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Integration of ICT Skill Among Vocational School Teachers: A case in West Java, Indonesia

Saripudin S., Sumarto, Juanda E. A., Ade Gaffar Abdullah, Ana A.

Abstract*: vocational education, particularly vocational teachers. The demands of vocational teachers in the digital era to be expected to be able to develop learning skills by using concepts, ideas, and thoughts in solving problems through digital technology, so that teachers are able to integrate digital technology in the learning process. This study aims to analyze the level of ICT skills of vocational teachers in West Java. The data of this study were collected using quantitative methods, questionnaires were given to 185 vocational teachers who taught subjects in both public and private vocational schools. Questionnaire items related to the knowledge of teacher ICT skills is based on demographic factors. Data analysis used SPSS V. 23 using independent T-Test and one way ANOVA. The findings of ICT abilities based on demographic factors (age, gender, years of service, academic qualifications and teacher certification) are valued at P>.05. This means that all ICT skills of teachers based on their demographic factors do not have a significant difference. However with further analysis, the average ICT ability of vocational teachers diverse based on age, gender, years of service, academic qualifications and teacher certification. Another finding is that the ability of ICTs to use Microsoft Power point is still weak compared to the ability to use computers, Microsoft Word, Excel and the internet. So training is required to improve the ability of ICT vocational teachers in an effort to integrate ICT in the learning process in the classroom

***Keywords* : ICT Ability, Vocational Teachers, ICT Integration.**

I. INTRODUCTION

Digital technology in the 21st century developed very rapidly and turned this 21st century into a digital era. This century also raises various opportunities and challenges, particularly vocational teachers, where the demands is that vocational teachers in this digital era are expected to develop learning skills by using concepts, ideas, thoughts in solving problems, being able to use computers and being able to integrate digital technology in learning [1] In addition, the characteristics of 21st century learning are vocational teacher competencies in digital literacy [2][3], technological competencies [4], and information and communication technology (ICT) competencies [5] [6][7].

Teacher competencies in both digital technology and information technology have the same direction so that these competencies require teachers to be confident, critical, and creative in utilizing information technology [8], teachers have two roles at once, namely as learners/users and teachers [2][4]. Competence in information technology implies that teachers must have pedagogical and technological abilities [4] [9].

School problem related to ICT is the lack of facilities and infrastructure to support ICT in schools [10][11]. This condition causes less optimal teacher competence in achieving learning goals [8]. In addition, teacher perceptions of ICT also influence competency towards the use of ICTs [9][13].

The ability and attitude of teachers towards ICT also have an impact on success in the learning process, especially the ability of teachers to integrate ICT in the learning process in the classroom, because one of the 21st century learning features requires teachers to have ability in the ICT field. The basic problem is whether teachers know how to use ICT effectively in learning. This ability for ICT is related to teacher literacy towards ICTs [14].

ICT literacy gaps also occur in women [1][13] this is due to social, economic, structural, psychological and institutional barriers resulting in low levels of access and use of ICT compared to men. Age factors also influence teacher ICT literacy rates [13] [15] the results show that young teachers know more about ICTs than older teachers. This proves that the variety of ICT literacy levels based on the individual teacher.

The use of ICTs is also influenced by the workplace [16], the results of the study reveal that the use of ICT in the workplace is understood as a routine activity in work, helping to accomplish work more effectively and as an important tool in professional activities. Thus, the way teachers understand ICT in the workplace can have an impact on teaching and consequently on student learning outcomes. For example, teachers who have a good concept of ICT in the workplace would make students to more likely to accept a series of given ICT assignments.

It is expected that the use of ICTs can be useful for industry partners who offer student placement, function as mentors in the workplace, and in other ways collaborate with vocational training institutions. Their awareness of how vocational teachers understand ICT in the workplace can help build a better shared understanding of how ICTs must be integrated in vocational teaching and learning [16].

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* Correspondence Author
Saripudin, S.*, Electrical Engineering Department, TEDC Polytecnic, Cimahi, Indonesia. Email: bangsarip@up.edu
Sumarto, Departement of Electrical Engineering Education, Universitas PendidikanIndonesia,Bandung,Indonesia,Email:soemarto@icould.com
Juanda, **E.A** Departement of Electrical Engineering Education, UniversitasPendidikanIndonesia,Bandung,IndonesiaEmail: juanda@upi.edu
Ade Gafar Abdullah. Departement of Electrical Engineering Education, UniversitasPendidikanIndonesia,Bandung,Indonesia.Email: ade_gaffar@upi.edu
Ana, A.*, Departement of Home Economics, Universitas Pendidikan Indonesia, Bandung, Indonesia, Email: ana@upi.edu

For students, digital use in learning can provide great benefits, because material that is integrated with information technology in learning is faster and more easily accepted [17], building students' knowledge with the principles of independent learning [18], and information technology learning is seen as a form of lifelong education because it is seen as a form of learning that can be done anywhere and at any time without limitations of space and time [19].

