



Teachers Ability on Information and Communication Technology in Industry 4.0 Era.pdf

Jan 13, 2022

2604 words / 14027 characters

Anas Arfandi

## Teachers Ability on Information and Communication Technolo...

## Sources Overview

8%

OVERALL SIMILARITY

1	eprints.unm.ac.id INTERNET	3%
2	download.atlantis-press.com INTERNET	1%
3	Seninil ., Mochamad Bruri Triyono, Asnul Dahar Minghat, Herman Dwi Surjono, Siti Salina Mustakim. "E-Learning Model for Technical a...	<1%
4	A Jatmiko, M Mila, I Irwandani, C Anwar, A Taher, P M Sari. "The development of multi-representation media based on instagram on te...	<1%
5	d-scholarship.pitt.edu INTERNET	<1%
6	Saharuddin Ronge Sokku, Misita Anwar. "Factors Affecting the Integration of ICT in Education", Journal of Physics: Conference Series, ...	<1%
7	Tshwane University of Technology on 2017-03-26 SUBMITTED WORKS	<1%
8	Universiti Putra Malaysia on 2011-11-15 SUBMITTED WORKS	<1%
9	University of Bedfordshire on 2013-08-26 SUBMITTED WORKS	<1%

## Excluded search repositories:

None

## Excluded from document:

Bibliography

Quotes

Citations

## Excluded sources:

None

# Teachers Ability on Information and Communication Technology in Industry 4.0 Era

Purnamawati<sup>1</sup> Anas Arfandi<sup>1,\*</sup>

<sup>1</sup>Faculty of Engineering, Universitas Negeri Makassar, Makassar, Indonesia

\*Corresponding author. Email: [anas.arfandi@unm.ac.id](mailto:anas.arfandi@unm.ac.id)

## ABSTRACT

Being a teacher in industrial 4.0 is demanded to adaptable to technological developments. This study aims to describe the understanding and ability of teachers of Vocational High Schools to use ICT in learning. This research is survey research. Research respondents were 142 Vocational Teacher of Computer and Information Technology expertise programs in South Sulawesi Province. The study was conducted from April to July 2019. Data were collected using a questionnaire that had previously passed the Validity and Reliability test. Data analysis was performed using descriptive analysis. The results showed that the teacher's understanding of hardware in the form of inputs, processes, and outputs was very well understood. However, they still lacked knowledge of artificial intelligence. The ability of teachers to utilize offline technology in learning is quietly better, but it still needs to be improved in terms of making mind maps, instructional videos, and graphic designs. The teacher is also familiar with the use of search engines, hotspots, e-mail, and LAN connected online. However, teachers have not optimized the use of databases, online learning, online video, online data storage and sharing.

**Keywords:** *ICT in learning, vocational high school, vocational teacher*

## 1. INTRODUCTION

The information and communication technology (ICT) is an important part of learning activities in the 21st century. The efforts to develop student knowledge through the integration of Information and Communication Technology (ICT) are a vital part of the education process. In the context of education, the role of ICT is a tool to enable an effective, efficient, and enjoyable learning process.

The 2013th curriculum (K13) encourages educators to be more creative in implementing the learning process. The use of information and communication technology (ICT) in the learning process is one indicator of teacher creativity in learning. ICT integrated learning will provide opportunities for students to learn dynamically and interactively [1]. It is in line with the statement of V. Chandra and M. Lloyd [2], which states that learning that utilizes ICT optimally will be able to improve student learning achievement.

The implementation of ICT School-Based Management is expected to improve school services for all citizens. It affects to the quality improvement of graduates who can compete when continuing their studies

in higher education or working in the industrial world [2] [3]. The teacher's ability to master ICT becomes a problem that arises along with the use of ICT in the world of education. Therefore, mastery of ICT becomes a necessity to improve teacher professionalism.

Industry era 4.0 (I4.0) requires teachers to understand not only ICT but also the ability to use ICT. In the development of 4.0 technology, everything is connected to the internet (Internet of Things). For this reason, teachers must also be able to adapt to use ICT either offline or online to the network. Technology literacy is also a prerequisite for teachers in developing communication with the outside world to improve their competencies to become professional teachers [4]–[7].

This research was conducted to describe the ability to use ICT of vocational teachers in the Computer Technology and Information Technology expertise program in schools of South Sulawesi. The formulation of the problems stated in this study is: 1) how is the understanding level of ICT in industry 4.0 of vocational high school teachers? 2) how is the teacher's ability to utilize technology without networking? 3) how is the teacher's ability to use online technology in the network?

