The Dominant Soft Skills that Affect Readiness of Vocational Graduate in Entering Construction Labor Market

Nathanael Sitanggang[1], Putri Lynna Adelinna Luthan[2], Felix Andika Dwiyanto[3], Satrio Dwi Sanjaya[4]

[1,2]Universitas Negeri Medan, Indonesia
[3]Universitas Negeri Malang, Indonesia
[4]National Taipei University of Technology, Taiwan

ARTICLE INFO	ABSTRACT
	Abstract: This study aims to recognize the dominant soft skills factors that influence the readiness of vocational education graduates to enter the job market in the field of construction. The method used is survey study including samples that consisted of 40 workers graduated from State University of Medan civil engineering diploma 3. The instruments used were the soft skills and the competence readiness questionnaire with reliability coefficients of 0.93 and 0.98. Furthermore, the multiple regression analysis techniques is used to test the hypothesis. The results shows that the soft skills readiness influencing 74% the vocational education skills readiness in entering the job market in construction. Furthermore, the factors that has dominant influenced soft skills in vocational education graduates' readiness including (a) communication skills (20.07%), (b) working according to plan (6.00%), (c) emotional intelligence (3.13%), (d) digital abilities (2.07%), (e) problem solving (1.96%), (f) willingness to learn (1.61 %), (g) confident (1.23%), (h) ability to cooperate (1.14%), and (i) decision making (1.06%). This finding is useful for the university as an institution that produces graduates for vocational education, and the construction services as users of vocational education graduates. Moreover, it is also possible that these findings can apply more broadly to vocational secondary education institutions.

Correspondence Address:

Nathanael Sitanggang
Universitas Negeri Medan
E-mail: nathanaelsitanggang@unimed.ac.id

The industrial revolution 4.0 had a direct effect on the development of human resources. It is because the pattern of industrial movement began to emphasize the patterns of the digital economy, artificial intelligence, and robotic technology (Francois-Lavet et al., 2018; Popkova & Sergi, 2020; Sima et al., 2020). The construction industry in the 4.0 industrial revolution demanding workers who had skills in digital literacy, technological literacy, and human literacy. Digital literacy is directed at the ability to read, analyze and use information in the digital world (big data) (Guess et al., 2020; Hague & Payton, 2011). Technology literacy aims to provide an understanding of the machine workings and technology applications (Dinçer, 2018). On other hands, human literacy is directed at improving communication skills and mastery of design science that requires soft skills to collaborate with fellow work teams (Wofford & Tibi, 2018). Based on the related study, soft skills significantly had a positive effect on work readiness, while learning achievement did not significantly influence (Succi & Canovi, 2020). It means that workers are.

Furthermore, the potential problems faced by employment of vocational graduates including (1) mismatch between the competencies of vocational graduates with industry needs, (2) the large number of students in particular vocational competencies due to the development of vocational education that is not directed; and 3) the development of a non-directed vocational education facility system. This description explains one of the problems faced by vocational graduates is the lack of a link and match between vocational education graduates and business and industry needs. In this case, the link and match indicate that graduates must have a competitive attitude, such as work ethics, achievement motivation, mastery, competitiveness, money beliefs, and attitudes to saving.

Based on the description, it requires efforts to improve the quality of vocational education graduates that are relevant to the business and industrial world. One effort to improve the quality of vocational education graduates is revitalization of vocational education by adjusting the Polytechnic curriculum to the needs of the industry. The government has established the revitalization framework for vocational education including (1) 50% of Polytechnic lecturers from industry, 50% from universities, (2) dual system implementation, (3) construction of a teaching factory in the Polytechnic, (4) retraining of Polytechnic lecturers, and (5) polytechnic as a place for competency assessment and Professional Certification Institute.

Therefore, the output of revitalization of vocational higher education is that all Polytechnic graduates have competency certificates in accordance with industry needs and the outcome is that industries can supply competent workforce. Also, all Polytechnic graduates can work in accordance with their competencies. It is expected that the future vocational education graduates must have work readiness relevant to business and industry needs.

