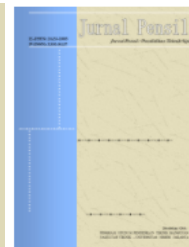


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RELEVANCE EMPLOYABILITY SKILLS OF VOCATIONAL HIGH SCHOOL STUDENTS' DEPARTMENT OF SANITATION BUILDING CONSTRUCTION AND MAINTENANCE IN DIY TO THE CONSTRUCTION SERVICE INDUSTRY

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Abstract

This study aims to prove the importance of employability skills for the construction service industry for graduates of vocational high school majoring in Sanitation Building Construction and Maintenance (KGSP), revealing the implementation of employability skills and their suitability at vocational high school majoring in KGSP in DIY, and describing the level of relevance of employability skills of vocational high school students majoring in KGSP in DIY to the construction service industry. This type of research uses a descriptive quantitative approach and uses a survey method. The research was conducted in vocational schools and the construction service industry in DIY. The research subjects were the head of the company, project manager, engineer, surveyor, and vocational students majoring in KGSP in DIY. Collecting data using observation and questionnaires. The results of the study show: (1) employability skills are very important and needed by the construction service industry for graduates of vocational high school majoring in KGSP obtaining 85.95% with a very important category, employability skills needed by the construction service industry in total are 54 points (2) vocational high school majoring in KGSP implement employability skills obtained 84.01% in the very appropriate category or taught by teachers in schools, the overall employability skills implemented were 45 points (3) the level of relevance of employability skills of vocational students to the world of industrial work obtained 83.3% with a very relevant category.

Keywords: Employability Skills, Construction Service Industry, KGSP of Vocational High School

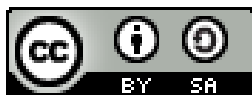
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Introduction

In the era of the 21st century, it is undeniable that human civilization has developed rapidly in all sectors of life (Eko, 2019). In the 21st century, entering the era of the industrial revolution, someone can get a job and keep a job (Rufai et al., 2013). The Industrial Revolution Era 4.0 is an effect of globalization and automation of industrial systems (Alaloul et al., 2020) with artificial intelligence that is integrated with human needs as users (Rachmad Prihadi, 2019). The fourth generation industrial revolution not only provides opportunities but also challenges for the millennial generation (Marsudi & Widjaja, 2019).

In this era of the industrial revolution, there have been many changes in technological progress, changing patterns of life, and human interaction (Tjandrawina Raymond, 2016). Changes in this era also saw a reduction in the workforce because the use of human labor was reduced (Yahya, 2018) this was shifted by the presence of electronically controlled machine tools so that they could produce more production quantities (Maysitoh et al., 2018). And even in the next 10 years, the types of jobs that will be lost will increase to 75 percent (Hamdan, 2018). Many jobs have been lost because they have used the role of automation and digitalization technology (Sung, 2018). So that the preparation of labor or human resources is getting tighter (Himawati1 et al., 2020). Without good and thorough preparation, an incompetent workforce will find it difficult to adapt to the era of the industrial revolution 4.0.

Necessary to shape students' mindsets to undertake lifelong learning to keep pace with rapidly changing technology and the need for new skills (Kornelakis & Petrakaki, 2020). It is undeniable that vocational and technical education is an important investment for humans and a valuable asset for the progress of the country (Sudira, 2018). Vocational education has a role in efforts to create a workforce that has skills with characteristics that are suitable for the world of industrial work (Diwanggoro & Soenarto, 2020).

The education sector is an important line to face the challenges of the revolutionary era. This sector is expected to produce graduates who have advantages and high competitiveness in the global situation (Pusriawan & Soenarto, 2019). Education has a very crucial role in shaping the next generation (Hastutiningsih et al., 2022). In improving the competitiveness of graduates to face the globalization of labor, one of which is through resources humans (Ali, 2013). Efforts to improve the quality of competent Human Resources are one of the objectives of the issuance of Presidential Instruction no. 9 2016 concerning the revitalization of Vocational High Schools. The purpose of the Presidential Instruction is to increase the competitiveness and quality of Indonesian human resources.

In terms of education, the quality of human resources can be seen through the skills possessed. Belief in the success of vocational education and producing a skilled workforce is an important part of developing human resources to provide knowledge and skills to the community by the needs of the world of work and industry (Ridwan, 2021). The competitiveness of human resources increases if the quality of human resources increases (Riyoko, 2012). The era of RI 4.0, is marked by the increasingly strong tendency of an open system that creates global competition, so that a nation can excel in the line of global competition, namely by increasing the nation's competitiveness.

