

Teacher Profile Analysis In Integrating The Industrial Revolution

4.0. Into Learning Process

Muhammad Amin¹, Abdul Muin Sibuea², Bima Mustaqim³

^{1,2}*Electrical Engineering Education, Universitas Negeri Medan, Medan, Indonesia.*

³*Electrical Engineering, Institut Teknologi Sepuluh Nopember, Surabaya, Indonesia.*

¹*Corresponding author: aminunimed@unimed.ac.id*

ABSTRACT

With "Making Indonesia 4.0" as a policy, the Indonesian government has begun to address the issue of industrial change in an effort to pave the way for Indonesia to become one of the new powers in Asia. One of the actions is to alter the educational system at Indonesia's vocational high schools, where the system has been changed starting April 2018 to one that is competency-based and student-centered. To develop pupils who can meet the demands of the fourth industrial revolution, teachers must be highly competent. In this piece, we pose the following question: What degree of preparation do teachers have to incorporate 4.0 industrial revolution principles into the classroom? and to compare how prepared vocational teachers are to incorporate the concepts of the fourth industrial revolution into the teaching and learning process based on their professional profiles. This study employs a quantitative approach with comparative studies because data in this study is collected using research instruments and its presentation is based on numbers that aim to describe the phenomenon that occurs, which includes teacher readiness. Our findings show that teachers at vocational high schools are among those who are prepared to incorporate the ideas of the fourth industrial revolution into the teaching and learning process. The analysis of variances in vocational teacher profiles on teacher readiness reveals that there are three different teacher profiles, including variations in terms of teacher age, gender, and educational background. Three teacher profiles, including the school where they teach, their job status, and the number of years they have been teaching, are also the same. It may be simpler for vocational teachers to find knowledge on the industrial revolution 4.0 due to the quick growth of technology. Because of this, teachers of vocational subjects fall into the category of those who are prepared to incorporate 4.0's ideas into the teaching and learning process.

Keywords: Profile vocational teacher, industrial revolution 4.0, teacher readiness, vocational education and training.

INTRODUCTION

In the 21st century, education is becoming increasingly important to ensure that students have the skills to learn and innovate, the skills to use technology and information media, and can work and survive using life skills. The 21st century is also marked by the amount of information that is available anywhere and can be accessed anytime, faster computing, automation that replaces routine jobs, and

communication that can be done from anywhere and anywhere (Cogan-Drew, 2010).

The industrial revolution 4.0 is marked by increased connectivity, interaction and development of digital, artificial intelligence, and virtual systems (Sung, 2018). With the increasingly convergent boundaries between humans, machines and other resources, information and communication technology certainly has an impact on various cross-sectors of life. Because we cannot deny that with the

increasingly sophisticated technology that is being developed, it must bring significant changes. One of them is the impact on the education system in Indonesia. The era of the Industrial Revolution 4.0 also changed the perspective on education. The changes made are not only in the way of teaching, but are far more essential, namely changes in the perspective of the concept of education itself.

In implementing the Industrial Revolution 4.0, there are at least five industrial sectors that are the main focus of the government (Harahap & Rafika, 2020), namely: (1) the food and beverage industry with a target to become a great power in ASEAN, (2) the textile and clothing industry in order to reach the target of becoming a leading functional clothing producer, (3) the automotive industry with the goal of becoming a leading player in the export of internal combustion engine (ICE) and electric vehicle (EV), (4) the chemical industry, where the target is to make Indonesia a leading player in the biochemical industry, (5) the electronics industry that will develop the capabilities of domestic industry players. However, Indonesia's success in facing the Industrial Revolution 4.0 is also determined by the quality of educators such as lecturers, teachers and other teaching staff, especially vocational/vocational teachers. Teachers are professional educators with the main task of educating, teaching, guiding, directing, training, assessing, and evaluating students in early childhood education through formal education, basic education, and secondary education (Anaelka, 2018).

Professional teachers must have the competencies needed in carrying out the duties and functions of teachers, namely: teaching, educating, guiding, training, directing, assessing, and evaluating their students. Not only that, teachers are required to master the skills, the ability to adapt to new technologies and global challenges. Every educational institution in Indonesia must prepare new orientations and literacy in the field of

education, especially those that are closely related to the preparation of Human Resources in the face of the Industrial Revolution 4.0 (Amin & Mustaqim, 2021). According to (Dudung, 2018) professional teachers are teachers who are able to manage themselves in carrying out their daily tasks. The professionalism they mean is a process that moves from ignorance to knowledge, from immaturity to maturity.

Changes in this era cannot be avoided by anyone so it takes the readiness of Human Resources to accommodate them to be ready to adapt and be able to compete on a global scale. Quality education is very dependent on the capacity of an educational unit in transforming students to obtain added value related to aspects of taste, heart and sport. As it is known that teachers have a contribution in improving the quality of education and also teachers are part of the national education system (Amin et al., 2022). Improving the quality of Human Resources through formal education channels from primary and secondary education to tertiary institutions is the key to being able to keep up with the development of the Industrial Revolution 4.0 (Shahroom & Hussin, 2018). Therefore when we are going to improve the quality of education, we have to improve the quality of teachers first. In the era of disruption, not only students, but teachers and lecturers must also have 21st century skills. Because it is impossible for teachers to train these skills to students if the teachers themselves haven't mastered it. Teachers must have strong competencies, have soft skills, includes critical, creative, communicative and collaborative thinking. The teacher's role is as a role model, spreading passion and inspiration (Lee et al., 2020).

