resumes containing personal information, educational achievements, interests, and relevant co-curricular activities (Jamaludding et al., 2013). All IFE goals can be realized by having a preliminary meeting of supervisors to coordinate with field patrons and to discuss expected competencies in accordance with the curriculum in higher education. In accordance with the SIWES (Students' Industrial Work Experience Scheme) stated that the relationship between school and industry is vital for the workforce needed by a market that prioritizes skills (Usman & Tasmin, 2015). From previous industry visits, it was noted that some companies did not carry out proper training programs, and as a result, students ended up doing irrelevant assignments (Jamaludding et al., 2013).

Competencies gained during an IFE are the results of programs designed in the university (school base program). To achieve desired competencies after the completion of study, the industry must devise a program suitable to learn at school/higher education levels (industrial-based program). Example of implementation of the industrial base program is Teaching Factory. The principal idea of Teaching Factory is "Factory to Classroom" aimed to transfer actual industrial production environment to the practice room. Actual production processes are greatly needed to improve learning competencies based on real industry practices daily. Teaching factory is a novel approach for vocational education with the goals of (1) modernizing learning process by bringing students closer to industry practices; (2) leveraging industrial knowledge through new knowledge; (3) supporting the transition from manual to automated labour and reduce the gap between industrial resources (workers and capital) and industry knowledge (information); (4) improving and maintaining the growth of industrial wealth; and (5) ultimately promoting graduates' capability development (Kementerian Pendidikan dan Kebudayaan, 2016).

In its practice, laboratories/workshops are places for scientific research, experimentation, investigation and proving scientific studies, or in other words, they are a first-line sentinel of learning process. Adequacy, comfort and standard safety are the priorities of these spaces. They will increase in value if each laboratory or workshop has the latest equipment and facilities according to the knowledge and technological advancement, for example, computer laboratory with the latest hardware and software and/or workshop with the same equipment/facilities as the business and industrial world. If possible, schools should build a super plus laboratory, so that they can be a laboratory of the business and industrial world, not the other way around (Bakrun; Widjajanti, 2018).

Regarding the ideal time for carrying out IFE, students and lecturers prefer to do it after students take 80% of the total credits with a minimum GPA of 2.0 and have passed the prerequisite courses compared to after passing all courses except the IFE and Final Project/thesis. If students carry out IFE before completing their courses, their schedule is limited to break period. Therefore, it is almost impossible to take upon an internship offer from the company.IFE Performance Stage (P9-P20).

3.3 IFE Performance Stage (P9-P20)

To date, IFE in the Civil Engineering Department of the Faculty of Engineering of UNP typically runs for two months during the semester break. Students felt this is too short to acquire a meaningful experience in the field and the industry also suggested that IFE run for 6 months so that students could be invited to work as project personnel. In the questionnaire for IFE duration, there were 2 alternative options asked, namely a maximum of 6 months (effectively present in the field) or a minimum of 6 months to 12 months (effectively present in the field), It turns out that students prefer the first option, while the lecturers believe that IFE for 6 to 12 months is less important. Length of internship contrasts with the statement in the Independent Study Guide Book, which states that so far, students lack in work experience in the real industry/professional world. Thus, they are not ready to work. Meanwhile, short-term internships (less than 6 months) are not sufficient to provide meaningful industry experience and competence. Employing companies also revealed that short internships are useless because they disrupt activities in the industry (Belajar & Merdeka, 2020). Internship program for 1-2 semesters provides sufficient experience for students, and on the other hand, the industry gets talents that, if suitable, can be immediately recruited, thereby reducing the cost of recruitment and initial training (Blicblau, Nelson & Dini, n.d.). Students that are familiar with a workplace will have an easier time to adapt to the working world and their new career (Muhson et al., 2012). According to the input from the IFE coordinators, an IFE should run for a maximum of 3 months; thus, in a semester, students can finish both their practices and reports. However, an exception can be made for a company that requires 6-month practice period (typically an internship program). In light of this, learning processes outside the campus, one of which is Internship/Industrial Practice, planned by the Minister of Education and Culture, Nadiem Makarim (2020) is not yet a great importance or necessity seen from the perspective of students and lecturers in this study. In other words, the new policy cannot yet be implemented. According to Michael Fullan with his innovative theory, any changes to an education policy will affect various aspects in terms of its implementation, such as facilities and infrastructure, human resources, stakeholders and incentives for professional staff at regional and national levels (Fullan, 2007).

