International Journal of Emerging Trends in Science and Technology
http://ijetst.in/index.php/ijetst ISSN 2348-9480
DOI: https://dx.doi.org/10.18535/ijetst/v8i10.01 || Vol: 09 Issue: 10 (Page No. 20-26) (2022)

Relationship and Differences of Teacher Attitude towards Their Skills in the Utilization of Ict in the Learning Process in West Sumatera

Erman Har [1*] | M. Amri [2] | ERMI HUSNI [3]

1. Biology Education, Education and Training Faculty, Bung Hatta University Padang-Indonesia

2. Utilization of fishery resources, Faculty of Fisheries and Marine Sciences Bung Hatta University Padang-Indonesia

3. Utilization of fishery resources, Faculty of Fisheries and Marine Sciences Bung Hatta University Padang-Indonesia

Abstract: The purpose of this study was to explore the differences and relationships of teachers' ICT knowledge by school location, work experience, and to explore the relationship between teachers' attitudes and skills in using ICT.This study report states that there is a significant difference between the knowledge of science teachers who teach in cities and science teachers in villages. In addition, there is a significant difference in the knowledge of science teachers about ICT based on work experience. There is also a strong relationship between the attitudes and skills of science teachers in utilizing ICT during the learning process. There is a strong relationship between the attitude of science teachers with ICT skills and attitudes of science teachers on the use of ICT. The attitude of science teachers to use ICT has a weak and positive correlation with the skills of teachers to use ICT in the science learning process. The implication of this research is that computer hardware, internet access, and training facilities can increase teachers' knowledge of ICT, especially experienced teachers.

Keywords: Relationship, differences, attitude towards their skills, utilization of ICT, learning process.

1. INTRODUCTION

In recent times, ICT is an important, inseparable part of aspects of human life, especially in the field of education. Changes in educational innovation we are currently facing. This change causes the demand for higher graduate knowledge, both in quality and quantity, ICT plays an important role in this. Palloff and Prat (2000) Universities have made changes by including ICT in the curriculum at colleges. E-learning triggers major changes in students and higher education institutions. According to Ali, Haolader and Muhammad (2013); “In this global era, the development of computer technology, such as multimedia and the internet, can make it easier for teachers and students to get information, and encourage active and independent learning. Individual learning obligations, such as distance learning, motivate teachers and students to continue learning outside of school hours, plan and store learning materials, design and facilitate file delivery. Sing and Chan (2014) one of the factors that determine the development and innovation of public education is the teacher. In addition, Oladosu (2011) teacher awareness in the form of understanding, acceptance and assessment in ICT. Application of the learning process. Teachers are aware of guiding principles, build positive attitudes, and lead to increased individual productivity. In order to encourage them to develop skills and competencies. Teachers need to give special consideration because they have mandates and problems that need to be explained well to be able to accept new technologies that are applied in the learning process (Lawal, 2006). More effective implementation of ICT requires facilities and availability of competent personnel computers, internet access, how to integrate ICT into the learning process and how ICT supports the assessment of learning outcomes (Oladosu, 2011). The research report shows that between students who take the ICT module

and the environment and students who follow conventional learning strategies there are differences in science knowledge and achievement. Science learning achievement increased significantly by using various constructive learning media (Osman. K. et.al 2014)

