

# Analysis of ICT Literacy Competence among Vocational High School Teachers

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**Abstract.** To realize learning quality in Vocational Secondary School, and to achieve educational goal, teacher competence is needed. The application of ICT Literacy in vocational secondary school is intended to upgrade teachers' knowledge, skill and competence in ICT. This paper is aimed to describe the process of teachers' competence adaptation to ICT integrity in learning in Vocational Secondary School. This study use descriptive method with literature study and documentation technique. The source in this study is research journal and research report book. The study result showed that teachers lack of self-confident in using ICT, and gender factor influence ICT integration in which the level of ICT literacy in male is higher than female. The group of young teachers aged 21-40 have higher level of ICT literacy compared with the older group. Demographic factor in ICT literacy competence are gender, education level and age. This study suggest that teachers enhance the ability in ICT literacy competence, increase their knowledge and knowledge creation in each aspect of ICT literacy competence.

## 1. Introduction

Quality learning reflect teachers and school preparation to create learning environment in enhancing students achievement [1]. It require teachers' ability and competence. Until now, learning still very formal and teacher-centered. Learning system now is demanded to use technology application and using ICT to overcome the difficulty in learning material [2]. Instructional technology such as this has many advantage and benefit, but the use of facility is still less optimal and need implementation strategy to enhance effectiveness and efficiency [3]. There are few literatures which attentive to instructional technology particularly on how teachers can apply technology in learning process [4].

This study will discuss how teacher obstacles in applying ICT literacy in learning process which are divided into two categories, namely external and internal obstacle. External obstacle consist of ) lack of access toward resource, b) lack of time, c) lack of effective training and d) technical problem. In the other side, internal obstacle consist of: a) Lack of self-confident, b) Resistance toward change and negative attitude, c) There is no perception about advantage. These two kind of obstacles play big role in forming teacher competence and finally will influence students' learning achievement [5, 6].

Teachers competence influence students' learning achievement particularly in vocational secondary school. To achieve education goal, it is regulated in Standard of Educational National that educators should possess academic qualification and competence as learning agent, physically and mentally health in ability to realize national education goal. The implication of teachers competences which



need to be enhanced namely pedagogical, personality, social and professional competence [7]. By using efficient ICT facility, government through Directorate of Vocational Development had developed Center of Vocational Education Service for vocational secondary school teachers. The information center give instrument for teachers to compare their competence in ICT learning. Until 2010, there are 431 vocational schools which had been appointed as center of ICT service distributed in all city regencies in Indonesia. Because each school can establish Center of ICT Vocational Service, it is expected that teachers can develop ICT based-learning and empower students. However, there are issues of teacher competence in achieving technology mastery such as their experience and knowledge of ICT facility, websites, and teaching task. Five factors which influence teacher competence in mastering technology are (a) teacher skill in using ICT actually in learning, (b) ICT resource, (c) teachers' attitude toward ICT usage in learning, (d) technical support and necessity, and (e) staff development in using ICT. Lack of teacher competence in using ICT integration in classroom can result in students' distrust to teachers [8, 9]. Integrity of ICT facility depend on teacher ability to arrange learning environment from traditional pedagogic to non traditional [10, 11]. Teacher ability has big influence to computer usage, competence in class management, and finally to pedagogic skill.

Information Communication and Technology (ICT) is technology to process data, including to process, obtain, arrange, store, and manipulate data with various ways to produce quality information. ICT had been grown rapidly in various fields particularly education [12-14]. ICT also has broad experience comprising everything related to process, tool, manipulation, and management of information. ICT also media or tool to transfer data, to acquire data and information, and can be used for communication tool both one-way and two-way communication [15]. ICT has various aspects involving technology, technique and management technique used in controlling and processing information and its usage, computer and human and human relation, and everything related to social, economic and culture [16]. The kind of ICT which commonly used are Computer, Laptop, printer, LCD projector, Internet. ICT consist of Hardware and Software to operate hardware in the form of Operating System (OS), application or content.

