Why is School-University-Industrial Partnership Management Relevant in 21st Century Education?

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Abstract. This study aimed to analyze the relevance of School–University–Industry Partnership Manage-ment (SUIPM) in improving students' employability skills. The study addresses two research questions: How can students' employability skills be strengthened through SUIPM?; and How can teachers appreciate the SUIPM to strengthen students' employability skills? This research used a qualitative methodology conducted with a survey. The research participants were twen-ty-seven industrial chemistry teachers in Central Java, Indonesia. Data were collected in two ways: through interviews and questionnaires with Google Forms. The collected data were ana-lyzed using an interactive model. The results showed that the SUIPM is a feasible strategy to be implemented to strengthen students' employability skills. The teachers provided positive appreciation for the SUIPM, considering it as a trigger for strengthening students' employability skills. The results also provide feedback on the "teaching factory"—a program initiated by the government—which so far has not had an optimal impact in preparing prospective skilled workers.

Key words: partnership management; school–university–industry; employability skills.

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INTRODUCTION

Modern industries in the 21st century are determining factors in the development of the nation-state (Fleckenstein & Lee, 2017). Industrialization efforts will continue to be made to support the community economy. Advanced industries require a skilled workforce trained through vocational education (Lyson & Welsh, 2005). The competence of a workforce and their perspectives on a job in an industrial environment determine the achievement of a company's targets (Lowden, Hall, Elliot, & Lewin, 2011; Saunders & Zuzel, 2010). Such labor is not only generated by experience in the work environment, but essentially, the educational process greatly determines the capacity and ability of the prospective workforce (Nisha & Rajasekaran, 2018). In Indonesia, the gap between the competence of vocational school graduates and the needs of the workforce is very real. Skilled graduates who are less able to maintain harmony (link and match) with the needs of graduate users become a problem that has not been solved until now (Baiti & Munadi, 2014; Fauzi, Suswanto, & Wibawa, 2020; Wibowo, 2016). This is quite unfortunate, because the needs of modern industries are skilled workers, in an adaptive, communicative, and professional sense, ready to face all the challenges of the work environment.

The population with the highest open unemployment rate based on education level is vocational school graduates, at 10.42% (BPS, 2019). These data indicate that education in the field of vocational schools is not enough to prepare a skilled workforce that has sufficient skills and professionalism. This means that every graduate of a vocational school is currently considered less capable, less adaptive, and difficult to develop professionalism. In the 21st century, employability skills (ES) have become a concept that needs to be internalized into learning, so that students can understand and be prepared for post-school life (Scott, Connell, Thomson, & Willison, 2019). ES is a determinant in preparing skilled personnel who are ready to contribute to industrialization in various manners. Results of the preliminary study showed that the partnership management model between schools and industry, known as Teaching Factory, has not had a significant impact on reducing the number of vocational school graduates who cannot be employed by the industry. Teaching Factory only provides students with insights into practical, theoretical industrial life (Fuadi, 2016; Prasetiyo, 2020); it does not guarantee that students can synchronize the knowledge they have with the work they will perform.

Employability skills are individuals' perceptions of their ability to keep working or find other jobs according to their interests or desires. Employees with high employability do

not depend on one company to keep working, but rather depend on their ability to work (Collet, Hine, & Du Plessis, 2015). Thus, the mastery of employability skills is important so that graduates have good job preparation and are able to withstand various job challenges, because employability has a strategic role in determining one's success in their work (Suleman, 2016). Employability skills are considered very important because each job demands initiative, flexibility, and the ability of a person to handle general, fundamental tasks. This means that the skills of the workforce do not have to be specific, but need to be oriented to services; more importantly are social skills (de Guzman & Choi, 2013). This competency is vital for the industrial world, which is quite dynamic and moves quickly to keep up with the rapid developments in today's society.