Based on the above problems, researchers are interested in examining the ICT skills of vocational teachers based on their demographic factors, namely the factors of age, gender, years of service, academic qualifications and teacher certification are fine and satisfactory. Author (s) can make rectification in the final paper but after the final submission to the journal, rectification is not possible.

II. THEORITICAL BASIC

A. Use of ICTs for Vocational High Schools

Information technology and ICT communication in education are increasing exponentially due to technological developments and social needs. Therefore, ICT is the main key that can open the way for the global education system to improve students' knowledge and abilities. The use of ICT in education also raises a variety of learning models and methods, including network learning, multimedia education, online and open education, and blended learning [20].

The challenges above require teachers to progressively improve information when the learning environment is integrated with ICT. In other words, the factors that lead to successful use of ICT in the classroom are components that include developing technological infrastructure, accessibility of educators, technical support, human resources (teachers, principals, and the existence of IT teams) and their beliefs in ICTs and institutional vision [11][21].

Revealing that the challenge of integrating technology is no longer understood only as a challenge of "integration" but rather as a rearrangement of the education system towards a more student-centered experience. One example of the use of ICT in schools is exploring the use of electronic portfolios in the school learning process; a significant positive impact of the use of electronic portfolios on student learning is related to the preparation of students to choose their careers [22].

In addition, presently there is internet access for every school, meaning that it is very possible for teachers to develop the to use ICT in the workplace in completing various tasks related to regular work, helping to complete work more effectively, and using ICT as an important tool in professional activities. There are three categories of ICT uses in the practice of ICT professional workplaces as follows [23]:

Category A: use of ICT for various routine tasks related to work;

Category B: helping to complete work more effectively; and

Category C: considering ICT as an important tool in professional activities.

Category A, ICT is seen as a complementary tool or media in professional work. The purpose of using ICT is to support professionals in the performance of various routine tasks at work. For example, ICT tools, both software and hardware, are used to keep records in small and large businesses, to check the details of patients in hospitals, to complete various tasks at the bank, or to keep records in other technical and professional fields.

Category B: ICTs help to get the job done more effectively. In Category B, the focus is to use ICT in completing professional assignments more effectively than with-out ICT. Effectiveness is felt through four commonly used criteria: time, cost, level of accuracy, and productivity. As seen in Figure 1 below:

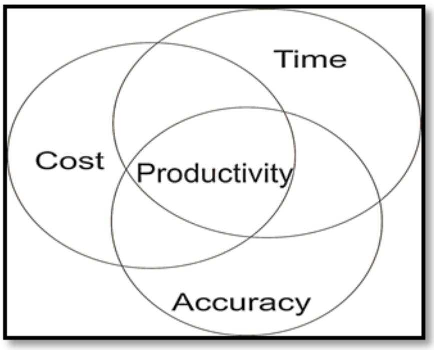

Fig. 1. Elements that influence productivity in industry

Source: Khan, MSH, & Markauskaite, L. 2017

ICT is considered as a time-saving tool. This allows for faster performance tasks and helps industries to plan and complete their work on time. Work is achieved faster with the use of ICT compared to using other conventional methods. Research was conducted on the effectiveness of the use of ICTs to promote vocational teaching and learning in Bangladesh, which revealed that ICTs facilitate teaching and learning, to save time compared to traditional teaching [18].

The use of ICTs is also seen as a contributor to cost-effective operations. Although the initial cost of setting up technology can be high, it turns into a cost-effective system with faster access to the data needed and low production and operating costs. For example, participants mentioned that ICTs helped reduce labor in the industry, because technology-supported control systems need fewer personals than manually controlled systems, or increases volume production because of the integration of technology into the process cycle, or make effective decisions based on information data. Therefore, ICT can produce a reduction in overall costs in industrial operations.

ICT is also seen as a tool that helps complete tasks at work with greater accuracy and minimizes the possibility of human error. Overall, the use of ICTs is seen as a means of increasing direct or indirect productivity due to a reduction in time and production costs and increased accuracy (Figure 1). The main purpose of using ICTs is to increase efficiency and effectiveness in the workplace, which leads to increased productivity and ultimately profit. Category C: ICT is an important tool in professional activities. In Category C, ICT is seen as an unavoidable condition for the continuation of professional activities.

This is based on the fact that some technology-driven industries depend on ICTs and some professions will not exist without them. Some participants felt that various activities in their professional fields depend on technology. For example, the drawing industry, the electronics industry, the production industry, and the ICT industry regard technology as an important part of everyday business.

The significant impact of ICT is not limited to the central role of ICT in high technology and the production industry, but is related to the integration of ICT into the many services that are used every day by individuals and society. This is evidenced in the reliance on ICT infrastructure for many professional tasks in various sectors, especially in the service and public service industries, such as communication, transportation, health, education, and entertainment. Therefore, Category C presents technology as an 'important condition' for the continuation of the professions' existence.