During IFE, students keep an activity diary in a logbook and consultation with their supervisor. Students felt that this only adds to their task and brings no benefits. However, from the notes in the logbook, something interesting could be found in the field that can be used as a case study and could even continue as material for their final assignments. Another obstacle faced by students in the performance of IFE is that the learning plan they made is inexecutable. This may happen for various reasons such as the planned work has been completed, the desired position has been filled by students from other universities, and others. In the field, students are guided in detail on a task by a mentor, meaning that with a learning plan made by students before IFE, the company has prepared a mentor that will guide them for the achievement of desired competencies (Azodo, 2018). Internship with mentoring system because students learn with jobsheet and communicative guidance in completing daily tasks. Internship with mentoring system is a great opportunity for students to learn according to their expected future professional career. This shows that in addition to mentor support, an internship should also take into account the consequence of students' decision (Kramer-Simpson, 2018).

During IFE in the field, students should deliver a progress logbook and learning plan to their supervisors on akama web, which has not been implemented. In IFE, students should be involved in actual tasks related to the field (Teoh, 2006). Students should work following applicable working hours and regulations in the workplace. It is expected that students proactively learn and observe as much as possible what they are possibly able to do on the field. Thing which is not less important is maintaining ethics, complying with and respecting applicable rules and regulations as well as preserving the confidentiality of data and information of the place in which they are placed in. Students must practice discipline during IFE because late attendance/absence or failing to maintain manners and code of ethics can result in students failing IFE.

Lecturers need to make field monitoring and evaluation in order to establish a good relation with industries and resolve any students' issues (Gibson, 2013). However, the performance of monitoring and evaluation activities is far from optimal due to the lack of funding. Not all students are visited by their supervisors and in particular for students who have their IFE outside West Sumatra, the activity depends on the amount of funds available from the faculty. This monitoring activity can also be carried out online via the akama website where discussions can be held by the parties concerned about the smooth running of IFE. The benefits of the monitoring activity can be maximized with harmonious cooperation between two coordinators, namely the academic internship coordinators and industry supervisors (Kramer-Simpson, 2018). Periodic control with a clear format by the supervisor alongside the IFE supervisor must be done to observe the course of the IFE and the conditions and constraints during the IFE. Monitoring by supervisors is important to evaluate student performance and maintain good relations with industry. Monitoring to the company in which the IFE is held needs to be done to get information on student activities and what competencies are needed by the company in the future (Golich et al., 2018).

3.4 Post-IFE Stage (P21-P23)

After the completion of IFE, students must report to the supervisor bringing all IFE documents. Students must obtain a certificate and IFE score from the field supervisor. The score obtained is often not a clean score due to cooperation between the student and field party. To date, IFE assessment is directly given to the students thus tainting its confidentiality. It would be better if the assessment was given directly to the supervisor. The assessment is based on the logbook, executive summary, employer's survey, communication, ethics and professionalism. There is also an assessment aspect that requires stakeholders to fill in a survey from to assess student performance during a training period. Through this survey, the faculty also receives feedback from the industry on how to improve the program (Jamaludding et al., 2013). Then, students are required to compile an IFE report and arrange a consultation with the supervisor. Since a project can be shared by 4 individuals, to identify any proof of plagiarism supervisors need to apply extra care in examining these reports. Final IFE reports should be presented in front of peers and juniors to provide references for those have not carried out or are about to carry out IFE and to serve as a presentation practice for the student in question.

3.5 IFE Evaluation Stage (P24-P30)

IFE report evaluation must include task description, learning goal accomplishment, task completion and problem-solving abilities and competence in achieving project targets. After IFE, the supervisor assesses the accomplishment rate of IFE based on IFE goal accomplishment rate. Evaluation can also be seen from the student's IFE final score taken from: 30% from field supervisor score, 40% from verbal examination by the supervisor and 30% from report score. The main objectives of students carrying out IFE is the achievement of competencies expected in accordance with the field. The competencies consist of hard skills and soft skills. So far, students do not gain the best experience as they are supposed to, resulting in employment unpreparedness. At the same time, short-term internships (less than 6 months) are not adequate to provide necessary, though preliminary, industrial experience and competencies for students. Employers have expressed that short-term internships bring no benefits; in fact, they serve more as a hindrance to industrial activities. In order for students to deserve a competency certificate after the completion of IFE, according to the Independent Study, Independent Campus guidebook, the IFE program is reformed into an internship program with 1-2 semesters in length to provide more experience for students and to facilitate the industry to recruit a person as they see fit which leads to a reduction in recruitment and preliminary training costs. Students that already have an idea about the workplace they are targeting will have an easier time adapting to the new job or career.