Teaching Factory, which only focuses on the business world and the industrial world (BWIW), is widely complained about by industries because it is considered burdensome; it is time-consuming and demanding to have to re-learn theories (Fajaryati, 2012). Daily life is related to skills and professionalism in the context of work or service. Training students and providing them with knowledge is considered less effective, considering that students also gain industrial work practices (Prakerin) that can provide hands-on experience related to work in an industrial environment. This concept in some schools is difficult to apply ideally; Fuadi (Fuadi, 2016) explained that schools have difficulty adapting Teaching Factory into learning because there are aspects that need to be synchronized and it takes a long time, for example, in the development of teaching factory structures in schools. This means that teaching factory learning is not run optimally, and the expected results have not been obtained.

Partnership management based on schools and industry alone is considered not strong enough to develop ES graduate vocational schools (Lestari, 2014). In practice, it appears that the school relies on the professional competence of students in the role of industry, when there are two aspects that need to be considered by the school; the first is the role of education in the context of the transfer of knowledge and the role of professionals in the process of making experiences. Both of these roles should be considered for contextual implementation. For theoretical matters and improved understanding, schools are less suitable for the industry to rely on for teaching the role of practitioners in teaching factories. This occurs because there is an unbalanced process in preparing the skilled workforce of vocational schools, where the role of universities which are supposed to be aligned with schools or industries is treated separately; this makes the resulting learning process un-collaborative, and lifelong learning that could be accelerated by universities cannot run contextually. Therefore, breakthroughs are needed in building partnerships and developing management practices which are oriented for developing ES and preparing skilled graduates who are ready to enter the world of work.

Previous studies have shown that the role of universities in developing the skills of vocational school graduates who are ready to enter employment is indispensable. Suryandari, Hidayah, Baroroh, and Hajawiyah (2021) explained that to produce learning which has an impact on improving the competence of learners, it is necessary for teachers to continue to actualize their teaching skills. This process can be built through college activities with the aim of improving teacher competence, through training, workshops, and technical guidance. The activities enable teachers to continue to develop their competencies, and then nurture students to become skilled individuals. Prasetiyo (Prasetiyo, 2020) showed that the application of Teaching Factory in schools has become an important breakthrough for synchronization between the worlds of education and industry, although the dependence of schools on the knowledge provided by practitioners has led to weaknesses in the implementation of this program. Coaching skilled graduates who are ready to enter the world of work not only needs to be supported by the industrial sector as a potential benefactor, but most importantly, is how students can optimally learn about new knowledge in the industry; this is only possible if universities enter the process through more progressive partnership schemes and are able to respond to the challenges of change.

Based on the description above, this study aimed to analyze the role of universities for vocational schools in producing graduates who are ready to enter the world of work with sufficient employability skills (ES). This research seeks to initiate the emergence of more dynamic partnership management in strengthening ES and focuses on school–college–industry collaboration. The concept was also introduced as School-University-Industrial Partnership Management (SUIPM). The research questions of

this study are: How can students' employability skills be strengthened through SUIPM?; and How can teachers appreciate SUIPM to strengthen students' employability skills? An important contribution to this research is the novelty of partnership management, which was introduced to provide reinforcement for teaching factories which have been endeavoring to equip students with employability skills that are relevant to the needs of the industry.

LITERATURE

Employability Skills (ES) are a necessary competency for vocational school graduates to enter the industrial world (Nisha & Rajasekaran, 2018). ES means a proficiency in carrying out and completing work as expected. ES are a set of skills that include fundamental skills, self-management skills, and teamwork skills. ES are needed by every school through the integration of a curriculum oriented towards coaching graduates who have professionalism and rapid adaptation patterns. ES need to be supported by 21st century competencies known as 4C: Critical Thinking, Collaboration, Communication, and Creativity (Zubaidah, 2018). These skills have not been developed optimally through the Teaching Factory scheme, as described by Suryandari et al. (Suryandari et al., 2021) and Prasetiyo (Prasetiyo, 2020); the management of school partnerships with existing industries has not been a trigger for the development of work skills with strong knowledge bases. ES are still not included as an important discourse in preparing graduates with contextual competencies for the industrialized world.

