Information and Communication Technology Competencies of Madrasah Aliyah Teachers in West Java

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Abstract:

This article presents the results of research on mapping the competency of Information and Communication Technology (ICT) Madrasah Aliyah teachers in West Java. The study was conducted by survey method, with a population of all teachers in the State and Private Madrasahs in West Java. The results showed that the basic competencies of ICT teachers in West Java were good enough, with the highest score in Microsoft Word and the lowest in Microsoft Excel and graphic design. The age characteristics have a significant difference in the teacher's ICT ability test scores. While related to the use of ICT for various aspects, this research has managed to find several things, namely: the use of ICT for curriculum and assessment is in the quite high category; for pedagogics it is also quite high, for administration and organization it is in the high category; and for the development of the teaching profession in general is still low. The inhibiting factors in the use of ICT are mostly caused by the limited number of computers and laptops, the limited speed of the internet, and the limited time.

Keywords: Information and Communication Technology, Madrasah Aliyah, Competence.

I. INTRODUCTION

Entering the era of globalization and free trade, the life of society, nation and state in Indonesia has experienced continuous development and change as an accumulation of responses to the problems that have occurred so far and the influence of global change, the development of science and technology and the arts and culture. In addition, the community is now faced with increasingly swift world of business competition, where competence / expertise is one of the absolute requirements that must be possessed to enter the workforce, in addition to certain competencies are also required to have basic abilities in any variety, and one of the fields that are in demand Today's society is in the field of Information and Communication Technology (ICT).

The existence of ICT in the world of education is considered an absolute necessity. The UNESCO World Education Agency, in several publications, expressed the importance of the use of ICTs in the field of education. The Joint Team of the Ministry of Communication and Information, the Ministry of Education and Culture and the Ministry of Religion identified several strategic roles of ICT in the primary and secondary education system. The roles are: 1) As a repository of knowledge, 2) As a learning aid, 3) As an educational facility, 4) As a competency standard, 5) As an educational administration support, 6) as a school / madrasah management tool, and 7) . As an education infrastructure. (R. Eko Indrajit & R. Dojokopranoto, 2007: 375, 381-388).

One of the highly competent educational institutions in the use of ICT is madrasas, starting from the level of Madrasah Ibtidaiyah (MI),

Madrasah Tsanawiyah (MTs) and Madrasah Aliyah (MA). MA as one of the top-level educational institutions (equivalent to high school) is demanded not only as a religious-based school, but instead madrasa in its development must be able to follow the trends in society without leaving its originality as a religious institution, so that madrasas now not only create students students who are able to provide religious understanding only, but also madrasas are able to make their students have a religious understanding that is supported by the abilities or competencies needed in the business world in the modernization era, especially the ability of ICT. An important element in an education process in the madrasa is human resources, especially educators / teachers.

The development of technology is increasingly advanced, students' knowledge is growing more rapidly, even beyond the guidance of the times. If the teacher does not try to follow the development of technology (ICT), it is not uncommon when the teacher teaches in class, the student turns out to know more than the teacher, even the student has stronger references than the teacher. It was there that the authority of the teacher began to fade, where respect as a source of knowledge began to slack, where students began to reduce their confidence in the teacher.

The world of Indonesian education includes Madrasah Aliyah, indeed it is colored by various problems, from curriculum, national examinations to the quality of teachers which must be improved. The problem of teacher quality attracts attention because it is related to the progress of national education. Formal education and training are not enough to produce professional teachers. Teachers themselves must have the desire to improve the quality of themselves by constantly looking for new sources of knowledge.

Indonesia has the highest number of madrasa teachers in the world, with a ratio of one teacher teaching 10 students (1:10). With this large number of teachers, it is expected that the quality of our education is good, meaning that it is directly proportional to the quantity with the quality or quality of existing education. For this reason, the Ministry of Religion together with the Ministry of Education and Culture (Kemendikbud) is working to improve the quality of teachers through competency tests for mapping. Through this mapping, said Kamaruddin Amin (Director General of Islamic Education) the weaknesses of each teacher will be identified so that it will be easy to correct. Improvements can be made through ongoing professional development training such as workshops.

"So, the quality of teachers must be improved. The great challenge of Indonesian education is the teacher. If teachers are successfully improved, education will be good," he said. Therefore, he continued, the Ministry of Religion's strategic plan going forward is to improve the quality and quality of teachers.