It is not easy to prepare ideal teachers as required in education in the era of the industrial revolution 4.0 in a short time (Termit Kaur & Samli, 2014). It is necessary to change the teacher's thinking which was originally only tasked with teaching to become a teacher who

is able to encourage students to be more active and creative. Apart from several existing obstacles, teacher readiness is the most important factor in integrating the principles of the industrial revolution 4.0 in the learning process. Teachers are at the forefront of implementing the principles of the industrial revolution 4.0 in the learning process because the teacher is a person who deals directly with students, thus providing a direct influence on the success of students in the learning process. The success of integrating the industrial revolution 4.0 in the learning process is largely determined by the readiness of teachers. Therefore, it is necessary to study how the readiness of vocational teachers is to integrate the principles of the industrial revolution 4.0 in the learning process. This study is to find out how far the readiness of vocational teachers is, what aspects have been mastered, then what aspects have not been mastered. The results of this study will be useful for stakeholders and policy makers, especially in preparing teachers to integrate the principles of the industrial revolution 4.0 in the learning process and improve teacher education and training in the future (Wibowo et al., 2018).

According to (Sasmoko et al., 2020) the readiness of vocational teachers can be influenced by the background of the vocational teacher itself. Vocational teachers in Indonesia have different backgrounds. In terms of gender, there are male vocational teachers and female vocational teachers. Male vocational teachers and female vocational teachers, of course, have differences in terms of time, energy, and work so that they can affect the readiness of these vocational teachers to integrate the principles of the industrial revolution 4.0 in the learning process (Igberadja, 2016).

When viewed from the status of the place where vocational teachers teach, there are vocational teachers who teach at state vocational high schools with vocational teachers teaching in private vocational high schools. State vocational high schools are of

course different from private vocational high schools both in terms of facilities, facilities and infrastructure and others (Delprato & Chudgar, 2018). In terms of educational background, there are vocational teachers who graduated from state universities and vocational teachers who graduated from private universities. State universities differ from private universities both in terms of the learning process and facilities (Naidu & Derani, 2016).

In terms of employment status, there are vocational teachers whose employment status is civil servants and there are also vocational teachers who are non-civil servants (honorary). Civil servant vocational teachers have significant differences with non-civil servant vocational teachers both in terms of salary, facilities provided and others (Andani & Sulasminten, 2007).

In terms of age, vocational teachers who teach in vocational high schools have different ages so that they can affect the readiness of vocational teachers to integrate the principles of the industrial revolution 4.0 in the learning process. Vocational teachers who are in their early middle adulthood are of course different in terms of teaching with vocational teachers who are in adulthood (Andersson & Köpsén, 2015). When viewed from the length of teaching, there are vocational teachers who have taught less than 5 years with vocational teachers who have taught more than 5 years (Goodwin et al., 2019). Vocational teachers who have taught less than 5 years of course have differences with vocational teachers who have taught more than 5 years, both in terms of teaching skills, competence and experience in teaching. So that teachers who have a better teaching period can certainly affect the readiness of vocational teachers in integrating the principles of the industrial revolution 4.0 in the learning process.

The strategic objective of this research is to provide data and evidence that forms the basis for reforming the vocational education system in Indonesia. Vocational teachers as the most

important human resources in the learning process must see the level of readiness in integrating the principles of the industrial revolution 4.0 in the learning process so that students can compete and be ready to face the industrial revolution. In accordance with the literature review, this study aims to measure the level of readiness of vocational teachers in integrating the principles of the industrial revolution 4.0 in the learning process. Previous research, soft and hard skills are best developed by a combination of practical and theoretical learning. Numerous effective educational strategies have been implemented including, active, collaborative, cooperative, inquiry and blended learning (Greenstein, 2012). This means teaching at the university level no longer entails just physical lectures and slide presentations, but is now centred on the students who are encouraged to build their soft skills through various offline and online learning activities.

Research Questions

The following research questions guided the study:

1. Is there a difference in the readiness of male vocational teachers and female vocational teachers in integrating the principles of the industrial revolution 4.0 in the learning process?
2. Is there a difference in the readiness of vocational teachers who teach in public vocational high schools with vocational teachers who teach in private vocational high schools in integrating the principles of the industrial revolution 4.0 in the learning process?
3. Is there a difference in the readiness of vocational teachers whose educational background is from a state university with vocational teachers whose educational background is from private universities in integrating the principles of the industrial revolution 4.0 in the learning process?
4. Is there a difference in the readiness of vocational teachers who have civil servant status with vocational teachers who have non-civil servant (honorary) employment status in integrating the principles of the industrial revolution 4.0 in the learning process?
5. Is there a difference between vocational teachers whose age is at the beginning of middle adulthood and vocational teachers whose age ends in middle adulthood in integrating the principles of the industrial revolution 4.0 in the learning process?
6. Is there a difference in the readiness of vocational teachers who have taught for more than 5 years with vocational teachers who have taught less than 5 years?