## 2. RESEARCH METHOD

This research is survey research. The respondents of this study were vocational teachers in the Computer and Information Technology expertise program in South Sulawesi Province. The research sample was taken randomly with a total sample of 71 teachers. The study was conducted from April to July 2019. Data were collected using a questionnaire that had previously passed the Validity and Reliability test. Data analysis was performed using descriptive analysis.

The teachers of the computer and information technology expertise program were chosen as the respondent. They were asked about their ability in ICT as vocational teachers. They responds in accordance with their scientific fields is one of the research variables. If they do not understand and have not even applied ICT in their learning, what will happen to other vocational teachers in other expertise programs? The following figure is a general description of the respondents:

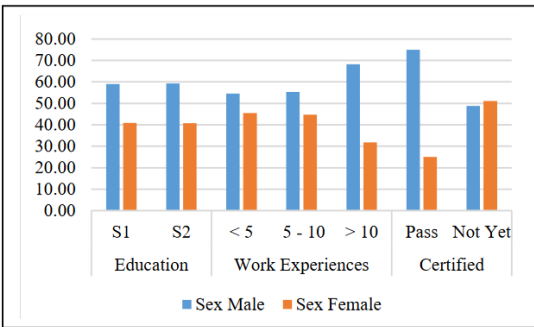


Figure 1 Respondent based on Sex, Education, Work Experiences, and Certified

Figure 1 shows that the dominant respondents are men and have bachelor degree. More than half of the respondents are teachers who have worked for 5-10 years. Most of them do not have teacher certification.

## 3. RESULT AND DISCUSSION

Based on research that has been done, the following results were obtained related to understanding, the ability to use ICT, and the use of ICT in networks.

### 3.1. Teacher understanding of ICT

Figure 2 shows that the teacher's knowledge of inputs, processes, and outputs hardware was very well understood. Dominant of the teachers have also understood databases, programming languages, and virtual classes. However, most of them still do not understand the use of artificial intelligence in learning. It indicates that the knowledge of teachers of TKI expertise programs in South Sulawesi still needs to be improved in

facing industry challenges 4.0 [8]–[10]. Teachers in the millennial era should no longer be limited to the use of word processing software, numbers, and presentations, but they must improve their technological literacy skills in the 21st century [1] [8] [11]–[15].

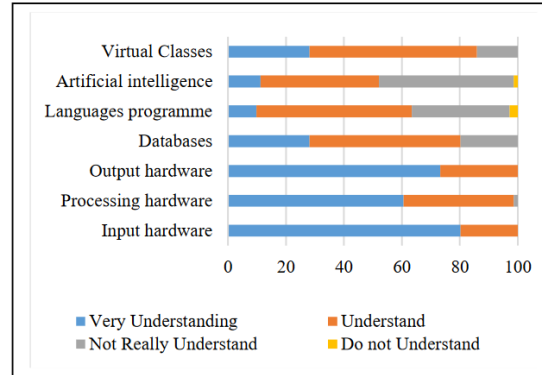


Figure 2 Teacher understanding of ICT

### 3.2. Teachers ability in using ICT offline

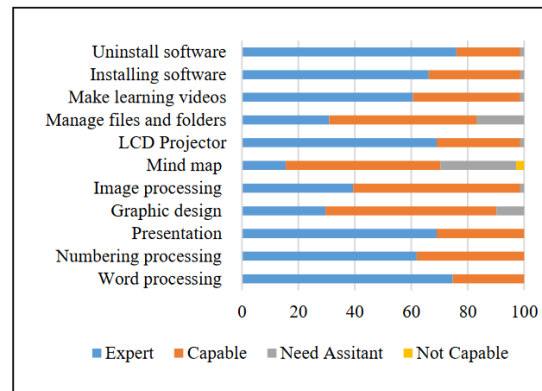


Figure 3 The teacher using ICT offline

Figure 3 shows that the dominant respondents have used various software which operates offline. This device is also often used in learning. However, there are a small number of teachers who are still unable to use concept mapping software, learning videos, and graphic design. These findings are in line with the states that teachers have used ICT in learning, especially vocational teachers [12] [14]–[17]. On the other hand, there is no difference between the use of ICTs and teacher demographic factors [11].

### 3.3. Teachers ability in using ICT online

Figure 4 shows that the dominant respondents are familiar with the use of search engines, hotspots, e-mail, and LAN connected online. However, teachers have not optimized to use databases, online learning, online video, online data storage, and sharing. It shows that teachers

need to reinforce the use of these facilities to improve their quality of teaching and learning.