Skills Development Scotland (2018), in collaboration with the Center for Work-based Learning, illustrates a future skills model called meta-skills. Meta-skills are skills that individuals need in the future that are defined by high-level skills, even though in the past these skills already existed. The intended Meta-skills including self-management, social intelligence, and innovation. Self-management consists of focusing, integrity, adapting, and initiative. Social intelligence consists of communicating, feeling, collaborating, and leading. Furthermore, innovation consists of curiosity, creativity, sense making, and critical thinking.

Based on the description, it can be seen that the aspects of meta skills described are the components of soft skills that must be possessed by individuals in the future. In related matters, the conclusion of Secretary's Commission on Achieving Necessary Skills (SCANS) about work readiness. SCANS concluded that one's job readiness is divided into two groups which are basic skills and skills needed in the workplace (Chaganti et al., 2015). The basic skills intended are basic skills, thinking skills, and personal qualities. While skills in the workplace are technology, systems, information, interpersonal skills, and resources. Furthermore, Impetus Private Equity Foundation (2014), concludes three main factors that are prepared by young people to look for work (work readiness), including stable personal circumstances, appropriate qualifications for the job role, and personal capabilities.

The main personal abilities to be ready to work are self-awareness, receptive attitude, driven, self-assured, resilient, and informed. Vocational education graduate work readiness is needed for career development. Based on relevant study show that job readiness influences career development by 8.50%. In Indonesia, the competencies of vocational education graduates (Diploma III) have been agreed in the national regulation concerning the Implementation of the Indonesian National Qualification Framework Higher education. The competencies including (1) able to complete wide-scope work, choose the appropriate method, and be able to show performance with measurable quality and quantity, (2) master the theoretical concepts of certain fields of knowledge, and be able to formulate procedural problem solving, (3) has the ability to manage working groups and compile written reports comprehensively, (4) responsible for their own work and can be given responsibility for the achievement of group work. From the several descriptions of work readiness, it can be concluded that the work readiness of vocational education graduates can be divided into two parts, which are soft skills readiness and hard skills readiness. Soft skills readiness is the readiness of vocational education graduates based on character, while the hard skills or competency is expertise in a particular field owned by vocational education graduates and their expertise in accordance with job vacancies.

Furthermore, in this study, we focused on competency of construction due to high demand from labor market, especially in North Sumatra, Indonesia. As an illustration, based on national statistical data in 2019, the population workers in North Sumatra is 6,823,000 people, and those working in the construction sector is 307,000 (4.50%). As well as workers from vocational education graduates is 239,000 people (3.40%). Furthermore, licensing data issued by the Medan city integrated licensing services agency for construction services business permits totaled 958, and construction services consultant business permits amounted to 72. These data represents that the construction sector is in high demand by graduates of vocational education.

The majority construction workforce is come from vocational education graduates produced by higher education institutions. One of the higher education providers of vocational education in Medan City, is Universitas Negeri Medan (UNIMED). Since 2000, UNIMED provides a study program that prepared graduates to become intermediate experts as skilled workers in the field of construction in the current and future industrial revolution 4.0 era. For this reason, the empirical study is required to discover graduates' readiness to enter the job market that used to design curriculum, implement models and learning strategies. Every graduate must feel confident and have a future orientation, ability, and confidence to prepare themselves for work. Each graduate are expected to be able to determine a career, specific goals, so they are confident to enter the job market and must be able to make adjustments to changes that occur in the workplace. Due to the quick changes, they must be able to adapt with the working environment and predict the future needs.

Based on the background, the soft skills of vocational education graduates including communication skills, teamwork, problem solving, emotional intelligence, decision making, work according to plan, willingness to learn, digital ability, and confident. While the hard skills of vocational education graduates' including understand construction work, the ability to read pictures, the ability to calculate work volume, the ability to evaluate budget plans, the ability to make reports on work implementation, and the ability to analyze project scheduling. From that, it shows that the soft skills are related to aspects of competence, such as good communication skills, it can be able to make reports on good work implementation; the ability to solve problems will contribute to the ability to analyze project scheduling; the ability to make decisions will contribute to the ability to evaluate the budget plan. Therefore, the purposes of this study including (1) discover the description of the soft skills of vocational education graduates, (2) the picture of vocational education graduates' skills readiness to enter the job market in

the field of construction, and (3) relation of the soft skills that affect the readiness of vocational education graduates' skills to enter the job market in the field of construction.

