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Educational Innovation Policy for Improving Digital Literacy Capabilities in Higher Education

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Abstract:
The era of disruption innovation forces higher education institutions to innovate and have good technological literacy skills. This study aims to examine educational innovation policies in higher education institutions and their implications for the technological literacy capabilities of their academic community. This literature research uses journals and books as data sources. Data collection used documentation techniques and was then analyzed using content analysis techniques. The results of the study found that ICT-based educational innovation policies in higher education institutions resulted in several programs, such as (1) ICT-based selection processes, (2) management of electronic scientific journals, (3) online libraries, (4) higher education academic systems, and (5) use of the internet in learning. These policies have implications for increasing the digital literacy capabilities of the academic community, which regards ICT as an integral part of their daily activities and influences their behavior and culture of life. The implication of this research is that the government must provide a complete and easily accessible ICT-based educational infrastructure. It should not be difficult for educational institutions and the public to finance their digital access.

INTRODUCTION

The world will enter the era of the Industrial Revolution 5.0, which is marked by the massive development of digital economy patterns, artificial intelligence, big data, robotics, and—the most phenomenal—disruptive innovation (Haqqi and Wijayati 2019). Over the past few decades, disruptive innovation has changed civilization rapidly. This is not realized by established organizations but is felt to interfere with the activities of the old system. (Robinson, Morgan, and Reed 2016). Disruptive innovation has the potential to destroy an existing system. This is solely driven by the rapid development of information technology (Flavin and Quintero 2018). Retail shops have started to go out of business because of the presence of e-commerce, and conventional taxis have lost most of their income due to the presence of online transportation services. They are on the simple list of victims of this disruptive innovation (Priatna 2018; Flavin 2012).

The phenomenon of disruption innovation in Indonesia has been widely discussed in the economic, banking, and tourism sectors. However, it is still limited to being discussed in

the education sector. For example, Fitriana (2019) discusses the impact and consequences of higher education innovation in the era of disruption. Ohoitimur (2018) examines the challenges of scientific development and the opportunities for higher education institutions in the era of disruption. Previous research has only discussed the transformative impacts, opportunities, and challenges of higher education caused by innovation disruption. There are no studies that discuss educational innovation policies implemented by higher education institutions as an effort to improve the digital literacy capabilities of their academic community.

Digital literacy capability is strongly influenced by an understanding of Information and Communication Technology (ICT). Meanwhile, as we enter the 21st century, technology has become a mandatory choice that must be applied in the world of education. Not only in the context of education in general but also penetrates into education specifically, namely learning (Helaluddin 2019). The application of technology in education and learning is a form of innovation (Dwivedi and Joshi 2021; Castro and Zermeño 2020). Innovation is carried out with the aim of balancing and keeping up with the times. Another consideration behind it is the fact that students have far different characteristics when compared to before. The millennial generation and generation Z are unique and different individuals who must also be handled uniquely in their educational processes (Kuleto et al. 2021). Today, students are no longer interested in the teacher-centered learning process. They are more interested in something new and oriented toward their own discovery process. This process is better known as the student-centered learning approach (Hastini, Fahmi, and Lukito 2020).

The problem is that not all educators respond well to the existence of information and communication technology. Zulham's research shows that there is a level of digital divide that occurs among teachers. This gap is caused by the capability factor in the use of technological tools for these teachers, most of whom have not mastered it properly (Zulham 2013). Even though we all understand that ICT cannot shift the vital function of educators in learning, the presence of ICT should be used optimally in achieving educational and learning goals (Valcke 2004).

Based on recommendations from the 2015 World Economic Forum, there are several 21st century skills that must be possessed by the world community, one of which is digital literacy (ICT) (Vista 2020). The higher education academic community, as the vanguard in changing the field of education, is required to be literate in ICT. This means that there is no longer any reason for them to be ignorant of technology (Celume and Maoulida 2022). In recent years, several higher education institutions have started implementing various policies using technology. These policies were created to bring educators closer to technological devices and tools (Castro and Zermeño 2020). This article examines higher education innovation policies for improving the digital literacy capabilities of lecturers, staff, and students. The study focused on (1) various educational innovation policies in higher education institutions; (2) descriptions of increasing the digital literacy capabilities of the higher education academic community; and (3) the implications of higher education innovation policies for increasing the digital literacy capabilities of the academic community.

This type of research is a literature review. Data sources consist of books and journals that discuss educational innovation policies and improving digital literacy capabilities in higher

education. The data was collected using documentation techniques. The collected data were analyzed using content analysis techniques.