Hypotheses

The following hypotheses were tested at 0.05 level of significance:

1. There are differences in the readiness of male vocational teachers and female vocational teachers in integrating the principles of the industrial revolution 4.0 in the learning process.
2. There is a difference in the readiness of vocational teachers who teach at state vocational high schools with vocational teachers who teach at private vocational high schools in integrating the principles of the industrial revolution 4.0 in the learning process.
3. There is a difference in the readiness of vocational teachers whose educational background is from state universities and vocational teachers whose educational background is from private universities in integrating the principles of the industrial revolution 4.0 in the learning process.
4. There is a difference in the readiness of vocational teachers whose employment status is civil servants and vocational teachers whose employment status is non-civil servant (honorary) in integrating the principles of the industrial revolution 4.0 in the learning process.
5. There is a difference in the readiness of vocational teachers who are in their early

middle adulthood and vocational teachers who are in their late middle adulthood in integrating the principles of the industrial revolution 4.0 in the learning process.

6. There is a difference in the readiness of vocational teachers who have taught for more than 5 years with vocational teachers who have taught less than 5 years.

RESEARCH METHOD

The research method used in this study is a quantitative approach with a comparative study of each variable (Sugiyono, 2015). The vocational teacher readiness profile categories are gender, school status, educational background, teacher employment status, age and length of teaching. The population in this study were vocational teachers in the province of North Sumatra, amounting to 1661 teachers who teach in vocational high schools. This study aims to determine the difference in teacher readiness in integrating the principles of the industrial revolution 4.0 in the learning process. The sampling technique in this study was purposive random sampling. The following sample data are used as research objects:

1. Gender: There are 755 male vocational teachers, and 906 female vocational teachers
2. School Status: Public vocational high schools totaling 276 and private vocational high schools totaling 744.
3. Educational background: 705 state universities and 809 private universities
4. Employment status: Government Employment is 460 and NonGovernment Employment is 1201
5. Age: Early middle adulthood 560 adult 1101
6. Length of teaching: > 5 years 968 and < 5 years 693

Data were collected using data collection techniques: 1) Observation, 2) Questionnaire, and 3) Documentation. The instrument used is a questionnaire with a checklist filling format with a scale Likert measurement. The scale items are presented in a closed form by

providing 4 alternatives according to table 1. The instrument was developed based on several indicators or aspects proposed by. The instrument was distributed to vocational high school teachers by using the google form. This was done because of the Covid-19 pandemic that attacked Indonesia and caused several vocational high schools to apply online learning. In addition, the use of google forms can make it easier for researchers to analyze research data. The data from the research results obtained are classified as answer categories based on the indicators or aspects studied, then entered into the data tabulation table. The definition of tabulation in data processing here is an effort to present data in tabular form. The criteria for the readiness of vocational teachers in integrating the principles of the industrial revolution 4.0 in the learning process are seen in the following table:

Table 1. Readiness Category

Interval	Category
3.26 – 4.00	Very Ready
2.51 – 3.25	Ready
1.76 – 2.50	Fairly Ready
1.00 – 1.75	Less Ready

RESEARCH RESULT

Results

The results of data analysis through crosstabs to determine the comparison between vocational teacher profiles and the level of teacher readiness in integrating the principles of the industrial revolution 4.0 in the learning process. To compare the level of teacher readiness, a paired sample t-test was used with a significance level of 5%. The decision making to see the comparison between teacher readiness indicators and teacher profiles is shown in Table 2.

Table 2. Summary of Teacher Readiness Comparison Test Results Based on Respondent Profiles.

Teacher Profile	t-test	Information
Gender (Male – Female)	0.03	Different at $\alpha = 0.05$
School Status (Public School – Private School)	0.07	Not different at $\alpha = 0.05$
Teacher Education Background (Public School – Private School)	0.01	Different at $\alpha = 0.05$
Employment Status (Government – Non Government)	0.19	Not difference at $\alpha = 0.05$
Teacher Age (Early Adulthood – Middle Adulthood)	0.002	Different at $\alpha = 0.05$
Length Of Teaching (< 5 Years -- > 5 Years)	0.18	Not difference at $\alpha = 0.05$

Note:

- Significance Value < 0.05 = There is a Difference.
- Significance Value > 0.05 = No Difference.

Comparison Between Gender and Readiness Level

Table 3. Results gender indicator t-test

Indicator	Mean	Std. Deviation	Sig. (2-tailed)
Male	3.032	0.108	0.03
Female	2.930	0.128	

Table 3 shows the difference in the level of readiness between male and female vocational teachers. Male vocational teachers and female vocational teachers, of course, have differences in terms of time, energy, and competence. Therefore, the researcher analyzed the difference in readiness between male vocational teachers and female vocational teachers. There are differences in the readiness of male vocational teachers with female vocational teachers. This is evidenced by the results of the t-test which shows a value of 0.03, where the value is smaller than 0.05 ($0.03 < 0.05$).

