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THE CAPABILITY OF VOCATIONAL EDUCATION STUDENTS IN INDUSTRIAL PRACTICE LEARNING PROGRAMS

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Abstract

The industrial work practice program is essential in vocational education to prepare students to work according to their fields. Analysis of the level of capability of students who carry out work practices in large and small industries and the differences between aspects that require assistance to be considered. This research also measures the difference in the level of capability of students who carry out work practices in large and small industries. This research uses a quantitative approach and uses a survey method. Two hundred thirty vocational education students were involved in this study out of 596 students. Sampling using a simple probabilistic random sampling technique and collecting data using a Likert scale questionnaire (1-4). Data analysis in this study used one-way analysis of variance (ANOVA) and independent sample t-test. The research results on the capability level of students who carry out work practices in large industries obtain a higher score than small industries. The capability aspect significantly differs in value for each type of industry used for program implementation. This research implies that the implementation of industrial work practice programs in vocational education needs to be improved and developed so that industrial work practice programs have better quality results.

Keywords – Vocational education, Industrial work practice program, Capability.

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1. Introduction

In the industrial revolution 4.0, technological developments have become more extensive and sophisticated (Neumann, Winkelhaus, Grosse & Glock, 2021; Nur, Arifin, Soeryanto, Mutohhari & Daryono, 2023; Xu, Xu & Li, 2018). Cultural change in society is heavily influenced by technology and cannot be avoided either directly or indirectly (O'Donovan & Smith, 2020; Xu, David & Kim, 2018). In addition, technological developments also increasingly demand the availability of Human Resources (HR) who can deal with developments (Made-Sudana, Apriyani & Nurmasitah, 2019; Pusriawan & Soenarto, 2019). One sector that has felt the impact of the industrial revolution 4.0 is the manufacturing and automotive industries. Research conducted by (Pardi, 2019) explains that transformation technology to automate manufacturing processes in the automotive industry has failed. This is because good teamwork based on human power has proven to be more flexible and efficient in handling complex assembly processes. Another problem is a productivity and quality output gap between leading and lagging companies. A skilled workforce with good core work competencies is a key success factor facing industrial revolution 4.0. Vocational education must carefully prepare students to deal with technological developments in the industrial revolution 4.0 by paying attention to soft and hard skills. (Chirumalla, 2021; Spöttl & Windelband, 2021). However, in research (Chirumalla, 2021), the results obtained from soft skills are more important than hard skills.

Vocational education focuses on developing students' skills when working according to the field of interest (Misbah, Gulikers, Dharma & Mulder, 2020; Niittylahti, Annala & Mäkinen, 2021). Quality human resources are created from a well-managed education system (Cents-Boonstra, Lichtwarck-Aschoff, Denessen, Haerens & Aelterman, 2019). Schools and industries must complement and support each other (Mårtensson, 2020). Vocational programs must provide students with industry-appropriate abilities and hands-on experience solving work problems (Jackson & Edgar, 2019; Quiroga-Garza, Flores-Marín, Cantú-Hernández, Eraña-Rojas & López-Cabrera, 2020). With good cooperation between schools and industry, it can be an effort to produce actual outcomes and minimize possible problems (Jackson & Edgar, 2019). Like research (Misbah, Gulikers, Dharma & Mulder, 2020; Spurk, 2021), most of the problems in vocational education are suitable approaches in the field, work skills, self-management, and social and work contexts.

In the workplace culture, students must align and develop good communication methods, critical, imaginative, creative, adaptable, and flexible thinking (Akintolu & Letseka, 2021; Muja, Blommaert, Gesthuizen & Wolbers, 2019). The contribution can be to maximize quality industrial work practice programs to improve students' capability (Ceelen, Khaled, Nieuwenhuis & de Bruijn, 2021). Industrial work practice programs can align competencies obtained in schools with competencies in the industry (Roll & Ifenthaler, 2021). It can also provide opportunities for students to develop, explore and gain hands-on experience working in the world of work (Ceelen et al., 2021). Industrial work practices are a significant part of the vocational education system (Schels & Abraham, 2021; Stahel, Lacombe, Cardoso, Casali, Negrouk, Marais et al., 2020). As in research (Alla-Mensah & McGrath, 2021), there is a process of accountability for completing work assignments, work problems, and work targets, which gradually gain identity and confidence at work. By participating in industrial work practice programs, students can gain work experience (Michelsen, Høst, Leemann & Imdorf, 2021). Experience in the industry can later become students when working after completing studies (Hirschi & Koen, 2021; Wahyudi, Sudira, Mutohhari, Nurtanto & Nur, 2023).