Partnership management which emphasizes school and industry collaboration is not yet complete enough to internalize actual knowledge. Another support system is needed that can complement school and industry collaboration which has been conducted through the Teaching Factory program. Cherednichenko (2020) explained that universities have a strategic position to strengthen the capacity of schools in fostering graduate skills. The roles of universities can be mentoring teachers in developing learning tools, media, and learning resources that integrate certain skills. The skills in question can be filled with ES which aspire to synchronize the quality of graduates with the needs of the industry.

School–University–Industrial Partnership Management (SUIPM) can provide school opportunities to determine the learning management of vocational students that are more contextual in terms of objectives, and actual in terms of the knowledge provided. This idea allows students to learn theories and practices from a more balanced perspective, and each element in this partnership lacks burdensome dependency, as was the case in the implementation of teaching factory. That dependency can be a management point performed at the time of the formation of the partnership management structure, including the duties and responsibilities of each element in the development of ES. In the end, the management of this partnership may provide constructive criticism for the Teaching Factory program that has been judged to not be strong enough in developing student ES, in addition to the proposed partnership management, which is also an important concept that may affect the capacity of the school in preparing skilled personnel who are compatible with the needs of the industry, in an adaptive, communicative, and professional sense.

METHODS

Research Goal

This study emphasizes two focuses: the relevance of SUIPM to student ES, and teacher appreciation of SUIPM. Qualitative analysis was reviewed from teacher per-ceptions and literature support related to ES and vocational education partnership management in the *teaching factory program*. To achieve the purpose of the designed research, the literature was studied, concepts were described, *focus group discussions* were conducted, and conclusions were drawn. Qualitative approaches give researchers the opportunity to dig deeper through specific open questions in describing the problems studied.

Data and Data Collection Technique

As a qualitative project, this study relied more on verbal data to analyze the problems studied (Cresswell, 2014). The data were compiled from twenty-seven teachers of industrial chemistry in Central Java as research participants. The selection of participants applied purposive techniques; this involved teachers of industrial chemistry groups from various backgrounds and different working periods in providing information. Data were collected in two ways, namely, interviews and questionnaires with Google Forms. Interview techniques were used, first through focus group discussions after researchers had explained School–University–Industrial Partnership Management (SUIPM)

conceptually; then, the study participants were asked to fill out questionnaires on Google Forms with the intention of providing factual responses to SUIPM and its relevance to strengthening student ES.

Analyzing of Data

The data analysis explored the framework of interactive data analysis developed by Miles, Huberman, and Saldaña (2014) with four main stages, namely, data collection, data reduction, data display, and conclusion drawing. The data collection was performed by means of a literature study and focus group discussion. The data reduction was performed by removing less relevant information or information unrelated to the focus of the research. The data display stage involved exploring and coding the themes that were determined in the interviews and completing the questionnaires. To facilitate this process, the two main codes in the presentation of data were adjusted to the research question (RQ). Meanwhile, the participants were identified by 6 data codes, namely, Participant 1 = P1, Participant 2 = P2, etc. The last stage was the forming of conclusions by discussing data in relation to previous studies which have been conducted. The result is a descriptive analysis that promotes the relevance of School–University–Industrial Partnership Management (SUIPM) to strengthen student ES.

RESULT AND DISCUSSION

RQ1: How can Students' Employability Skills be Strengthened with SUIPM?

Teaching Factory, which has been relied on to develop student skills relevant to the needs of the industry, has been proven to not show significant results. The Teaching Factory design itself is still not perfect for developing student competence in accordance with the pace of industrial development. P1 argued:

> Teaching Factory has shortcomings in terms of the novelty of knowledge delivered to students, therefore it is necessary the role of universities engaged in the devel-opment of knowledge in order to strengthen learning devices and materials taught to students.

This opinion is relevant to the existing conditions and public criticism of the Teaching Factory, which has not been implemented as expected. P1's opinion was supported by P3, who stated that:

> School is the first place in studying science, the college is a place of actual and relevant science development to the needs of the community, it is natural that universities are not only involved separately, but integrated with the implementation of school and industry partnership management.