2 LITERATURE REVIEW

The integration of ICT into the curriculum depends on the teacher's belief that implementing ICT provides better and more beneficial access and facilities for teachers and students (Yusuf 2005). In line with that, in the report Udo (2005) the effectiveness of ICT depends on the awareness and attitude of teachers to provide innovation, this requires skills, understanding, attitudes and knowledge of teachers. ICT as an aid tool for students in carrying out ICT skills. In line with that, ICT is a set of tools that can be used to provide information and communicate (Tino, 2003). Anthony (2012) said in studying ICT between: a) ICT facilitates communication, students can collect and correct information anywhere and anytime. Students can connect with their teachers wherever they are. b) ICT supports access to knowledge; students can benefit from thorough knowledge. c) ICT can present knowledge more simply, individually or in groups, able to take notes and make presentations. This approach accommodates training for students to participate in various future research. Bell and Margaret (2006) that ICT has advantages in education: are global access to knowledge, instant experience sharing, independent learning, fun learning and interaction through multimedia, stimulating experiential learning, windows of opportunity to think. and innovation, inspiring motivation and obtaining technological excellence for progress. According to Furthermore, Aina (2013) said the use of ICT in every science learning, such as biology, chemistry, and physics is as follows; a) Applications in chemistry education; Most of the chemical substances and chemical reactions are harmful to the human body especially if not handled with care and special treatment. In most cases, chemical reactions are difficult for students to understand without witnessing them firsthand. Generally, teachers explain reactions in an abstract way and draw molecular diagrams. b) Computers help students visualize small objects. Example; Computers can be used to visualize human anatomy, the internal structure of animal and human cells. For this purpose, ICT is very important, because students can witness chemical reactions directly from computer software. Animations and videos of complex molecular structures of chemists for classroom learning for all students. c) Applications in physics education; Most people assume that physics is an abstract subject (Adeyemo, 2010) In a well taught physics concept with the support of ICT, this is a real concept. This is due to the way teachers teach physics subjects, some may be difficult to understand. The mechanisms are complicated to explain, however, technology has solved this problem through educational software. To teach difficult concepts or to learn challenging skills in physics. As an example; the teaching of electric generators in physics can be facilitated by educational software. Spindle rotation in a magnetic field is explained with this software. Teachers are agents of change in promoting the development of education globally. The teacher's role is very vital in the growth and development of the teaching-learning process and the development of science. ICT teacher knowledge about teaching and learning, problem solving skills, capacity building, and problems related to education.

In managing ICT, teachers need to have a positive attitude towards ICT as a learning tool (Oladosu, 2011). As control of individual individuals. Attitudes are part of the cognitive structure that can be used to control systems and their experiences and behavior. Guoyuan et al (2009) reported that attitude is a tendency to respond positively or negatively to an object. In line with that, Okoli (2000) states that attitudes are built from a mental set that a person uses to evaluate whether something is useful. He further states that attitudes are inferred from overt behavior, verbal or non-verbal, appropriate or inappropriate. Teachers' attitude towards ICT is their opinion whether they accept or reject ICT as a learning tool. There should be a place for teachers to develop their ICT skills to foster positive attitudes. ICT has facilitated the knowledge and professionalism

of teachers, skills and abilities, expanded their subject knowledge, and enabled more efficient planning and preparation of teaching. To improve the integration of ICT classrooms, teachers are identified as the main factor in developing this integration, science teachers are facilitators and managers in the ICT classroom environment (Jegede, 2008). This study shows that there are significant differences between high school science teachers in rural and urban areas. In addition, there are differences between science teachers who have not graduated and postgraduate science teachers. 4 (four) independent variables have a major role in skills. In the use of science teachers' ICT in the learning process, the teacher's attitude towards ICT makes the highest contribution (Har E et. al 2022)

3. RESEARCH PURPOSE

This study aims to:

1. Tracing differences in ICT-based teacher knowledge by school location.
2. Tracing differences in the knowledge of ICT teachers according to teacher education.
3. Tracing differences in teacher knowledge according to work experience.
4. Exploring the relationship between attitudes and skills of teachers using ICT in science learning.

4. METHODS AND MATERIAL

This study uses a population of science teachers in West Sumatra. The sample is determined by purposive research. 280 respondents have provided information on the given instrument. Data processing using SPSS program. Inference analysis used t-test and 'One Way ANOVA and product moment correlation was also used

5. RESULTS

Differences in teachers' ICT knowledge in the science learning process based on school location, as table 1.1:

Table 1.1: t-test assessment, the differences of science teachers' knowledge about ICT in West Sumatra based on School Location

Variable	**Independent assessment t-test samples**				
	School Location	N	Mean	t	Sig
ICT Knowledge	Urban	180	3.82	3,15	0,003
	Rural	100	3.65		

*Sig. p< 0.05

Table 1.1 t-test of science teachers' ICT knowledge according to school location in West Sumatra. There was a significant difference between the knowledge of science teachers at high school in the city compared to high school teachers in the village (t = 3.15, p = 0.003). t-test (p=0.003<0.05), there is a significant difference in ICT knowledge between high school science teachers in cities and high school science teachers in villages, the average value of high school science teachers in cities is higher than the average science teacher score SMA in the village see Table: 1.2

Table 1.2: t-test assessment, the differences of science teachers' knowledge about ICT in West Sumatra based on teachers' education.