From the World Economic Forum, Performance Overview Global Competitiveness Index 4.0 2019 Indonesia is ranked 65th out of 141 countries on the skills pillar. This includes an index of the skills component in the current and future workforce which is still low, causing Indonesia's competitiveness to decline. Based on data from GTCI Scores Versus GDP per Capita 2019, the weak assessment index is influenced by vocational and technical skills, including middle-level skills; secondary education workforce; professional technicians and associates; employability; the

relevance of the education system to the economy; skills matching secondary education (GTIC, 2019). This is supported by the quality index of Indonesian human resources, which ranks 111 out of 189 countries in the world based on the 2019 Human Development Report. Meanwhile, at the DIY regional level, the Open Unemployment Rate (TPT) of Vocational High School is still relatively high. At the regional level, namely in the Province of Yogyakarta, recorded in the BPS DIY TPT by the province in August 2020 at 4.57%. Based on the BPS DI Yogyakarta Province, TPT in DIY from August 2019 to August 2020 according to education level, Vocational High School became the highest TPT at 7.26%.

From the explanation above, it can be seen that graduates of secondary vocational education or Vocational High School are still low on absorption in the world of work, even those who have worked face skills problems. The skills and knowledge possessed are not necessarily able to make them survive in the work environment. The challenges of vocational education facing the Industrial Revolution 4.0 era include changes in the way students learn, mindsets, and patterns of action in developing creative innovations in various fields. The demands for qualifications and skills needed in this era are technical and non-technical skills. Someone who has employability and competence, as well as technical ability, is an important asset to the company (Rasul et al., 2013). Graduates or the workforce are expected to have the latest skills that are in line

with the needs of the current work industry (Abdullah et al., 2020). In its implementation, Vocational High School offers many Expertise Programs to meet the needs of the industrial world of work. Vocational education graduates are expected to become productive individuals who can work in the workforce and have the readiness to face job competition (Pratama et al., 2018). Vocational High Schools in Indonesia have 9 areas of expertise and have different competencies achieved. Among

these areas of expertise are Technology and Engineering, Construction and Property Technology Expertise Program with a major in Sanitation and Maintenance Building Construction (KGSP).

Increase in development The infrastructure launched by the Indonesian government has resulted in a growing demand for competent, relevant, appropriate, certified skilled, and expert construction workers to meet the standards in the construction service industry (Adi & Adillah, 2012). The job positions needed in the construction sector currently include Planning services (design, drawings, etc.), Implementation (builders, laborers, head craftsmen, foremen, and implementers, and supervisors) (Oktaviastuti et al., 2021)

The need for manpower in these job positions is not always followed by the provision of appropriate personnel, especially Vocational High School graduates who in the IQF pyramid are level 2 who fill work positions as drafters, foremen, chief handymen, estimators, technical and/or administrative operators (Almira et al., 2016). This job position can be fulfilled by KGSP graduates if they have the skills and prerequisites needed by the Construction Services Industry.

Graduates of Building Construction, Sanitation, and Maintenance undergo a 4-year program that can be equivalent to a Diploma 1 education program with a 3rd level regulated in Presidential Regulation No. 8 of 2012. This demand for skilled workers is accompanied by the requirement for a company to have skilled workers and experts certified by a licensing agency, while not all companies at the regional level can prepare it in a short time (Nirmalawati et al., 2012).

The Department of Building Construction, Sanitation, and Maintenance are an A major that focuses on producing graduates who understand civil buildings, design sanitation systems, and their maintenance with a 4-year education period. Of the 4 years of the education program, 1 year is carried out specifically for students to carry out fieldwork practices, thereby

increasing the work readiness and work mentality of Vocational High School students graduating from KGSP. Seeing that the KGSP department is trying to provide graduates who can work in the construction of civil buildings such as buildings, maintenance, and sanitation, their role in the world of vocational education is very large. However, whether graduates of Vocational High School majoring in KGSP have criteria that are following the needs of the world of work, needs to be studied more deeply. In particular, this research focuses on vocational schools that have a Construction and Property Technology Expertise Program, majoring in KGSP in DIY, totaling 4 vocational schools.

