



The Ability of Ece Teachers To Use ICT in The Industrial Revolution 4.0

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Abstract

This research is conducted with the aim to determine the ability of early childhood education teachers to use ICT in the industrial revolution 4.0. The qualitative method is used with data collection techniques in the form of surveys and data analysis using descriptive statistics. The subjects of the study were 26 early childhood education teachers in South Jakarta and Tangerang city. The results showed that early childhood education teachers are able to utilize information and communication technology for the sake of organizing educational development activities quite well. ICTs are used to find references, examples of learning media, look for examples of activities according to themes and sub themes, as well as preparing learning plans and assessments. Improvements need to be made in an effort to operate the computer to be better because there are still teachers who are awkward in interacting with computers because the ability to operate computers is not optimal and the lack of availability of computers in adequate numbers.

Keywords: *pedagogical competence; early childhood education teachers; utilization of technology; industrial revolution.*

Abstrak

Penelitian bertujuan untuk mengetahui kemampuan guru pendidikan anak usia dini memanfaatkan TIK di era revolusi industri 4.0. Penelitian menggunakan pendekatan kualitatif dengan teknik pengumpulan data berupa survey dan analisis data menggunakan statistik deskriptif. Subjek penelitian adalah guru-guru pendidikan anak usia dini di wilayah Jakarta Selatan dan Kota Tangerang berjumlah 26 responden. Hasil penelitian menunjukkan bahwa guru pendidikan anak usia dini telah mampu memanfaatkan teknologi informasi dan komunikasi untuk kepentingan penyelenggaraan kegiatan pengembangan yang mendidik dengan cukup baik, seperti mencari referensi, contoh-contoh media pembelajaran, mencari contoh kegiatan sesuai dengan tema dan sub tema, serta menyusun perencanaan dan penilaian pembelajaran. Peningkatan perlu dilakukan dalam upaya mengoperasikan komputer agar lebih baik karena masih ada guru yang canggung dalam berinteraksi dengan komputer karena kemampuan mengoperasikan komputer yang belum maksimal serta kurangnya ketersediaan komputer dalam jumlah yang memadai.

Kata Kunci: *kompetensi pedagogik; guru pendidikan anak usia dini, pemanfaatan teknologi; revolusi industri.*

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INTRODUCTION

The concept of the industrial revolution 4.0 was first introduced by Professor Klaus, a German technician and economist, who is also the founder and Executive Chairman of the World Economic Forum. In his book *The Fourth Industrial Revolution* (2017), he mentioned that we are at the beginning of a revolution that fundamentally changes the way of life, work and relate to one another. The era of the industrial revolution 4.0 emphasizes the patterns of digital economy, artificial intelligence, big data, robotics. The existence of revolution 4.0, written by (R.Tjandrawinata, 2019), has the potential to empower individuals and society because it can create new opportunities for economic, social, and personal development. However, it can also cause stunting and marginalization of some groups, exacerbate social inequality, create new security risks, and can damage human relations.

In response to these conditions, the Government of the Republic of Indonesia responded by launching a roadmap called "Making Indonesia 4.0". In the roadmap, there are 10 national priorities to deal with the Industrial Revolution 4.0, namely improving the material flow, redesigning the industrial zone, accommodation for sustainability standards, enhancing the quality of human resources, forming an innovation ecosystem, implementing technological incentives, harmonizing rules and policies, empowering SMEs, building a national digital infrastructure, and attracting foreign investment (anggraini & Paolo, 2018). Improving the quality of human resources as one of the 10 national priorities becomes the main task in the field of education that can be done by redesigning the education curriculum to adapt to the industry 4.0 era and implementing talent mobility programs for professionals, so that education graduates have the ability to compete and live their lives in the middle of the industry 4.0 era.