Variable	**Independent assessment t-test samples**				
	Education	N	Mean	t	Sig
ICT's Knowledge	Undergraduate	175	3.78	1,82	0,08
	Postgraduate	105	3.55		

*Sig. p< 0.05

The t-test of science teacher education on ICT knowledge in West Sumatra, did not differ in knowledge between undergraduate and postgraduate teachers (t=1.82, p=0.08). . T-test (p=0.08>0.05), also did not differ significantly between ICT knowledge between S1 Science teachers and S2 Science teachers. Differences in teacher knowledge in using ICT based on teacher work experience, see table 1.3.

Table 1.3 Science teachers' knowledge about ICT based on working experiences

Resources	Total Quadrad	dk	Mean Quadrad	F	Sig.
Among Group	89,57	2	44,78	2,93	0,056
In Group	4525,69	297	15,23		
Total	4615,26	299			

*Sig. p< 0.05

One way ANOVA test of teacher knowledge about ICT based on teacher work experience there is no significant difference One way ANOVA analysis, to see differences in science teacher knowledge about ICT based on teacher work experience is shown in table 1.4

Table 1.4 Tukey's HSD test science teachers' knowledge about ICT based on working experiences.

Resources	(I) working experience	(J) working experience	Mean Difference (I-J)	Sig.
Teachers' knowledge about ICT based on working experiences.	0-15 yrs	16-30yrs	-,64928	,415
		> 31yrs	,79674	,373
	16-30yrs	0-15yrs	,64928	,415
		> 31 yrs	1,44602(*)	,043
	> 31 yrs	0-15 yrs	-,79674	,373
		16-30yrs	-1,44602(*)	,043

*Sig. p< 0.05

Table 1.4; The Turkish HSD test showed a significant difference between teachers with 16-31 years of work experience and teachers with work experience >31 years (Mean difference (I-J) = 1.44602(*), p=0.043. There was no significant difference between teachers who had work experience 0-15 years and teachers who have work experience 16-30 years.In addition, there is no difference in teacher knowledge based on work experience.See the correlation between skills and attitudes of teachers in ICT-based science learning, see table 1.5.

Table 1.5 Test Result about correlation of teachers' attitude to ICT and teachers' skills on utilizing ICT on learning process.

Resources	Teachers' attitude to ICT	Teachers' attitude on ICT utilizing	Teachers' skills on utilizing ICT on learning process
Science teachers' attitude to ICT	1	.796(**)	.503(**)
		.000	.000
Science teachers' attitude to ICT utilizing	.796(**)	1	.395(**)
	.000		.000
Teachers' skills on utilizing ICT on learning process	.503(**)	.395(**)	1
	.000	.000	

** Correlation is significant at the 0.01 level (2-tailed).

Table 1.5 shows that the attitude of science teachers towards ICT and the attitude of science teachers in using ICT is strongly correlated with 0.796 (**), meaning that there is a positive relationship with a 99% confidence level. Teachers' skills in using ICT in the learning process and science teachers' attitudes towards ICT, have a significant correlation as well as a weak correlation of 0.503(**), while the confidence level is 99 percent. The attitude of science teachers towards the use of ICT has a positive and weak correlation with the skills of teachers in utilizing ICT in the science learning process, the correlation coefficient is 0.395 (**), where the confidence level is 99 percent.

6. CONCLUSION AND DISCUSSION

There are differences in the ICT knowledge of high school science teachers according to the location of the school. Science teachers' knowledge of ICT in urban secondary schools is higher than that of rural secondary school teachers. (Har.E et al 2022) Information provided on differences in ICT skills between science teachers teaching science in urban and rural secondary schools. Science teachers' skills in using ICT in the learning process, high school science teachers with postgraduate education are higher than high school science teachers who have not graduated.