Comparison Between School Status and Readiness Level

In Indonesia, there are many vocational high schools with various facilities offered by these schools. The difference in facilities can of course affect the readiness of vocational teachers in integrating the principles of the industrial revolution 4.0 in the learning process. The difference in facilities offered is of course different between public vocational high schools and private vocational high schools, where the sources of funding from the two schools are different. Therefore, the researcher conducted an analysis to see the difference between vocational teachers who teach at public vocational high schools and private vocational high schools. From the results of the analysis, it turns out that there is no difference in teacher readiness between vocational teachers who teach in public schools and private schools. This is evidenced by the results of the t-test which shows a value of 0.07, where the value is greater than 0.05 ($0.07 > 0.05$).

Table 4. Results of t-test School Status Indicators

Indicator	Mean	Std. Deviation	Sig. (2-tailed)
Public School	3.024	0.135	0.07

Private School	2.920	0.057
----------------	-------	-------

Comparison Between Teacher Education Background Status and Readiness Level

Similar to the public schools and private schools above, in Indonesia there are also two types of universities, includes public universities and private universities. The difference between the two is the facilities and quality of existing education and the teaching staff who teach at the university. Public universities in Indonesia are always superior to private universities. Even though the facts on the ground are not necessarily that graduates from state universities are superior to graduates from private universities. Therefore, the researcher conducted an analysis to see the

Table 5. Results Educational Background Indicator t-test

Indicator	Mean	Std. Deviation	Sig. (2-tailed)
Public Universities	3.022	0.109	0.01
Private Universities	2.862	0.178	

Comparison Between Employment Status And Readiness Level

In Indonesia, there are 2 employment statuses for teachers, includes civil servant teachers and school honorary teachers (non-permanent teachers). The basic difference between the two is in terms of salary and recruitment system. Teachers from civil servants are paid by the government while honorary school teachers are paid by school owners or foundations. For the recruitment system that is carried out, civil servant teachers are carried out with tests that are in accordance with the standards of the Education Personnel Education Institution and are carried out by the government, while for honorary school teachers the recruitment system is carried out with a system made by the school itself. To see the difference in the employment status of vocational teachers, the t test was used. From the results of the t-test, there is no difference between vocational

difference in the readiness of vocational teachers whose graduates came from state universities with vocational teachers whose graduates came from private universities. From the results of the analysis, it is found that there are differences in the readiness of vocational teachers whose educational background is from state universities and vocational teachers whose educational background is from private universities. This is evidenced by the results of the t-test conducted to see the comparison, the value is 0.01, where the value is smaller than 0.05 ($0.01 < 0.05$). In accordance with decision making, if the significance value is less than 0.05, then there is a difference between the two variables.

teachers whose status is civil servants and vocational teachers whose status is school honorary. The t-test value was 0.19 greater than 0.05 ($0.19 > 0.05$). In accordance with decision making if the significance value is greater than 0.05 then there is no difference between the variables tested.

Table 6. Results Employment Status Indicator t-test

Indicator	Mean	Std. Deviation	Sig. (2-tailed)
Government Employment	3.000	0.172	0.01
Non-Government Employment	2.062	0.093	

Comparison Between Age and Readiness Level

Age is one of the supporting factors for a teacher to exist in teaching. Age of course can

affect the performance, performance, competence and experience of a teacher. The readiness of teachers is of course influenced by age, therefore the researchers conducted an analysis to see the difference in the readiness of vocational teachers who entered adulthood and vocational teachers who entered middle adulthood. From the results of the analysis, there are differences in the readiness of vocational teachers who are in early adulthood (24-40 years) with vocational teachers who are in middle adulthood (41-60 years). This is evidenced by the results of the t-test conducted to compare the level of readiness and obtained a value of 0.002, where the value is smaller than 0.05 ($0.002 < 0.05$). In accordance with decision making, if the significance value is less than 0.05, then there is a difference between the variables tested.

Table 7. Results Age Indicator t-test

Indicator	Mean	Std. Deviation	Sig. (2-tailed)
Early Adulthood	3.104	0.105	0.002
Middle Adulthood	2.858	0.142	

Comparison Between The Length Of Teaching And The Level Of Readiness The

Length of time a teacher teaches is of course a factor that affects the readiness of vocational teachers to integrate the principles of the industrial revolution 4.0 in the learning process. Vocational teachers who teach longer of course have quite a lot of experience compared to vocational teachers who have just taught. However, in today's digital age, sometimes these factors cannot affect teacher readiness. Therefore, the researcher conducted an analysis to see the difference in the readiness of vocational teachers who had taught more than 5 years with vocational teachers who had taught less than 5 years. From the results of the

analysis, there is no difference in the readiness of vocational teachers who have taught more than 5 years with teachers who have taught less than 5 years. This is evidenced by the results of the t-test which shows a value of 0.18, where the value is greater than 0.05 ($0.18 > 0.05$). In accordance with decision making, if the significance value is greater than 0.05 then there is no difference between the variables tested.

