Local Adaptive Curriculum Model (LACM) as An Alternative to Address Competency Gap Between Vocational School Graduates and Industry

Mustafa
Doctoral Program of Information System
School of Postgraduate Studies
Diponegoro University
Semarang, Indonesia
cakmustafa@unissula.ac.id

Adian Fatchur Rochim and Oky Dwi Nurhayati
Departement of Computer Engineering
Diponegoro University,
Semarang, Indonesia
adian@ce.undip.ac.id, okydwin@gmail.com

Abstract

According to the Central Statistics Agency data, the number of unemployed in August 2020 reached 9.77 million, with Vocational High School (SMK) graduates contributing 13.55% of the total. The Ministry of Education and Culture has revitalized SMK through an internship program in the industry for link and match program. However, in its implementation, it was found a problem that the learning curriculum in schools did not match the needs of the industry. This study uses qualitative research with open-end questions through in-depth interviews and Focus Group Discussions (FGD) with respondents, i.e., teachers, students, communities majoring in engineering in Semarang, Yogyakarta, Jakarta, Bandung, Surabaya, and Malang. In addition, the purposive sampling method was used to determine respondents from the ICT field majoring in Software Engineering, Animation, Visual Communication Design, and Multimedia. The result is recommendations for local adaptive curriculum models for vocational high schools (SMK). This model would adjust the competencies needed to ensure the competencies of SMK graduates meet industry needs. The local adaptive curriculum includes continuous development, implementation, and assessment processes through collaboration between government, vocational schools, and industry.

Keywords
Adaptive Curriculum, Vocational School, Unemployment, Continuous Improvement, Competence

1. Introduction
According to data from the Indonesian Central Bureau of Statistics, the number of unemployed in August 2020 reached 9.77 million. The most significant number was from vocational school graduates, which reached 13.55%. Whereas most students prefer vocational schools, aiming at being able to gain immediate jobs after graduating (Rintala & Nokelainen 2020, R F Maruanaya1 2021). Vocational schools must innovate to provide a learning environment that meets the industry's competency requirements (Boersma & Willem 2016, Büth et al 2017). As a result, the Ministry of Education and Culture revitalized vocational schools, including internship programs in the industry, link & match programs, and vocational school centers of excellence.

The revitalization of vocational schools mandated by Presidential Instruction No.9 of 2016 aims to improve the quality and competitiveness of Indonesian human resources. According to the Presidential instruction, all stakeholders in Indonesia must work together to revitalize vocational schools by increasing teacher human resources, redesigning curriculum to meet industry needs, and certifying students based on the Indonesian National Work Competency Standards or from the Industry, Business, and Work.

The mismatch of learning facilities compared to facilities used by industry and learning materials that do not follow industry needs contributes to the differences between vocational school graduates' competency and industrial needs. According to Amad Mukhadis' study, vocational schools must conduct self-evaluation in order to adjust their educational curriculum to meet the needs of industry (Mukhadis et al., 2018). The "*Link and Match*" program for vocational schools with Industry, Business, and Work (IDUKA) is a solution to the problem of discrepancies between the vocational school graduates' competencies and the industry's minimum competency requirements (Mukhadis et al., 2018). In her study, Leesa Wheelah, in 2015, mentioned that the vocational school curriculum should not only be academically oriented but should also develop an employment needs-based curriculum (Wheelahan, 2016). Schools must also create a conducive learning environment that is at least similar to industrial work patterns (Büth et al., 2017). It is expected that through the link and match program, vocational school graduates would be prepared to continue to adapt to the needs of the industrial workforce and the world of work. With the development of IDUKA, the curriculum in vocational schools must be adjusted regular
ly.

To increase the competitiveness of vocational schools, the Presidential Instruction and link and match program are under Linda Hobbs' research, which claims that school and industry collaboration is very beneficial if it takes place at the beginning of the education program, through curriculum preparation. Curriculum development in vocational schools can be centrally controlled and adapted to the school's resources and the area's industrial needs network. School-industry collaboration must be long-term in order to benefit both parties (Hobbs, 2020).

The Ministry of Education and Culture's Directorate of Partnership and Coordination of Business and Industry (DUDI) develops excellent vocational education programs to meet the industrial and working worlds (IDUKA). Some of these flagship programs include vocational school collaboration with IDUKA, development of quality assessment of vocational schools in accordance with IDUKA standards, and integration of vocational school curriculum and infrastructure with IDUKA.