ICT literacy is basic competence for teachers in utilizing ICT to prepare students in order to be able to master new technology as equipment for them in developing themselves as long life learner [17]. This stage focus on technology literacy development in teachers to integrate ICT tool.

Teachers' competence and understanding need skill, behavior and professional value [18]. It means that teachers' competence can comprise fact and concept repetition until advance motor skill toward learning behavior and professional value [19, 20], that competence is one's unique characteristic and the way of behave and thinking in every situation which is effected on their ability to use tool and facility in workplace. From this opinion, competence refer to one's performance in a job which can be seen from thinking, attitude and behavior.

The enhancement of teachers' competence is a necessity and comprehensive training is needed for each teacher. To develop skill and technology, learning is needed [15]. Teacher can use learning facility to enhance competence test, online teacher education and online performance assessment. It means that teachers should learn in using ICT [8]. Besides, there are three important things which should be thought again concerning education modernization: (a) how we learn (how people learn); (b) what we learn (what people learn); and (c) when and how we learn (how and when people learn). By seeing the answer to three questions, and the potential of ICT which can be exploited as had been explained before, the role of ICT in nation education modernization can be formulated.

This study use literature study. The study result concluded that teachers understanding toward ICT literacy competence form knowledge and skill in teaching [11]. The mastery of ICT literacy competence started from planning preparation, learning presentation, evaluation and analysis of evaluation result and means to search and download learning source [15, 21]. Therefore, teachers in all levels should be ready to continuously learn in ICT to fulfill the need. The earlier study had proposed various enhancement in teachers' ICT literacy competence which should be suited with adequate facilities. However, learning quality enhancement through ICT sometimes is not synergic and need integrated vision to develop competence. In vocational, education and training (VET), ICT

integrity is not only an option but also a need to make the educational process more interesting. ICT research findings are not only a tool for creating lesson materials, but also as a means of conveying, cultivating, and discussing even though they are limited [22]. ICTs play an important role to assist teachers in teaching. Change is essential to VET programs in support of labor development [23]. ICT in education has been identified as the top trends and issues in VET [24]. There are significant differences in ICT and computer usage scores by gender and age [25].

## 2. Methods

This study use descriptive survey research methodology. Thirty teachers who are selected randomly from Public and Private Vocational Secondary School had been taken as sample. Research instrument consist of test and non-test mode. Test instrument is ICT basic competence test whereas non test instrument is questionnaire including ICT literacy questionnaire, observation, and interview with Vocational Secondary School teachers. Based on table 1 about sample of study.

**Table 1.** Sample of study.

No	Name of SMK	Amount
1	SMKN 1 Pekanbaru	3
2	SMKN 2 Pekanbaru	3
3	SMKN 3 Pekanbaru	3
4	SMKN 4 Pekanbaru	3
5	SMKN 5 Pekanbaru	3
6	SMKN 6 Pekanbaru	3
7	SMKN 7 Pekanbaru	3
8	SMKS Muhammadiyah	3
9	SMKS Taruna	3
10	SMKS Ibnutamiah	3
11	SMKS Hasanah	3

### 2.1. Characteristic of respondent studied in research

Data is collected from Vocational Secondary School teachers. They fill questionnaire which is distributed and explain their demography. Next, they collect data to obtain description of respondent characteristic such as gender, age and education level. Respondents are 30 persons who work as teachers in Vocational Secondary School in Pekanbaru as summarized in table 2.

**Table 2.** Respondents characteristic.

Respondents	Total	
	Person	%
Respondents by gender		
• Men	17	57%
• Women	13	43%
Respondents by age		
• 25-30 years old	5	17%
• 30-35 years old	12	40%
• 35-40 years old	6	20%
• 40-45 years old	5	17%
• 45-50 years old	2	6%
Respondents based on education level		
• D3	4	13%
• S1	17	57%
• S2	6	20%
• S3	3	10%

Source: interview results processed author.