In implementing industrial work practice programs, it is necessary to develop critical thinking skills directed at solving problems during practice (Stahel et al., 2020). However, in the field, critical thinking skills that lead to problem-solving should be explored more by students. Vocational students must adapt to the challenges of change in their area of work (Forster & Bol, 2018; Friedrich, 2021). Therefore, maximizing learning in the workplace as an effort to improve skills in supporting their work must be carried out by students (Jackson & Edgar, 2019). The main principle of workplace learning is that students are trained in specific competencies and activities carried out in the workplace, and social interactions are an essential part of workplace learning (Ceelen et al., 2021; Jackson & Edgar, 2019). This principle must be carried out in workplace learning to shape the capabilities of students to the maximum. However, good interaction between students and the industry must be structured so students feel free to ask about something they need help understanding.

Capability is not limited to having skills. However, capabilities understand more in detail so that they master their abilities from weak points to how to overcome them (Gomes & Wojahn, 2017; Misbah et al., 2020). Capabilities in participating in fieldwork practice programs may include learning capabilities, methodological capabilities, social capabilities, personal capabilities, and technical capabilities (Forster & Bol, 2018; Gomes & Wojahn, 2017; Grzybowska & Łupicka, 2017; Sutiman, Sofyan, Arifin, Nurtanto & Mutohhari, 2022). As in research (Matete, 2021), mastery of students' capabilities determines the success of industrial work practice programs. The gap in the field is that there are differences in students' abilities due to external factors when carrying out industrial practice programs that affect students' performance (Gomes & Wojahn, 2017; Pusriawan & Soenarto, 2019). External factors are not an absolute requirement in influencing performance at work. However, the internal factors of students are also very influential in influencing student performance, especially in dealing with adjustments to changes in the work environment. In addition, changes in the work environment require developing soft skills, which are more crucial than hard skills (Benešová & Tupa, 2017; Sopa, Asbari, Purwanto, Budi-Santoso, Mustofa, Hutagalung et al., 2020). Independent soft skills are needed to coordinate and collaborate to solve word problems (Gulikers, Runhaar & Mulder, 2018; Muja et al., 2019).

Professional growth towards work occurs when students work together collegiately, and conversations lead to professional growth (McGrath, Ramsarup, Zeelen, Wedekind, Allais, Lotz-Sisitka et al., 2020; Niittylahti et al., 2021). Professionalism is obtained by carrying out tasks at work several times so that workers gain experience that can be used when doing the same task (Alla-Mensah & McGrath, 2021; Nurtanto, Sudira, Sofyan, Kholifah & Triyanto, 2022; Roll & Ifenthaler, 2021). In line with the demands of competence in the industry, it is hoped that students can work to prioritize initiative, have communication skills and be able to organize their work (Pusriawan & Soenarto, 2019). Whereas in research (Cents-Boonstra et al., 2019; Yazar-Soyadı, 2015), the internal context, such as the place of study, study time, how to interact, and students' self-awareness needs to be considered. It should be noted that currently, vocational skills are valued more in the labor market (Böckerman, Cawley, Viinikainen, Lehtimäki, Rovio, Seppälä et al., 2019; Roll & Ifenthaler, 2021). However, it still needs to be improved in preparing a workforce with the vocational skills needed.

The industrial practice program is part of the vocational education curriculum, which has a significant impact as a process for maturing students' capabilities before they enter the real world of work (Sutiman et al., 2022; Suyitno, Kamin, Jatmoko, Nurtanto & Sunjayanto, 2022). In the vocational education curriculum, industrial practice programs are designed for a particular time by agreement with the industry. Based on the fact that the industrial practice program has been carried out, school management provides the opportunity to implement it in the industry of choice or is determined by the school through cooperation. Two industrial groups were found as places for students to conduct industrial practice programs, namely large and small industries. Large industries have the characteristics of facilities and infrastructure that are fully used, have relatively many human resources and are by their field of expertise. Workers only work according to the notes given by the service advisor. Pay more attention to the quality of the work performed. The industry has a manufacturer's name that legal and organized management. While small industries have characteristics with limited infrastructure and advice, a high level of innovation in doing work, limited human resources, home or individual industries, and usually in the field, everyone plays multiple roles. The difference between the two industrial groups, especially in the automotive sector, is the completeness of infrastructure. One of them is the role of technology in implementing industrial practice programs. Meanwhile, the achievements of graduates from vocational education are skills that are on par with the needs of industry 4.0. The gap between the two industry groups is the main focus of research that is important for vocational education in the future.

