ICT literacy level analysis of elementary school teachers

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Abstract. The purpose of this study was to determine the level of Information and Communication Technology (ICT) literacy in the ability of elementary school teachers in integrating ICT in learning and knowing the factors that influence ICT literacy of teachers reviewed by age, gender and educational background. The method used is a quantitative descriptive approach with a longitudinal trend survey method, with data collection techniques using a questionnaire. The results of this study indicate that the level of ICT literacy of elementary school teachers which refers to the Ministry of Communication and Information of the Republic of Indonesia is at the level one of the six levels available. This means that an individual has had one or two experiences, where information is an important component for achieving desire and solving problems, and has involved information technology to look for it. Then based on inferential analysis the factors that influence the level of ICT literacy of elementary school teachers show that age and gender factors significantly influence the ICT literacy of teachers. While the education level factor does not have a significant influence on the level of ICT literacy of teachers. The results of this study can be a reference for improving the ability of elementary school teachers in ICT literacy.

1. Introduction
ICT (Information and Communication Technology) has affected all aspects of human life. In fact, individuals in the community are required to master it. ICT has brought significant changes, especially in the fields of technology, social, health, economics, and education fields. The existence of ICT has an impact on the quality of education nowadays. ICT involvement in education helps the teaching and learning process more effective [1].

The involvement of ICT in education is a demand of 21st century learning. The term of 21st century learning itself is having ability and positive attitude towards the use of ICT equipment for teaching and learning. Integration of ICT in learning not only provides changes to the teacher’s role in the classroom, but also makes the learning environment more dynamic where students can be more directed and motivated to learn [2].

The success of integrating ICT in learning depends on the ability and attitude of the teacher in using and integrating ICT in learning. Therefore, the 21st century learning feature requires teachers, one of them Elementary School teachers to have the ability in ICT. The basic problem is whether teachers know how to use ICT effectively in learning. This capability is related to teacher literacy towards ICTs [3].
SunJu Park has conducted a study related to the ability of teachers to use ICT in learning, the result is that the ability of teachers to use ICTs is quite diverse but occupies a low category, so the teachers need ICT training with different programs to develop their abilities [4]. In addition, Johanes Zylka examined the literacy level of teacher ICTs in Germany which were measured based on teacher knowledge of ICTs with a focus on the age and gender of the teacher. The results show that the teacher's level of ICT knowledge varies greatly from age, where younger teachers know more about ICTs than older teachers. Then seen by gender. Male teachers have more knowledge of ICT compared to female teachers [5]. This proves that there are variety of ICT literacy levels from an individual teacher. So, the researcher was interested in examining the condition of ICT literacy of elementary school teachers in Garut Regency.

The purpose of this study was to determine the level of ICT literacy of elementary school teachers in Garut Regency in integrating ICT in learning and knowing the factors that influence the level of ICT literacy. Based on the results of literature, the authors found temporary hypotheses to answer the formulation of existing problems. The following available hypotheses:

- H1: There is a significant influence between age and the ICT literacy of elementary school teachers in Garut Regency
- H2: There is a significant influence between gender and the ICT literacy of elementary school teachers in Garut Regency
- H3: There is a significant influence between education level and ICT literacy of elementary school teachers in Garut Regency.

2. Method

This study uses a quantitative descriptive approach with survey methods to gather information from respondents. The survey method used is a type of longitudinal survey with a trend study (6,7]. The population in this study amounted to 13,668 elementary school teachers taken from the primary education data of Garut Regency in 2016. The samples taken were 371 elementary school teachers based on the calculation of Isacc and Michuel formula.

The instruments in this study are questionnaires. The measuring indicator is referring to the area of ICT literacy, while the one used is integrate (the ability of the teacher to use ICT in learning) [8,9]. The scale used is a Likert scale with alternative answers Never = 1, Ever = 2, Often = 3, and Very Often = 4.