The internship program in question called Certified Student Internship Program (CSIP), designed collaboratively with the industry and colleges. With CSIP, students will use up their remaining credit in that semester at the industry, and after its completion they will receive an industrial recognition in the form of an industry certificate (Belajar & Merdeka, 2020). Students are also assessed based on their initiatives to improve the results of practice in the field, initiatives to solve or overcome problems encountered and initiatives to collaborate with other people/the IFE team. In addition, they are also assessed in terms of their ability to adapt to situations and conditions at the practice site. These abilities are called soft skills that are needed in the world of work. Interviews with industry partners revealed that specific academic skills are indeed required, however, the most important aspects but not many people are aware of for the current and future job market are teamwork, communication, problem-solving skill, leadership and critical thinking (Golich et al., 2018). In line with the demand for 21st-century skills needed, Partnership for 21st Century Skills (P21) (2005) and Trilling and Fadel (2009) present the skills that students must possess in this century. Here are the details:

a) Communication and collaboration: A person must have good communication skills, so that the interlocutor can understand the meaning of the thoughts conveyed. Collaborative learning helps students develop and achieve their communication skills. Learning together in teamwork at IFE place enables students to overcome communication difficulties, develop social and critical thinking skills, encourage reciprocal interaction, and help prepare students for challenges in the workplace, where collaboration and communication skills are needed in many careers (Aliyu, 2017; Fadel, 2009).

b) Critical thinking and problem-solving: Critical thinking is a skill that underlies solving a problem. A student must have this skill because it is needed in finding the right solution to a problem where the source of the problem must be found. This is in line with what Yasushi Gotoh (2016) stated, that critical thinking skills are a set of skills and tendencies that allow a person to solve problems logically.

c) Creativity and innovation: Creative learning means understanding and developing students' creative abilities and encouraging them to believe in their creativity and providing opportunities for them to be creative using activities, methods, media, and assessment (Tran, LTB, Ho, NT, & Hurle, 2016). During IFE, students are required to display creativity and innovation in activities, such as doing something that is not usually done by others but which has an effective impact on these activities.

d) Information literacy (IL): IL facilitates students to evaluate and contextualize information sources and promote students as the researcher and contributor in dissemination (Bury, S., Craig, D., & Shujah, 2017). They stated that students well-versed in IL wouldstudy more independently and take better control for their academic achievements.

e) Information and communications technology (ICT) literacy: Technology has greatly inspired students and drive them to study more about learning materials (Bahadorfar, M., & Omidvar, 2014). Technological tools are more interesting and able to provide fun learning, motivating and assisting them to improve their study in a beneficial way.

f) Flexibility and adaptability: An understanding of flexibility and adaptability contributes to successful communication, whereas a lack of these skills can lead to failure. Currently, employers actively seek graduates who not only have many resources and adaptability but are also flexible and can adapt to ever-changing circumstances and environments, welcome new ideas and come up with new ways of solving problems (Kivunja, 2015).

g) Social and cross-cultural: Activities related to cross-cultural materials are great in helping students to understand and improve their skills and abilities amidst cultural diversities, cross-cultural communications, empathy, willingness to work collaboratively and in a cross-cultural network and interact with people from different cultural and social backgrounds (Partnership for 21st Century Skills, 2005).

h) Leadership and responsibility: IFE activities can foster interpersonal and problem-solving skills to influence, guide and be responsible toward other people. Students are taught to be a leader and act responsibly through several tasks in the field. This way, they receive meaningful feedbacks regarding problem-solving, building positive cooperative relations, conflict resolution, diversity awareness, confidence, integrity and work ethic (Al-Jammal, 2015).

4. Conclusion

These results of need analysis are summarized based on students and lecturers' opinions and expectations that include their wish for cooperation between the campus and industry. The pre-IFE stage alleviates the difficulty in finding an IFE destination, guidance and explanation by the industry during the briefing and financial support from the campus to encourage IFE outside West Sumatra. Furthermore, akama website that is meant to facilitate the IFE program must be bolstered with more supporting features. In order to achieve the expected IFE competencies according to the curriculum, the supervisor must hold an initial meeting to explain to the industry. An IFE typically runs for two months and the industry has expressed their wish for it to be extended to six months. A learning plan describing positions and tasks needed by students is necessary in order to obtain a mentor in the field for the achievement of competencies. Monitoring and evaluation activities by the supervisor are necessary to evaluate student performance and maintain good relations with the industry. After the completion of IFE, students are granted a certificate and IFE score by the field supervisor, and the industry provide their inputs on how to improve the IFE program. The students are not only evaluated and assessed in terms of academic competencies but also in terms of soft skills as required in the 21st century, namely: communication and cooperation, critical thinking and problem-solving, creativity and innovation, information literacy, information and communications technology literacy, flexibility and adaptability, social and cross-cultural and leadership and responsibility. Lastly, it can be concluded that constant development of the IFE program is necessary to achieve its goals. For further researchers, being able to examine the IFE program being developed is judged on how much application it is in the field.

Aknowledgement

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