Large and small industries have different characteristics, from facilities and infrastructure to human resources and strategies for implementing work processes (Ceelen et al., 2021; Gomes & Wojahn, 2017; Pusriawan & Soenarto, 2019). This difference raises the question of whether the capabilities acquired by students can be as expected. From the description above, the researcher wants to examine students' capability levels to analyze the extent of student capabilities after participating in the Industrial Work Practice program (Sutiman et al., 2022; Suyitno et al., 2022). It also measures the level of capability of students who carry out work practices between large and small industries. This research can be a reference for those interested in making improvements or in-depth evaluations by considering aspects that occur in the world of work.

2. Methodology

2.1. Research Design

This study considered student satisfaction with industrial practice programs to obtain feedback and rewrite requirements, and redesign industrial practice programs in the future. Student satisfaction in carrying out industrial practice programs is measured using indicators of student abilities, including learning, methodological, social, personal and technical abilities. This study also measures the differences in capability aspects in large and small industries in the automotive sector in three competency skills (see Table 1). This study uses a descriptive quantitative approach adapted by Teater, Devaney, Forrester, Scourfield & Carpenter (2017). The data collection technique using the survey method aims to obtain comprehensive data (Paradis, O'Brien, Nimmon, Bandiera & Martimianakis, 2016) and trends toward implementing industrial practice programs.

2.2. Research Participant

The population of this study is vocational education students who have carried out industrial work practice programs at the public and private vocational education in Karanganyar, Central Java, Indonesia, totaling 596 students. The sample in this study was 230 respondents, consisting of 104 students who did work practices in large industries and 126 who did work practices in small industries. Sampling uses a simple probabilistic random sampling technique so that all students in the population have an equal opportunity to be sampled in the study (Creswell, 2014). The characteristics of the respondents are shown in Table 1.

Competence Expertise	Industrial Work Practice Program	
	Small Industries (%)	**Large Industries (%)**
Automotive Light Vehicle Engineering	49 (38.89)	40 (38.46)
Body and Repair Engineering	36 (28.57)	29 (27.89)
Motorcycle Engineering	41 (32.54)	35 (33.65)
Total	126 (100.00)	104 (100.00)

Table 1. Respondents' Characteristics

2.3. Research Instruments

The data collection technique used a questionnaire containing statements about students' capability levels after carrying out work practices in large or small industries. The questionnaire uses a 4-choice Likert scale design, where 1 indicates "Disagree,"; 2 " Sufficiently Agree," 3 "Agree," and 4 "strongly agree." The analysis includes learning, methodological, social, human, and technical capabilities. Aspects and instrument indicators for the capability level of students who carry out industrial work practice programs are shown in Table 2.

Aspects	Indicator	Item	Source
Learning Capabilities	Establishing learning strategies	1-2	(Gulikers et al., 2018; Mårtensson, 2020; Sudira, 2020)
	Concentration in learning	3-4	
	Self-study and in teams	5-6	
	Concern for lifelong learning	7-8	
	Learn self-reliant in a structured way	9-10	

Aspects	Indicator	Item	Source
Methodology Capabilities	Define structured goals and tasks	1-2	(Gomes & Wojahn, 2017; Spoettl & Tūtlys, 2020)
	Find relevant information	3-4	
	Solving problems and work processes related to tasks	5-6	
	Plan, prepared and executed jobs	7-9	
	Monitor and assess the quality of work	10-11	
Social Capabilities	Delivering criticism fairly	1-2	(Forster & Bol, 2018; Irawan, Sutadji & Widiyanti, 2017; Sánchez-Ramírez, Íñigo-Mendoza, Marcano & Romero-García, 2022)
	Work in a team and other considerations	3-4	
	Communicate and exchange information	5-6	
	Cooperation	7-8	
	Resolve conflicts and build consensus	9-10	
Personal Capabilities	Trustworthy willingness to act	1-2	(Alla-Mensah & McGrath, 2021; Sánchez-Ramírez et al., 2022)
	Work under pressure	3-4	
	Reflecting on yourself	5-6	
	Accepting uncertainty	7-8	
	Self-reliant development	9-10	
Technical Capabilities	Knowledge and skills related to the work process	1-4	(Billett, Íñigo-Mendoza, Marcano & Romero-García, 2018; Grzybowska & Łupicka, 2017; Puriwat & Tripopsakul, 2020)
	Work activity	5-6	
	Using equipment	7-10	
	Material handling	10-11	
	Interact and communicate with machines	12-14	
	Using the manual book, fault análisis and symbols	15-17	
	Organizing work activities	18-19	