EDUCATIONAL INNOVATION POLICY IN HIGHER EDUCATION

Educational innovation policies refer to strategic steps in the form of innovative programs in educational activities (Syafaruddin et al. 2016). Higher education strategic steps in the form of educational programs are educational innovation efforts in a higher education institution. An idea or a particular subject can be said to be an innovation if it has several characteristics: (1) has an identity as a distinctive characteristic; (2) has an element of novelty; (3) is obtained through a planned process; and (4) has a purpose (Silahuddin 2015). If these various characteristics exist in an educational program, it can be said to be an educational innovation.

Innovation theory in education is a paradigm of a unit that is interrelated and cannot be separated between the three main pedagogic processes, which include creating novelty, mastering, and applying (Stukalenko et al. 2016). That is, the subject matter of educational innovation theory is the study of the integration of development, mastery, and novelty. In essence, the theory of innovation in education describes an innovative process in the education system, educational activities, novelty, and the educational environment that exists in the innovation process (Helaluddin 2019).

Innovation in education includes all activities. Starting from curriculum innovation, learning strategies, learning methods, learning media, and others (Kryukov and Gorin 2017). Several ICT-based educational innovations that have become policies by generally higher education institutions in Indonesia include:

ICT-Based Selection Process

Entering the era of the 2000s, the selection process for new students, scholarship programs, faculty and staff recruitment, and others had integrated ICT into them (Nugroho 2012). For example, the process of accepting Prospective Civil Servants (CPNS) lecturers starting in 2013 has been computer-based using the Computer Assisted Test (CAT). The selection process using computer technology is considered fairer because collusion, corruption, and nepotism are no longer possible (Martono 2017).

Likewise, several recruitment processes for participants in various ministry programs have used ICT, such as the selection of scholarships for LPDP, BUDI, Unggulan, and others. Various programs that integrate ICT in the participant selection process are generally used in current higher education programs and policies (Listiaji and Subhan 2021). Even though there are still deficiencies in its implementation, the policy can be evaluated for follow-up improvements (Helaluddin 2019).

Management of Electronic Scientific Journals

Journal is a collection of articles from theoretical studies or research reports from researchers, lecturers, and students. Journals, as periodic scientific publications, also experience a metamorphosis from the print version to the electronic version. The process of submitting articles from the author to the journal system, making revisions, and confirming receipt of

articles is done electronically in the journal system known as the Open Journal System (OJS). With this condition, journal managers and writers who wish to publish their research articles must understand and use this journal system. In other words, all elements of journal management and writers must be familiar with this ICT-based application.

Online Library

Today, the existence of a library can not only be accessed by visiting the building or the room. In this digital era, there are already many libraries that provide online-based services. As has been done by the Republic of Indonesia National Library in integrating its services with ICT. The National Library has subscribed to several resources so that the public can access them at any time after registering as library members (Iswanto 2017).

Likewise, universities in Indonesia generally use a digital library system in the form of a repository (Asmad et al. 2018). The scientific work of lecturers and students must be disseminated in higher education institutions' repositories to make it easier to access and increase the number of citations (Rifqi and Mardiyanto 2020). With this digital system, people do not have to visit the library room but can simply access it with their gadgets or laptops anywhere and anytime.

Higher Education Academic System

The campus academic system also has to integrate ICT into it (Putra 2018). Thus, everything related to course schedules, filling out study plans (KRS), downloading study scores (KHS), and various academic information can be accessed easily (Indrayani 2011). Through this ICT-based campus academic system, it will be easier for students to access various information related to their studies.

Use of the Internet in Learning

Classroom learning is no longer dominated by traditional learning patterns, but has to use the internet as part of learning. There are three types of internet utilization in learning media: (1) web course, (2) web-centric course, and (3) web enhanced course (Helaluddin 2019). Web course is the use of the internet in the learning process by integrating assignments, materials, discussions, consultations, and others delivered via the internet (Saregar et al. 2019). Web centric course is learning that still partially adopts the internet; the rest is done by meetings like traditional learning (Ardiansyah and Diella 2017). The web enhanced course is a learning system that still prioritizes meetings in traditional learning (Saregar et al. 2019). This system can be said to be a learning process towards internet-based learning. However, the percentage of meetings is still higher than the use of the internet because it is still in the introduction stage (Diani and Syarlisjiswan 2018).

In addition, the use of ICT in learning can also be done by utilizing Learning Management System (LMS) applications, smart phones, teleconferences, and others (Kasim and Khalid 2016). Several universities in Makassar City, as a representative of eastern Indonesia, have used LMS in their learning processes. Such as Sikola at Unhas, Syam-Ok at UNM, Lantera at UIN Alauddin, and Naqrau at UIM. The use of LMS, smart phones, and teleconferences in learning is increasing and developing as we enter the COVID-19 pandemic (Fitriani 2020).