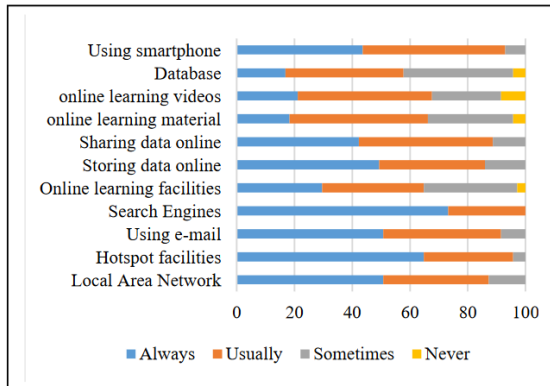


Figure 4 The teacher using ICT online

Vocational education emphasizes the importance of the relevance of industry needs so that the improvement and development of individuals need to align with the conditions and demands that exist in the industry [18] [19]. Vocational education has a vital role in preparing quality, competitive, and capable graduates who can adapt to changes that occur in the world of work. Therefore, strengthening the position of teachers in industry 4.0 has been urged to be carried out [20].

One of the movements launched by the government to strengthen the quality of education in response to the industrial era 4.0 is the new literacy movement. This movement integrates digital, technology, and human literacy in each component of Education [21]–[23]. Therefore, the implementation of K13 in Indonesia for primary and middle educational systems forces the teachers to adapt to technology as soon as possible, especially in the industry 4.0 era.

The users of ICT in the work environment will influence teachers in utilizing ICT. Many colleagues who increasingly use ICT as a communication tool and learning media will certainly motivate each teacher to participate in using ICT. The number of coworkers who frequently use ICT will also form a work environment that is conducive because each teacher can ask each other questions and help each other in using ICT in the school environment. It means that the more support in using ICT in the school environment, the more teacher's willingness to take part in using ICTs arise.

So far, the teacher uses ICT in the learning process in the classroom only as a learning aid, such as for typing material, making handouts or learning modules, and processing student grades. Teachers have not been able to use ICT as an integrated media to improve their performance. One of the practical uses of media can be done by utilizing ICT devices.

Thus, the use of ICT can no longer only be used as a tool but also as an integrated media that support the learning process in the classroom. The usefulness of ICT in learning in class and the completion of the task will encourage teachers to be more likely to use ICT to facilitate further work activities so that the use of ICT will be able to improve their performance. The performance in the learning process includes five essential things: understanding the material, choosing the right method, using the media effectively, implementing the ability to motivate students, and evaluating the learning process.

#### 4. CONCLUSION

1. The understanding of vocational teachers about ICTs is excellent, while using technology in industry 4.0 for most teachers still needs to be improved.
2. The ability of teachers to utilize offline technology in learning is good, but it still needs to be improved in terms of making mind maps, instructional videos, and graphic designs.
3. The teacher has used online technology in learning activities. Otherwise, they need to improve those abilities in applying databases, online learning, online video, online data storage, and sharing, which are required in the learning process that supports the industrial era 4.0.

#### ACKNOWLEDGMENT

Authors wishing to give an appreciation for financial support from the Ministry of Research, Technology, and Higher Education of the Republic of Indonesia as a sponsor of this research.

#### REFERENCES

- [1] S. R. Arnold, M. J. Padilla, and B. Tunhikorn, "The development of pre-service science teachers' professional knowledge in utilizing ICT to support professional lives," *Eurasia J. Math. Sci. Technol. Educ.*, vol. 5, no. 2, pp. 91–101, 2009.
- [2] V. Chandra and M. Lloyd, "The methodological nettle: ICT and student achievement," *Br. J. Educ. Technol.*, vol. 39, no. 6, pp. 1087–1098, 2008.
- [3] M. Huda and K. S. M. Teh, "Empowering professional and ethical competence on reflective teaching practice in digital era," in *Mentorship Strategies in Teacher Education*, IGI Global, 2018, pp. 136–152.
- [4] R. Bakar and S. Mohamed, "Teaching using information and communication technology: Do trainee teachers have the confidence?," *Int. J. Educ. Dev. using ICT*, vol. 4, no. 1, pp. 5–12, 2008.
- [5] A. Albirini, "Teachers' attitudes toward information and communication technologies: The case of