To produce graduates who have skills relevant to the needs of the construction service industry, many competencies need to be mastered by graduates of Vocational High School KGSP majors such as problem-solving skills that are usually never taught in Vocational High School (Wijayanti & Jaedun, 2019). Teamwork, discipline, and adaptability will support students in acquiring skills (Sa-Nguanmanasak & Khampirat, 2019). On the other hand, students implement their knowledge or practice directly more effectively and affect the employability level of vocational students (Sa-Nguanmanasak & Khampirat, 2019). On the other hand, students implement their knowledge or practice directly more effectively and affect the employability level of vocational students (Sunardi et al., 2016). According to Shakir (2009), these skills are not easily taught in schools although these skills are very important to get a job. To minimize the gap in the problem-solving skills of graduates, the Vocational High School provides a system of directing students to the construction service industry, known as the Industrial Work Practice.

This is in line with the results of research conducted by (Ramadhan et al., 2013) namely Vocational High schools should hold school programs that can improve the skills of students by holding a professional Industrial Work Practice

system. Industrial work practices also has an effective and significant effect on job readiness in students of the building engineering expertise program (Fauzi et al., 2017).

Technology in the world of industrial work develops with the times so that the required workforce competencies also change following technological growth (Adha et al., 2020). One of the main challenges of technical and vocational education is to shape students to effectively meet the demands of the global industrial market (Aktas et al., 2017). Companies are increasingly selective in choosing prospective workers so the competition for vocational students to get jobs is getting tougher. On the other hand, students implement their knowledge or practice directly more effectively and affect the employability level of vocational students (Sunardi et al., 2016).

Employability skills are often referred to as job readiness skills (Rowe & Zegwaard, 2017). Employability skills are a skill needed to get and keep a job (Abas & Imam, 2016). Employability skills can increase if you can communicate, teamwork, solve problems, take initiative and try, plan and organize activities, cultivate yourself, learn, and use technology and K3 (PSMK, 2018). Employability skills are a set of skills formed from work-integrated learning through activities carried out in vocational schools, both learning, organization, extracurricular, and internship (Hakim & Fitri, 2020).

Employability skills are skills that are trusted by business owners or company owners for an employee to carry out their role as well as possible (Goodman & Tredway, 2016). to survive in the workplace, employees must have employability skills (Venugopal & Kumar, 2022). Employability skills are skills that individuals need to make them employable (Ganesan & Ashok Kumar, 2015). (Oresanya et al., 2014) in the results of the study stated that for graduates to be employed, employability skills must be included in the curriculum to be applied to learning.

The relevance of the competence of vocational students to the needs of the world of work refers to the Regulation of the Director General of Primary and Secondary Education of the Ministry of Education and Culture concerning the Spectrum of Expertise for Vocational High Schools (SMK/Madrasah Aliyah Vocational Schools (MAK), Number: 06/D.D5/KK/2018.

Employability Skills related to work ability according to Prof. Sudji Munadi (2018) are (1) communication skills, (2) teamwork, (3) problem solving, (4) initiative and effort, (5) planning and organizing activities, (6) self-management, (7) learning, (8) using technology, (9) occupational health and safety (K3).

Iyer & Dave (2015) explain that employability is formed through education. Based on the results of a preliminary study that has been carried out in 4 State Vocational High Schools majoring in KGSP in DIY, the results of employability skills that are implemented or taught in vocational schools according to students in learning get a percentage of 84.01%. Employability skills taught by teachers in schools include 9 skills, namely: (1) communication skills get a percentage of 84.16%, (2) teamwork skills get a percentage of 86.53%, (3) problem-solving skills get a percentage of 79, 77%, (4) skills in taking initiative and trying to get a percentage of 82.97%, (5) skills to plan and organize activities get a percentage of 80.8%, (6) self-management skills get a percentage of 87.14%, (7) skills in learning get a percentage of 83.18%, (8) skills using technology get a percentage of 81.44%, and (9) occupational health and safety skills get a percentage of 90.11%.

Therefore, based on the results of the preliminary study, research on the relevance of the employability skills of Vocational High School students KGSP majors in DIY for the construction service industry are very important to be able to find out what kind of employability skills the construction service industry needs, how to classify employability skills of vocational students majoring in KGSP in terms of the interests

of the construction service industry, whether they are relevant to the needs of the industrial world of work. The results of the research will be input for Vocational High School in the application of employability skills so that Vocational High School graduates can get jobs and be able to maintain their jobs and adapt to the growing industrial revolution era. The results of this research will also become information and recommendations for related parties in this case the Central Government, DIY Education Office, Construction Services Industry, Vocational High Schools, Vocational High School students, and the Community.

Research Methods

This type of research is descriptive research using a quantitative approach with a survey method. The research subject is the head of the company, a senior engineer for construction services in DIY.