One of the Ministry of Industry's ten Making Indonesia 4.0 agendas is to improve the quality of Human Resources (HR) through redesigning the educational curriculum to adapt to the development of the industrial era 4.0 and talent mobility for professionals. Curriculum development needs to become more adaptable and responsive to industry demands.

To keep up with the latest technological developments and industry needs, vocational schools must constantly update their curriculum and learning in engineering (Gede et al., 2021). They should not simply sell programs to prospective students without first assessing the industry's competency requirements. Because the knowledge gap from schools is too large compared to industry needs, some companies even hold special training programs for new employees. A vocational school's curriculum should validate local, national, and international industries (Douglass, 2020)(Lucietto et al., 2019). The curriculum can be designed to meet the needs of students, schools, and industry (Liu et al., 2020).

An adaptive learning approach can be used to perfect the development of an adaptive curriculum that is decentralized and adapted to the needs of the industry (Hobbs, 2020)(Mirata et al., 2020). The most challenging thing for schools to implement curriculum and adaptive learning is the lack of technical support and teacher resistance to change. However, it can be overcome gradually if school leaders commit and enforce the regulation (Mirata et al., 2020).

The highest number of unemployed graduates of vocational schools is an urgent issue that must be addressed. One of the causes is a mismatch between the competencies of vocational school graduates and the competencies required by the industry. In addition to technical competencies, students must be equipped with interpersonal competencies and qualifications from other majors that can support student competencies (Liu et al., 2020). When they graduate, they are better prepared to enter the industry. As a result, studies on an adaptive curriculum model to minimize differences in vocational school graduates' competence with industrial competencies are critical. This study can be used as a reference for ongoing adaptive curriculum development with students, schools, and industry.

1.1 Objectives

This research to develop local adaptive curriculum models applied in higher vocational schools (SMK) to adjust the competence required in order to ensure the vocational school graduates' competencies to meet the needs of industry. The adaptive curriculum includes processes for developing, implementing and assessing the curriculum in a sustainable way through collaboration between government, vocational schools, and industry

2. Literature Review

2.1. Curriculum Development

The development of the Engineering curriculum is undoubtedly oriented toward the quality of student outputs by emphasizing the optimization of student learning and teacher delivery ease. Curriculum development includes conducting prolonged evaluations of the effectiveness of teaching methods that can increase student understanding. Hence, students can benefit from and apply the knowledge they have just learned after they have finished learning. In the Engineering curriculum, there should be a mapping of the output competencies of each subject against the overall output target in the Engineering department so that learning progress can be tracked (Lucietto et al., 2019).

Graduates of technology must be flexible, interdisciplinary, and creative to keep up with global developments. These skills are becoming increasingly difficult for new graduates to acquire. Efforts are required to restructure the curriculum in accordance with the requirements of industry competencies. The development of a new curriculum requires the participation of stakeholders who use graduates in this case, notably schools, students, and industry. Curriculum development occurs in three stages: exploration and observation of stakeholder needs, data analysis, and design recommendations, and preparation of curriculum prototypes for performing reanalysis by stakeholder representatives (Reeping, 2017).

It is necessary to form a collaborative team to produce high-quality curriculum development (Jonker et al., 2019). This collaboration team can be formed from various stakeholders, but it must be ensured that it represents the interests and benefits that each stakeholder derives from these joint activities. So it is because if each party derives significant benefits from the collaboration, it will engage actively and constructively in curriculum development (Fachrunnisa & Adhiatma, Ardian, 2016).

In developing an Engineering curriculum, it is essential to consider the competency map between attitudes, knowledge, and skills. The intermediation of competence from knowledge to skills is required to ensure that students can apply what they have learned in engineering to real-world practice. The curriculum is not only ability-oriented based on the academic curriculum, but it also considers the needs of the work environment (Wheelahan, 2016)(Azemi, 2019). For students to become innovators or entrepreneurs, multidisciplinary material must be included in the Engineering curriculum (Azemi, 2019).

Project-based learning (PBL) in Engineering education is one solution for students to immediately integrate knowledge and skills, even though PBL is a case study from the teacher. Project-based learning teaches students technical competencies in their fields and how to collaborate and communicate. In today's digital era, general competence is crucial (Huang et al., 2019).

In designing and implementing PBL, there are three key elements: first, the project must have something in common with the current project situation in accordance with the technical field, allowing students to learn comprehensively; second, PBL must be designed to be active learning. Third, students are fully responsible for the competencies learned as an outcome of PBL activities. Finally, PBL also requires students to honestly and openly assess themselves against the competencies gained from PBL activities when evaluating processes and outputs (Huang et al., 2019).