The employability skills factor determines the industry's acceptance of graduates produced by vocational schools. This factor is not only limited to the mastery of certain technologies, but also to social skills and patterns of labor adaptation to knowledge and technology that continue to evolve. P2 argues that:

> Employability skills are closely related to partnership management applied in vo-cational schools. Partnership management involving universities can open op-portunities in strengthening the fundamental skills of students who belong to employability skills. Knowledge from universities can complement the knowledge provided by teachers and practical skills gained from the industry.

Based on the above opinion, employability skills have become determinants in strengthening the industry acceptance of vocational school graduates with work skills and mature patterns of self-actualization. P4 argues that:

> Employability skills of students develop because one of them is the learning pattern that is used in school. Partnership management based on Teaching Factory only provides additional insights into the work system in the industrial world without the social knowledge that can be used for self-actualization. I think it would be very relevant if universities were also involved in the development of employability skills.

The opinions of P2 and P4 complement the existing implementation of teaching factory in vocational schools. P1 argues:

> Skilled workers not only have human indicators that can work, but also humans who have complex knowledge of a job and He also has the ability to continue to

develop with rapid adaptation capabilities, clear communication, and consistently implemented professionalism. It can be done if the management of school and industry partnerships also involve universities as an element of reinforcement in their implementation.

The opinions expressed by P1, P2, P3, and P4 provide a strong argument that the teaching factory, which was expected to strengthen students' employability skills in practice, has not produced a significant impact. This is quite unfortunate for teachers; however, there are opportunities for improvements to the system which is already in practice by including other factors that may be able to strengthen the system.

Partnership management with only two elements, such as those in the teaching factory scheme, still requires supporting elements. This means that there needs to be an alternative partnership management model which can be used by schools to prepare skilled and relevant workers for the needs of the industrialized world. Skilled labor in this context means graduates who have strong adaptive skills, clear communication, and consistent professionalism. To develop such skilled personnel, the management of partnerships involving universities can be considered. This conceptual partnership model is School–University–Industrial Partnership Management (SUIPM), which is illustrated in Figure 1.

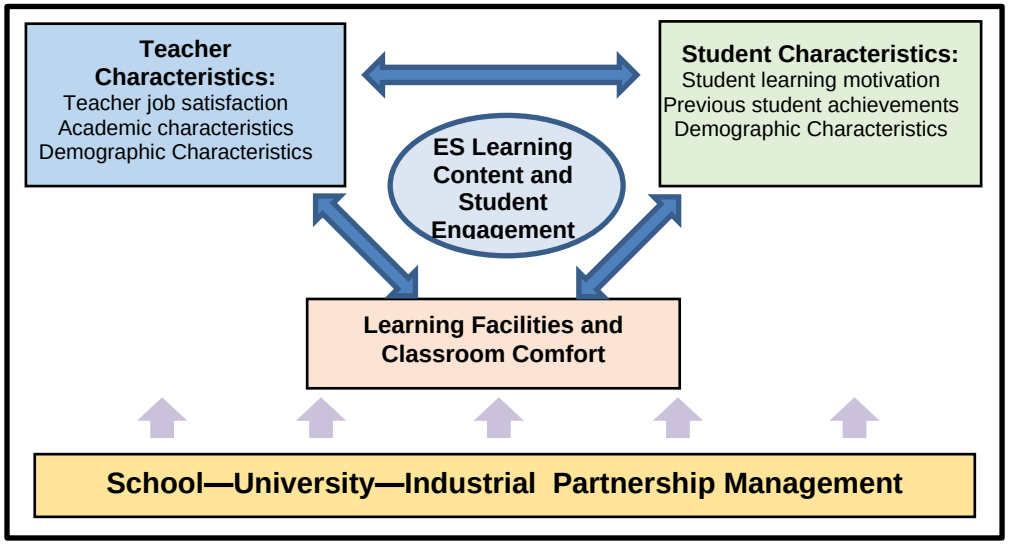

Figure 1. Conceptual Models School University Industrial Partnership Management (SUIPM)