The study was conducted in 13 construction service industries in DIY with a total of 33 respondents. The determination technique for respondents in the industrial world uses purposive sampling. The study was also conducted in 4 vocational schools in DIY that have KGSP expertise competencies with 264 students as respondents. Determination of the number of respondents SMK students using the Slovin technique.

Data collection using a questionnaire. In this research on the relevance of employability skills, the answers to the instrument items use a four-point Likert scale. The questionnaire data analysis technique uses descriptive statistics. The questionnaire instrument consists of 9 aspects of employability skills with 45 statements. The list of aspects of employability skills consists of communication skills, team work skills, problem solving skills, skills in taking initiative and business, skills in planning and organizing activities, self-management skills, skills in learning, skills in using technology and K3.

Table 1. Employability Skills Questionnaire Interpretation Criteria

No	Score Interval	Category
1	$81,25\% < x \leq 100\%$	Very Important/Highly Teachable
2	$62,50\% < x \leq 81,25\%$	Important/Teachable
3	$43,75\% < x \leq 62,50\%$	Not Important / Less Taught
4	$25,00\% < x \leq 43,75\%$	Very Unimportant/Not Taught

Table 2. Competency Relevance Data Interpretation Criteria

No	Interval	Category
1	$75\% < x \leq 100\%$	Very Relevant
2	$50\% < x \leq 75\%$	Relevant
3	$25\% < x \leq 50\%$	Less Relevant
4	$0\% \leq x \leq 25\%$	Irrelevant

Results and Discussion

In the 21st century, the need for generic skills that must be possessed by worker is increasing (Gibb, 2004:7). The results of a research survey (Sutabri, 2007) show that in recruiting workers, companies prioritize employability skills/soft skills rather than hard skills. Employability skills are basic skills that must be possessed to be able to adapt in the workplace and increase competitiveness and productivity. Employability skills are skills to improve the competitiveness of human resources, especially the workforce. Therefore, mastery of employability is needed, especially for work-oriented education.

The purpose of vocational education has an important role in preparing graduates. Students must be equipped with skills according to industry needs. so that SMK which is a vocational education

institution has a role to provide skills that are in accordance with the needs of the world of work or industry. The lack of absorption of graduates from secondary vocational education or vocational high school is evidenced by data from the Central Statistics Agency in August 2019 in the Open Unemployment Rate category. This means that there is still a lack of human resources in improving workforce skills and the competitiveness of graduates is still relatively low, so the relevance of the employability skills of vocational high school students of KGSP expertise in DIY to the world of work in the construction service industry, to find out the employability skills needed by the construction service industry, how implementing employability skills taught by teachers to students according to the current needs of the construction service industry. The importance of describing employability skills for future civil engineering graduates needed by the labor sector in order to work and compete and have job feasibility.

This research is devoted to the field of Sanitation and Maintenance Building Construction (KGSP) which is an expertise competency in the field of Engineering and Engineering expertise as well as Construction and Property expertise programs. The formulation of employability skills is based on the needs of the growing world of work in the construction service industry. Employability skills that have been described are items of skills that are needed by the construction service industry and the industry provides additional skills needed today. The implementation of learning in vocational high schools in providing employability skills according to the needs of the construction service industry as perceived by students in schools is taught, researched by vocational high school students with KGSP expertise competencies as respondents. The results of the two-variable research can be seen in Figure 1.

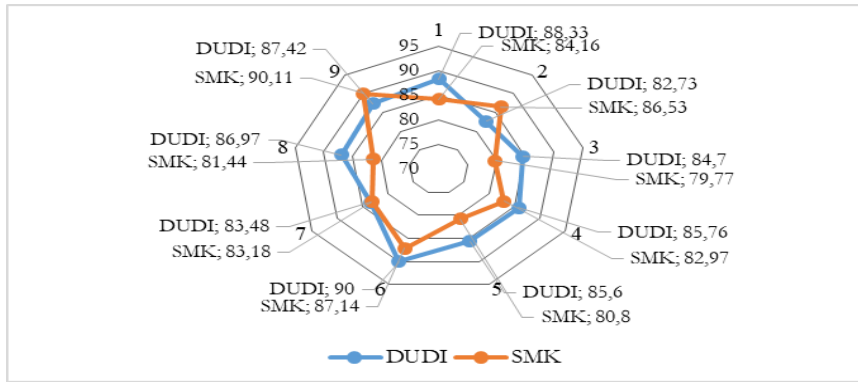


Figure 1. Results of 9 Aspects Employability Skills Needed by the Construction Services Industry Implemented by KGSP Major Vocational High Schools in DIY