Indonesia has begun the process of adaptation to Industry 4.0 by increasing the competence of human resources through a link and match program between education and industry. This effort is carried out synergistically between the Ministry of Industry and related ministries and institutions such as the Ministry of National Development Planning (*Badan Perencanaan Pembangunan Nasional*), the Ministry of State Owned Enterprises (*BUMN*), the Ministry of Manpower, the Ministry of Education and Culture, and the Ministry of Research, Technology and Higher Education. (Satya, 2018)

To be able to realize the link and match program between the fields of education and industry needs, education and cultural actors must naturally adjust to school reform, increase capacity, and teacher professionalism, a dynamic curriculum, reliable facilities and infrastructure, also up-to-date learning technology. Perspective on education is also certainly not the same as the previous era. Now, the teachers must be able to carry out their role as educators as well as a facilitators who can teach students how to learn and make students as learners throughout their lifetime by providing various resources available as a "result" of electronic media development, such as radio, television, tape, and others, which are able to penetrate geographical, social and political boundaries more intensely than printed media. This certainly means that the teacher not only provides a variety of sources but must learn to use these resources while also teaching children how to use these learning resources wisely (Hasniyati, 2018).

This is consistent with what is conveyed by Minister of Education and Culture (*Menteri Pendidikan dan Kebudayaan*) Muhadjir Effendy, that "*Tugas guru sebagai pendidik adalah menanamkan nilai-nilai dasar pengembangan karakter peserta didik dalam kehidupannya. Termasuk dalam pemanfaatan kemajuan teknologi informasi secara bijak serta sebagai inspirator bagi anak didiknya.*" On the other hand, Supriano, the Director General of Teachers and Education Personnel of the Ministry of Education and Culture stated that the education sector must anticipate the current development. The students must be prepared to face drastic changes in the working world (Sekretariat GTK, Kementerian Pendidikan dan Kebudayaan, 2019). And the preparation of students to deal with these changes must certainly start from the educator itself, especially educators for early childhood. Educators for young children are educators

who have the duty to provide educational services for children aged 0-6 years so that the various potentials of children can develop optimally. Educators for early childhood must also be able to become professional teachers. (Afrianto, 2018) writes that "professional teachers must be aware of and adapt themselves to this development. Teachers of this digital age, for instance, should be teachers with the 21st-century learning mindset, possess digital literacy, keep learning new things, and should be able to make use of opportunities provided by the IR 4.0 for their better teaching." In the regulation of the minister of education and culture of the Republic of Indonesia No. 137 of 2014 (Kementerian Pendidikan dan Kebudayaan Republik Indonesia, 2014), clearly written is "to become a professional teacher and related to the ability to use technology, educators for young children must master pedagogical competence as 1 of the 4 teacher competencies." Yunita also wrote that one indicator of a teacher must be professional and competent, that is, a teacher must be able to adapt to a scientific development that is increasingly sophisticated by means of mastering Information and Communication Technology (ICT) more developed than before. (Yunita, 2019). Regarding the characteristics of professional teachers, written by Malawi, which is mastering deep substance, can carry out learning that educates, has personality, and has a commitment and attention to the development of students. In an effort to improve competence, teachers need to have the ability to explore information and various sources including electronic sources and conduct studies or research to support educational learning. (Malawi, 2011)

Various studies on the pedagogical competence of PAUD teachers have been carried out, including research conducted by Habibullah with the aim of research to find out how the teacher's pedagogical competencies, viewed from aspects of learning knowledge capabilities, compiling learning designs (RPP), and learning in class (Habibullah, 2012) as well as a study entitled Improving Teacher Pedagogic Competencies in the Formulation of Learning Plans through Academic Supervision of School Principals, which aims to improve teacher pedagogical competencies in preparing learning implementation plans (RPP) (Suparmi, 2019). Then also found various results of community service activities, including those conducted by Dewi, to improve teacher pedagogical competence related to the ability of teachers to create active, innovative, creative, innovative, and fun learning for students, but no research results have been found on the ability of PAUD teachers to use information and communication technology. Based on that, a study was conducted to determine the ability of PAUD teachers to use information and communication technology, related to the era of the Industrial Revolution 4.0 in Indonesia. (Dewi L. , 2014)