Overall, the identified categories represent the focus that develops from the teach-er's view of the general use of ICT in the workplace (Category A), ICT features that change performance effectiveness (Category B), and the vision of ICT becoming an integral part of professional work (Category C). Category A represents the basic view of ICT in the workplace, because the main emphasis is on using ICT in general for routine tasks in the workplace. Category B represents a more inclusive view of ICT; of being used in workplaces to complete or add to routine tasks, teachers emphasize ICT's "additional value" in improving the effectiveness of organizational performance. Category C represents the most inclusive view as expressed by the teachers. This view, in addition to effectiveness, emphasizes the integral role of ICT in professional work and society. Therefore, the three categories represent a hierarchy, in which Category B is considered more inclusive than Category A as it inevitably has features marked in Category A. Similarly, Category C is considered to be more inclusive than Category B because its default features are characterized in Category A and B (Figure 2).

This hierarchical relationship can be illustrated by the individual teachers view. For example, one participant from the ICT department believes in the features of Category C, where ICT is seen as important for sustained professional development and communication.

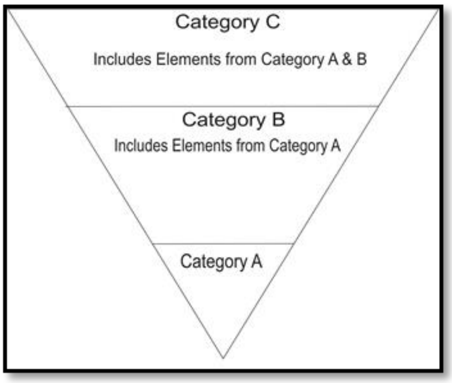

Fig. 2. Hierarchical relationship among the three categories

Source: Khan, MSH, & Markauskaite, L. 2017

The advantages of ICT in the development of student learning through presentations prepared by the teacher can be managed to obtain the latest knowledge and information that will refer to teachers and students and can improve the school management system as a substitute for traditional teaching and management methods. One of them is the development of e learning [20], which offers students new methods to obtain, process and produce information, and thus offer new forms of engagement for multimedia tutors, students and administrators, online and open education, and blended learning.

B. Vocational Teachers ICT Skills

The teacher's ICT skills are an important requirement in developing learning in the classroom [24] including the ability of teachers to integrate ICT in learning, so one way to improve the ability of teachers is to conduct training. ICT training offers many benefits for the education system in general, both in teaching and learning [25]. Therefore, to instill ICT in vocational teachers, a lot of training is needed so that teaching in the classroom can be achieved.

In addition, the teacher's ICT skills are able to increase student learning motivation [25][26][27] ICT has become an important component of education, ICT is a teaching tool in the classroom if it is used well by trained teachers, as it can increase student motivation in learning. The use of ICTs by teachers can help explain difficult concepts, so that students can easily understand these concepts. The ability to integrate ICT [26] in the learning process is a skill that must be present in teachers. Examples of integration of ICT are in information networks and computers, digital content, internet sites, multimedia, and others

An important prerequisite for teacher ICT skills is the ability to use computer technology, facilitate the use of educational technology and digital material in the education system [19][28]. Many studies have shown that a new generation of ICT users [11] and skills for teaching and learning especially with pre-service teachers are very important to improve shared conditions in relation to integrating digital technology into TVET programs.

In addition, there are three phases of the success of vocational teachers in developing ICT skills, including:

1. The first phase: Curriculum development. The curriculum development contains student skills related to creative thinking, communication, research, problem solving, decision making and information and communication technology skills. To do this, teachers must be familiar with using learning strategies using media/software pro-grams, especially in integrating skills digitally [2].

2. The second phase provides opportunities for students to carry out digital literacy. Digital literacy skills include: information literacy skills that enable students to access information effectively and productively. Second; media literacy that reflects 21st century skills in which students are required to use media and communication tools such as; videos, podcasts, web pages, and web 2.0 tools in the learning process. Third, information and communication technology literacy expresses the ability to integrate and use digital tools such as; computers, tablets, and mobile devices in the learning process effectively [6].

3. The third phase of teaching skills, 21st century teacher skills as discussed by [19] is based on the use of global competencies and skills in using ICT skills in the learning process in the classroom to meet the needs of digital learners.

Thus, vocational teachers' ICT skills are an important factor in improving the quality of learning in the classroom, so that it will impact the students, which can be motivation in learning, increasing creativity and innovation, and being able to solve life problems through the use of technology.

Vocational teachers' ICT skills can also be influenced by many factors in pre-service teacher training programs, specifically pedagogical knowledge and ICT-related courses [29][30], have a significant effect in enabling pre-service teachers to use ICT. On the other hand, it was found that attitudes towards technology, external barriers, computer use anxiety and gender on ICT integration capabilities did not have significant differences in pre-service teachers in the integration of ICT in the classroom learning process [6][12].

Some of the main ICT competencies needed by teachers, including competencies which include among others [3][11][31]:

1. Using ICT personally;
2. Mastery of various educational paradigms that utilize ICT;
3. Utilizing ICT as mind tools
4. Using ICT as a tool for teaching,
5. Mastering various assessment paradigms involving the use of ICTs; and
6. Understanding the dimensions of ICT use policies for learning and teaching processes.