### 3. Results and Discussion

In this study, it is found level of ICT literacy competence among teachers based on ICT literacy questionnaire.

#### 3.1. *Gender and ICT implementation in Vocational Secondary School in Pekanbaru*

Analysis of questionnaire answer of respondents showed that gender influence teacher ability in ICT integration. It is predicted that male teachers have higher percentage in ICT integration in class learning by 59% whereas the percentage of female teachers is 41%, therefore male and female is different biologically. This difference certainly has perspective and treatment difference toward male and female.

Gender also influence emotional development and intellectual capacity in which female generally is better in memory and male is better in logical thinking [26, 27]. Female is more interested in daily life problem which is practical, whereas male is interested in abstract aspect.

Regarding the issue of gender and ICT integration in class, gender is factor which very influence the use of ICT integration in class, that gender difference will be effected on teacher competence and finally on teacher performance [28, 29]. Male teachers will be more easy to use ICT than female teachers in ICT integration in learning process [30]. In this case, female is more interested in another issue so they don't have opportunity to use ICT facility [31]. The finding of study showed that there is gender gap in which female teacher is differ in frequency of using ICT because historically, computation is generally thought as masculine activity. The tendency of male in dominating mathematics and computation than female in computer industry shows gender gap in technology. This argument is the same with our analysis that male teachers use more computer than their counterpart.

#### 3.2. *The influence of age in ICT implementation in Vocational Secondary School in Pekanbaru*

Analysis of questionnaire answer shows that teacher competence also influenced by age. It means that ICT application is effected on respondents aged 25-30 years old. Our observation shows that the percentage of teachers who use ICT only reach 35%. Only 43% of teachers aged 30-35 who use ICT compared with teachers aged 40-4 years old.

It is supported by age influence on ICT integration in class by reporting that young teacher utilize ICT facility more than older teacher [32]. Based on study, young teachers in the range of 21-40 years old more often use ICT facility than another age group. It is confirmed by study result in Philipina which emphasize that young teachers use ICT more than older teachers [33, 34].

#### 3.3. *Implementation of education and ICT in Vocational Secondary School in Pekanbaru*

Analysis of questionnaire answer viewed from teachers competence is influenced by education background particularly in ICT integration in learning process. The result of observation showed that ICT application among respondents in education level of D3 has percentage of 17% in ICT usage. This figure is increase if education level of respondents is higher in which S1 is 21%, whereas S2 is 32% which is higher compared with S3.

Education level has strongest influence to ICT integration because most teachers in school use ICT to work [35, 36]. It means that teachers with higher education level tend to use ICT more often because they probably possess more skill. Formal education also form new mindset and work style among teachers, because they has higher burden and pressure to finish their job, and enhance skill, knowledge and mastery in ICT, with academic discipline as demographic factor to determine teachers' adoption and use of ICT integration in learning [37, 38]. The result is there is significant difference among teachers' science disciplines particularly technology science, social and humanity science toward ICT integration.

### 4. Conclusions

Accessing various ICT resource, that access describe to what extent level of ICT literacy competence among vocational school teachers. Besides, the distance of location will determine whether a teacher

will integrate ICT in learning process. Teachers' lack of self-confidence in using ICT facility in learning process is because of teacher demographic. It is evidenced from analysis result which showed that the percentage of ICT literacy among teachers in learning process is higher for male teachers than their counterpart. Besides, age also influence teachers in using ICT particularly for them in the age range of 21-40 years old who have ICT competence higher than another age group. Age and education level should become main attention of teachers and school administrator in order that ICT implementation can be more optimal in learning process. Based on discussion result about analysis of ICT literacy competence among teachers, it can be concluded that ICT literacy competence among teachers had reached good category, but they need to increase their knowledge and knowledge creation in ICT integration in learning process. Instrument in ICT literacy competence need to be developed in order to develop instrument which is empirically can measure ICT literacy competence among teachers.

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