METHODOLOGY

The qualitative method is used in this study with data collection techniques in the form of questionnaires. The subjects were 26 early childhood education teachers from 13 kindergarten institutions in South Jakarta and Tangerang City. The determination of the sample is carried out in collaboration with the head of the kindergarten teacher association in order to facilitate the collection of data. Data analysis was performed using descriptive statistical techniques, where the results of the analysis were presented in the form of diagrams and interpreted in narrative form. The purpose of this study was to determine the ability of early childhood education teachers to utilize information and communication technology in accordance with one of the indicators contained in the early childhood education teachers' pedagogical competence.

RESULTS AND DISCUSSION

Results

The ability to use technology is certainly not an easy thing to do, especially for educators who are not accustomed to using technology. It is necessary to understand how to use and utilize the information available in the technology, as well as the ability to sort information according to the needs of teachers as educators.

Based on the results of the study, it is known that the ability to use computers is one of the requirements for early childhood care education institutions in recruiting educators.

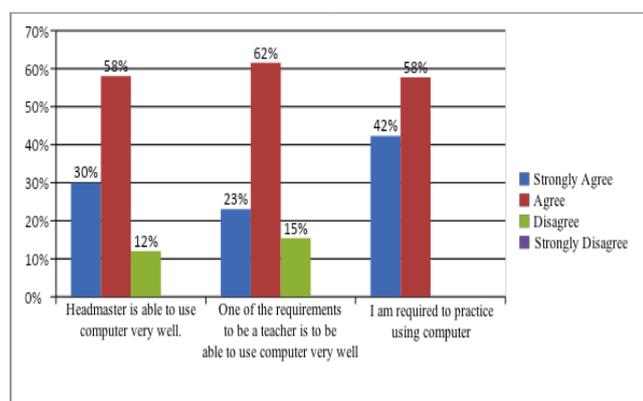


Figure 1. Ability to use a computer

From Figure 1 above, it can be seen that 88% of school headmasters are able to use computers well although there are 12% of respondents who stated that headmasters are not able to use computers properly. Regarding the requirements for recruiting teachers, 85% of respondents stated strongly agree and agree that the ability to use computers is one of the requirements to become a teacher. Although there are 15% of respondents disagree if the ability to use a computer is one of the requirements to become a teacher, but all teachers agree to continue to practice in using a computer. This needs to be done so that teachers can keep up with the current development and not be crushed by the wheel of life full of technological challenges.

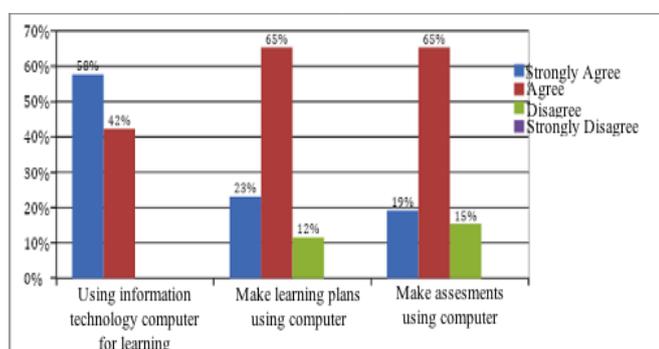


Figure 2. The use of computers in learning

Computers as technology products have been used in the early childhood care education. Based on Figure 2, it is known that 100% of teachers have used computers for learning, where through computers with internet networks, many teachers are looking for sources of information related to the media to be used or activities that will be given to children using the available internet. Computers are also used to collect data on employees and students. In addition, the computer is used by the teacher to make learning tools including the preparation of the weekly learning implementation plan (WLIP), the daily learning implementation plan (DLIP), as well as assessing learning outcomes. But in its use, there are still 12% of respondents who prepare learning plans without using a computer and 15% have not made an assessment using a computer. This means that the preparation of planning and assessment is done manually handwritten by the teacher. Generally teachers use lined folio paper which is then made into tables with content according to what the school has determined. Some of the respondents gave reasons, because: limitations in

computer equipment; if there is still a lot of wrong, can be repeated again by being deleted/crossed out; not mastering IT; not all teachers have laptops; more efficient than using a computer; neater and more practical; and limited energy (Rohita & Hapsari, 2018). This is also the answer to the complaints made by the teachers (Figure 3)