Teachers' ICT skills at the global level, UNESCO has designed a competency framework for teachers (CFT), launched in 2008, to help education policy makers and curriculum developers identify skills needed by teachers to utilize technology in education [33]. This can be seen in Figure 3 below:

THE UNESCO ICT COMPETENCY FRAMWORK FOR TEACHERS

	TECHNOLOGY LITERACY	KNOWLEDGE DEEPENING	KNOWLEDGE CREATION
UNDERSTANDING ICT EDUCATION	Policy awareness	Policy understanding	Policy innovation
CURRICULUM AND ASSESSMENT	Basic knowledge	Knowledge application	Knowledge society skills
PEDAGOGY	Integrate technology	Complex problem solving	Self management
ICT	Basic tools	Complex tools	Pervasive tools
ORGANIZATION AND ADMINISTRATION	Standard classroom	Collaborative groups	Learning organizations
TEACHER PROFESSIONAL LEARNING	Digital literacy	Manage and guide	Teacher as model learner

Fig. 3. UNESCO ICT Competency Framework for Teachers Framework

Source: UNESCO, 2008

In Figure 3 above, it shows the Competency Standards developed by UNESCO 2008 in collaboration with Cisco, Intel, Microsoft and the International Society for Technology in Education (ISTE). The framework is made of three approaches in the integration of ICT in education, namely (Technology Literacy, Knowledge Deepening, and Knowledge Creation), the three approaches can be implemented with the support of six components of the education system, namely Policy & Vision, Curriculum & Assessment, Pedagogy, ICT, Organization & Administration, and Professional Teachers

With regard to teachers' ICT skills and gender, the issue of gender inequality in ICTs has been the subject of much research both internationally and locally, that men's ICT skills are more dominant than women's [17][21]. Established women tend to be less interested in computers than men. In addition, women lack confidence in computer skills compared to men. From the review of the research above, there is evidence of gender-specific differences in ICT skills. Thus, based on the above theoretical study, this study intends to analyze the extent to which the differences in vocational teachers' ICT skills are based on their demographic factors.

III. METHODOLOGY

This research method uses a quantitative approach. Respondents in this study were vocational teachers both honorary and civil servants (PNS), gender, age, years of service/teaching experience, educational qualifications and teacher certification status. This is intended so that there is a variety of data from each teacher studied. The number of participating teachers is 185 spread across cities/regencies in West Java Province of Indonesia, which can be seen in table 1 below:

Table 1. Respondents Demographic Characteristics (n=185)

Aspect	Recapitulation		Percentage
Gender	MALE	101	55%
	FEMALE	84	45%
Age	20-24	17	9%
	25-29	39	21%
	30-34	37	20%
	35-39	25	14%
	40-44	26	14%
	45-49	21	11%
Years of Experience	1-5	74	40%
	6-10	51	28%
	11-15	31	17%
	16-20	15	8%
	21-25	2	1%
	26-30	5	3%
	31+	7	4%
Academic Qualification	S2	23	12%
	S1	153	83%
	D3	9	5%
Teaching Certification	Obtained	110	59%
	Not obtained	75	41%

Table 1 above revealed that out of 185 respondents, male teachers are n = 101 (55%), and female teachers are n = 84 (45%). Age groups of 55-year-old teachers or more n = 11 (6%) of the total respondents, followed by 50-54 years, amounting to n = 9 or (5%), (45-49) years totaling n = 21 (11%), next, followed by (40-44) years totaling n = 26 (14%), (35-39) years totaling n = 25 (14%), (30-34) years totaling n = 37 (20%) , (25-29) years totaling 39 (21%) and (20-24) years totaling n = 17 (9%). The teacher's working period (1-5) year is n = 74 (40%), (6-10) years is n = 51 (28%), (11-15) years is n = 31 (17%),

(16-20) years totaling n = 15 (8%), (21-25) years totaling n = 2 (1%), (26-30) years totaling n = 5 (3%) and (31+) years totaling n = 7 (4%) of the total number of respondents as many as 185 people. While the biggest teacher academic qualifications are S1, which amounts to n = 153 (83%) followed by S2 totaling n = 23 (12%) and D3 totaling n = 9 (5%). Furthermore, teachers who have taken certification are n = (%) and those who have not been certified are n = (% 0 of the total 185 teachers).

A. Instrument

The instrument in this study is divided into two parts; part one contains teacher information based on teacher demographics starting gender, age, years of service/teaching experience, academic qualifications and teacher certification; part two is a test of basic knowledge of computer skills (n = 4), Microsoft Word (n = 4), Excel (n = 3), and Power point (n = 4) and internet usage (n = 6) which amounts to 20 questions.

B. Data Collection and Analysis

The researcher distributed questionnaires randomly to vocational teachers in West Java using google doc. From google doc, they collected 185 respondents who filled out the questionnaire. After that, researchers used IBM SPSS V.23 software to analyze data through frequency and percentage for demographic information, mean (M) and standard deviation (S.D) to analyze a range of ICT skills for vocational teachers.