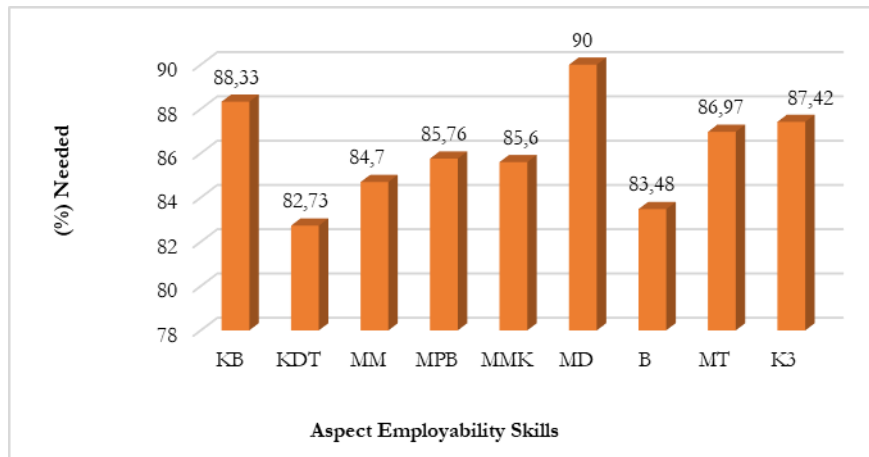


Figure 2. Aspects of Employability Skills needed by the Construction Services Industry

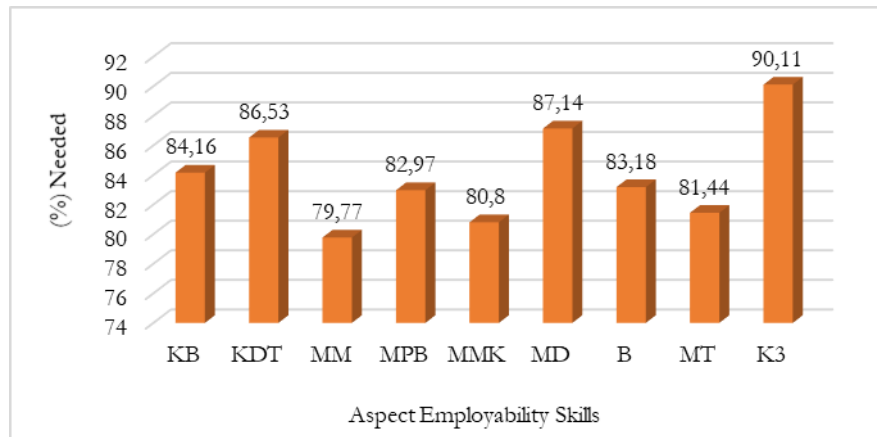


Figure 3. Aspects of Employability Skills Implemented in SMK KGSP Expertise Competence in DIY

Aspects of employability skills consist of, communication skills (KB), teamwork skills (KDT), problem solving skills (MM), skills in taking initiatives and doing business (MPB), skills in planning and organizing activities (MMK), self-management skills

(MD), skills in learning (B), skills in using technology (MT) and K3.

Employability Skills what the construction service industry needs for Vocational High School students majoring in KGSP is included in the very important category with a percentage of 86.11%. The

percentage gain of the average value of each aspect of the employability skills required by the construction service industry is shown in Figure 2.

The work skills applied in Vocational High Schools of KGSP expertise competence in DIY obtained the highly taught category with a percentage of 84.01%. The achievement in the aspect of work skills with the largest average score on the occupational health and safety aspect was 90.11% and the lowest was the problem-solving aspect of 79.77%. The proportion of average scores for each aspect of work skills implemented in Vocational High Schools of KGSP skill competencies can be seen in Figure 3.

Classification of employability skills of Vocational High School students majoring in KGSP to the construction service industry obtained: 1) 7 additional skills are needed by the construction service industry that is not implemented by the Vocational High School majoring in KGSP, namely: (1) Motivate yourself to learn more so that can be an example or motivate the team; (2) Able to manage time so that it remains within a clear framework in formulating problem solving; (3) Be wise and neutral in making decisions; (4) Able to see opportunities to achieve success; (5) Able to self-evaluate from work experience; (6) Can adapt easily; (7) Pay attention to quality aspects in developing or using technology, 2) There is 1 additional skill item that is the need for the construction service industry implemented by the Vocational High School majoring in KGSP, 3) There are 45 skills items available. in the instrument, required by the construction service industry, it has been implemented in Vocational High School majoring in KGSP, 4) Vocational High School majoring in KGSP does not implement employability skills that are not needed by the construction service industry.