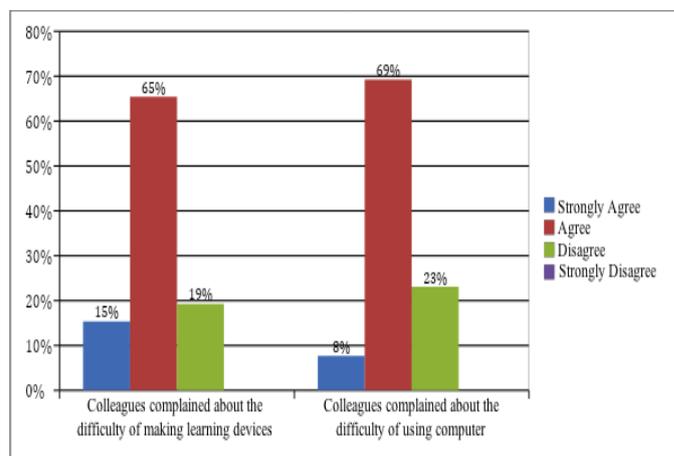


Figure 3. Difficulties using computers

Two difficulties experienced by early childhood education teachers in accordance with Figure 3, namely difficulties in compiling learning devices and difficulties in using computers. The difficulty in making learning tools is due to the difficulty of teachers in understanding the 2013 early childhood education curriculum in Indonesia. While difficulties in using the computer can be caused by the habit of completing tasks conventionally (by hand), not being able to type with 10 fingers (figure 4), until the lack of computer facilities in schools (figure 5) so that there is not enough time for the teachers to work using computers.

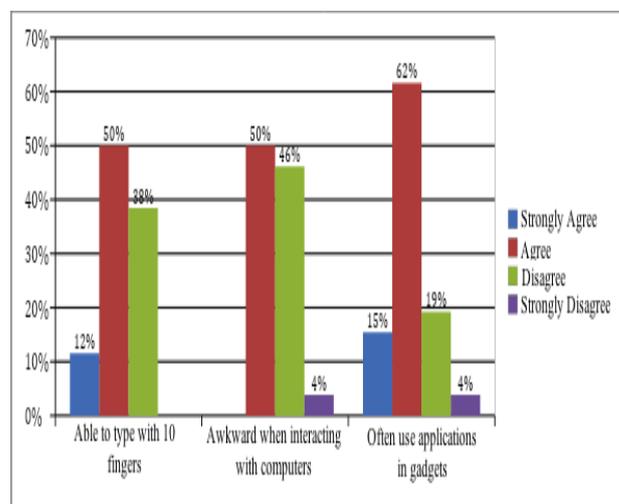


Figure 4. The use of technology

Based on Figure 4, there is a balanced number (50% of respondents) between respondents who feel awkward interacting with computers and respondents who do not experience these feelings. But, 77% of respondents stated that they often use applications that are available in gadgets. Every teacher certainly has a gadget, so the ability and habit of using gadgets can be an alternative use of technology in meeting the information needs and learning resources that will be given to their students.