To test differences in basic knowledge of ICT skills based on gender, teacher certification uses independent T-tests. Whereas to analyze age, tenure, and academic qualifications, one way ANOVA analysis was used.

IV. RESULT

A. Differences in the Ability of ICT Vocational School Teachers based on demographic factors

Analyzing the differences in vocational teachers' ICT skills based on demographic factors using the Independent T-Test analysis. The results of the analysis can be seen below:

B. Vocational Teachers ICT Ability and Gender

Testing the differences in the level of ability of ICT teachers based on gender with independent T-Test analysis can be seen in table 2.

Table 2. Vocational teachers ICT skills based on gender

Category	Gender	N	Mean	SD	df	F	P
Computer skills	Male	101	89.60	15.917	183	.002	.595
	Female	84	88.39	14.750			
MS Word skills	Male	101	85.64	21.315	183	.126	.835
	Female	84	86.31	22.091			
MS Power point skills	Male	101	43.53	27.131	183	.840	.856
	Female	84	42.83	24.768			
MS Excel skills	Male	101	77.98	25.075	183	2.034	.177
	Female	84	82.64	20.963			
Internet skills	Male	101	68.23	25.431	183	5.793	.871
	Female	84	67.65	21.625			

In Table 2, it was obtained from the independent T-Test test that the average test of male computer use ability (89.60) was greater than female (88.39), average test ability of female MS word (86, 31) was greater than male (85.64), the average test for male MS power point ability was greater (43.53) than for female (42.83). Furthermore, the average MS excel ability test for female was greater (82.64) than male (77.98) and the male internet skill test was greater (68.23) than female (67, 65). However, from the results of the independent T-Test it was found that the value of P is > 0.05, which means there was no significant difference in the level of teachers' ICT ability based on gender.

C. ICT Ability and Age

Testing the differences in the level of ICT skills based on age using one-way ANOVA analysis, and the results can be seen in Table 3 below:

Table 3. Prepare Your Paper Vocational School Teachers ICT Stills Based on Age

Category	Age	N	Mean	SD	DF	F	P
Computer skills	20-24	17	94.12	10.931	7	.781	.604
	25-29	39	90.38	15.827			
	30-34	37	87.16	16.268			
	35-39	25	91.00	15.943			
	40-44	26	84.62	14.277			
	45-49	21	88.10	16.991			
	50-54	9	88.89	13.176			
	55+	11	90.91	16.855			
	Total	185	89.05	15.369			
MS Word skills	20-24	17	88.24	12.862	7	1.782	.094
	25-29	39	89.74	17.879			
	30-34	37	92.57	12.997			
	35-39	25	80.00	26.021			
	40-44	26	76.92	29.089			
	45-49	21	82.14	28.661			
	50-54	9	88.89	18.162			
	55+	11	86.36	17.189			
	Total	185	85.95	21.614			
MS Excel skills	20-24	17	88.29	20.180	7	1.477	.178
	25-29	39	84.74	18.379			
	30-34	37	81.16	22.963			
MS Excel skills	35-39	25	69.36	33.290			
	40-44	26	80.92	19.166			
	45-49	21	79.43	24.701			
	50-54	9	77.78	28.965			
	55+	11	73.00	13.349			
	Total	185	80.10	23.353			
MS Power point skills	20-24	17	45.06	20.477	7	1.206	.302

	25-29	39	50.44	25.407			
	30-34	37	47.73	21.817			
	35-39	25	34.60	28.125			
	40-44	26	38.38	22.672			
	45-49	21	42.86	31.996			
	50-54	9	40.67	22.439			
	55+	11	39.36	32.831			
	Total	185	43.57	25.644			
Internet skills	20-24	17	66.59	19.510	7	1.657	.122
	25-29	39	74.69	21.926			
	30-34	37	73.81	19.754			
	35-39	25	58.64	27.657			
	40-44	26	64.69	28.729			
	45-49	21	62.67	23.510			
	50-54	9	70.44	19.982			
	55+	11	63.64	23.428			
	Total	185	67.97	23.717			

In table 3., it was found that the average test of the ability of computer use was the highest at the age (20-24) (M = 94.12), and the lowest at the age of 40-44 (M = 84.62), for the average MS word ability test the highest was at age 30-34 (M = 92.57), and the lowest was at the age of 40-44 (M = 76.92), the highest average test ability of MS power point was 25-29 (M = 50.44), and the lowest at age 35-39 (M = 34.60). Furthermore, the highest average MS excel ability test age was 20-24 (M = 88.29), and the lowest was at age 35-39 (M = 69.36, and the average internet ability test was the highest at age 25-29 (M = 74.69), and the lowest at age of 35-39 (M = 58.64). However, the results of the one-way ANOVA test produced a value of P> 0.05, which means there was no significant difference in the level of ICT skills of teachers based on their age.