One model for measuring the literacy level of ICTs in the community is usually used by the Personal Capability Matuarity Model (P-CMM). Therefore, the Ministry of Communication and Information of the Republic of Indonesia provides a level of ICT literacy as presented in table 1 [10]:

| Level | Description |
|-------|-------------|
| 0     | If an individual does not know at all and does not care about the importance of ICT for life |
| 1     | If an individual has had one or two experiences, where information is an important component for achieving desire and solving problems, and has involved information technology to look for it. |
| 2     | If an individual has repeatedly used technology to help with daily activities and has a pattern of repetition in its use. |
| 3     | If an individual has a standard of mastery and understanding of information and technology that is needed, and consistently uses these standards as a reference for carrying out daily activities |
| 4     | If an individual has been able to improve significantly (can be stated quantitatively) the performance of daily life activities through the use of information technology. |
| 5     | If an individual has considered information and technology as an inseparable part of daily activities, and directly or indirectly has influenced his behavior and culture of life (part of information society) |
3. Results and discussion

3.1. Results of respondents’ data collection

The results of the distribution and collection of questionnaires conducted in 42 sub-districts, obtained as many as 432 respondents. Percentage of respondents data grouped according to educational background and teacher's tenure can be shown in table 2 below:

| Respondent | Age          | Gender | Educational background |
|------------|--------------|--------|------------------------|
| 432        | 432 (100%)   | 128(29.6%) | 304 (70.4%) |
| Information: | (1). Age (19-64) | (5). Diploma |
|            | (2). Male    | (6). Bachelor |
|            | (3). Female  | (7). Master  |
|            | (4). High School |

Based on table 2, the age of respondents is from the age range 19 to 64 years, the majority of respondents gender is female, bachelor educational background and the remainder are respondents who have a high school background, diploma and master.

3.2. Description analysis

In this study, description analysis is used to describe the results of data processing. The results of data processing about the ability of teachers to integrate ICT in learning are presented in Table 3 below.

| No. | Item | Statements | Score | %  | SD  |
|-----|------|------------|-------|----|-----|
| 1   | Using Microsoft Word application in making a Learning Plan. | 2.47 | 61.75 | 0.83 |
| 2   | To process student grades/scores, I use Microsoft Excel application. | 2.22 | 55.5 | 0.88 |
| 3   | Using the Microsoft PowerPoint application to present teaching material. | 1.73 | 43.25 | 0.80 |
| 4   | Using LCD projector to display teaching material. | 1.62 | 40.5 | 0.76 |
| 5   | Using video as a learning media. | 1.71 | 42.75 | 0.74 |
| 6   | Insert information from mass media (television / radio) in the learning process. | 2.24 | 56 | 0.78 |
| 7   | Looking for teaching materials using a web browser (google chrome, Mozilla Firefox, internet explorer). | 2.42 | 60.5 | 0.91 |
| 8   | Using Adobe Flash as a learning media. | 1.54 | 38.5 | 0.79 |
| Mean| | 1.99 | 49.75 | |

Table 3 shows the score of each statement of the teacher's ability to use ICT in learning, with the visible percentage of scores divided into two categories, namely medium and low. As for the included in the medium category such as the ability to use the Microsoft Word application in making Learning Plans, searching for teaching materials using a web browser (google chrome, Mozilla Firefox, internet explorer), to process the grades/scores of students using Microsoft Excel applications, and inserting information from mass media (television / radio) in the learning process. Then the statements included in the low category such as using Microsoft PowerPoint applications as learning media to present teaching material, using video as a learning medium, using LCD projectors to display teaching material, and using Adobe Flash as a learning media. The statement using Adobe Flash as a learning media get the lowest score.

Based on the results, it shows that the use of ICT in learning in elementary schools in Garut district is still lacking. The result is that the average score of ICT literacy on the ability of teachers to integrate ICT in learning is 49.75%. This means that teachers have had one or two experiences integrating ICT in
the teaching and learning process, teachers have not yet integrated and utilized ICT in everyday learning [10]. Even though the importance of ICT involvement in learning are to help teachers improve the quality of learning in the classroom and help teaching and learning activities effectively. The involvement of ICT in the learning process starts from planning, implementing, evaluating, and class administration interests [11].

3.3. Inferensial analysis and hypothesis testing

3.3.1. The influence of age on teacher ICT literacy. Hypothesis 1, presumes that there is a significant influence between the age and the ICT literacy of elementary school teachers in Garut Regency. The following are the results of calculating the r value can be found in table 4.