As the spearhead of education, an inspiring teacher is needed who is able to educate, set a good example, and can understand the mental condition of students, and be able to motivate and encourage their students towards progress. The vanguard teacher towards the success of education must have some competence, both professional, pedagogical, personal and social. In addition, teacher competence is not only mastering what must be taught, but how to learn to students so that learning becomes more interesting, enjoyable, and students become more motivated when learning with a teacher who is able to inspire.

One way that learning becomes more interesting, and students become motivated is learning by utilizing the development of information and communication technology (ICT) or what is known as IT-Based Learning (Information Technology). With IT-based learning to educate students to think critically, increase students' insights and knowledge, educate students to learn self-taught, and improve student learning outcomes so as to improve the quality of education. In addition, using a computer /

internet can facilitate educators and students in the learning process. With all the facilities available on the internet can be used to find materials and media for learning media that will be carried out by educators and students. So that IT-based learning will accelerate the realization of technology-aware people, especially lecturers as part of educational institutions.

The need for IT-based learning is also a means to prepare students to prepare students for national computer-based examinations (UNBK). In the implementation of UNBK at the education unit level, the role of the teacher is very vital, of course the role of the technician is equally vital. Teachers who are assigned as prokors are given the authority to supervise the implementation of the UN-CBT in schools / madrasas. Because of the vital role of the proctor, one of the criteria and requirements for the actor is that the teacher has competency in the field of information communication technology (ICT).

In order to deal with UKG-online, teachers are also required to be internet literate, and know how to test online. With this online test, like it or not, like it or not, teachers who are not familiar with computers and the internet will be motivated to learn. They become less technologically illiterate. The teachers are confronted with the digital native generation, where they are the generation that is already internet literate. Like it or not, teachers must be able to become guides so that computers and the internet can be put to good use.

Based on the above thought, we feel that research on mapping the ICT competency of Madrasah Aliyah teachers is needed, which in detail describes the objective conditions of the ability and mastery of teachers towards ICT especially teachers in Madrasah Aliyah in West Java Province, both public and private. In addition, it is also necessary to explore the inhibiting factors faced by madrassas related to the use of ICT, as well as how the characteristics of teachers relate to basic ICT competencies. The results of the research can be used as a policy base for the government, in this case the Director General of Islamic Education, the Ministry of Religion, to develop a training program and improve the quality of teachers in madrasas.

Studies relating to mastery, utilization or problems of ICT by teachers, have been carried out by various parties. Kurahman (2013) examines "Madrasah Teacher Competency Development in the Utilization of Information and Communication Technology in Islamic Learning". The results of the study mention that there are several issues regarding the competence of ICT teachers, especially Islamic religious education teachers, which include: the mastery of ICT by madrasa teachers is relatively very low and uneven; learning media are produced by many people who do not have a religious teacher education background; Islamic learning in the classroom has not made much use of information and communication technology.

Other research was conducted by Nurhayati (2016) on "Teacher Problems in Mastering Information and Communication Technology in Islamic Education Learning and Its Solutions in MI Al Asy'ariKuniranBatangan, Pati Regency 2015/2016 Academic Year". The results of the study found that the problems faced by teachers in mastering ICT in the learning of Islamic Education were: a) the basic abilities of teachers in the field of ICT were indeed still low; b) the availability of inadequate ICT facilities; c) schools do not require teachers to use ICTs in the learning process, so teachers are less motivated to develop themselves more; d) limited time used to prepare ICT media in learning; e) the assumption of the teacher who considers that the material in the book is sufficient to teach students well so that no ICT media is needed; f) the comfort of the teacher in using conventional learning methods, which are considered easier and not difficult; g) the absence of training activities for teachers to improve the ability of teachers in the field of ICT.

Lowe and McAuley (2000, in Sitompul, 2004) defines the competence of Information and Communication Technology (ICT) as a skill and

ability to use computers and information technology to meet personal goals, educational goals and labor market objectives. Minister of Education and Culture Regulation Number 16 Year 2007 regarding Teacher Competencies, states that the ICT competency framework focuses on teachers as global educators who are digitally connected, and able to access diverse knowledge and learning resources, as well as sharing knowledge and creativity with others in various different locations.

This study uses an ICT competency framework for teachers established by the Ministry of Education and Culture in 2012, by adapting the UNESCO model.