D. Teachers ICT Ability and Working Period (Teaching Experience

To test differences in ICT skills based on teaching experience, One-Way ANOVA results are presented in Table 4 below:

Table 4. Working Period and ICT Skills

Category	Working Period	N	Mean	SD	df	F	P
Computer skills	1-5	74	89.19	16.070	6	1.057	.390
	6-10	51	87.25	16.103			
	11-15	31	92.74	13.219			
	16-20	15	83.33	12.199			
	21-25	2	100.00	.000			
	26-30	5	95.00	11.180			
	31 +	7	89.29	19.670			
	Total	185	89.05	15.369			
MS Word skills	1-5	74	87.84	17.183	6	.994	.431
	6-10	51	86.76	24.162			
	11-15	31	81.45	26.589			
	16-20	15	78.33	26.502			
	21-25	2	87.50	17.678			
	26-30	5	100.00	.000			
	31 +	7	85.71	13.363			
	Total	185	85.95	21.614			
MS Power point skills	1-5	74	44.59	25.036	6	.402	.877
	6-10	51	41.76	24.972			
	11-15	31	43.00	31.385			
	16-20	15	44.33	16.590			
	21-25	2	33.50	47.376			
	26-30	5	53.40	18.623			
	31 +	7	33.29	38.539			
	Total	185	43.22	26.017			
MS Excel skills	1-5	74	81.64	22.809	6	.846	.536
	6-10	51	82.43	22.457			
	11-15	31	78.55	27.983			
	16-20	15	71.27	21.372			
	21-25	2	66.50	47.376			
	26-30	5	86.80	18.075			
	31 +	7	71.71	12.473			
	Total	185	80.10	23.353			
Internet skills	1-5	74	70.18	21.745	6	.444	.849
	6-10	51	66.94	24.549			
	11-15	31	65.03	29.551			
	16-20	15	71.13	20.357			
	21-25	2	58.50	12.021			
	26-30	5	70.00	29.908			
	31 +	7	59.57	16.349			
	Total	185	70.18	21.745			

Based on Table 4 above, it was found that the average test of computer use ability was the highest for working period of 21-25 (M = 100.00), and the lowest was 16-20 (M = 83.33), the average MS ability test for the highest working period was 16-20 (M = 78.33), and the lowest was 16-20 years of work (M = 78.33), the average MS power point ability test for the highest was working period 1-5 (M = 44.59), and the lowest at 31 + (M = 33.29). Furthermore, the average test ability of MS excel was the highest for working period of 26-30 (M = 86.80, and the lowest was 21-25 M = 66.50, and the average internet ability test was the highest for working period of 16-20 (M = 71.13), and the lowest for the working period of 21-25 (M = 58.50). However, the results of one-way ANOVA test resulted in P> 0.05 which means there was no significant difference in the level of teachers' ICT skills based on the their tenure.

E. Vocational Teachers ICT Ability of and Academic Qualifications

To test for differences in ICT skills based on academic qualifications, the One-Way ANOVA results are presented in Table 5 below:

Table 5. Working Period and ICT Skills

Category	Academic Qualifications	N	Mean	SD	df	F	P
Computer skills	D3	9	80.56	20.833	2	1.573	.210
	S1	153	89.71	15.046			
	S2	23	88.04	14.828			
	Total	185	89.05	15.369			
MS Word skills	D3	9	88.89	13.176	2	.087	.917
	S1	153	85.78	21.606			
	S2	23	85.87	24.802			
	Total	185	85.95	21.614			
MS Power point skills	D3	9	27.968	9.323	2	.672	.512
	S1	153	26.054	2.106			
	S2	23	25.402	5.297			
	Total	185	26.017	1.913			
MS Excel skills	D3	9	77.78	28.965	2	2.073	.129
	S1	153	81.58	22.877			
	S2	23	71.13	23.213			
	Total	185	80.10	23.353			

Internet skills	D3	9	57.33	20.700	2	1.216	.299
	S1	153	69.01	23.944			
	S2	23	65.17	22.924			
	Total	185	67.97	23.717			

Based on Table 5 above, it was found that the average computer use ability test was the highest for academic qualification S1 (M = 89.71), and the lowest at D3 (M = 80.56), the highest average MS word ability test was D3 (M = 88.89), and the lowest was S1 (M = 85.78), the average MS power point ability test was the highest for D3 (M = 27,968), and the lowest for S2 (M = 25,402). Furthermore, the average MS excel ability test was the highest for S1 (M = 81.58), and the lowest for S2 (M = 71.13), and the average internet ability test was the highest for S1 (M = 69.01), and the lowest for D3 (M = 57.33). However, the results of the one-way ANOVA test produced a value of P> 0.05, which means there was no significant difference in the level of ICT skills of the teacher based on academic qualifications.