- Syrian EFL teachers,” *Comput. Educ.*, vol. 47, no. 4, pp. 373–398, 2006.
- [6] Davies, R. S. (2011). Understanding technology literacy: A framework for evaluating educational technology integration. *TechTrends*, 55(5), 45.
- [7] S. Erol, A. Jäger, P. Hold, K. Ott, and W. Sihh, “Tangible Industry 4.0: a scenario-based approach to learning for the future of production,” *Procedia CiRp*, vol. 54, pp. 13–18, 2016.
- [8] R. Oliver, “The role of ICT in higher education for the 21st century: ICT as a change agent for education,” Retrieved April, vol. 14, p. 2007, 2002.
- [9] J. Tondeur, K. Aesaert, B. Pynoo, J. van Braak, N. Fraeyman, and O. Erstad, “Developing a validated instrument to measure preservice teachers’ ICT competencies: Meeting the demands of the 21st century,” *Br. J. Educ. Technol.*, vol. 48, no. 2, pp. 462–472, 2017.
- [10] E. Van Couvering, “The history of the Internet search engine: Navigational media and the traffic commodity,” in *Web search*, Springer, 2008, pp. 177–206.
- [11] A.-O. Alazam, A. R. Bakar, R. Hamzah, and S. Asmiran, “Teachers’ ICT skills and ICT integration in the classroom: the case of vocational and technical teachers in Malaysia[1] A.-O. Alazam, A. R. Bakar, R. Hamzah, and S. Asmiran, “Teachers’ ICT skills and ICT integration in the classroom: the case of vocational,” *Creat. Educ.*, vol. 3, p. 70, 2012.
- [12] M. S. Saud, B. Shu, and M. A.-M. Yasin, “Effective integration of information and communication technologies (ICTs) in technical and vocational education and training (TVET) toward knowledge management in the changing world of work,” *African J. Bus. Manag.*, vol. 5, no. 16, pp. 6668–6672, 2011.
- [13] E. G. Caldarola, G. E. Modoni, and M. Sacco, “A Knowledge-based Approach to Enhance the Workforce Skills and Competences within Industry 4.0,” in *The Tenth International Conference on Information, Process, and Knowledge Management*, Rome, 2018.
- [14] B. Aberšek and A. Flogie, “Evolution of competences for a new era or education 4.0,” in *XXV Conference of Czech Educational Research Association (CERA/ČAPV) “Impact of Technologies in the Sphere of Education and Educational Research”*, Czech, 2017.
- [15] A. Durmuş and A. Dağlı, “Integration of vocational schools to industry 4.0 by updating curriculum and programs,” *Int. J. Multidiscip. Stud. Innov. Technol.*, vol. 1, no. 1, pp. 1–3, 2017.
- [16] N. A. A. Rahman, S. A. Kadir, M. F. Mohammad, and M. I. A. Moin, “Higher TVET Education in Aviation: Teaching Quality and a Master Key to Industry 4.0,” *Int. J. Educ.*, vol. 2, no. 5, pp. 44–53, 2017.
- [17] K. Schuster, L. Plumanns, K. Groß, R. Vossen, A. Richert, and S. Jeschke, “Preparing for Industry 4.0–Testing Collaborative Virtual Learning Environments with Students and Professional Trainers,” *Int. J. Adv. Corp. Learn.*, vol. 8, no. 4, pp. 14–20, 2015.
- [18] Arfandi, A. and Sampebua, O., 2018. The Study of Vocational Higher Education Graduates Skills That Requires in Industry. *Advanced Science Letters*, 24(5), pp.3632-3635.
- [19] Purnamawati, “Needs Analysis of Vocational High School Partnership Model with World Business and Industry in Makassar,” 2018, vol. 1028, no. 1, doi: 10.1088/1742-6596/1028/1/012081.
- [20] Nurhabibah, A. Setiawan, H. Yanti, Y. Z. Miraj, and Yannuar, “Analysis of ICT Literacy Competence among Vocational High School Teachers,” 2018, vol. 306, no. 1, doi: 10.1088/1757-899X/306/1/012097.
- [21] J. E. Aoun, *Robot-proof: higher education in the age of artificial intelligence*. Cambridge: The MIT Press, 2017.
- [22] K. Ayoub and K. Payne, “Strategy in the age of artificial intelligence,” *J. Strateg. Stud.*, vol. 39, no. 5–6, pp. 793–819, 2016.
- [23] D. Vernanda, A. G. Abdullah, and D. Rohendi, “Internet Literacy of Vocational High School Teachers,” in *IOP Conference Series: Materials Science and Engineering*, 2018, vol. 306, no. 1, p. 12032.