Table 4. The results of correlation calculation between the age of the teacher towards teacher ICT literacy.

| Age range (years) | N   | Minimum value | Maximum value | r count | r table |
|-------------------|-----|---------------|---------------|---------|---------|
| 19-64             | 432 | 1             | 4             | -0.167  | 0.098   |

Table 4 explains the results of the correlation calculation analysis between the age and the ICT literacy level of the teacher. r count shows the value of -0.167 and r table 0.098. Then it can be seen that r count > r table, this shows that hypothesis 1, accepts Hₐ and rejects H₀. It can be concluded that there is a significant influence between the age of the teacher and the level of ICT literacy with a value of r = -0.167. The sign (-) shows the direction of the correlation is negative, meaning that the higher the age of a teacher, the lower the level of literacy of the ICT [4].

3.3.2. Gender influences on teacher ICT literacy. The second hypothesis assumes that there is a significant influence between gender and ICT literacy of elementary school teachers in Garut Regency. The following are the results of r test calculations which can be seen in table 5.

Table 5. The results of the correlation calculation between gender and teacher ICT literacy.

| No  | Gender | N   | Value    | Mean  | SD   | r count | r table |
|-----|--------|-----|----------|-------|------|---------|---------|
| 1   | Female (0) | 304 | 59.07%   | 1.93  | 0.79 | 0.158   | 0.098   |
| 2   | Male (1)   | 128 | 63.20%   | 2.52  | 0.83 | 0.158   | 0.098   |

Table 5 explains the results of the correlation between gender and teacher's literacy. Female are represented by 0 and male are represented by 1. The correlation value is obtained (r = +0.158) and r table 0.098, indicating the value of r count > r table, meaning that H₀ is rejected and Hₐ is accepted. Then it can be concluded that there is a significant influence between teacher gender and ICT literacy. Where the sign (+) shows the direction of positive correlation, meaning that male teachers have a higher literacy rate than female teacher. It is shown that male know more and work using ICT devices than female teacher [12].

3.3.3. Influence of teacher education level on teacher's ability to integrate ICT. The third hypothesis predicts that there is a significant influence between the level of teacher education and the ICT literacy of elementary school teachers in the district. The results of the correlation calculation between the level of teacher education and teacher ICT literacy can be seen in table 6:
Table 6. The results of the correlation calculation between the level of teacher education and teacher literacy

| No | Education level | N   | Mean | SD  | r count | r table |
|----|-----------------|-----|------|-----|---------|---------|
| 1  | High school    | 58  | 2.09 | 0.80| -0.0045 | 0.098   |
| 2  | Diploma        | 20  | 1.81 | 0.90|         |         |
| 3  | Bachelor       | 342 | 1.97 | 0.80|         |         |
| 4  | Master         | 12  | 2.54 | 0.79|         |         |

Based on table 6, it explains the results of the correlation between the level of teacher education and teacher ICT literacy. The value is obtained of $r_{count} = -0.0045$ and $r_{table} = 0.098$, meaning that the value of $r_{count} < r_{table}$ then $H_0$ is accepted and $H_a$ is rejected. It can be concluded that there is no significant influence between teacher education level and teacher ICT literacy level, meaning that the teacher's education level does not affect the ICT literacy of the teacher. The world of ICT today does not know the level of education, they can be easily recognized by all people, both children and adults as well as from the level of education [13].

4. Conclusion

Based on the findings and discussion, it can be concluded that the level of ICT literacy of elementary school teachers in Garut Regency with the ability to integrate ICT in learning which refers to the Ministry of Communication and Information of the Republic of Indonesia is at the level of one of the six levels available, and can be stated quantitatively by 49% ($M = 1.99$). This means that an individual has had one or two experiences, where information is an important component for achieving desire and solving problems, and has involved information technology to look for it, even though the availability of teacher access to ICTs is not fully available.

The factors that influence the level of ICT literacy of teachers with the ability to integrate ICT in learning based on hypothesis testing indicate that factors of age, and gender have a significant influence on ICT literacy with a $r_{count}$ value of each age ($r = -0.167$) and gender ($r = 0.158$). While the education level factor ($r = -0.0045$) did not show a significant effect on the level of ICT literacy.

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