F. Vocational Teachers ICT Ability of and Teachers Certification

To test for differences in ICT skills based on teacher certification, the results of the Independent T-Test are presented in Table 6 below:

Table 6. Vocational Teachers ICT Skills and teaching Certification

Category	Teacher Certification	N	Mean	SD	df	F	P
Computer skills	Obtained	75	87.67	16.631	183	2.169	.312
	Not obtained	110	90.00	14.447			
MS Word skills	Obtained	75	86.00	21.451	183	.207	.978
	Not obtained	110	85.91	21.823			
MS Power point skills	Obtained	75	37.72	27.159	183	.009	.017
	Not obtained	110	46.96	24.635			
MS Excel skills	Obtained	75	80.97	23.989	183	.160	.675
	Not obtained	110	79.50	23.001			
Internet skills	Obtained	75	66.20	27.372	183	4.966	.404
	Not obtained	110	69.17	20.911			

Based on Table 6 above, it was found that the average test of the ability to use computers for teachers who have been certified was (M = 87.67), and those who have not was M = 90.00, the average MS word ability test for teachers who have been certified (M = 86.00), and those who have not (M = 85.91), the average MS power point ability test for teachers who have been certified (M = 37.72), and who have not M = 46.96. Furthermore, the average MS excel ability test for teachers who have been certified (M = 80.97), and who have not M = 79.50, and the average internet ability test for teachers who have been certified (M = 66.20), and who have not M = 69.17. However, the results of the Independent T-Test test resulted in a P value> 0.05, which means there was no significant difference in the level of teacher ICT ability based on teaching certification.

V. DISCUSSION

The discussion in this study presents answers to research questions about the level of vocational teachers' ICT skills based on their demographic factors.

A. Gender and Vocational Teachers ICT Ability

Based on table 1, For gender and vocational school teachers' ICT abilities, from the average value of five abilities measured, (the ability to use computers, MS word, MS power point, MS excel and internet), it was found that male vocational teachers have more dominant ability than female vocational teachers. This can be seen in the level of ability of male vocational school teachers in their ability to use computers, MS powe rpoint and internet, whereas female vocational teachers are more dominant in MS Word and MS Excel capabilities. However, if it is seen from the level of difference in ICT skills of vocational school teachers based on their gender, there is no difference. This means that they have the same level of ability. Linkages to teacher and gender ICT skills [32] that male teacher ICT skills are more dominant than female teachers. According to Volman and Eck, (2001) this can happen because men know and work more using ICT than women do, male teachers have a higher literacy level, because men are usually more curious about something new than women are, whereas women usually only use ICT devices only as needed, according to Baya'a & Daher, the teacher's attitude towards ICTs influences him or her in using ICT in class and the teacher's gender can influence the use of ICT, where in teaching using ICT, male teachers use it more often than female teachers [33]. So the more often you use ICT, the higher your ability, because you are already accustomed to using the said access.

B. Age and Vocational School Teachers ICT Ability

The next discussion is about the findings of the level of vocational teachers' ICT skills based on their age. Based on table 2, showing age differences on the level of ICT skills of vocational teachers. The findings suggest that there is no significant difference in the level of ICT skills of teachers based on their age. From the average value, it turns out that there is a diversity of teachers' ages with the levels of ability. Table 3.2 shows that the average level of teachers' ICT ability to their age has a variety. In table 2, it was found that the age (20-24) years had the highest ability to use computers and the lowest at the age of 40-44.

This means that there are more than 40-44 years of age having a better ability to use computers.

Furthermore, for the ability level of MS word use, the highest is at the age of 30-34 years and the lowest is at the age of 40-44 years. This means that MS Word's ability for people under the age of 20-24 years needs more training. At young age, they should be able to operate MS word better than 55+ year olds.

Likewise with the highest MS power point ability was at age 25-29 years, and the lowest at age 35-39 years. Furthermore, the highest MS excel ability is at age 20-24, and the lowest is at age 35-39. Finally, the average internet capability is the highest at age 25-29 and the lowest at age 35-39 years old.

The findings above prove that age factors influence the level of vocational school teachers' ICT ability. ICT Vocational teachers who are of young age are more likely to have further exploration of ICT compared to the old age range [34]. Therefore, despite the diversity of teachers' ICT abilities based on their age, the findings of this study indicate that there is a need to reconsider ICT training programs so that this training program can prepare the foundation for teacher professionalism in the teaching and learning process in the classroom.

C. Working Period and Vocational School Teachers ICT Ability

The ability of ICTs seen from their working period is shown in Table 3.3, it was found that there was no significant difference in the vocational school teachers' ICT ability with their working period. However, if viewed from the average value of various ICT abilities, there is a diversity of abilities at the different levels of work. In table 3.3, it is found that the average value of computer capabilities with a working period of 21-25 years is higher than the other working period, the highest MS Word ability in the 26-30 year working period, while MS Power point's ability is the most superior in the working period of 1 -5 years. MS Excel's ability in working period of 26-30 years is higher than other working period, and internet ability with a working period of 1-5 years is higher than the ability of other working period. This means that the ICT ability for working period below 30 years is better than the working period of more than 30 years.

The amount of teaching experience and age is inversely proportional to the teaching process using ICT access, the higher the teacher's tenure, the lower the ability of ICTs, and vice versa, because teachers who have taught longer generally are old and as old as possible, so the comparison of ICT skills is inversely proportional to the ICT ability.