Some of the shortcomings of Engineering Education projects that prevent them from meeting the prerequisites for Project-Based Learning (PBL) learning are as follows: first, projects are usually structured and well defined by the instructor, and they involve material learned from only one material. Second, the instructor leads the learning material required for the project during the project, rather than the student's self-learning process. Third, assessments are typically based on project performance but rarely include student performance on other professional skills, and they are administered by the instructor (Huang et al., 2019).

2.2. Internship and Mentoring Program

Mentoring in Engineering education is one of the project-based learning innovations that allows students to learn directly from experienced people. In addition, online mentoring will allow students to receive assistance from experienced mentors who are not limited to the students' hometowns or schools (Huang et al., 2019).

Learning methods in Engineering schools that combine theory and practice can help students develop the 21st-century essential competencies, such as Critical Thinking, Collaborative Problem Solving, and Communication. Case studies, internships, and Problem-Based Learning can all be employed to integrate theory and practice (PBL). The scope of PBL includes the clarification of problems that students must solve based on learning materials, the identification and execution of alternative solutions based on real-world environments, collaboration with industry, and student

participation in the process of reflection on the learning process that has been completed. Students' reflection is as critical as their learning progress because it allows them to carry out self-evaluation and follow-up plans to develop their competencies (Perusso & Baaken, 2020). Communication skills, both written and oral, are another basic competency that needs to be improved in the Engineering curriculum. Writing skills in Engineering school students require a systematic approach and program (Goldsmith & Willey, 2017).

Implementing an internship at a company within a specific time frame allows students to experience the actual work environment in the industry immediately. Students can face immediate problems and attempt to solve them through interaction with more experienced peers. The apprenticeship program's mentoring process will go efficiently. Teachers can also learn about the development of industrial competency needs and engage in comparative analyses of the curriculum's compliance with the needs of industrial competencies through the internship learning program (Vasquez et al. 2019, Perusso & Baaken 2020, Salazar 2017, Siddamal et al. 2020).

The use of the project-based learning (PBL) learning model in conjunction with mentoring from a combination of school teachers and industry mentors provides students with the opportunity to gain valuable experience in order to improve their actual competence in accordance with the needs of the industry (Huang et al. 2019, Vasquez et al. 2019).

2.3. Adaptive Curriculum and Learning

Currently, the industry requires employees with interdisciplinary competencies, so vocational schools must be adapted by offering curricula that are adaptable to industry demands. Rujiun Liu stated in his study on Humanized Computing for Mass Customization Application in Curriculum Management that today's industry requires graduates with not only technical but also managerial and problem-solving skills (Liu et al., 2020).

The development of the Engineering Education curriculum should make it easier for students to learn and become competent in their respective fields. In addition, teachers may find it easier to deliver structured learning if the curriculum is more easily accessible (Lucietto et al., 2019).

The adaptive curriculum is the development of a learning curriculum based personalized of a student (Spring, 2016). The learning program starts with identifying the student's profile : Passion, Learning style, and baseline learning outcomes (Oliveira et al., 2021).

Developing an adaptive curriculum is a challenge in and of itself for school administrators, starting with the formulation, implementation, and evaluation stages. A strategy of training and continuous mentoring is required (Pak et al., 2020). The advancement of information technology creates new opportunities for the implementation of learning in various distance learning schools, which necessarily involves creativity on the part of schools and teachers in learning implementation strategies ranging from learning reference sources to learning strategies. Content and learning strategies that are customized to student profiles must be developed (Bremgartner 2017, Almeida 2019). Personalizing learning based on student profiles is important, but personalizing teachers' teaching methods is also essential for the effectiveness of the learning process. Personalizing the teacher's profile makes it possible to improve the effectiveness of the learning planning, implementation, and evaluation (Geddawy, 2019).

Personalization of content sources and learning strategies based on student profiles, such as personal information covering recent education, language, and so on, as well as current learning styles and competency levels (Almeida, 2019).

However, the basic principle that schools must pay attention to, both face-to-face and distance learning, is to design learning source content based on student profiles. Distance learning can now be done adaptively and collaboratively, thanks to advances in information technology. The process of virtually personalizing the learning environment by adapting and proposing learning resources based on the characteristics of students using application software. Furthermore, when it comes to distance learning, schools must create a positive ecosystem among stakeholders such as teachers, students, and community support, such as parents and industry. This ecosystem includes communities associated with the core competencies of student learning programs (Bremgartner, 2017).