Table 8. Results of teaching length indicator t-test

Indicator	Mean	Std. Deviation	Sig. (2-tailed)
< 5 Years	3.060	0.269	0.18
> 5 Years	3.260	0.194	

Discussion

Readiness integration of vocational teachers on the principles of the Industrial Revolution 4.0 into the learning process will make learners more able to adapt to the development of the industrial revolution 4.0 in modern times. Based on the results of the research conducted, it was found that the vocational teachers as a whole were in the ready category. The industrial revolution 4.0 can still be well known by vocational teachers, so teachers can integrate the principles of the industrial revolution 4.0 in the learning process, where vocational teachers are able to use the internet in the learning process and teachers have an entrepreneurial attitude based on technology and are able to motivate students to produce innovative work through the expertise of each. In addition, vocational teachers also train students' thinking in solving problems found by students in learning excellence. However, vocational teachers always upgrade existing technology and information in accordance with the times and teachers are able to convey any opportunities that exist in the industrial revolution 4.0, where the task of a teacher is to be able to facilitate students as counselors to understand what students need. related to

psychological problems, stress due to pressure from increasingly complex circumstances and teachers must be ready to motivate students to take advantage of what are the strengths and weaknesses of these students (Andersson & Köpsén, 2015) (Mulyadi, 2019).

The analysis of differences in vocational teacher profiles on teacher readiness shows that there are 3 teacher profiles that have differences, includes differences in terms of gender, educational background and teacher age. Furthermore, there are 3 teacher profiles that do not have differences, includes the school where they teach, employment status and the length of teacher teaching. The following is the profile of teachers who have different competencies:

1. The difference in readiness between male vocational teachers and female vocational teachers is found in time management, readiness to learn new things and energy (Choi, 2020). Male vocational teachers tend to be superior in terms of time because male vocational teachers pay less attention to household work. In contrast to female vocational teachers who must be able to divide their time between taking care of their educational competence and taking care of the household. From the results of the analysis, it is found that the difference in competence is caused by female vocational teachers who are still not fast enough in learning IoT and making IoT a basic skill, in contrast to male vocational teachers who are very fast and responsive in learning and finding out about IoT and making IoT a basic skill. Then female vocational teachers still lack understanding and lack of insight into the techno market which will later be used as a forum to display the work of students. In contrast to male vocational teachers who have more insight and understanding of the techno market whose function will later display the work of students and be sustainable from the products needed by the market (Kwak et al., 2016). Competencies that are almost the same between male and
2. Educational background. There is a difference between vocational teachers whose educational background comes from public universities and vocational teachers who come from private universities. The difference is in terms of facilities and quality of education. State universities tend to be better and better in terms of facilities and quality of education (Naidu & Derani, 2016). In education competence, vocational teachers whose educational background is from a state university are more prepared than vocational teachers whose educational background is from a private university due to the facilities and completeness of equipment that supports competency development that can support and hone the competence of their students. In education competence, vocational teachers are required to be able to make IoT a basic skill, in state universities the campus has prepared for this (Smith, 2000). The difference between counselor competence for vocational teachers whose educational background comes from state universities is more prepared than vocational teachers from private universities. This is because the teaching experience provided by public universities is more or longer than private universities. Long time period given to a student in a teaching experience in the field is very important.

Because to be able to train students to interact with students at school before the student becomes a genuine vocational teacher. The duration of the teaching experience can influence students to know the characteristics and traits possessed by students at school, so that students can learn and understand students at school. This is done by state universities, includes providing a long teaching experience of approximately 3 months to be trained as prospective vocational teachers in the field. Almost the same competence possessed by vocational teachers from state universities with vocational teachers from private universities is in competence in globalization. This competency is certainly taught by every university. This is to make the quality of existing graduates ready to accept the various existing cultures and be able to compete in the digital world after graduation. Overall, vocational teachers whose educational background comes from state universities are more prepared to integrate the principles of the industrial revolution 4.0 in the learning process compared to vocational teachers whose educational background comes from private universities (Moradkhani & Haghi, 2017).

3. There are of course differences in age. This is because vocational teachers in early adulthood still have the time, stamina, and strong energy to continue to hone their competencies (Hildebrandt & Eom, 2011) (Kinney & Smith, 1992). In addition, vocational teachers in early adulthood are faster to adapt and master the development of the times and technology in accordance with the needs of the industrial revolution 4.0. In contrast to vocational teachers in middle adulthood who have reduced time, energy and energy to learn and hone their competencies. Therefore, vocational teachers in middle adulthood are better prepared to integrate the principles of the industrial revolution 4.0 in the learning process.