D. Academic Qualifications and Vocational School Teachers ICT Ability

Next, the discussion about the level of ICT skills of vocational teachers based on their academic qualifications, based on table 4, it is found that the average computer skills were the highest for S1 academic qualifications, followed by S2 and D3. The highest MS word ability is for D3 followed by S2 and S1. The highest MS power point ability is for D3, followed by S1 and S2. Furthermore, the average MS excel ability is the highest for S1 followed by D3 and S2, and finally the highest internet ability is for S1, followed by S2 and D3. However, the results of the one-way ANOVA test resulted in a value of $P > 0.05$, which means there was no significant difference in the level of ICT skills of vocational teachers based on their academic qualifications.

The findings above can show that the S2 academic qualifications are always second or third. This means that the teacher's ICT ability cannot be seen in terms of his or her academic qualifications. Therefore, this result provides an opportunity for teachers who have S2 academic qualifications to continue to improve their ICT skills, so that they can provide better teaching in the classroom. The capacity building of teacher ICTs can be carried out through trainings organized by the school. As pre-service teacher training programs, especially pedagogical knowledge and ICT-related courses have a significant effect in enabling pre-service teachers to use ICT [22].

E. Teaching Certification and Vocational School Teachers ICT Ability

Lastly, the discussion of the ICT skills of vocational school teachers on the status of teacher certification, based on table 6, it is found that there was no difference in the ability of ICT teachers in both of those who have and have not yet been certified. However, if viewed from the average ability of ICT, both who have and who have not been certified had diverse abilities. The diversity of teachers' ICT skills based on certification can be seen in table 6 as follows: teachers who have been certified. The average ability to use computers for teachers who have not been certified was higher than those who have been, then the average ability of MS word for teachers who have been certified is higher than those who have not been certified, the average ability of MS power point for teachers who have not been certified is higher than those who have been certified.

Furthermore, the average ability of MS Excel for teachers who have been certified is higher than those who have not been certified, and the average internet capability for teachers who have not been certified is higher than those who have been certified

VI. CONCLUSION

The results was found that that there was no significant difference in the level of ICT capacity of teachers based on demographic factors teacher, good sex, age, length of service, academic qualification and certification status of vocational teachers in West Java. Meanwhile, if in view the average ability of ICT vocational teachers have the diversity level of its ICT capabilities either gender, age, years of academic qualification and certification status of teachers. From all ICT abilities of teachers tested in this study is the ability to operate Microsoft Power point has an average value of the lowest of the ability to use the computer, Microsoft Word, Microsoft Excel and Internet usage.

Based on the study findings, researchers recommend that teachers need to be improved ICT capacity by conducting training on a regular basis. ICT skills training of teachers is expected to be done through school policies relating to or through cooperation with school training institutions.

Of course, with this training can enhance the ICT capacity of teachers and ICT Vocational teachers should be integrated into the certificate program that allows teachers vocational training qualifications ICT skills according to international standards that have been set.

In addition, the ICT teacher training is also expected to bridge the ICT capacity variation vocational school teachers, and provide opportunities for teachers to collaborate and exchange experiences in the process of integration of ICT in the classroom.

The study had several limitations, including; for distributing a questionnaire to the teachers of VES uneven in West Java, for remote locations between cities / regencies in West Java, so there is some vocational teachers in the area of West Java can not fill in these questionnaires.

Expected future directions for research in a long time so as to allow retrieval of data more evenly. Another limitation is related to data collection vocational school teachers in West Java, the future focus on specific vocational teachers are teachers productive, normative or adaftif only, so you can easily see the level of its ICT capabilities.

Finally, this study is expected to provide information to certain parties to the attention of ICT in order to improve the ability of vocational teachers in West Java.

For further study, we recommend the development of ICT literacy didactic model of vocational school teachers.

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AUTHORS PROFILE

Saripudin, is a graduated student from Universitas Pendidikan Indonesia, he holds in TVET Master. He is a student in postgraduate school of UPI Technology and Vocational Education Study Program for doctoral. He also as a lecture in TEDC Politecnic In Bandung, West Java, Indonesia

Sumarto, is one of professor in in Electrical Engieneering Education Department, Faculty of Technology and Vocational Education Universitas Pendidikan Indonesia. He was a head of Research Institution and Community Service in Universitas Pendidikan Indonesia.

Enjang Akhmad Juanda, is a lecturer in Electrical Engieneering Education Department, Faculty of Technology and Vocational Education, UPI. His skills and expertise in computer programming, LTE, Wireless Communication, Antennas, MIMO and Computer.

Ade Gafar Abdullah, is a lecturer in in Electrical Engieneering Education Department, Faculty of Technology and Vocational Education, UPI. He hold in Physics PhD from Institut Teknologi bandung (ITB). He is a head of Program in postgraduate school, UPI.

Ana A., is a graduated student from Technology and Vocational Education of Universitas Negeri Yogyakarta for P.hD in TVET and actively involved in the regional and international research. She is a lecturer and vice dean in Faculty of Technology and Vocaional Education, UPI.