Adaptive and collaborative learning will be effective if students explain their perceptions, actively engage in learning, discussion, and are fully responsible for learning outcomes. Students must be able to interpret basic competency profiles honestly and openly, demonstrate an interest in an area of competence and communicate the progress of learning activities (Bremgartner 2017, Alexander et al. 2019).

Students' passion has a significant impact on implementing Engineering Education because it encourages hard work, never gives it up, and is adaptable to job challenges. Students' continuous commitment and consistency are required for the learning process in vocational schools (Deter, Jessica, Leydens, 2017). Therefore, a personalized learning program based on student passion will positively impact students to reach the learning outcome (Dalponte et al., 2021).

3. Methods

The research was conducted using qualitative research methods with the primary data source determined by purposive sampling, which is considered familiar and by the research focus (Haq et al., 2019). In-depth interviews and Focus Group Discussions (FGD) were employed to collect the data. In addition, purposive sampling was used to determine the sample, which involves determining respondents based on the researchers' evaluation of the stakeholders completeness, such as educational institutions (schools and government), industry, industry associations, and communities.

This study was carried out in Semarang, Yogyakarta, Jakarta, Bandung, Surabaya, and Malang, with case studies in vocational schools majoring in digital technology-based creative industries such as Software Engineering, Animation, Visual Communication Design, and Multimedia.

This study was conducted in three stages: in-depth semi-structured interviews with open-ended questionnaires to gather information, data analysis, and focus group discussions (FGD) on confirming the results of data analysis from researchers. FGD was used to generate recommendations for adaptive curriculum models that vocational schools might use to cut the competency gap between vocational school graduates and the industry.

4. Data Collection

In-depth interviews were conducted with 59 institutions, including as many as 15 institutions (25.4%) from educational and government institutions, 25 institutions (42.4%) from industry, and 19 institutions (32.2%) from industry associations. Because vocational school educational institutions in a variety of departments and industries have businesses that are related to the departments of the target respondents in this study, the total number of respondents based on their relationship with vocational school majors is 121, with 39 respondents (32.2 %) from the Software Engineering (RPL) department, 28 respondents (23.1 %) from the Visual Communication Design (DKV) department, 23 respondents (19.0 %) majoring in Multimedia, and 31 respondents (25.6 %) majoring in Animation. Specific competencies for direct associations and communities are in accordance with the majors in vocational schools.

5. Results and Discussion

5.1. Competency Gap Analysis

In India, 60 % of vocational school graduates are not accepted by companies due to a competency gap with the needs of industrial competencies (Büth et al., 2017). In-depth, open-ended questionnaire interviews with companies receiving internship students or hiring new employees from vocational school graduates were used to analyze the competency gap of vocational school graduates with industry needs. In addition, interviews were held with industry and community associations following the competence of the majors in vocational schools. In-depth interviews were conducted to gather information about competency knowledge, skills, and attitudes. This is in accordance with the Indonesian National Professional Certification Agency's (BNSP) policy of determining competent human resources through an assessment of Knowledge, Skill, and Attitude. According to Ruijun Liu's study, schools must pay much attention to competencies besides academics, such as cooperation, communication, and problem-solving (Liu et al., 2020).

In addition to identifying competency gaps in knowledge, skills, and Attitude, this study highlighted other important competencies to meet industrial era 4.0: managerial competencies, such as project management, collaboration, communication, critical thinking, and problem-solving. This is in line with Andre Perusso's study, which states that students must have the 21st century competencies such as Critical Thinking, Communication, Collaboration, and Problem Solving (Perusso & Baaken, 2020), as well as Rajni Singh's study, stating that schools must focus on the competencies of Cooperation, Communication, Critical Thinking, Ethics, and Attitude (Herrmann et al., 2019).

In this study, the categories of knowledge, skills, Attitude, and management are used to identify competency gaps. According to the analysis of the in-depth interviews' results, the most significant competency category according to industry, association, and community is Attitude. The industry recognizes that they cannot expect much from internship

students or vocational school graduates to complete technical competencies (knowledge and skills) relevant to industry needs. However, if the Attitude is positive, technical competence can be enhanced through special training or direct collaboration with competent employees.

Following Attitude, the next most significant competencies are skills, knowledge, and lastly, managerial. The lowest managerial competence compared to others is due to the prevalence of vocational school graduates to replenish operator or executive positions.