II. METHODOLOGY

This study uses a quantitative approach with a survey method, where data is collected from a number of samples or populations to represent the entire population (Singarimbun, 1995). The study was conducted in West Java Province with the consideration that West Java has the highest number of Aliyah Madrasas in western Indonesia. Demographically, West Java adjacent to Indonesia's national capital is assumed to have better ICT access facilities than other provinces. The study population was all teachers of State Aliyah Madrasas (MAN) and Private Aliyah Madrasas (MAS) in the province of West Java, with a total of 14,824 people (EMIS, 2017). The sampling technique is done by stratified random sampling (multi-stage sampling). By using the Slovin formula: $n = N / (1 + N.e ^ 2)$ with a 5% sampling error and a 95% confidence level, the following sample is obtained:

n (West Java) = 14,824 / (1 + 14,824 * 0.0025) = 389.49 (rounded off to 400)

The stages of sampling technique with Multi-stage random sampling are as follows:

1. Stage 1: Stratification based on the proportion of districts / cities in West Java
2. Stage 2: Randomly selecting Madrasah Aliyah samples as Primary Unit Sampling (PSU) with proportional amounts in each district / city
3. Stage 3: For each selected PSU, 8 randomly selected teachers with a proportion of 4 male and 4 female

Research instruments in the form of tests and non-tests. The test instrument is intended to explore data about the ability of ICT teachers. While the non-test instruments in the form of questionnaires and observation guidelines. Questionnaire to gather data about the use of ICT for education and teacher professional development. Observation guidelines are intended to explore data on the condition of madrasas related to ICT facilities and infrastructure.

In accordance with the scope of the above research, then as a measurement tool for ICT Competencies of Madrasah Aliyah teachers by referring to the UNESCO ICT Competency Framework for Teachers includes 5 (five) dimensions, namely:

1. Curriculum and Assessment; includes teacher competency in the use of ICT curriculum development and assessment
2. Pedagogic; includes the use of ICT in planning and developing learning strategies, developing learning resources, problem-based learning, and communication and collaboration.
3. Basic competence in Information and Communication Technology; includes the competence of teachers in using ICT software, multimedia, internet and audio visual.
4. Organization and Administration; covers the use of ICT in the organization and administration.
5. Professional Teacher Learning; includes the ability of teachers to use ICT for self-development, participation and contribution in professional forums, as well as utilizing ICT as a means of research and professional development.

While the stages are limited to the technological literacy stage (literacy) which allows teachers to use ICT in learning efficiently. The development of instruments primarily to measure ICT / ICT teacher skills is an ICT / ICT literacy test. The questions in the questionnaire included general questions such as: demographic data, ICT infrastructure and access, use of ICT for teaching and learning (pedagogy), curriculum, assessment, organization and administration, and developing teacher professionalism.

III. RESULTS

1. Sample Distribution

After clearing the data, a representative questionnaire to be analyzed was 394 copies (respondents). The sample design largely determines the accuracy in estimating or estimating population parameters with statistical values. The sampling technique is multi-stage random sampling. Survey samples were 394 scattered in 51 madrasas aliyah. One way to validate sample designs is to compare the proportions of the population and the sample of known entities. The population and sample proportional difference in each city / district does not exceed 5%. Thus it can be said that the sample design is valid

2. Karakteristik Demografi

Demographic characteristics surveyed in this study include: madrasa status, gender, age, teacher status, years of service, education level, certification status, and subjects studied.

Table 1: Demographic characteristics of respondents.

Madrasa Status	%
Public	22,08
Private	77,92
Gender	%
Men	51,02
Women	48,98
Age	%
Less than 25 years	6,60
25 - 30 years	21,83

| 30 - 39 years	35,79
40 - 49 years	26,14
More than 50 years	9,64
Teacher Status	%
PNS	18,78
Non PNS	81,22
Years of service	%
Less than 1 year	3,05
1 - 5 years	30,96
6 - 10 years	24,11
11 - 15 years	21,83
More than 15 years	20,05
Education	%
SMA / equivalent	4,31
Diploma	1,52
S1/D4	84,77
S2	9,39
S3	0,00
Certification Status	%
Certified	50,25
Not Certified	48,22
Subjects Supported	%
Islamic education	20,56
Natural Education	6,09
Social Sciences	18,02
Mathematics	9,14
Language	19,29
Others	25,63
No Answer	1,27

In terms of age, Madrasah aliyah teachers in West Java are mostly in the age range of 30-39 years (35.79%). This shows that the majority of madrasa aliyah teachers in West Java are at a very productive age.From the aspect of teacher status, teachers in Madrasah aliyah in West Java 18.78% PNS teachers and 81.22% non PNS teachers. From the aspect of Education, as many as 4.31% of teachers are still in high school / equivalent and 1.52% of those who have Diploma education. From the aspect of certification status, 50.25% of madrasah aliyah teachers in West Java were not yet certified.