Table 2. Aspects and Indicators of Research Instruments

2.4. Data Analysis

The data is then analyzed with the SPSS software program version 26. Descriptive statistical analysis is used to obtain the average and percentage scores of each aspect of students' ability to carry out work practice programs in large and small industries. Furthermore, inferential analysis is used for one-way variance analysis (ANOVA) tests to measure differences in each aspect of the ability of students who carry out industrial work practice programs in each place of industrial work practice. Meanwhile, an independent sample-t test was carried out to measure the difference between aspects of capability in large and small industries. The criteria for each level of ability aspect are determined based on the criteria from Allanson and Notar (2020) found in Table 3.

Interval Score	Category
$Mi + 1,5\ SDi \leq M \leq Mi + 3,0\ SDi$	Very high
$Mi + 0\ SDi \leq M \leq Mi + 1,5\ SDi$	High
$Mi - 1,5\ SDi \leq M \leq Mi + 0\ SDi$	Low
$Mi - 3,0\ SDi \leq M \leq Mi - 1,5\ SDi$	Very low

Table 3. Capabilities Level Categories

Information:

Mi: The ideal mean is obtained from an instrument with a value of 1/2 (ideal highest score + ideal lowest score).

SDi: The ideal standard deviation is obtained from an instrument with a value of 1/6 (ideal highest score - ideal lowest score).

M: The average of the instruments.

3. Results

3.1. Capability Level of Learners in Large Industries

Data from one hundred and four respondents who practice industrial work is used to analyze large industries' capability levels. Characteristics of respondents are gender, type of school, and competency skills in vocational education. The instrument used is 60 items that contain statements. The instrument used a Likert scale to determine the response of students who do work practices in large industries. The data obtained from the respondents were then analyzed and displayed in the form of a description related to the variability and central tendency. In contrast, the analysis describes the different aspects of the capability of students who do work practices in large industries. The results of the descriptive analysis regarding the capability level of students who carry out work practice programs in large industries are presented in Table 4.

Capability aspect level	Min	Max	Median	Mode	Std. Dev	Mean	Percentage	Category
Learning Capabilities	24	38	31.00	31	3.115	31.29	78.22%	High
Methodology Capabilities	25	42	34.00	37	3.844	34.09	77.45%	High
Social Capabilities	26	40	33.00	31	3.149	32.57	81.42%	Very High
Personal Capabilities	25	39	32.50	32	3.142	32.60	81.49%	Very High
Technical Capabilities	49	69	58.50	57	3.110	58.69	77.23%	High

Table 4. Capability Levels of learners in large industries

The level of personal capability gets the highest score with an average of 32.60 and a percentage of 81.49%, which is included in the very high category. Then social capability obtains an average of 32.57 and a percentage of 81.42%, which is included in the very high category. The level of learning capability of students who carry out work practices in large industries has an average of 31.29 and a percentage of 78.22% in the high category. Meanwhile, the level of methodological capability obtained an average of 34.09 and a percentage of 77.45, which is included in the high category. Finally, the level of technical capability obtains an average of 58.69 and a percentage of 77.23%, which is included in the high category. Thus, these results provide information that all aspects of capabilities possessed by students who carry out work practices in large industries have a high level of maturity.

One-way ANOVA analysis determines the differences in the capability level aspect of an enormous industrial scope. In the one-way test, ANOVA data must meet the requirements of normality and homogeneity. The results of the normality test are shown in the Table 5 with the result that all aspects meet the normality requirements with significance values above 0.05 (sig. > 0.05).