The researchers investigated the attitude competencies revealed by the interview results as sub-competencies in the order of their importance, namely commitment, ethics, discipline, and politeness/friendliness. Commitment is the highest because the industry believes that by having committed, another sentiment will arise that would significantly impact performance. Furthermore, the researchers identified managerial competence in the order of importance, namely communication, cooperation, critical thinking, problem-solving, and project management. Finally, the most important aspect is communication, since communication between teams has a significant impact on the production performance in this industry.

Table 1 shows an analysis of the factors causing the occurrence of technical competency gaps in each department in vocational schools as the findings of this study. Based on the data in Table 1, what causes a gap in the technical competence of vocational school students with industry needs is the curriculum itself, which is too broad for students to study. In addition, the researchers confirmed with vocational school stakeholders that the curriculum adhered to the Ministry of Education and Culture's standardization, namely Level II of the Indonesian National Qualifications Framework (KKNI).

Through Focus Group Discussions (FGD) with all categories of stakeholders, it was discovered that the Center of Excellent SMK program is free to collaborate with industry for curriculum adjustment activities based on industry needs, increasing teacher competence, internships for teachers and students in industry, and inviting industry to teach at schools. The Center of Excellence (COE) program promotes vocational school development innovation by allowing schools to explore curriculum development in response to industry needs. The industry hopes that vocational school curriculum can be adjusted to include sufficient competencies for each position in the digital product project management value chain appropriate for each department.

In addition, a technical competency curriculum adapted to students' interests, and talents can be performed. Technical competency specifications that are strengthened in the curriculum based on student interests will also impact students' readiness to enter the industry because they will master the material more thoroughly. According to Jessica Deter's study, an adaptive learning curriculum based on students' passions effectively boosts student motivation in learning and contributes to making lessons easier to master (Deter, Jessica, Leydens, 2017).

Table 2 shows the mapping of positions and functions that require different main competencies based on the industrial production pipeline for each department. Each position in production management requires a different set of principal technical competencies; thus, students can be mapped from an early age to determine the concentration of competencies that are students' passions, after which the school develops adaptive curriculum and learning programs. If vocational schools can accomplish this, it will encourage students to work hard, never give up, and be resilient in the face of job challenges. Student competencies must be developed in accordance with industry needs, which involve ongoing commitment and consistency on the part of vocational school students (Deter, Jessica, Leydens, 2017).

Table 1 The results of the Identification of Factors Contributing to the Competency Gaps Between Vocational Schools and Industry

Category stakeholder	**Causes**
Education	- U: No student selection due to the zoning system during new student admission. - U: The department is not in the best interests of the students. - U: Students lack the production equipment required for practice. - U: Teacher competence falls short of industry standards. - RPL: a set of frameworks used in industry. - ANM: The Different Softwares used by both Schools and Industry

Industry	- U: The school curriculum is overburdened, resulting in a lack of depth. - U: More than 80% of students are unprepared for internships. - U: low commitment, internship considered as a formality - U: The department is not in line with the interests of the students. - RPL: The framework used in schools is incompatible with industry - DKV, MM, and ANM: poor communication and creativity
Association / community	- U: The curriculum for vocational schools is too broad, so it is not in-depth. - U: Students at vocational schools are inactive and lack confidence in the community. - U: Commitment to increase the portfolio is weak.

Notes : U: General, RPL: Software Engineering, DKV: Visual Communication Design, MM: Multimedia, ANM: Animation

There are special notes from respondents from vocational schools. The application of an adaptive curriculum based on the needs of the main competencies of each occupational position in the industry can be carried out. However, students are still given a glimpse of learning according to national curriculum standards so that schools still get excellent assessments at the time of accreditation. Learning can be done adaptively, and students can have deeper abilities based on industry needs by focusing on specific competencies.

Management competence and Attitude can be improved by integrating learning with a case study strategy or problem-based learning (PBL), both individually and in groups. Furthermore, the internship program in the industry will provide students with opportunities to learn real-world problems to improve managerial, social, and personal competence. Students will gain real-world experience in improving managerial, social, and personal competencies due to strong collaboration between schools and industry (Siddamal et al., 2020). Industry requires students who have academic competencies and other skills such as communication, cooperation, and problem-solving (Bremgartner, 2017)

Constructive collaboration between stakeholders, particularly government, schools, and industry, to minimize the competency gap between vocational school graduates and industrial needs requires commitment from all parties to form a sustainable collaborative ecosystem

Table 2: The Mapping of production management positions for companies in the digital creative industry and vocational school curriculum inputs