The teacher profiles that have no difference with the teacher's readiness to integrate the

principles of the industrial revolution are as follows:

1. In terms of where vocational teachers teach. There is no difference between vocational teachers teaching in public vocational high schools and vocational teachers teaching in private vocational high schools. This is due to the fact that the available facilities and quality of education are almost the same, including the use of the same curriculum, therefore there is no difference. In addition, differences in teaching places for vocational teachers do not prevent teachers from developing their competencies. In addition, the Indonesian government does not compare vocational teachers who teach in public schools with vocational teachers who teach in private schools. In terms of facilities and infrastructure, there is almost no difference between public schools and private schools (Coleman et al., 2019). This can be a trigger for teachers to continue to develop their competencies. The most basic difference is the status of schools, where public schools are managed by the government while private schools are managed by foundations or private individuals (Delprato & Chudgar, 2018).
2. Employment status. There is no difference between vocational teachers with civil servant status and vocational teachers with honorary employment status. Both of them have their own strengths and weaknesses. Both have the same responsibilities, the only difference is the recruitment and salary system (Robinson & Edwards, 2012). Where for civil servant vocational teachers are recruited directly by the government with the standards of the Education Personnel Education Institution and are paid directly by the government, while honorary vocational teachers are recruited according to the system created by the school and are paid by the school owner or foundation (Arief Fillah & Ina Savira, 2018). The condition of teacher employment status does not affect the difference in teacher readiness in integrating indicators of the industrial

revolution 4.0 in learning, because they work in the same situation, and even cooperate with each other in carrying out their duties, and are given the same treatment from the school or from the foundation in the assignment process. at the workplace.

3. In terms of long teaching teachers. The length of teaching does not affect the differences in competencies that exist in vocational teachers. Vocational teachers with more than 5 years of teaching experience certainly have a lot of qualified teaching experience and understand the characteristics and characteristics of vocational high school students. It will not mean that vocational teachers who teach less than 5 years can have little experience and training (Goodwin et al., 2019). With today's digital world, of course, it can help the teacher to hone the competencies needed in the current era of the industrial revolution 4.0. In terms of competence, vocational teachers who have taught for more than 5 years have attended many training sessions for competency improvement held by training institutions and from the government. Likewise, vocational teachers who teach less than 5 years have also attended training, but not as many as vocational teachers who teach more than 5 years. Therefore, there is no difference in the level of readiness between vocational teachers who teach more than 5 years and vocational teachers who teach less than 5 years in integrating the principles of the industrial revolution 4.0 in the learning process. The ability of young teachers to utilize IoT includes literacy skills so that the experience of senior teachers can be balanced by young teachers in integrating the principles of the industrial revolution 4.0 in the learning process (Dori & Herscovitz, 2005)(Hall et al., 1992).

CONCLUSION

The level of readiness of vocational teachers in integrating the principles of the industrial revolution 4.0 in the learning process is in the ready category. The ready category here illustrates that there are still some teachers who

are not ready, this causes differences in competencies that exist in the teacher profile, such as: 1) Differences in terms of gender, male vocational teachers and female vocational teachers there are still significant differences in competence, 2) Differences in the educational background of vocational teachers, includes vocational teachers from state universities and vocational teachers from private universities, and 3) Differences in competence in terms of age of vocational teachers.

While the profiles of teachers who do not have differences include: 1) The places where vocational teachers teach, vocational teachers who teach in public vocational high schools and vocational teachers who teach in private vocational high schools do not have differences, 2) The employment status of vocational teachers, includes vocational teachers whose employment status is civil servants and vocational teachers whose status is honorary school employment, and 3) The length of teaching teachers does not have a difference, includes between vocational teachers who teach less than 5 years and vocational teachers who teach more than 5 years.

These differences greatly affect the competence of teachers and the readiness of teachers to integrate the principles of the industrial revolution 4.0 in the learning process. The differences that occur are due to the lack of cooperation between agencies and the government to prepare vocational teachers. The solutions that researchers can provide to overcome differences in teacher profiles with the readiness of vocational teachers in integrating the principles of the industrial revolution 4.0 are as follows: 1) For differences in the readiness of vocational teachers in terms of gender (readiness of male vocational teachers and female vocational teachers) can be done by providing assistance or training in terms of work arrangements controlled by female vocational teachers. Therefore that female vocational teachers can manage and

divide time in terms of taking care of the household and honing the competencies of vocational teachers needed in accordance with the principles of the industrial revolution 4.0, then female vocational teachers can integrate the principles of the industrial revolution 4.0 in the learning process. 2) Differences in the educational background of vocational teachers from state universities and vocational teachers from private universities, to avoid differences between the educational backgrounds, this can be done by providing assistance or equalizing the facilities and quality of education provided by the two universities. Private universities can hold hearings or collaborate with state universities to adjust the facilities and quality of education available at public universities. Therefore that vocational teacher graduates from private universities can balance the existing competencies of vocational teachers graduates from state universities. 3) The difference in terms of age between vocational teachers in early adulthood and vocational teachers in middle adulthood. To avoid the difference both of them, it can be done by collaborating, where middle-adult vocational teachers can inspire in the content of teaching materials while teachers in early adulthood inspire in the part of technological development that is in accordance with the content of teaching materials or collaboration is carried out in terms of honing competencies in accordance with the principles of the industrial revolution 4.0, and collaboration is carried out in terms of compiling teaching materials so that both can integrate the principles of the industrial revolution 4.0 in the learning process.