Capability Aspects	Statistic	df	Sig.	Decision
Learning Capabilities	0.986	104	0.330	Normal
Methodology Capabilities	0.983	104	0.190	Normal
Social Capabilities	0.983	104	0.222	Normal
Personal Capabilities	0.983	104	0.207	Normal
Technical Capabilities	0.980	104	0.114	Normal

Table 5. Normality Test Results in Large Industries

While the homogeneity test results obtained homogeneous results with a significance value of 0.073 > 0.05, data on the capability level of students who carry out work practice programs in large industries meet the requirements of the one-way ANOVA test. The results of the one-way ANOVA analysis test on the capability level of students who carry out work practice programs in large industries are df (103), F value of 1.318 (Sig. 0.001 < 0.050). These results indicate that significant decisions can be made. Furthermore, it is necessary to do a post hoc test to find out the different aspects of capabilities. The test results are shown in Table 6.

Capability Aspects		Mean Diff	Sig	Decision
Learning Capabilities	Methodology Capabilities	-2.798	0.001	Different
	Social Capabilities	-1.279	0.041	Different
	Personal Capabilities	-1.308	0.034	Different
	Technical Capabilities	-27.404	0.001	Different
Methodology Capabilities	Learning Capabilities	2.798	0.001	Different
	Social Capabilities	1.519	0.008	Different
	Personal Capabilities	1.490	0.010	Different
	Technical Capabilities	-24.606	0.001	Different
Social Capabilities	Learning Capabilities	1.279	0.041	Different
	Methodology Capabilities	-1.519	0.008	Different
	Personal Capabilities	-0.029	1.000	No Different
	Technical Capabilities	-26.125	0.001	Different
Personal Capabilities	Learning capabilities	1.308	0.034	Different
	Methodology Capabilities	-1.490	0.010	Different
	Social Capabilities	0.029	1.000	No Different
	Technical Capabilities	-26.096	0.001	Different
Technical Capabilities	Learning Capabilities	27.404	0.001	Different
	Methodology Capabilities	24.606	0.001	Different
	Social Capabilities	26.125	0.001	Different
	Personal Capabilities	26.096	0.001	Different

Table 6. Capability Level Test Results of Large Industry Learners.

Table 6 shows that the level of ability of students who carry out work practices in large industries in terms of learning, methodological, and technical capabilities have significant differences. In contrast, the aspect of social capability does not significantly differ from the aspect of personal capability.

3.2. Capability Level of Learners in Small Industries

Data from one hundred and twenty-six respondents who practice industrial work is used to analyze small industries' capability levels. Characteristics of respondents are gender, type of school, and competency skills in vocational education. The instrument used is 60 items that contain statements. The instrument used a Likert scale to determine the response of students who do work practices in small industries. Data obtained from the respondents were analyzed and presented in a descriptive related to the variability and central tendency. The analysis also describes various aspects of the capability of students who do practical work programs in small industries. The descriptive analysis results related to the capability level of students who carry out work practices in small industries are presented in Table 7.

Capability Aspects Level	Min	Max	Median	Mode	Std. Dev	Mean	Percentage	Category
Learning Capabilities	24	39	31.00	31	3.565	31.23	78.08%	High
Methodology Capabilities	25	38	31.50	31	3.125	31.66	71.95%	High
Social Capabilities	21	39	30.00	30	3.283	30.33	75.81%	High
Personal Capabilities	22	40	30.00	30	3.803	29.67	74.19%	High
Technical Capabilities	52	68	59.00	59	3.459	59.47	78.25%	High

Table 7. The capability level of learners in small industries

The aspects of levels of capability used by students who carry out work practices in small industries are the same as those in large industries. Technical capability obtained the highest results compared to other aspects, with an average value of 59.47 and a percentage of 78.25% in the high category. Meanwhile, the lowest result in the capability level of students working in small industries is the methodological capability aspect, with an average of 31.66 and a percentage of 71.95 in the high category. These results prove that small industries provide students with the technical capabilities to work. However, even though the universal scope is relatively high, the mastery of the capabilities of students who carry out work practices in small industries must be improved in all aspects.

From the results of descriptive data on the level of capability of students who carry out work practices in small industries obtained, a one-way ANOVA test is carried out to analyze differences in the level of capability between aspects of the capabilities that exist in students. The data must meet the normality requirements in the one-way ANOVA test and be homogeneous. The normality test results are shown in the table. 8, with the results of all aspects meeting the normality requirements with a significance value above 0.05 (sig. > 0.05).

Meanwhile, the homogeneity test obtained homogeneous results, namely 0.356 > 0.05. After the data meet the normality and homogeneity test requirements, the test can be used for data analysis. The test results using ANOVA obtained a df value (125) and an F value of 1.751 (Sig. 0.001 <0.050) with a significant decision. Table 9 shows the results of one-way ANOVA testing.