Result from ANOVA test shown that there is not significant correlation between achievement and school grade B and C. Otherwise, from that result shown, there are significant correlation between achievement and school grade A, with B and C. From this research we can conclude that student achievement profile is good and it can be developed for all school category. Based on this fact, teacher participation is very important to develop students' skills. Contextual learning can be an asset for students to face the challenges of 21st century education (Suryawati, E. et.al 2014). In line with that, education also found differences between the ICT knowledge of undergraduate science teachers and postgraduate science teachers. Likewise, science teachers' ICT knowledge is determined by work experience, experienced teachers have lower knowledge of ICT while less experienced teachers have higher ICT knowledge, it is possible that teachers who have been on duty for a long time at the college level have not been touched by the ICT curriculum. The results showed that teachers' attitudes towards ICT were in the high category, skills in using ICT were in the medium category and skills in making ICT-based teaching materials were in the low category. Teachers' skills in using ICT based on school location have significant differences, meaning that junior high school science teachers have higher ICT skills, teachers' attitudes towards ICT are also higher. Middle school science teachers out of town, junior high school science teachers' skills in making ICT-based teaching materials based on school location also have significant differences (Har.E et.al 2019). The results revealed that less than half of the respondents possess computers outside the school, though more than half have internet access. The intention of internet and computer availability is to facilitate teacher's access to teaching resources and to accomplish school tasks. The research reveals that teachers' attitude toward ICT is high, in contrast, teachers' skills in delivering

learning based on ICT is low. Furthermore, teachers' skill on ICT use in teaching science is at a modest level. The implication of this research is to recommend to upgrades teachers' knowledge and skills in designing as well as delivering learning based on ICT. Teacher Training Institutes are advised to design a new curriculum and establish computing as one of their compulsory subjects. (Har.E 2019). The attitude of science teachers towards ICT has a strong correlation with the attitude of science teachers in the use of ICT. Shows that there is a significant difference between the knowledge of science teachers who teach outside school and science teachers who teach in urban schools. Teachers who teach in cities have higher ICT knowledge than teachers who teach in schools outside the city. Teachers with undergraduate education are higher than postgraduate education teachers' ICT knowledge and differ significan Furthermore, there is a significant difference in the science teacher's ICT knowledge based on work experience. The implication of this research is that schools located outside the city need to be equipped with computers, internet access and training that can increase the ICT knowledge of teachers, especially experienced teachers. (Har E et al 2018)

7. ACKNOWLEDGEMENT

We extend our deepest appreciation and gratitude in particular to the Ministry of Research, Technology and Higher Education of Bung Hatta University, the Head of the West Sumatra Provincial Education Office who has given permission for this research, students who have helped us in collecting data and all parties who have provided contribution to the completion of this research.

11 REFERENCES

1. Ali, Haolader and Muhammad. (2013) The Role of ICT to Make Teaching-Learning Effective in Higher Institutions of Learning in Uganda. International Journal of Innovative Research in Science, Engineering and Technology (An ISO 3297: 2007 Certified Organization) ISSN: 2319-8753 .Vol. 2, Issue 8, August
2. Aina, J.K. (2013) Effective Teaching and Learning in Science Education through Information and Communication Technology [ICT]. IOSR Journal of Research & Method in Education (IOSR-JRME) e-ISSN: 2320–7388, p-ISSN: 2320–737X Volume 2, Issue 5 (Jul. –Aug. 2013), pp 43-47
3. Adeyemo, S.A. (2010) Teaching/ learning physics in Nigerian secondary school: The curriculum transformation, issues, problems and prospects. International Journal of Educational Research and Technology, 1 (1), 99-111).
4. Anthony, O (2012) Challenges of effective use of ICT as a tool for implementing the UBE schemes 53rd annual conference of science teachers association of Nigeria 2012. HEBN publishers.
5. Bell, Margaret and Avis, Peter. (2006)"Information technology in education", Microsoft ®Encarta® 2006 (DVD) Microsoft corporation,
6. Har E, Amri M, Gusmaweti (2022) Skills and Ict Science Learning Toward Teachers' South Coast District International Journal of Emerging Trends in Science and Technology http://ijetst.in/index.php/ijetst ISSN 2348-9480 DOI: https://dx.doi.org/10.18535/ijetst/v8i9.02 || Vol: 09 Issue: 09 (Page No. 11-19) (2022)
7. Har, E., Roza, W., & Khairi, A. Pengetahuan ICT Guru Sains Berdasarkan Lokasi Sekolah dan Pengalaman Kerja SMA Negeri di Sumatera Barat. In Proceeding Biology Education Conference: Biology, Science, Enviromental, and Learning (Vol. 15, No. 1, pp. 466-470).
8. Har, E., Roza, W., & Khairi, A. PENGGUNAAN ICT DALAM PEMBELAJARAN SAINS PADA GURU SMP N DI SUMATERA BARAT. In Proceeding Biology Education Conference: Biology,