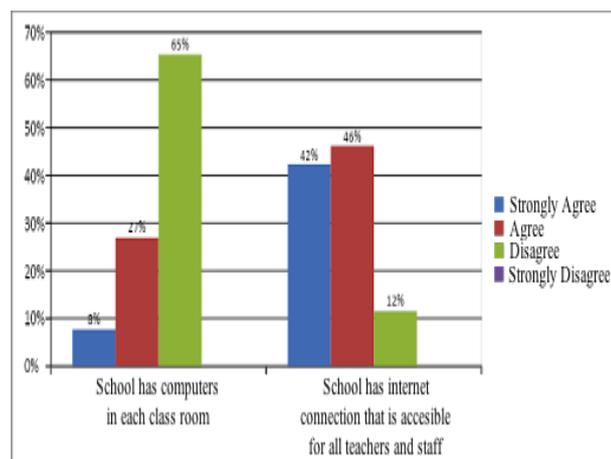


Figure 5. Availability of computers and networks

Although the availability of computers in schools is still inadequate, 88% of respondents stated that the school has internet network that can be accessed by all teachers and staff at the school. Thus, teachers can still meet their needs in providing up to date information and various activities also media that can attract children's learning interests in accordance with the themes and materials that will be provided.

Discussion

The ability to use information and communication technology is a must, especially in the era of the industrial revolution 4.0. All fields of life will not be separated from the influence of the industrial revolution, so everyone involved in it must be able to adjust to the changes caused by the era of the industrial revolution 4.0, this is no exception in the field of education from the highest level, namely university or college level to the lowest level which is education for early childhood care education.

Educators for early childhood is one of the human resources in the field of education. As a profession, educators are required to master 4 competencies, one of which is pedagogical competence. Of the 11 indicators in pedagogical competence, the ability to utilize information and communication technology (ICT) for the benefit of conducting educational development activities is one of them. The ability to use ICT can be seen from the ability of teachers to use information and communication technology wisely and teaching materials that are appropriate to early childhood development activities; and able to use information and communication technology to improve the quality of educational development activities. (Kementerian Pendidikan dan Kebudayaan Republik Indonesia, 2014). There is a demand for the ability of teachers to use ICT, in this case computers, making computer ability one of the conditions for being a teacher. In addition, teachers are also required to continue practicing using computers to meet various educational service needs. The renewal of abilities must be continuously carried out so that early childhood education teachers can adjust to changes in the era of the industrial revolution 4.0 if they do not want to be left behind or crushed by others. (Afrianto, 2018) writes: "today's educator is obliged to make self-adaptation and certain changes to successfully utilize all the potential benefits brought by the IR 4.0 era. Otherwise, they will be left behind, and it's not impossible 'die'. Among the adaptations and changes that the teacher must do is shifting the mind about the role of the teacher and the learning process.

The early childhood education teachers' ability to use ICT can be seen from the results of research conducted, where 100% of respondents or 26 teachers have used ICT for learning, in the sense of early childhood education teachers use ICT to look for various references, information, media, and even activities that can be adjusted to themes, sub-themes, and age groups, and children's abilities in their respective institutions. Technology is

also used by early childhood education teachers to make learning plans and make assessments of children's learning outcomes. The learning videos and various songs and dances for children have also been accessed by the teacher to support the learning process. What early childhood education teachers also do in relation to the use of technology is the uploading of various learning activities that might inspire other early childhood education teachers. This indicates that early childhood education teachers are not only able to receive the benefits of technology but are also able to benefit others. (Husain, 2014) in his writing states that the use of information technology in education has an important meaning, especially in efforts to equalize educational opportunities, improve the quality of education.

Another phenomenon seen is that the presence of a number of early childhood education teachers who experience difficulties related to the use of technology, both in the ability to operate computers, and the availability of computers in the educational institutions where they work are inadequate. These difficulties are caused by various factors. Based on observations made by Wernely, it is known that there are still teachers who think that they do not use computers and IT in the learning process. using a computer. If seen from the reality this happens to teachers who are old, even though there are still junior teachers who are stuttering on the advancement of IT (Wernely, 2018). Rinawati also found the fact that teachers in utilizing ICT advances in the learning process and other activities were considered to still be technologically illiterate. (Rinawati, 2019)