3. ICT Infrastructure

The ICT infrastructure in madrassas most owned by madrasa aliyah in West Java in sequence are printers (98.04%), computers (88.24%), LCD projectors (86.27%), and laptops (86.27%). The least ICT infrastructure in madrasas is tablets (13.73%) and photocopiers (27.45%). Furthermore, as many as 54.90% madrassas in West Java have madrasa websites.

As many as 70.59% or 36 madrassas in West Java have a computer laboratory. Thus there are still 29.41% of madrasa aliyah in West Java that do not have a computer laboratory. As many as 94.12% of madrasa aliyah in West Java have access to the internet.

Graph 1: Proportion of teachers in ownership of ICT infrastructure
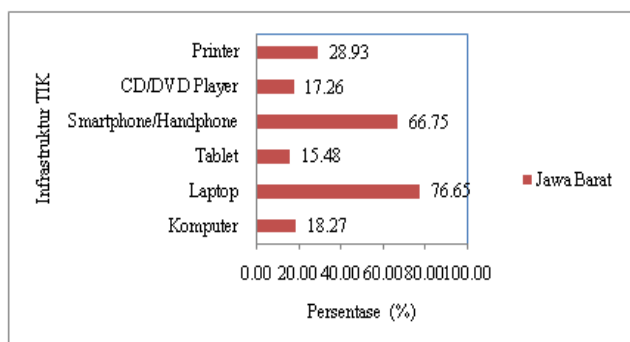
The most common private ICT infrastructure owned by Madrasa aliyah teachers in West Java is laptops (76.65%) and smartphones (66.75%). This indicates that there are still many aliyah madrasa teachers in West Java who do not yet have a personal laptop which is 23.35%. As for the ownership of other infrastructure such as printers, CD / DVD players, tablets and computers, each is below 30%.

4. Frequency of ICT Infrastructure Utilization

The most used ICT infrastructure almost every day by Madrasa aliyah teachers in West Java is laptops (40.36%) and tablets (22.08%). Whereas the ICT infrastructure that most of the teachers have never used is CD / DVD Player (56.85%) and LCD Projectors (50.25%).

5. Utilization of ICT for Learning
5.1 Utilization of ICT for Curriculum and Assessment

The most common use of ICTs for curriculum and assessment is in the activities of making lesson plans (3.64), downloading learning materials (3.59), making student exam questions (3.55) and listing student test scores (3.54). The most rare or low use of ICT is making reports on student development to parents (2.71) and student development charts (2.72) and making digital material (2.77). In general, the achievement index of the use of ICT for curriculum and assessment of Madrasah Aliyah teachers in West Java is 3.20 in the quite high category.

Table 2: Utilization of ICT for Curriculum and Assessment.

Curriculum and Assessment	Index (1-5)
Type a learning implementation plan	3,64
Download learning material	3,59
Internet teaching resources	3,26
Digital material	2,77
Student exam questions	3,55
Student evaluation instruments	3,27
List of student exam scores	3,54
Graph of student development	2,72
Student progress reports to madrasas	2,96
Student development reports to parents	2,71
Total	3,20

5.2 Utilization of ICTs for Pedagogic

Table 3: Proportion of ICT Use for Classroom Learning

Classroom Learning	Index (1-5)
Presenting material with internet media	2,65
Presenting material with audio visual	2,77
Present material with ICT software	2,81
Presenting digital material	2,23
Provide individual assignments with ICT	2,86
Provide student group assignments with ICT	2,90

Provide individual homework with internet access	3,07
Provide group homework with internet access	3,08
Total	2,80

Madrasa aliyah teachers in West Java most often use ICTs for pedagodics by providing homework or group homework with internet access and giving individual homework (3.08) with internet access (3.07). Whereas the lowest utilization of ICTs for pedagogical activities is presenting digital material (2.23). In general, the use of ICT for pedagogic aliyah madrasa teachers in West Java reached an index of 2.80 or quite high category.