METHOD

This study using quantitative approach to measure the dominant factor that affecting vocational graduate in entering labor market. The survey was conducted to obtain the data from the participants. The sample consisted of 40 workers graduated from UNIMED Diploma III Civil Engineering who worked in the construction field in Medan City. The sample was selected using purposive random sampling technique. In its implementation, respondents were divided into two group. The first group consist of 20 participants for trial phase, while the other 20 participants are for research stages. Furthermore, Figure 1 presents the framework of this study.

The soft skills and graduates' skill readiness are measured by a Likert scale model instrument. The instrument will be testing with validity test and analyzed by Karl Pearson's product moment correlation technique (Puth et al., 2014). Then, the reliability coefficients of the two instruments were calculated with the Alpha coefficient. From the 45 items in the soft skills readiness test, 30 valid items were obtained, and the reliability coefficient was 0.93. While of the 45 items of readiness skill test obtained 40 valid items, and the reliability coefficient is 0.98. Furthermore, the analysis technique used for hypothesis testing is regression analysis (Creswell, 2013). This analysis technique is used to predict the relationship effect of soft skills and graduates' skill readiness to entering the labor market.
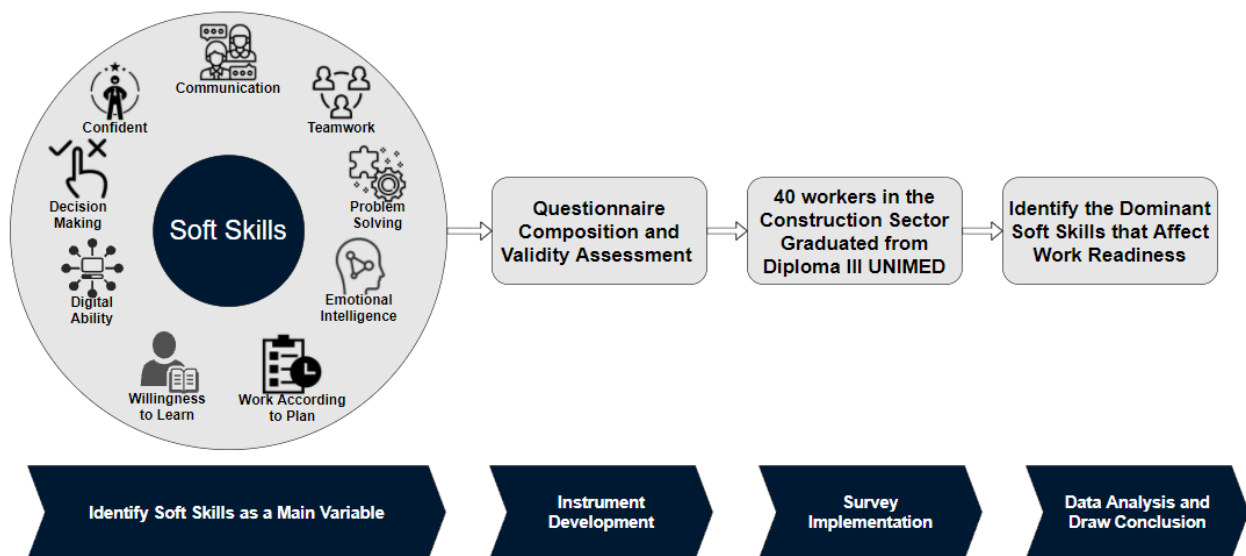

Figure 1. Study Framework

RESULT AND DISCUSSION

The tendency of graduates' soft skills readiness is analyzed based on ideal standard criteria, and classified into four, which are as high, sufficient, lacking, and low. Based on analysis, after doing the analysis, it was found that 35% of the soft skills readiness of vocational education graduates is high, 55% is sufficient, and 10% is lacking. Thus, it can be concluded that the readiness of the soft skills of vocational education graduates tends to be sufficient, although there are still 10% that are classified as lacking. Furthermore, 45% of the skill readiness of vocational education graduates is high, 25% is sufficient, and 30% is lacking. Thus, it can be concluded that the readiness of vocational education graduates' skills tends to be high, but there are still 30% who are classified as lacking. For more details, a summary of the results of a descriptive analysis of research data is shown in table 1.