The total number of employability skills required by the construction service industry is 54 points. So that the level of relevance between the two variables is $45/52 \times 100\% = 86.5\%$. From these results, it can be concluded that the level of

relevance between the employability skills of Vocational High School students majoring in KGSP DIY to the construction service industry is in the very relevant category.

The level of relevance of employability skills is based on each aspect, namely: the level of relevance in the aspect of communication skills is 100%. The level of relevance in the aspect of teamwork skills is 83.3%. The level of relevance in the aspect of problem solving skills is 71.4%. The level of relevance to the skills aspect in taking the initiative and doing business is 83.3%. The level of relevance in the skills aspect of planning and organizing activities is 100%. The level of relevance in the aspect of self-management skills is 71.4%. The level of relevance to the skills aspect in learning is 100%. The level of relevance in the aspect of skills using technology is 83.3%. The level of relevance in the occupational health and safety skills aspect is 100%.

Conclusion

From the research results, it is known that employability skills are needed by the construction service industry for vocational students majoring in Sanitation Building Construction and Maintenance (KGSP) in DIY as a whole, obtaining a percentage of 85.95%.

Level of relevance Among the employability skills required by the construction service industry for students of Vocational High School majoring in KGSP in DIY, 83.3% fall into the very relevant category, but there are several points on the aspect of employability skills that fall into the category of being taught and not being taught. This can be developed for the better by using learning models such as product based learning, factory teaching, and industrial work practices.

Vocational High School majoring in KGSP can establish partnerships with the construction service industry so that industrial work practices continues and students can find out and learn various aspects of employability skills during internship and the work that will be done by

students after graduating from Vocational High School, the importance of industrial and vocational cooperation so that graduates will have the skills needed.

References

- Abas, M. C., & Imam, O. A. (2016). Graduates' Competence on Employability Skills and Job Performance. *International Journal of Evaluation and Research in Education (IJERE)*, 5(2), 119. <https://doi.org/10.11591/ijere.v5i2.4530>
- Abdullah, Q. A., Humaidi, N., & Shahrom, M. (2020). Industry Revolution 4.0 : The Readiness Of Graduates Of Higher Education Institutions For Fulfilling Job Demands. *Romanian Journal Of Information Technology And Automatic Control*, 30(2), 15–26.
- Adha, L. H., Asyhadie, Z., & Kusuma, R. (2020). Indonesia Industrial Digitalization and Its Impact on Labor and. *Jurnal Kompilasi Hukum*, V(2), 32.
- Adi, & Adillah. (2012). Sertifikasi Tenaga Kerja Konstruksi Sebagai Unsur Pendukung Pembangunan Infrastruktur. *Universitas Sultan Agung*.
- Aktas, F., Pitts, K., Richards, J. C., & Silova, I. (2017). Institutionalizing global citizenship: A critical analysis of higher education programs and curricula. *Journal of Studies in International Education*, 21(1), 65–80. <https://doi.org/10.1177/1028315316669815>
- Alaloul, W. S., Liew, M. S., Zawawi, N. A. W. A., & Kennedy, I. B. (2020). Industrial Revolution 4.0 in the construction industry: Challenges and opportunities for stakeholders. *Ain Shams Engineering Journal*. <https://doi.org/10.1016/j.asej.2019.08.010>
- Ali, M. (2013). Analisis Kesiapan Smk Rsbi Dalam Peningkatan Daya Saing Lulusan. *Jurnal Kependidikan: Penelitian Inovasi Pembelajaran*, 43(1), 78–86.
- Almira, D., Dardiri, A., & Isnandar, I. (2016). Kompetensi Lulusan SMK Program Keahlian Teknik Bangunan Kompetensi Keahlian Teknik Konstruksi Batu dan Beton yang Dibutuhkan Industri Jasa Konstruksi di Jawa Timur. *Jurnal Pendidikan: Teori, Penelitian, Dan Pengembangan*, 1(4), 673–680.
- Diwangkoro, E., & Soenarto, S. (2020). Development of teaching factory learning models in vocational schools. *Journal of Physics: Conference Series*, 1456(1). <https://doi.org/10.1088/1742-6596/1456/1/012046>
- Eko. (2019). Tantangan Pengembangan SDM Polri di Era Revolusi Industri 4.0. *Ilmu Kepolisian*, 13(2), 90–105.
- Fauzi, M., Neolaka, A., & Arthur, R. (2017). Pengaruh Efektivitas Praktik Kerja Industri Terhadap Kesiapan Kerja Siswa Kelas XI Program Keahlian Teknik Bangunan SMK Negeri 1 Cibinong Kabupaten Bogor. *Jurnal Pensil*, 6(1), 15–20. <https://doi.org/10.21009/jpensil.v6i1.7247>
- Ganesan, G., & Ashok Kumar, M. (2015). Employability Skill: A Literature Review Related papers A Study on Self-Perception towards Basic Employability Skills among Post Graduates Students... Employability Skill: A Literature Review. *International Journal of Advance Research in Computer Science and Management Studies*, 3(3).
- Goodman, S., & Tredway, G. (2016). Antecedents of perceived graduate employability: A study of student volunteers in a community-based organization. *SA Journal of Industrial Psychology*, 42(1), 1–10. <https://doi.org/10.4102/sajip.v42i1.131>