Researchers assume that if these suggestions can be carried out or applied, there will be no difference in the readiness of vocational teachers in integrating the principles of the industrial revolution 4.0 in the learning process and vocational teachers fall into the category of being very ready to integrate the principles of the industrial revolution 4.0 in the learning process. Therefore, this research is expected to be a material consideration for office holders or

the government to be able to pay attention to the readiness and competence of vocational teachers in accordance with the principles of the industrial revolution 4.0 so that vocational teachers can integrate these competencies into the learning process, then students who graduate from vocational high schools can compete in the digital world and have creativity that can advance the Indonesian nation.

ACKNOWLEDGEMENTS

This article is part of a research that had been funded by the Indonesian Ministry of Research, Technology, and Directorate of Higher Education.

REFERENCES

- Amin, M., & Mustaqim, B. (2021). Vocational Teachers Readiness in Integration The Principles of Industrial Revolution 4 . 0 into The Learning Process. 6(November), 106–119. <https://doi.org/doi.org/10.21831/elinvo.v6i1.44210> Vocational
- Amin, M., Sibuea, A. M., & Mustaqim, B. (2022). The Effectiveness of Online Learning Using E-Learning During Pandemic Covid-19. *Journal of Education Technology*, 6(2).
- Anaelka, A. H. (2018). Education 4.0 Made Simple: Ideas For Teaching. *International Journal of Education and Literacy Studies*, 6(3), 92. <https://doi.org/http://dx.doi.org/10.7575/aiaac.ijels.v.6n.3p.92>
- Andani, R. T., & Sulasminten. (2007). Perbedaan Motivasi dan Disiplin Kerja pada Guru PNS dan Bukan PNS di SMP Negeri se-Surabaya Barat. *Universitas Negeri Surabaya*, 1, 1–8. <https://jurnalmahasiswa.unesa.ac.id/index.php/inspirasi-manajemen-pendidikan/article/view/14610/13260>
- Andersson, P., & Köpsén, S. (2015).

- Continuing professional development of vocational teachers: Participation in a Swedish National Initiative. *Empirical Research in Vocational Education and Training*, 7(1). <https://doi.org/10.1186/s40461-015-0019-3>
- Arief Fillah, I., & Ina Savira, S. (2018). Perbedaan Profesionalisme Guru Berdasarkan Pengembangan Tindakan Reflektif Guru Antara Guru Pegawai Negeri Sipil Dan Guru Honorer Di Sma Negeri Se-Kecamatan Kenjeran Surabaya. *Inspirasi Manajemen Pendidikan*, 6(2). <https://jurnalmahasiswa.unesa.ac.id/index.php/inspirasi-manajemen-pendidikan/article/view/24306/22232>
 - Choi, S. (2020). Impact of family background and individual characteristics on vocational high school choice in south korea: A gender analysis. *Journal of Technical Education and Training*, 12(4), 16–26. <https://doi.org/10.30880/jtet.2020.12.04.002>
 - Cogan-Drew, D. (2010). 21st Century Skills. *ELearn*, 2010(2). <https://doi.org/10.1145/1719292.1730970>
 - Coleman, J. S., Kilgore, S. B., & Hoffer, T. (2019). Public and private schools. *Equality and Achievement in Education*, 237–238. <https://doi.org/10.1037/14327-030>
 - Delprato, M., & Chudgar, A. (2018). Factors associated with private-public school performance: Analysis of TALIS-PISA link data. *International Journal of Educational Development*, 61(June 2017), 155–172. <https://doi.org/10.1016/j.ijedudev.2018.01.002>
 - Dori, Y. J., & Herscovitz, O. (2005). Case-based long-term professional development of science teachers. *International Journal of Science Education*, 27(12), 1413–1446. <https://doi.org/10.1080/09500690500102946>
 - Dudung, A. (2018). Kompetensi Profesional Guru (Suatu Studi Meta-Analysis Desertasi Pascasarjana UNJ). *JKKP (Jurnal Kesejahteraan Keluarga Dan Pendidikan)*, 5(1), 9–19.
 - Goodwin, A. L., Low, E. L., Cai, L., & Yeung, A. S. (2019). A longitudinal study on starting teachers' retention intentions: Do pre-teaching work experience and length of working years make a difference? *Teaching and Teacher Education*, 83, 148–155. <https://doi.org/10.1016/j.tate.2019.03.015>
 - Greenstein, L. (2012). *Assessing 21st Century Skill: A Guide to Evaluating Mastery and Authentic Learning*. In Corwin (Ed.), *Assessing 21st century skills: A guide to evaluating mastery and authentic learning* (Issue c). SAGE Publications. http://libproxy.usc.edu/login?url=https://search.proquest.com/docview/1081618851?accountid=14749%0Ahttps://usc-primo.hosted.exlibrisgroup.com/openurl/01USC/01USC_SP??url_ver=Z39.88-2004&rft_val_fmt=info:ofi/fmt:kev:mtx:book&genre=book&sid=ProQ:PsycINFO&at
 - Hall, B. W., Pearson, L. C., & Carroll, D. (1992). Teachers' Long-Range Teaching Plans: A Discriminant Analysis. *Journal of Educational Research*, 85(4), 221–225. <https://doi.org/10.1080/00220671.1992.9941119>
 - Harahap, N. J., & Rafika, M. (2020). *Industrial Revolution 4.0: and the Impact*