Table 1. Results of Research Data Descriptive Analysis

	Soft-Skills Readiness (X)	Competence Readiness (Y)
N	20	20
Mean	115.85	147.25
Median	118.00	152.50
Mode	130	165
Std. Deviation	15.665	34.469
Variance	245.397	1188.092
Range	62	110
Minimum	75	90
Maximum	137	200
Sum	2317	2945

According to table 1, the average skill readiness score (X = 147.25) is greater than the average soft skills readiness score (X = 115.85). However, when the two factors are combined, the percentage of vocational education graduates classed as lacking skills readiness (30%) is significantly more than the percentage of soft skills readiness (10%). This means that graduates of vocational school are better prepared in terms of soft skills than they are in terms of technical abilities required to enter the construction employment market.

Prior to hypothesis testing, the analysis requirements test is conducted. In this study, test requirements analysis is used to determine the normality, linearity, and significance of regression data as a prerequisite for performing correlation and regression analysis. Table 2 summarizes the normality test results for soft skills readiness data and skills for vocational education graduate readiness data, while Table 3 summarizes the linearity test results and Table 4 summarizes the significance test results.

Table 2. Normality Test of Soft-Skills and Skills Readiness

		Soft-Skills Readiness (X)	Competence Readiness (Y)
N		20	20
Normal Parameters[a,b]	Mean	115.85	147.25
	Std. Deviation	15.665	34.469
Most Extreme Differences	Absolute	.128	.147
	Positive	.088	.092
	Negative	-.128	-.147
Kolmogorov-Smirnov Z		.574	.656
Asymp. Sig. (2-tailed)		.896	.782

a. Test distribution is Normal.
b. Calculated from data.

Based on Table 2 it is known that the Asymp value. Sig (2-tailed)> α, so it can be concluded that the data on Soft Readiness skill and vocational education skills readiness data are normally distributed.

Table 3. Linearity Test Between Soft-Skills and Skills Readiness

		Sum of Squares	df	Mean Square	F	Sig.
Quality* Soft-Skills Readiness	Between Groups (Combined)	20119.583	14	1437.113	2.928	.121
	Linearity	16766.907	1	16766.907	34.160	.002
	Deviation from Linearity	3352.676	13	257.898	.525	.838
	Within Groups	2454.167	5	490.833		
	Total	22573.750	19			

According to Table 3, the Fh value has a significance value 0.838> 0.05, indicating that the variable pair readiness of soft skills with readiness of skills is linearly connected.

Table 4. Significance Test Significance of Regression Equations Ŷ = -72,440 + 1,89X

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	16766.907	1	16766.907	51.974	.000ᵃ
Residual	5806.843	18	322.602		
Total	22573.750	19			

a. Predictors: (Constant), Soft-Skills Readiness
b. Dependent Variable: Skills Readiness

As shown in Table 4, the significance of the regression test is 0.00<0.05, indicating that the shape of the relationship between the variables of soft skills readiness and vocational school graduates' readiness skills satisfies the conditions for significance. Thus, all prerequisites for test analysis have been completed, allowing hypothesis testing to proceed. Table 5 summarizes the findings of hypothesis testing.

Table 5. Regression Equation Coefficient Ŷ = -72.44 + 1.89X

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	-72,440	30.737		-2.357	.030
Soft Skill	1.896	.263	.862	7.209	.000

a. Dependent Variable: Skills Readiness

According to Table 5, the correlation coefficient between soft-skills readiness and skills readiness is 0.862. Thus, $r2 = 0.74$ is found as the determination coefficient. This coefficient of determination indicates that 74% of soft skills readiness variables can account for the skills readiness variable, whereas 26% came from other variables.