Problems using technology, also found by Nurhayati also found that the problems faced by teachers in mastering ICT in learning Islamic Religious Education in MI AlAsy'ari Kuniran Batangan Pati are: the basic abilities of teachers in ICT are still low, and the availability of ICT facilities that are still inadequate (Nurhayati, 2015). Other research shows similar results, that the obstacles experienced by elementary school teachers in utilizing computer-based media include the limitations of facilities owned by schools, being unable to use computers, and not all teachers have backgrounds of being able to use computers. (Soewarno, 2019) The results of research conducted by Mahat, et al, also indicate that teacher knowledge in pedagogical technology needs to be improved because two out of three teachers still use Teaching Materials such as mahjong paper and markers rather than using computers or other newer technologies due to lack of infrastructure provided by their school. (Mahat, 2019)

This shows that difficulties in using computers not only occur in education at the lowest level also occur at higher levels such as in elementary schools. However, this should not be an obstacle for early childhood education teachers to continue learning to use technology, especially in the era of the industrial revolution where no area of life is running without being able to avoid the use of technology.

Information and communication technology can be used as a way to solve problems in the learning process as well as can be used as a form of innovation in the world of education. Teachers are expected to not only be able to use ICT media but also be able to develop it as a media innovation in the learning process in the classroom so that teachers have creativity in providing material being taught to their students so that they do not experience boredom in absorbing the material provided which ultimately has an impact on increasing achievement study them. (Hermanto, Marsudi, Subali, & Hendrajati, 2018)

The willingness to continuously learn to use technology keeps us from being illiterate. Alvin Toffler in his book *Future Shock* writes that: "The illiterate of the 21st century will not be those who cannot read and write, but those who cannot learn, unlearn, and relearn". (Haron, 2018) Furthermore, the World Economic Forum, (2016) states that "65% of children entering primary school today will ultimately end up working in completely new job types that don't yet exist..". "A key step towards preparing individuals for the economy of the future is providing quality education opportunities for all." (US Government, 2017) and it is all in the hands of early childhood education teachers as the foundation and beginning of education for the younger generation, human resources. Teacher opportunities

to develop themselves are very wide open depending on the willingness and readiness to do so. Improving the ability of teachers to carry out their profession do not be passive but must be proactive, do not wait for opportunities but look for opportunities. If the teacher already has an attitude like that, then he will always try to develop themselves independently in the age of harmony in harmony with the era of the industrial revolution 4.0. (Sedana, 2019)

However, high willingness still needs to be supported by institutions, especially related to the provision of adequate facilities. The results of the research conducted by Rohman and Susilo, wrote that teachers at NU Muslimat Maslakul Huda Kindergarten had been able to carry out the learning process using learning media based on Information and Communication Technology. Teachers play a very large role in the continuity of ICT-based learning. The role of the teacher is also supported by the existence of supporting facilities and infrastructure by increasing ICT-based learning media in schools. (Rohman & Susilo, 2019) The same thing was stated by Yusril who stated that one way to keep abreast of developments in science and technology so quickly is to continuously access information that is up to date or current, and all of that can be obtained via the internet. However, in its application, it still requires the encouragement of infrastructure and human resources capabilities as facilitators, organizers, and users of information. (Yusril, 2019) Dewi and Hilman, in the results of their research also said that increasing the ability of mastery of ICT for teachers can be done some of them by completing ICT-based facilities and infrastructure to support learning. (Dewi & Hilman, 2018)

CONCLUSION

The conclusion from the results of this study is that early childhood education teachers have the ability to utilize information and communication technology for the sake of conducting educational development activities quite well. ICTs are used to search for various information and prepare learning plans to assess learning outcomes. The challenges and obstacles experienced are more because teachers are not accustomed to utilizing technology, especially computers, to solve the problems they face as well as the limited number of computers available in schools so that the opportunities to use computers are also limited.

Improvements need to be made in an effort to operate the computer to be better because there are still teachers who are awkward in interacting with computers because the ability to operate computers is not optimal and the lack of availability of computers in adequate numbers. The impact that can be caused is the lack of opportunities for teachers to practice using computers and take advantage of computer technology to conduct learning and provide better education services. The implication of the results of this study is to provide input to institutions in order to improve the ability of teachers to use computers through various computer use training activities so that teachers can use it to the fullest

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