Science, Enviromental, and Learning (Vol. 16, No. 1, pp. 49-54).

9. Har, E. M., Khairi, A., & Roza, W. (2019). Teachers' skills and ICT facilities for science learning at senior high school in Padang city. Australian Educational Computing, 34(1).
10. Suryawati, E., Putria, I. I., & Osman, K. (2014) developing inventive thinking and scientific attitude through contextual teaching and learning to face 21st century educational challenge.
11. Osborne J. F., Hennessey S. (2003). Science education and the role of ICT. Retrieved from www.sarahennessey.com and jonathan Osborne. Com on science education and the role of ICT 3rd August,
12. Tinio, V. (2003) ICT in education. Retrieved April 20, 2012 from http:/www.apdipnet/publications/lespprinmers/eprimenredu.edu.pdf
13. Osman, K., & Kaur, S. J. (2014). Evaluating biology achievement scores in an ICT integrated PBL environment. Eurasia Journal of Mathematics, Science and Technology Education, 10(3), 185-194.
14. Oladosu, Kamaldeen.(2012) Basic Technology Teachers' Awareness and Attitude Towards the Use Of Information and Communication Technology For Sustainable Development in Lagos State Education Districts: I, IV and VI. Journal of Education and Practice www.iiste.org ISSN 2222-1735 (Paper) ISSN 2222-288X (Online) Vol 3, No 13
15. Okoli, C.O. (2000) Educational and Psychological Measurement. Behenu Press Printer, Shomolu-Lagos. .
16. Palloff, M.R. & Pratt, (2000) KLesson from the Cyberspace Classroom: The Realities of Online Teaching. Jossey-Bass.
17. Singh, T. K. R., & Chan, S. (2014) Teacher Readiness on ICT Integration in Teaching-Learning: A Malaysian Case Study. International Journal of Asian Social Science, 4, 874-885.
18. Lawal, M.B. (2006) Energizing the Nigerian Teacher Trainer for Electronic and Virtual Education. A Paper Presented at the COEASU South-West Zonal Delegates Academic Conference in e-learning
19. Udo, R.O.(2005) Five Strategies for Sustainable Teacher ICT Platforms for Nigerian Teachers 2nd Nigeria elearning Capacity Building Int'l Associates in Collaboration with national Commission for Colleges of Education.
20. Yusuf, M.O. (2005) Integrating Information and Communication Technologies in Nigeria Tertiary Institutions. Journal of African Educational Research Network. Vol.5 (2) (2005). Retrieved from http://www2.nesu.edu/nesu/aem/INDEX.HTML.
21. [Guoyuan, S., Martin, V., Johan, V.B., & Jo, T.(2005) Factors Supporting or Preventing Teachers from Integrating Information and Communication Technology into Classroom Teaching: A Chinese Perspective. Proceedings of the 17th International Conference on Computers in Education Hong Kong. Asia-Pacific Society for Computers in Education. (2009).
22. [21]. Jegede, P.O.(2008) Information and Communication Technology Attitudinal Characteristics and Use Level in Nigerian Teachers. Issues in Information Science and Information Technology. Vol.6 (2008).