No	**Major**	**The Mapping of production management positions and Vocational School Curriculum Inputs**
1	Software Engineering (RPL)	- Web Programmer, Mobile Programmer, Front-end and Back-end developer, System Analyst, Website Development, Data Base Administrator, Server Management - Competence for companies' software application is possible according to the industry framework, so vocational schools must be adjusted. - The curriculum in vocational schools should not have to master it all; it is advisable to focus on specialization and students' ability to master these competencies.
2	Animation	- Scriptwriter/storyboard, Illustrator, Technical Artist, Animator, Rigger Artist, Modeler (Character & Environment Set), Dubbing, Music theme song. - The education curriculum is designed to meet the needs of industrial competencies; students should master one of the priority industrial competency needs based on their interests. - Internship program should ensure that students have a basic knowledge of the industry.
3	Visual Communication Design	- Graphic design, Image editing, Illustrator, Animator, Photography, Multimedia design - Graphic design is the primary competency for Visual Communication Design, despite another competency as of added value.
4	Multimedia	- Storyboard/scriptwriter, Video editor, Sound/music composer, Cameraman, Graphic Design, Multimedia animator, Talent, and Dubbing - Video editing, graphic design, and multimedia animators are the primary competencies in the multimedia field. - The multimedia curriculum should emphasize more practice than theory.

5.2. Vocational School Challenges in the Face of Competency Gap

Basically, vocational schools recognize the competency gap between graduates and industry competency needs. Therefore, the study's recommendations are expected to be a solution to the issue since these challenges are not only related to school commitment but also to government regulations, particularly vocational school accreditation activities.

According to the Central Java Provincial Education Office, which serves as a provincial supervisor for vocational schools, the Center of Excellence (COE) program provides numerous opportunities for vocational schools to implement Link and Match, with the main goal of harmonizing curriculums that are adapted to the needs of industrial competencies. Vocational schools are allowed as long as there are strong supporting documents, and they develop curriculum and adaptive learning through continuous synergism with industry.

The application of the curriculum and adaptive learning starts with identifying the student's passion profile and the improvement of previous knowledge and skills competency learning outcomes. Furthermore, with curriculum and adaptive learning, students will receive different learning programs based on their group size, and each student will have their path to competence (Pandit & Bansal, 2019). Curriculum and adaptive learning can be applied to student learning outcomes in the same group and competency orientation. Pre-assessment activities can be used to create a competency-based learning profile (Qu & Cai, 2019).

Industry claims that the two broad materials in the vocational school curriculum prevent students from deepening the core competencies required for each position in production management. Even the internship program, which should be one way of introducing students to the industry's competency needs, somehow does not carry out a comprehensive evaluation of schools' learning development needs.

Because of the disparity in competence between vocational school students and the industry's competency requirements, the industry must conduct training or internship programs from the ground up for new graduates from vocational schools before they can fully join and play a full role in production. Therefore, when vocational school graduates join a company, it would result in a cost of opportunity.

As a result, through the following programs, the industry contributes to long-term solutions to the problem of disparities in the competence of vocational school graduates and the competency needs of the industry.

- Curriculum according to industry needs
  The industry hopes that educational institutions will include the industry in curriculum development in a comprehensive manner. This involvement is required in planning and mentoring and evaluating student implementation (Bremgartner, 2017).
  Industry does not require students to be able to get all of them done, however one area of expertise is sufficient, and students master it thoroughly.