SUIPM is the result of extrapolating the aspirations of participants in vocational schools who have provided constructive criticism of teaching factory programs. The current system requires strengthening in other elements that can provide reinforcements to teacher performance in learning, especially in relation to the delivery of actual knowledge relevant to the needs of the industry. Thus, through the application of this management model, students are able to gain a complex understanding of work skills, and those skills are relevant to the needs of the industry.

SUIPM encourages improvement in learning quality, especially concerning teacher and student characteristics. Other important factors are taken into account in the implementation of SUIPM in strengthening students' employability skills, namely, learning facilities and class size comfort. The role of universities in partnership management prioritizes strengthening integrated ES learning through an intensive mentoring process; guidance conducted by academics from universities will be very important, considering that, thus far, the learning preparations have not considered employability skills as knowledge that needs to be mastered by students. In addition, SUIPM is projected to develop fundamental skills, self-management, and teamwork. Thus, the quality of vocational school graduates is relevant to the needs of the industrial world.

RQ2: how do teachers appreciate SUIPM to strengthen students' employability skills?

SUIPM is an alternative partnership management that can be used to strengthen the teaching factory program currently in practice. The output of the implementation of SUIPM is

strengthening the students' employability skills, so that the competence of vocational school graduates is relevant to the needs of the industry. P5 argued:

> I think the attachment of SUIPM variables is adequate, and most importantly the output of adequate employability skills and graduates absorbed in the world of work. Cooperation with outside parties, especially universities as a support system and industry that will use vocational school graduates to be more relevant. SUIPM can strengthen two sides of the implementation of Teaching Factory that still does not meet expectations, namely; intellectual side and social skills.

The opinion of P5 is agreed with by P6, who assessed the SUIPM as an ideal partnership management model that can prepare a skilled and professional workforce. This model emphasizes the involvement of universities, not in practical aspects, but rather on improving the quality of learning (pedagogy) that encourages students to be actively involved in developing their competencies autonomously. P6 argued:

> From the model of partnership management promoted already looks interrelationship between variables. We from the school really hope that the partnership management model offered can give better results from teaching factory. It takes a party that is willing to guide productive teachers in carrying out the learning process, because it is known that productive teachers do not have a background in teacher education and teachers also need the latest knowledge updates, so that it does not persist with the old theory that we fear is no longer relevant to students.

The renewal of knowledge in the form of theory and concepts related to the focus of student studies is necessary to maintain the quality of graduates who have skills relevant to the growing industry. The opinions P5 and P6 were in line with the opinion of P2:

> Universities can be an element that reinforces the quality of learning, particularly in solidifying the gap between theory and practice that vocational schools have faced. Universities can act as a distributor of actual knowledge and oriented to the formation of the character of vocational school graduates.

P2's opinion was supported by P3:

> The formation of this character is often forgotten in the teaching factory process, so perhaps students have skills, but not balanced with good character; manners, manners, accepting differences, caring, and being able to work with teammates. In addition, SUIPM also has the opportunity to create 4C-charged learning; Critical Thinking, Collaboration, Communication, and Creativity contextually with educational purposes. The knowledge of the college that is always up to date will be very meaningful in preparing contextual learning tools.

The above opinion reinforces the urgency of SUIPM for vocational schools. Partnership management is an idea which is positively appreciated because it is considered to be an alternative to solving problems that have been faced in the implementation of the Teaching Factory, as well as triggering the adoption of the latest educational concepts developed from academic insights in universities. P1 argued:

> I support SUIPM because conceptually the variables that are compiled are quite strong and have a connection to each other. This model has the advantage in terms of college involvement to strengthen the intellectual capacity of teachers and students. We hope that SUIPM also includes training activities and mentoring the preparation of learning tools that are integrated with employability skills. Those skills are a relevant output for today's learning and relevant to the needs of the industry.