5.3 Utilization of ICT for Administrative and Organizational Activities

Utilization of ICT to support the administration and organization of madrasas most often is to make a recapulation of test scores (3.76) and administration of learning (3.75). While the lowest use of ICT is to make an educational calendar. In general, the achievement index for the use of ICT for administration and organization is 3.53 or high.

Table 4: Proportion of Frequency of ICT Utilization for Administration and Organization.

Administrationand Organization	Index (1-5)
Student attendance list	3,67
Recapitulation of test scores	3,76
Student self-notes	3,27
Learning administration	3,75
Educational calendar	3,26
Total	3,53

5.4 ICT Utilization Index to Improve Learning Quality

Utilization of ICTs to improve the quality of learning according to the UNESCO model ICT framework is elaborated in three dimensions,

namely: 1) curriculum and assessment dimensions, 2) pedagogic or classroom learning and 3) administration and organization. The following graph illustrates the ICT utilization index for these three dimensions.

Graph 2: Utilization of ICTs to Improve Learning Quality
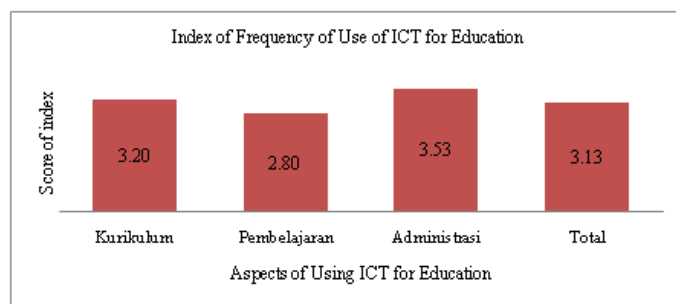
The graph above illustrates the use of ICT index to improve the quality of learning in the dimensions of curriculum and assessment, pedagogic or classroom learning, and administration and organization. In general, the results of a survey in West Java showed that the use of ICT by teachers to improve the quality of learning was in the high enough category with an index of 3.13. The highest utilization of ICTs from the three dimensions of the use of ICTs to improve the quality of learning is the use of ICTs for administrative and organizational activities. While the lowest is the use of ICT for pedagogic or classroom learning.

5.5 Utilization of ICTs for Teacher Professional Development

The results of a survey of Madrasa aliyah teachers in West Java show that the highest index of the use of ICT for the development of the teaching profession is to make books or student teaching materials (0.49), become members of the online profession of the teacher profession (0.49), and students (0.41). Whereas the lowest professional development activity is attending graphic design training (0.07). In general, the use of ICT by teachers to develop

the teaching profession has an index of 0.22 or in the low category Survey results in the last 12 months show that 95.57% of respondents have never taken graphic design training, 92.19% have never attended multimedia training, 84 , 64% of respondents had never attended internet training, 80.73% had never attended basic ICT skills training, and 91.41% of respondents had never made scientific articles.

Utilization of ICT for the development of the profession of madrasa aliyah teachers in the province of West Java is in the low category. In the past 12 months, most madrasa aliyah teachers have never attended ICT-related training such as basic computer skills, graphic design, internet, and multimedia.

Table 5: Utilization of ICT for Teacher Professional Development

Professional Development Activities	Index (0-1)
Participate in basic computer skills training	0,21
Following internet training	0,18
Take graphic design training	0,07
Attended multimedia training	0,10
Attends ICT seminar / workshop	0,23
Making papers as a resource	0,20
Make a paper as a speaker	0,10
Make scientific articles	0,11
Make a book or student teaching material	0,49
Create an online community with students	0,41
Create an online community with students' parents	0,15
Become a member of the online teacher professional community	0,49
Become a member of the online course community	0,10
Total	0,22

5.6 ICT Basic Competencies

The basic skills of ICT tested in the form of tests are skills using Microsoft Word, Excel, PowerPoint basic internet, and graphic design. In total, the basic skills of ICT in Madrasah aliyah teachers in West Java reach a score of 65 or in the quite

good category. The score that gets the highest score is the ability of Microsoft Word (score 79 or good) and the lowest is graphic design and Microsoft Excel (score 52 or very less).

Table 6: Basic ICT Competency Scores for Madrasah Aliyah Teachers in West Java.