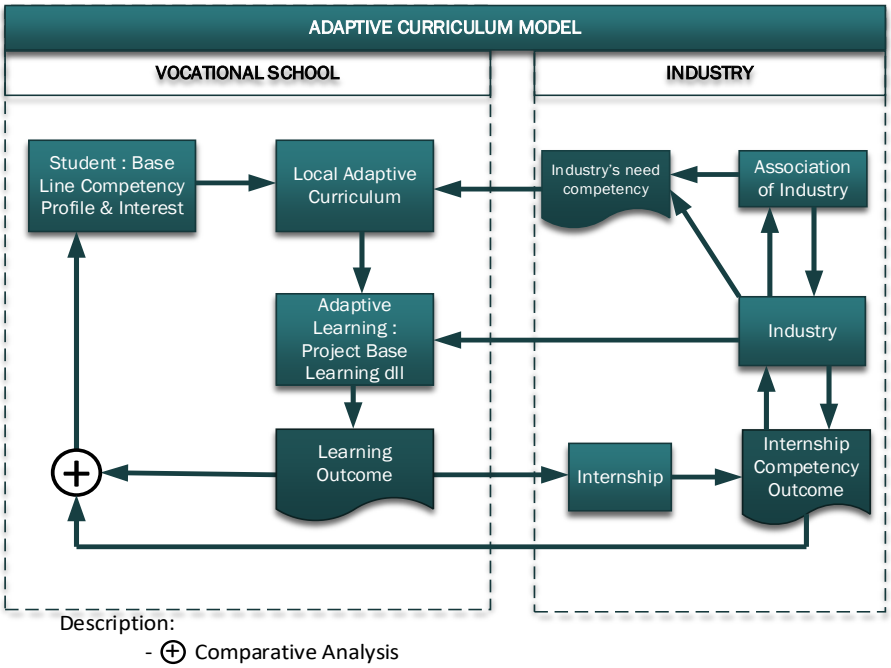

Figure 1 : Vocational School Local Adaptive Curriculum Model

- Personalized Learning
  The learning that students receive is adapted to the fundamental competencies and concentrations that they will learn. Personalization of learning can be pursued by initiating a curriculum that adapts to the orientation and concentration students choose (Pham & Jaaron, 2017). Learning in vocational schools must also be adaptive in terms of student profiles, learning outcomes, and learning styles, so that different learning content can be acquired from the same topic (Pak et al. 2020, Qu & Cai, 2019).
- Internship program for students
  Internship programs are adapted to local industries, particularly those involved in adaptive curriculum development, should be optimized (Pham & Jaaron, 2017). Schools and industry must work together to develop curriculum based on industry needs, engage in learning to provide information on case studies or project-based learning (PBL), or prepare apprentices who truly have the minimum competencies required by the industry (Douglass, 2020, Perusso & Baaken, 2020).
- Improving teacher's competence and industry collaboration on projects
  Teacher's competence should be significantly enhanced in accordance with the needs of industrial competence; it would be even better if they were also involved in industry-led projects. If possible, the teacher's participation in the Collaboration with Industry project could be a learning based project delivered to students.
- Engaging mentors from industry
  Industry needs to be involved in the implementation and evaluation of curricula that have been compiled with industry.

5.3. Curriculum Model and Adaptive Learning

The adaptive curriculum model can only be developed if there is collaboration between vocational schools and industry. An overview of the adaptive curriculum model is shown in Figure 1. The role of industry is involved in the design, implementation, and evaluation of the vocational school curriculum in the adaptive curriculum model. The adaptive curriculum will have a greater impact if it is supported with adaptive learning that adjusts student profiles based on basic competencies as well as previous learning outcomes.

Figure 2 illustrates a planning, implementation, and evaluation monitoring model for integrating adaptive curriculum into a learning program.