- Hakim, D. R., & Fitri, E. N. (2020). Membangun Daya Saing Siswa Smk Melalui Optimalisasi Employability Skill Dan Kompetensi. *Edutech*, 1(1), 50–70.
- Hamdan, H. (2018). Industri 4.0: Pengaruh Revolusi Industri Pada Kewirausahaan Demi Kemandirian Ekonomi. *Jurnal Nusantara Aplikasi Manajemen Bisnis*, 3(2), 1. <https://doi.org/10.29407/nusamba.v3i2.12142>
- Hastutiningsih, A. D., Sugiyono, S., Suyanto, S., & Wibowo, U. B. (2022). Strategi Jurusan Pendidikan Teknik Sipil dan Perencanaan Menghadapi Revolusi Industri 4.0: Studi Kasus di DIY. *Jurnal Pendidikan Teknik Sipil*, 4(1), 38–45. <https://doi.org/10.21831/jpts.v4i1.49503>
- Himawati1, I. P., Nopianti, H., & Diyas Widiyati. (2020). Sosialisasi Pengetahuan Mengenai Peluang dan Tantangan di Era Revolusi Industri 4.0 pada Pelajar di Sekolah Menengah Atas dan Kejuruan di Kota Bengkulu. *Widya Laksana*, 9(2), 205–212.
- Iyer, V. M., & Dave, K. (2015). Industry's role in employability. *Industrial and Commercial Training*, 47(3), 151–158. <https://doi.org/10.1108/ICT-11-2014-0072>
- Kornelakis, A., & Petrakaki, D. (2020). Embedding employability skills in UK higher education: Between digitalization and marketization. *Industry and Higher Education*, 34(5), 290–297. <https://doi.org/10.1177/0950422220902978>
- Marsudi, a. S., & Widjaja, Y. (2019). Industri 4.0 dan Dampaknya terhadap Financial Technology serta Kesiapan Tenaga Kerja di Indonesia. *Ikraith Ekonomika*, 2(2), 1–10.
- Maysitoh, Agung, D. F., & Afdal. (2018). Pendidikan Kejuruan di Era Industri 4.0: Tantangan dan Peluang Karier. *Indonesian Journal of School Counseling*, 3(3), 89–96. <https://doi.org/http://dx.doi.org/10.23916/08403011%0D>
- Nirmalawati, Labombang, M., & Asnudin, A. (2012). Supply and Demand of Road Construction Experts in The Province of Cetrul Sulawesi. *Infrastruktur*, 3(1), 40–49.
- Oktaviastuti, B., Nurmalasari, R., & Damayanti, F. (2021). Urgensi Technical Skill Bagi Tenaga Kerja Konstruksi Dalam Era Industri 4.0. *Rekayasa: Jurnal Teknik Sipil*, 5(2), 7. <https://doi.org/10.53712/rjrs.v5i2.1021>
- Oresanya, T. O., Omodewu, O. S., Kolade, T. T., & Fashedemi, A. O. (2014). *Vocational Education and Employability: The Nigerian Situation*. 5(2009), 2013–2015.
- Pratama, Y., Daryati, D., & Arthur, R. (2018). Hubungan Praktik Kerja Industri dengan Kesiapan Kerja Siswa SMK Negeri 1 Cibinong Kelas XII Kompetensi Keahlian Teknik Gambar Bangunan. *Jurnal PenSil*, 7(1), 53–62. <https://doi.org/10.21009/pensil.7.1.6>
- Pusriawan, P., & Soenarto, S. (2019). Employability skills of vocational school students in Palu City for entering the work world. *Jurnal Pendidikan Vokasi*, 9(1), 33–42. <https://doi.org/10.21831/jpv.v9i1.23351>
- R, A., Kamin, Y. Bin, & Saud, M. S. Bin. (2013). Acquisition of Employability Skills in Technical Vocational Education; Necessity For The 21st Century Workforce. *Aust J Basic and Applied Sci*, 7(6), 9–14.
- Rachmad Prihadi, W. (2019). Model Teacherpreneur Pada Pembelajaran Vokasi Menghadapi Era Disrupsi Dan Revolusi Industri 4.0. *Jurnal Pendidikan Teknik Sipil*, 1(1).