To test the hypothesis, the t-test analysis technique is used. After testing, the t-value = 7.30>t table (2.878) at the significance level $\alpha = 0.01$ and df = 18. Thus, it is concluded that the soft-skills readiness significantly influences the vocational education graduates' skill readiness in entering the construction job market in Medan. The results of this study support the previous studies that soft skills related to the student preparedness for employment (Teng et al., 2019), and an essential aspect for preparing graduates for work readiness (Winterton & Turner, 2019). Therefore, it is important to develop an learning environment and curriculum that aims to strengthening the soft skills (Ritter et al., 2018).

Additionally, to determine which elements are more influential than soft skills readiness, the influence of each indicator is computed using Multiple Regression analysis from soft skills readiness to competence readiness. Table 6 summarizes the descriptive analysis of soft skills indicators.

Table 6. Summary of Descriptive Analysis of Soft Skills Indicators

	X_1	X_2	X_3	X_4	X_5	X_6	X_7	X_8	X_9
N	20	20	20	20	20	20	20	20	20
Mean	14.65	12.60	12.00	14.85	12.00	11.75	13.40	13.00	11.85
Median	14.00	13.00	12.00	14.00	12.00	12.00	14.00	12.50	12.00
Mode	14	13	11	12	12	13	15	12	10
Std. Dev.	3.376	1.930	1.487	3.617	1.717	2.049	2.501	2.596	1.954
Variance	11.397	3.726	2.211	13.082	2.947	4.197	6.253	6.737	3.818
Range	14	8	6	12	7	7	9	9	7
Minimum	8	8	9	9	8	8	8	8	8
Maximum	22	16	15	21	15	15	17	17	15
Sum	293	252	240	297	240	235	268	260	237

Note:
X_1 = communication skills
X_2 = teamwork
X_3 = problem solving
X_4 = emotional intelligence
X_5 = work according to plan
X_6 = digital ability
X_7 = willingness to learn
X_8 = decision making
X_9 = confidence

To find out the dominant factor in soft skills readiness that is more influential on vocational education graduates' competence level, a multiple regression analysis with the research paradigm presented in figure 2 is performed.
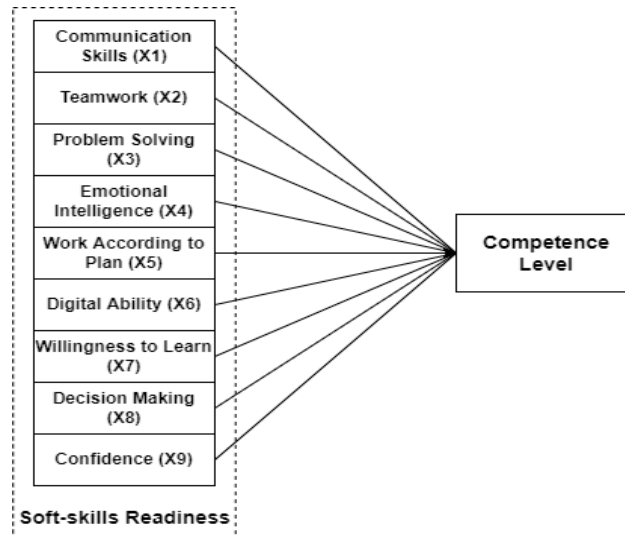

Figure 2. Research Paradigm

After the calculation is obtained the regression equation $\hat{Y} = -160.12 + 4.57X_1 + 1.91X_2 + 3.25X_3 + 1.68X_4 + 4.91X_5 + 2.42X_6 + 1.75X_7 + 1.36X_8 + 1.96X_9$. The influence of each factor on soft-skills readiness on vocational education graduates' competence level entering the job market in construction is presented in table 7.