Capability Aspect	Statistic	df	Sig.	Decision
Learning Capabilities	0.980	126	0.056	Normal
Methodology Capabilities	0.981	126	0.075	Normal
Social Capabilities	0.985	126	0.199	Normal
Personal Capabilities	0.983	126	0.108	Normal
Technical Capabilities	0.983	126	0.115	Normal

Table 8. Normality Test Results in Small Industries

Capability Aspects		Mean Diff	Sig	Decision
Learning Capabilities	Methodology Capabilities	-0.429	0.862	No Different
	Social Capabilities	0.905	0.231	No Different
	Personal Capabilities	1.556	0.003	Different
	Technical Capabilities	-28.238	0.001	Different
Methodology Capabilities	Learning Capabilities	0.429	0.862	No Different
	Social Capabilities	1.333	0.019	Different
	Personal Capabilities	1.984	0.001	Different
	Technical Capabilities	-27.810	0.001	Different
Social Capabilities	Learning Capabilities	-0.905	0.231	No Different
	Methodology Capabilities	-1.333	0.019	Different
	Personal Capabilities	0.651	0.566	No Different
	Technical Capabilities	-29.143	0.001	Different
Personal Capabilities	Learning Capabilities	-1.556	0.003	Different
	Methodology Capabilities	-1.984	0.001	Different
	Social capabilities	-0.651	0.566	No Different
	Technical Capabilities	-29.794	0.001	Different
Technical Capabilities	Learning Capabilities	28.238	0.001	Different
	Methodology Capabilities	27.810	0.001	Different
	Social Capabilities	29.143	0.001	Different
	Personal Capabilities	29.794	0.001	Different

Table 9. Capability Level Test Results of Small Industry Learners

Table 9 explains that the level of capability of students in the aspect of learning capability significantly differs from the aspects of personal and technical capability. Meanwhile, learning capability is the same as methodological capability and social capability. These results differ from students who carry out work practices in large industries.

3.3. Comparison of Learner Capability

After knowing the level of capability in each aspect of students who carry out work practices programs in small and large industries, the following procedure is to analyze the differences in capability levels in each aspect between large and small industries using an independent sample t-test. Analysis of differences in capability levels between large and small industries is shown in Table 10.

The independent sample t-test in table 10 obtained nominal values in two aspects: learning capability and technical capability. It means that the level of capability of students who carry out work practices in large and small industries in the two aspects of learning capability and technical capability has an insignificant difference. Meanwhile, the results of the independent sample t-test were significant in three aspects, namely methodological capability, personal capability, and social methodology. It means that the level of capability in these three aspects possessed by students who carry out work practices in large and small industries has a significant difference. Differences in capabilities between students who carry out work practices in large and small industries are shown in Figure 1.

Capability Aspects	t-values	t-table	Mean Diff	df	Sig.	Decision
Learning Capabilities	0.131	1.9704	0.058	228	0.896	No different
Methodology Capabilities	5.284	1.9704	2.428	228	0.001	Different
Social Capabilities	5.250	1.9704	2.242	228	0.001	Different
Personal Capabilities	6.265	1.9704	2.922	228	0.001	Different
Technical Capabilities	-1.790	1.9704	-0.776	228	0.078	No different

Table 10. Differences in The Capability Levels of Large and Small Industry Learners