- <https://doi.org/10.21831/jpts.v1i1.28274>
- Ramadhan, M. A., Iriani, T., & Handoyo, S. S. (2013). Relevansi Kompetensi Lulusan SMK Khususnya Kompetensi Keahlian Teknik Gambar Bangunan dengan Kompetensi yang Dibutuhkan di Dunia Kerja. *Jurnal Pensil*, 2(1), 1–10.
<https://doi.org/10.21009/jpensil.v2i1.7282>
- Rasul, M. S., Rauf, R. A. A., Mansor, A. N., Yasin, R. M., & Mahamod, Z. (2013). Graduate Employability For Manufacturing Industry. *Procedia - Social and Behavioral Sciences*, 102(Ifee 2012), 242–250.
<https://doi.org/10.1016/j.sbspro.2013.10.739>
- Ridwan, M. (2021). Pembangunan Sumber Daya Manusia Pada Sekolah Kejuruan Di Indonesia: Tantangan Dan Peluang Di Era Revolusi Industri 4.0. *Moderasi: Jurnal Studi Ilmu Pengetahuan Sosial*, 2(1), 1–10.
<https://doi.org/10.24239/moderasi.vol2.iss1.35>
- Riyoko, S. (2012). Studi Penentu Daya Saing Terhadap Investasi pada Industri Mebel di Kabupaten Jepara. *Jurnal Dinamika Ekonomi & Bisnis*, 9(1), 33–44.
- Rowe, A. D., & Zegwaard, K. E. (2017). Developing graduate employability skills and attributes: Curriculum enhancement through work-integrated learning. *Asia-Pacific Journal of Cooperative Education*, 18(2), 87–99.
- Sa-Nguanmanasak, T., & Khampirat, B. (2019). Comparing employability skills of technical and vocational education students of Thailand and malaysia: A case study of international industrial work-integrated learning. *Journal of Technical Education and Training*, 11(3), 94–109.
<https://doi.org/10.30880/jtet.2019.11.03.012>
- Shakir, R. (2009). Soft skills at the Malaysian institutes of higher learning. *Asia Pacific Education Review*, 10(3), 309–315.
<https://doi.org/10.1007/s12564-009-9038-8>
- Sudira, P. (2018). *Metodologi Pembelajaran Vokasional Abad XXI Inovasi, Teori, dan Praksis*. UNY Press.
- Sunardi, Purnomo, & Sutadji, E. (2016). Pengembangan Employability Skills Siswa Pendekatan Saintifik. *Jurnal Pendidikan*, 1(7), 1391–1398.
- Sung, T. K. (2018). Industri 4.0: a Korea perspective. *Technological Forecasting and Social Change Journal*, 132, 40–45.
<https://doi.org/https://doi.org/10.1016/j.techfore.2017.11.005>
- Tjandrawina Raymond. (2016). Industri 4.0: Revolusi industry abad ini dan pengaruhnya pada bidang kesehatan dan bioteknologi. *Jurnal Medicinus*, Vol 29, Nomor 1, Edisi April. *Jurnal Medicinus*, Vol 29, No(1), 31–39.
- Venugopal, K., & Kumar, V. S. (2022). Graduates Employability Skills and Placements - Mediating Role of Career Adaptability. *International Journal of Management and Humanities*, 8(9), 38–42.
<https://doi.org/10.35940/ijmh.j1490.058922>
- Wijayanti, M., & Jaedun, A. (2019). Relevansi Kompetensi Lulusan Kejuruan Teknik Bangunan untuk Bekerja Di Industri Konstruksi. *Jurnal Kependidikan*, 3(1), 81–94.
- Yahya, M. (2018). Era Industri 4.0: Tantangan Dan Peluang Perkembangan Pendidikan Kejuruan Indonesia. *Pidato Pengukuhan Penerimaan Jabatan Professor*.
<https://doi.org/https://doi.org/10.1080/15298868.2011.636509>