- on Human Resources. *Ecobisma (Jurnal Ekonomi, Bisnis Dan Manajemen)*, 7(1), 89–96.
<https://doi.org/10.36987/ecobi.v7i1.1545>
- Hildebrandt, S. A., & Eom, M. (2011). Teacher professionalization: Motivational factors and the influence of age. *Teaching and Teacher Education*, 27(2), 416–423.
<https://doi.org/10.1016/j.tate.2010.09.011>
 - Igberadja, S. (2016). Effects of teachers' gender and qualification on students' performance in vocational technical education. *Journal of Technical Education and Training*, 8(1), 34–42.
 - Kinney, D. P., & Smith, S. P. (1992). Age and Teaching Performance. *The Journal of Higher Education*, 63(3), 282–302.
<https://doi.org/10.1080/00221546.1992.11778363>
 - Kwak, L., Berrigan, D., Van Domelen, D., Sjöström, M., & Hagströmer, M. (2016). Examining differences in physical activity levels by employment status and/or job activity level: Gender-specific comparisons between the United States and Sweden. *Journal of Science and Medicine in Sport*, 19(6), 482–487.
<https://doi.org/10.1016/j.jsams.2015.05.008>
 - Lee, M. F., Lim, S. C. J., & Lai, C. S. (2020). Assessment of teaching practice competency among in-service teacher degree program (PPG) in Universiti Tun Hussein Onn Malaysia. *Journal of Technical Education and Training*, 12(1 Special Issue), 181–188.
<https://doi.org/10.30880/jtet.2020.12.01.019>
 - Moradkhani, S., & Haghi, S. (2017). Context-based sources of EFL teachers' self-efficacy: Iranian public schools versus private institutes. *Teaching and Teacher Education*, 67, 259–269.
<https://doi.org/10.1016/j.tate.2017.06.019>
 - Mulyadi, Y. (2019). Vocational Teacher Perception on Industry 4.0 and Society 5.0. *Global Conferences Series: Sciences and Technology (GCSST)*, Volume 2, 2019 The 1st International Conference on Education, Sciences and Technology, 2, 62–68.
<https://doi.org/doi.org/10.32698//tech1315126>
 - Naidu, P., & Derani, N. E. S. (2016). A Comparative Study on Quality of Education Received by Students of Private Universities versus Public Universities. *Procedia Economics and Finance*, 35(October 2015), 659–666.
[https://doi.org/10.1016/s2212-5671\(16\)00081-2](https://doi.org/10.1016/s2212-5671(16)00081-2)
 - Robinson, S., & Edwards, C. (2012). Assessing the Teacher Self-Efficacy of Agriculture Instructors and Their Early Career Employment Status: A Comparison of Certification Types. *Journal of Agricultural Education*, 53(1), 150–161.
<https://doi.org/10.5032/jae.2012.01150>
 - Sasmoko, Noerlina, Indrianti, Y., & Wahid, N. H. A. (2020). Indonesian vocational engagement (I-vocatie): A new concept in improving teacher competencies 4.0. *Journal of Technical Education and Training*, 12(3 Special Issue), 97–105.
<https://doi.org/10.30880/jtet.2020.12.03.010>
 - Shahroom, A. A., & Hussin, N. (2018). Industrial Revolution 4.0 and Education. *International Journal of Academic Research in Business and Social Sciences*, 8(9), 314–319.

<https://doi.org/10.6007/ijarbss/v8-i9/4593>

- Smith, R. W. (2000). The Influence of Teacher Background on the Inclusion of Multicultural Education: A Case Study of Two Contrasts. *Urban Review*, 32(2), 155–176.
<https://doi.org/10.1023/A:1005133815768>
- Sugiyono. (2015). *Metode Penelitian Pendidikan (Pendekatan Kuantitatif, Kualitatif, dan R&D)*. Alfabeta.
- Sung, T. K. (2018). Industry 4.0: A Korea perspective. *Technological Forecasting and Social Change*, 132(October 2017), 40–45.
<https://doi.org/10.1016/j.techfore.2017.11.005>
- Termit Kaur, R. S., & Samli, C. (2014). Teacher Readiness on Ict Integration in Teaching-Learning : a Malaysian Case Study. *International Journal of Asian Social Science*, 4(7), 874–885.
<https://doi.org/2224-4441>
- Wibowo, M. A. A., Purwaningsih, N., & Munadi, S. (2018). Industrial Revolution 4 . 0: Critical Thinking Skills in Vocational Education. *PGSD UST International Conference on Education*, 1, 81–84. <https://doi.org/26550687>