The opinions expressed by P5, P6, P2, P3, and P1 expressed a positive appreciation of SUIPM as a criticism of the Teaching Factory program and as an alternative partnership management scheme oriented towards strengthening students' employability skills. SUIPM may be worthy of promotion as a partnership management model that situates the role of the university as creating an active and contextual learning climate. The aspirations of teachers, such as in training and

mentoring, are important keywords to promote SUIPM as an ideal model of partnership management capable of preparing a skilled and professional workforce which suits the need of the industry. In other words, SUIPM is relevant for strengthening contemporary vocational learning.

This study sought to explore teachers' perception of the SUIPM conceptual model in strengthening students' employability skills. Encouragement from various parties who seek to standardize the quality of vocational school graduates with industrial needs is the strongest reason why SUIPM is promoted (Kurniasih, 2020; Resmiati, 2021). The findings of this study support Prasetiyo's opinion (Prasetiyo, 2020) that Teaching Factory, as a government program for preparing skilled workers, has not had a significant impact in achieving its goals. This partnership model has only impacted skill mastery and the improvement of technical skills for vocational school graduates. Employability skills are not in the main discourse in teaching factory implementation. Therefore, the partnership model still does not consider universities as integrative elements in strengthening the competence of graduates relevant to the needs of the industry.

This study also supports Suryandari et al. (Suryandari et al., 2021), in that the competency of vocational school graduates can be improved by involving universities in the process of improving the quality of learning. This improvement can be achieved through training, mentoring, and the creation of learning tools that integrate employability skills. Through the implementation of SUIPM, students can learn new knowledge needed in the industry. This is based on the fact that during the implementation of Teaching Factory, the development of skilled laborers focused more on practical aspects (Fajaryati, 2012; Fuadi, 2016). Universities provide up-to-date knowledge, needed for strengthening students' competencies.

In addition, the above conditions have a direct impact on the quality of graduates who have weak social skills. It is vital that this aspect is considered in the industry, because in later work, students are not only required to work individually, but also have the opportunity to work in teams (Fatimah, Jamal, & Suyidno, 2013; Wardani, 2011). Therefore, SUIPM which is oriented towards strengthening fundamental skills, self-management skills, and teamwork skills should be considered to improve the implementation of Teaching Factory, which has not had a real impact on schools or industry. In addition, this partnership management model provides a place for students to learn the components of 4C—critical thinking, collaboration, communication, and creativity—through learning activities in classrooms; SUIPM is a partnership management model which has conceptual advantages. This is based on the positive appreciation of teachers who judge this model to be constructive criticism and an improvement of the implementation of Teaching Factory. Through the support of various teacher characteristics, student characteristics, learning facilities, and class size comfort, SUIPM is increasingly contextual with efforts to strengthen students' employability skills (Collet et al., 2015; Scott et al., 2019). Therefore, the workforce produced by vocational schools has competencies that suit the needs of the industry, in an adaptive, communicative, and professional sense. Ultimately, this model should be promoted as an alternative to partnership management, relevant to today's education and modern industries in that it emphasizes the complexity of the skills of prospective workers in order to achieve educational and industrialization goals.

CONCLUSION

This study analyzed the relevance of School–University–Industrial Partnership Management (SUIPM) in developing student ES. The management of this partnership is considered to have an advantage in preparing a skilled workforce, especially the factors of universities that stand as liaisons in instilling the interests of industry in vocational schools, which has not been optimal in the implementation of Teaching Factory. The college factor in partnership management is also an actual knowledge transfer booster for students in vocational schools. Teachers provided feedback that the existence of universities in this partnership is considered to strengthen teacher involvement and support student activity within the framework of 4C learning: critical thinking, collaboration, communication, and creativity; therefore, ES students have the opportunity to develop better. In the end, SUIPM has become an alternative strategy which is important to consider in strengthening the vocational education process aimed at preparing skilled workers relevant to the needs of the industry.

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