ICT competence	Score	Category
Word	79,00	Well
Excel	52,00	Very less
Powerpoint	64,00	Not good
Internet	74,00	Pretty good
Grafis	52,00	Not good
Total	65,00	Pretty good

5.7 Hubungan Karakteristik Guru denganKompetensi Dasar TIK

Analysis of the relationship between teacher characteristics and ICT basic competencies uses one way ANOVA to find out whether there are significant differences in the average ICT basic competency according to respondent characteristics.

Table 7: Mean Difference Test Results on ICT Capability Scores Based on Respondent Characteristics

Madrasa Status	Mean	F	Sig.
Public	44,78	1,097	0,295
Private	45,92		
Gender			
Men	45,76	0,045	0,832
Women			
Age			
Less than 25 years	48,46	6,465	0,000
25 - 30 years	47,71		
30 - 39 years	46,55		
40 - 49 years	43,90		
More than 50 years	40,63		
Teacher Status			
PNS	44,20	2,457	0,118
Non PNS	46,01		
Education			
SMA/ equivalent	47,06	1,178	0,318
Diploma	39,50		
S1/D4	45,78		
S2	45,00		

Certification			
Certified	46,12	1,279	0,259
Not certified	45,09		
Subjects Supported			
Islamic education	43,85	1,264	0,279
Natural education	48,46		
Social sciences	46,30		
Mathematics	46,44		
Language	45,87		
Others	45,64		

5.8 Barriers to ICT Utilization for Education

Madrasah aliyah teacher ICT test scores in West Java provide significantly different scores (with a significance level of 5%) only on the age characteristics. Whereas the other characteristics such as madrasa status, gender, employment status, educational background, certification status and subjects that are taught do not give significantly different scores.

5.9 Barriers to ICT Utilization for Education

Barriers to ICT use are scored with an index. An index above 2.6 (on a scale of 1-5) means quite high.If sorted from the most common obstacle factors are the limited number of computers (3.67), internet speed limitations (3.63), laptop limitations (3.57), time limitations (3.16), less skilled (3.14), and limitations on internet access (3,13).

Table 8: Barriers to ICT Utilization Index

Factor	Index
Not skilled at using ICT	3,14
Lack of interest in ICT	2,76
Lack of confidence	2,82
Limited time	3,16
Limited number of computers	3,67
Laptop / Netbook Limitations	3,57
Limited internet speed	3,63
Limited electricity supply	2,62
Limited internet access	3,13

Madrasa Head Policy	1,91

IV. CONCLUSION

Some conclusions that can be generated from this study are as follows:

1. Mapping basic ICT infrastructure of Madrasah Aliyah teachers in West Java is:

a. Most of the aliyah madrasas in West Java already have basic ICT devices such as laptops, computers, printers, and LCD projectors although their numbers are limited.

b. More than half (54.90%) of Islamic schools in West Java have websites.

c. Almost all Islamic schools in West Java have access to the internet.

d. Most of the Islamic schools in West Java (70.59%) have computer laboratories.

2. Utilization of ICT for curriculum and assessment of Madrasah aliyah teachers in West Java is in the quite high category. The highest utilization of ICTs is in the implementation of learning plans (RPP), downloading learning materials, and making exam questions for students. Whereas the lowest utilization of ICT is making digital material (digital learning) and student development charts.

3. Utilizing ICT for pedagogy most often is presenting learning material with ICT, giving group and individual tasks using ICT. While the use of which is still rare is presenting digital material, internet media, and audio visual. In general, the use of ICT for pedagogy in West Java is quite high.

4. The most common use of ICTs for Administration and Organization in West Java is to recapitulate exam scores, learning administration, and student attendance lists. In general the use of ICTs for Administration and Organization in West Java is high.

5. Utilization of ICTs for the development of the teaching profession in West Java in general is still low. The most development activities are making books or teaching materials for students and the online profession of the teacher profession. The

lowest development activity is attending graphic design training, multimedia, and the internet.

6. Basic ICT competency of teachers in West Java is quite good. The basic competencies that get the highest score are Microsoft Word and the lowest are Microsoft Excel and graphic design.

7. The ICT ability test scores of Madrasah Aliyah teachers in West Java provide significantly different scores (with a significance level of 5%) only on the age characteristics. Whereas the other characteristics such as madrasa status, gender, employment status, educational background, certification status and subjects that are taught do not give significantly different scores.

8. Inhibiting factors in the use of ICTs tend to be more due to the limited number of computers and laptops, limited internet speeds, limited time, and less skilled use of ICT.

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