Table 7. Coefficient of Soft-skills Factor

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-160.120	23.186		-6.906	.000
	X_1	4.578	1.268	.448	3.611	.005
	X_2	1.911	.986	.107	1.938	.081
	X_3	3.256	2.149	.140	1.515	.161
	X_4	1.687	1.070	.177	1.576	.146
	X_5	4.919	1.710	.245	2.877	.016
	X_6	2.427	.855	.144	2.839	.018
	X_7	1.756	1.491	.127	1.178	.266
	X_8	1.368	.930	.103	1.472	.172
	X_9	1.960	1.098	.111	1.785	.105

a. Dependent Variable: Y

Based on table 7, the influence of independent variable is shown in standard coefficients beta. The communication skills (X1) influence the competence level by 0.448. Then, teamwork (X2) influence 0.107, problem solving (X3) influence 0.140, and so on. In addition, the quantity of successive direct contributions to competence level made by each Soft-skills readiness factors is shown in table 8.

Based on Table 8, from the nine Soft Skills factors studied, it turns out that the communication skills (20.07%) are the dominant factor influencing the competence level of vocational education graduates to enter the job market in the construction sector. Followed by work according to plan (6%), and emotional intelligence (3.13%). This result supports the findings of Harahap & Sagala (2019), that emotional intelligence has a positive effect on job readiness by 27%. Furthermore, this result also supported by related previous study which outlines that the structure of skills that graduates must possess is complex problem solving; teamwork; emotional intelligence; and decision-making ability (Arfandi & Sampebua, 2018; Līce & Sloka, 2021; Virtanen & Tynjälä, 2019).

Table 8. Sequence of Each Soft Skills Factor's Direct Contribution to Competence Level

Soft-skills factor	Influence	Contribution	Order
Communication Skills (X_1)	0.448	20.07 %	1
Work According to Plan (X_5)	0.245	6.00 %	2
Emotional Intelligence (X_4)	0.177	3.13 %	3
Digital Ability (X_6)	0.144	2.07 %	4
Problem Solving (X_3)	0.140	1.96 %	5
Willingness to Learn (X_7)	0.127	1.61 %	6
Confidence (X_9)	0.111	1.23 %	7
Teamwork (X_2)	0.107	1.14 %	8
Decision Making (X_8)	0.103	1.06 %	9

Moreover, a self-confidence is the main personal ability to be ready to work (Chaganti et al., 2015; Impetus Private Equity Foundation, 2014). Additionally, the study suggests that one community incorporated three work readiness factors: personal quality (ability to work in teams), professional skills and knowledge (ability to speak, hear, read, write, and solve problems), and technology skills and knowledge (digital capability) (Makki et al., 2015).

CONCLUSION

Research findings prove the soft skills readiness significantly influence the competence level of vocational education graduates to enter the job market in the field of construction. Of the nine soft skills factors studied, it turns out that communication skills are the dominant factor influencing the competence level. While the ability to work according to plan is in the second position, and the emotional intelligence factor is in the third position. Whereas the other six soft skills factors are ranked based on their contribution to vocational education graduates' competence readiness, which are digital, problem solving, willingness to learn, confidence, teamwork, and decision-making abilities.

REFERENCES

Arfandi, A., & Sampebua, O. (2018). The Study of Vocational Higher Education Graduates Skills That Requires in Industry. *Advanced Science Letters*, *24*(5), 3632–3635. https://doi.org/10.1166/asl.2018.11454

Billett, S. (2020). Perspectives on enhancing the standing of vocational education and the occupations it serves. *Journal of Vocational Education and Training*, *72*(2), 161–169. https://doi.org/10.1080/13636820.2020.1749483

Chaganti, S., Meschede, T., & Routhier, G. (2015). Job readiness training for homeless families: Preparing for work to achieve housing stability. *IASP Research and Policy Brief*.

Creswell, J. W. W. (2013). *Research design: Qualitative, quantitative, and mixed methods approaches.* Sage publication.

Dinçer, S. (2018). Are preservice teachers really literate enough to integrate technology in their classroom practice? Determining the technology literacy level of preservice teachers. *Education and Information Technologies*, *23*(6), 2699–2718. https://doi.org/10.1007/s10639-018-9737-z

Elmunsyah, H. (2014). A national education policy-based ICT model for Indonesian vocational high schools (VHS). *Global Journal of Engineering Education*, *16*(3), 136–140.