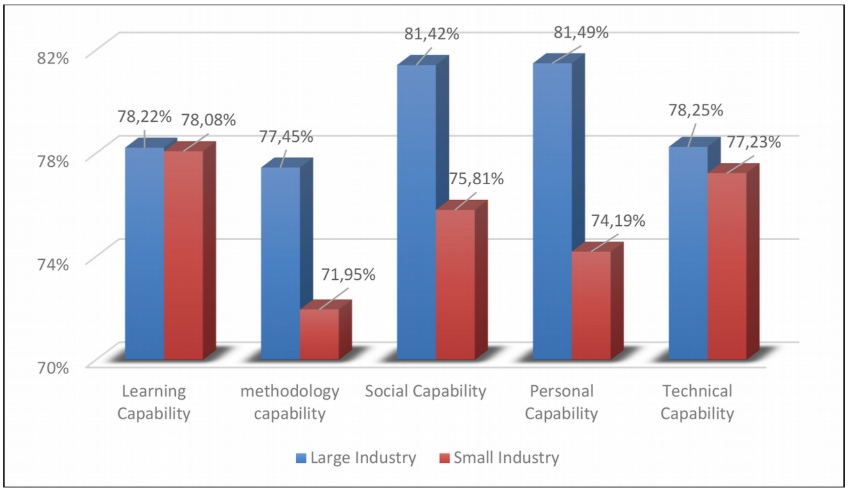

Figure 1. Percentage of The Capability Level

4. Discussion

Students who carry out work practices in large industries obtain results in the high category. It means that in implementing work practice programs, large industries are already promising in terms of implementation. Even though it got a suitable category, it still needs improvement in several items. Based on the questionnaire that the respondents filled in, it was obtained items that still needed to be improved, such as the learning capabilities of the students who were not prepared enough for the learning needs of theories related to their field and structure. Meanwhile, what needs to be improved in the methodology's ability is to assess the quality of the work performed. The technical capabilities that need to be increased are using tools according to their function and doing work according to Standard Operating Procedures (SOP).

Students who carry out work practices in large industries regarding technical capability get the lowest results compared to other aspects. In research (Roll & Ifenthaler, 2021), technical capabilities can be well mastered if the time spent doing work is sufficient according to the capacity of the workers. In this study, infrastructure plays a massive role in mastering technical capabilities. In line with research (Stahel et al., 2020), supporting infrastructure also influences mastery of technical capabilities. The role of all elements of education is essential to improve the capability aspect. The solutions offered to refer to research (Astuti, Arifin, Nurtanto, Mutohhari & Warju, 2022; Jiménez & Zheng, 2021; Mutohhari, Sutiman, Nurtanto, Kholifah & Samsudin, 2021), that steps can be taken, including various training and intensive assistance by utilizing existing technology and information.

The essence of industrial practice is learning to work in an industry guided by experts according to their fields, hoping to work in the field (Ceelen et al., 2021). Learning activities during the implementation of the program, students will be guided in the hope of being able to master the capabilities that are in the world of work and develop them so that they can become a provision for them to work after completing their education (Irawan et al., 2017). Without being based on a strong interest in learning from students, this guidance will not contribute significantly to the abilities acquired. In line with research (Jackson & Edgar, 2019), human awareness to develop their capabilities needs to be instilled in students, so they can respond to the challenges of developing the world of work. Appropriate strategies and methods are needed to obtain good results in the capability development process.

The challenges in the industrial revolution 4.0 require good capabilities in doing work (Chirumalla, 2021; Puriwat & Tripopsakul, 2020). Learning capability is the basis for facing challenges because it promotes lifelong learning, which requires humans to continuously learn to meet life's needs (Min & Kim, 2022). A coherent thinking methodology must support learning to obtain good results (McGrath et al., 2020). In addition, using methodological thinking will direct thoughts in a clear and not misleading direction (Muja et al., 2019). Research (Muja et al., 2019) implies that the challenges faced in a new era are not only about skills, but many aspects that are affected, including the structure of the labor market, the education system, and also human lifestyles will also change.

Students who carry out work practices in small industries also statistically obtain results in the high category. The implementation of work practice programs in small industries needs to be improved in methodological capability, which includes using work manuals as a reference in doing work, solving problems related to the work being done, and providing solutions to problems related to the field being studied. The aspect of social capability that needs improvement is relying too much on others at work. The technical capabilities of students still need to be improved in terms of doing work using technology. Problems in the field, small industries still need more infrastructure.

It is necessary to routinely control and monitor industrial work practice programs by the government and elements involved in the vocational education process (Misbah et al., 2020). Considering the limited implementation duration, which is between 3-5 months, the effectiveness of the industrial practice program can adapt to the findings made by Sutiman et al. (2022). These findings are grouped into three activities: activities before the program, during the program, and evaluation to develop an industrial practice program curriculum. Activities before implementing the program, namely providing understanding, including changing mindsets, strengthening practical work orientation, program planning carried out, career path orientation, and competencies based on case studies in the field. In the implementation activity, they run the program according to plan by coordinating with industry supervisors and academic assistants. Several findings were constructed to obtain feedback and redesign industry practice programs (Fawaid, Triyono, Sukardi & Nurtanto, 2023; Supriyanto, Munadi, Daryono, Tuah, Nurtanto & Arifah, 2022). The program must be carried out successively to obtain the appropriate implementation standards. In particular, serious attention is paid to small industries, which tend to be limited in infrastructure-supporting work (Stahel et al., 2020). In line with research (Roll & Ifenthaler, 2021), small industries need more human resources to manage work, impacting students who carry out work practices in small industries. Research (Mårtensson, 2020), suggests the need for creative and innovative thinking in managing industrial work practice programs so that students can learn to work according to the capacities and demands of the world of work.