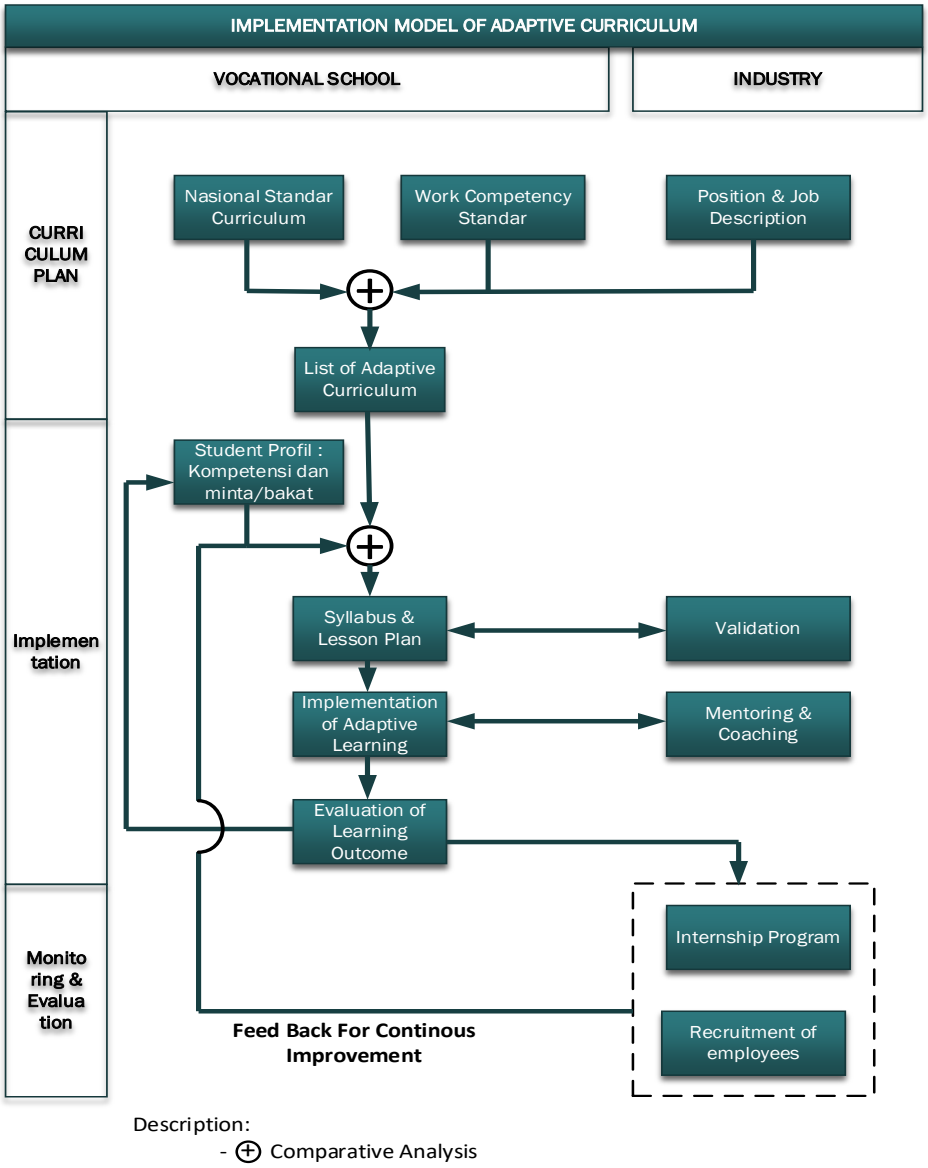

Figure 2: The Implementation of Learning Model using Local Adaptive Curriculum Model in Vocational Schools

6. Conclusion

From the study on the local adaptive curriculum model above, the following conclusions can be drawn:

- The development of an adaptive curriculum can be carried out by decentralization in accordance with the competence needs of local industries that have been vocational school partners while still taking into account the standardization of the national curriculum and work competency standards on a local, national, and international level. Competencies adapted to the industry's position/role and job description serve as the main foundation for adaptive curriculum development.
- Implementing the local adaptive curriculum model in vocational schools should be supported by a case study learning program or project-based learning (PBL) with mentors/coaches from the industry.
- The Center of Excellence (COE) program for vocational schools launched in 2020 is an opportunity for vocational schools to develop adaptive curriculum further since the government has officially encouraged the development and implementation of the adaptive curriculum in collaboration with the industry.
- Project-based learning (PBL) and internship programs are practical and effective ways to improve student's academic and work skills.

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Biography

Mustafa, ST., MM., M.Kom. is currently a student in the Doctoral Program of Information System School of Postgraduate Studies Diponegoro University Semarang, Indonesia. He holds an undergraduate degree in Electrical Engineering Department of Faculty of Engineering, a Master's in Magister of Management, and a Master's in Magister of Information System Diponegoro University Semarang, Indonesia. He has been a lecturer in informatics engineering at the Sultan Agung Islamic University since 2010. He is active as a board member of the Central Java Regional Information and Computer Higher Education Association, a member of the Indonesian Information Systems Association, and the Association of Indonesian Telematics Consulting Companies.

Dr. Adian Fatchur Rochim, S.T., M.T. is a lecturer in the computer engineering department, Faculty of Engineering, University of Diponegoro, who graduated from the doctoral program from University of Indonesia with primary competencies in the fields of Scientometrics, Computer Network, IT-Governance. He graduated from the master's program from the Bandung Institute of Technology and previously completed his undergraduate studies in electrical engineering at the University of Diponegoro. Since 2021, he has been the chairman of the computer engineering study program, Faculty of Engineering, University of Diponegoro

Dr. Oky Dwi Nurhayati, ST, MT is a lecturer in computer engineering, Faculty of Engineering, University of Diponegoro, Semarang, Indonesia. He graduated from electrical engineering at STT Telkom Bandung (1998 - 2002), master program in Electrical Engineering - Gajah Mada University Yogyakarta (2006 - 2008) and doctoral program in Electrical Engineering, Gajah Mada University Yogyakarta (2008 - 2011). Since 2021 he has been the Secretary of the Postgraduate Study Program at the University of Diponegoro, Semarang.