Fjellström, M. (2014). Vocational education in practice: a study of work-based learning in a construction programme at a Swedish upper secondary school. *Empirical Research in Vocational Education and Training*, *6*(1), 2.

Francois-Lavet, V., Henderson, P., Islam, R., Bellemare, M. G., & Pineau, J. (2018). An Introduction to Deep Reinforcement Learning. *Foundations and Trends in Machine Learning*, *11*(3–4). https://doi.org/10.1561/2200000071

Guess, A. M., Lerner, M., Lyons, B., Montgomery, J. M., Nyhan, B., Reifler, J., & Sircar, N. (2020). A digital media literacy intervention increases discernment between mainstream and false news in the United States and India. *Proceedings of the National Academy of Sciences*, *117*(27), 15536–15545. https://doi.org/10.1073/pnas.1920498117

Hague, C., & Payton, S. (2011). Digital literacy across the curriculum. *Curriculum & Leadership Journal*, *9*(10).

Harahap, D. A. F., & Sagala, E. J. (2019). Pengaruh Kecerdasan Emosional Terhadap Kesiapan Kerja Pada Mahasiswa Paramedis. *Akuntabel*, *16*(1), 47–53.

Impetus Private Equity Foundation. (2014). *Ready for Work: The capabilities young people need to find and keep work and the programees proven to help develop these*.

Līce, A., & Sloka, B. (2021). Promoting Emotional Intelligence in Vocational Education as a Method to Achieve Employability of Graduates. *Regional Formation and Development Studies*, 98–107. https://doi.org/10.15181/rfds.v29i3.2006

Makki, B. I., Salleh, R., Memon, M. A., & Harun, H. (2015). The relationship between work readiness skills, career self-efficacy and career exploration among engineering graduates: A proposed framework. *Research Journal of Applied Sciences, Engineering and Technology*, *10*(9), 1007–1011.

Popkova, E. G., & Sergi, B. S. (2020). *Digital Economy: Complexity and Variety vs. Rationality* (Vol. 87). Springer International Publishing. https://doi.org/10.1007/978-3-030-29586-8

Puth, M. T., Neuhäuser, M., & Ruxton, G. D. (2014). Effective use of Pearson's product–moment correlation coefficient. *Animal Behaviour*, *93*, 183–189.

Ritter, B. A., Small, E. E., Mortimer, J. W., & Doll, J. L. (2018). Designing Management Curriculum for Workplace Readiness: Developing Students' Soft Skills. *Journal of Management Education*, *42*(1), 80–103. https://doi.org/10.1177/1052562917703679

Sima, V., Gheorghe, I. G., Subić, J., Nancu, D., Subiʹc, J., & Dumitru Nancu. (2020). Influences of the Industry 4.0 Revolution on the Human Capital Development and Consumer Behavior: A Systematic Review. *Sustainability*, *12*(10), 4035. https://doi.org/10.3390/su12104035

Skills Development Scotland. (2018). *Skills 4.0: A skills model to drive Scotland's future*.

Succi, C., & Canovi, M. (2020). Soft skills to enhance graduate employability: comparing students and employers' perceptions. *Studies in Higher Education*, *45*(9), 1834–1847. https://doi.org/10.1080/03075079.2019.1585420

Teng, W., Ma, C., Pahlevansharif, S., & Turner, J. J. (2019). Graduate readiness for the employment market of the 4th industrial revolution. *Education + Training*, *61*(5), 590–604. https://doi.org/10.1108/ET-07-2018-0154

Virtanen, A., & Tynjälä, P. (2019). Factors explaining the learning of generic skills: a study of university students' experiences. *Teaching in Higher Education*, *24*(7), 880–894. https://doi.org/10.1080/13562517.2018.1515195

Winterton, J., & Turner, J. J. (2019). Preparing graduates for work readiness: an overview and agenda. *Education + Training*, *61*(5), 536–551. https://doi.org/10.1108/ET-03-2019-0044

Wofford, M. C., & Tibi, S. (2018). A human right to literacy education: Implications for serving Syrian refugee children. *International Journal of Speech-Language Pathology*, *20*(1), 182–190. https://doi.org/10.1080/17549507.2017.1397746