There are still many problems with the need for more infrastructure to support education, especially vocational education (Misbah et al., 2020). In addition, vocational education still relies on learning limited to students (Pusriawan & Soenarto, 2019). The passivity of students greatly influences creativity in developing development capabilities related to science and technology that occur (Pusriawan & Soenarto, 2019; Sopa et al., 2020). It is what causes the level of capability of students to participate in industrial work practice programs to be less than optimal. In line with research (Garmendia, Aginako, Garikano & Solaberrieta, 2021), it is necessary to consider essential success factors to encourage student involvement in their learning from the start, instructor feedback, well-designed assignments, and collaboration with their relationships. It is essential to apply various innovation models to overcome this problem (Nurtanto, Arifin, Sofyan, Warju & Nurhaji, 2020). Regional potential-based projects are effective for increasing students' perceptions of motivation, interest, and the natural world; beneficial, learning more lectures and fun, so they learn more actively and devote more time to learning (Syahril, Nabawi & Safitri, 2021).

A comparison of the results between students who carry out work practices in large industries and small industries shows that overall, the capabilities of students who take part in work practice programs in large industries are better than those who take work practices in small industries. However, what needs attention is the value of the difference in results between aspects of capability. Students who carry out work practice programs in large and small industries regarding the results of learning and technical capabilities are the same. However, on the other hand, there are significant differences between students who carry out work practice programs in large and small industries regarding methodological, social, and personal capabilities. Significant differences between abilities can be influenced by factors within the learner or their environment (Forster & Bol, 2018).

The aspect of personal capability is one of the keys to carrying out activities related to social and work activities (Forster & Bol, 2018; Friedrich, 2021). Self-control to do meaningful work is mastered in work (Friedrich, 2021). Challenges in the world of work are increasingly complex in entering the era of the industrial revolution 4.0 (Neumann et al., 2021). Prospective workers must be good at reviewing the field of work for a career (Muja et al., 2019). In addition, essential skills also need to be mastered in order to be able to do work effectively and efficiently (Puriwat & Tripopsakul, 2020). In line with research (Houghton, Lavicza, Diego-Mantecón, Fenyvesi, Weinhandl & Rahmadi, 2022), the role of vocational education and industry is crucial in developing skills that prospective workers must master.

Meanwhile, personal capabilities will support human activities according to applicable rules and norms (Baba, Mohammad & Young, 2021; Min & Kim, 2022). If human personality is terrible, it will affect their social life (Gomes & Wojahn, 2017). In real social life, qualified capabilities are needed to face challenges and solve societal problems (Persson & Hermelin, 2018). In addition, technical skills are also needed to carry out work according to the field (Billett et al., 2018). Therefore, all aspects of capability needed in work and activities must be honed at school to become provisions for work after completing education.

5. Conclusions

Industrial work practices are part of the compulsory program in vocational education. The industrial work practice program requires students to master learning, methodological, social, personal, and technical capabilities. However, the facts in the field of this program have yet to be carried out optimally in several aspects. Mastery of capabilities is influenced by many factors, including places for industrial work practices, supporting facilities, and factors originating from students. Research reveals that students who carry out work practice programs in large industries are more mature in mastering capabilities than in small industries. This problem must be resolved immediately to support the vocational education process to achieve the set targets. Industrial work practice programs need to be maximized by students in order to gain practical experience in dealing with challenges after completing their education. It is the duty of all parties involved in industrial work practice programs, both from the school and the industry. This research helps provide input as evaluation material to vocational education that have programs and industry as colleagues in implementing industrial practice programs. So that implications for the school need to maximize in preparing students who have not participated in industrial practice programs to be better prepared when carrying out the program. As a recommendation, schools can bring in instructors from the industry to conduct short training for students related to the description of the work to be done in the industry. By bringing in instructors from the industry, it is hoped that it can help students understand and have insight into the processes that will be carried out in the industry. The limitations of this study are students' opinions about their abilities without considering the industry as data confirmation. Finally, further research is targeted to obtain the perceptions of all relevant parties, namely academic assistants, industry and other informants involved.

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