DIGITAL LITERACY CAPABILITY IN HIGHER EDUCATION

Based on its definition, literacy skills are also referred to as reading and writing abilities, which are important in the development process of students (Suragangga 2017). With high literacy skills, it will guarantee the speed with which students keep up with the times. In simple terms, literacy is defined as the ability to read, write, and speak well (Suswandari 2018).

According to UNESCO, literacy is a form of integration of the ability to listen, speak, write, read, and think critically (Baynham 1995). There is a link between reading and writing abilities, like two sides of a coin, or a link between these language skills that cannot be separated (Roe, Smith, and Kolodziej 2018). Meanwhile, according to Helaluddin (2019), literacy is an effort to habituate humans to the four language skills, namely listening, speaking, reading, and writing.

In its development, literacy has expanded its meaning and reached various aspects (Irwanto 2021). As previously stated, literacy is not limited to reading and writing activities but also extends to other fields, such as ICT literacy, financial literacy, numerical literacy, and others (Herawan 2022). This was previously predicted at the Summit in Berlin in 2002, which predicted that literacy in the 21st century would not only be based on traditional literacy. The word literacy is already attached to various words in various fields, which will eventually form different meanings according to the fields that follow (Irwanto 2021).

One of the new concepts of literacy is digital literacy, or ICT literacy (Phuapan, Viriyavejakul, and Pimdee 2016). This literacy is defined as the ability to use and utilize new media, such as the internet, to access, disseminate, and communicate information effectively (Gallardo-Echenique, Marqués-Molias, and Esteve-Mon 2015). ICT literacy is also interpreted as media literacy, which positions humans as having the ability to understand, master, and utilize mass media content (Syarifuddin 2014).

A definition that is not much different is also put forward in the report of the international ICT literacy panel by The Educational Testing Service (ETS), which states that ICT literacy is using digital technology, communication tools, and/or networks to access, manage, integrate, evaluate, and create information in order to function in a knowledge society. Furthermore, ETS also states that ICT literacy must cover two fundamental things, namely cognitive abilities and the application of technical abilities and knowledge (Educational Testing Service 2003). ICT literacy can be classified into three parts, namely the group related to technological knowledge, the ability group to use technology, and the attitude growth group from critical reflection on the use of technology (Oye, Iahad, and Rahim 2014).

Another term that is closely related to ICT literacy is e-literacy. E-literacy is the ability to use information technology devices to adapt to the times. Along with changes and developments, this term has also expanded into several different terms such as technology literacy, computer literacy, and internet literacy (Rozikin, Hesty, and Sulikah 2020). It is undeniable that ICT literacy must be implemented in educational institutions in an effort to carry out educational innovations and welcome the 21st century (Omiunu 2019).

The implementation of this ICT literacy program can be carried out starting from elementary and middle school to the higher education level. However, for developing countries like Indonesia, this program must start in universities. This is based on the higher education

community (lecturers, staff, and students) who are considered more ready to accept technology in their educational process (Dewi and Hasmirati 2022). ICT literacy must be applied to other educational personnel, not only to students and teachers but also to educational administration staff.

Through the ICT literacy program, students are expected to have ICT skills. These skills are crucial in finding and selecting information from unlimited sources, communicating via computers, and manipulating certain information for specific purposes such as completing assignments, presentations, and data analysis. Furthermore, information technology plays a very vital role in the social needs of students, such as interaction on social media, enjoying hobbies, creating creative ideas, and finding information related to learning (Ahmad et al. 2016).

According to the Research and Development Agency for Human Resources (HR) of the Ministry of Communication and Information (KOMINFO), there is one model for measuring the level of ICT literacy, namely the P-CMM (Personal Capability Maturity Model). There are five levels in this model. Level zero means that the individual or person does not care or does not know about the important role of information and communication technology in everyday life. Level one is when someone has occasionally used information and communication technology to find or solve problems. Level two is that someone has used technology many times in their daily activities. Level three is the condition of a person who has awareness and knowledge about the use of technology in his daily life and consistently uses it. Level four is the level at which a person has been able to and has succeeded in improving the quality of his daily performance by using information technology in his daily activities. Finally, the fifth level is the condition of individuals who have considered information and communication technology an integral part of their daily activities and are aware that it both directly and indirectly influences their behavior and culture of life. (Helaluddin 2019).

In conducting an assessment of ICT literacy, usually researchers or educational practitioners can use guidance from the ETS (Educational Testing Service). This assessment focuses on the cognitive domain, namely problem solving and critical thinking skills associated with the use of technology to organize information (Educational Testing Service 2003). Assessment measurements on ICT literacy through seven performance areas: define, access, manage, integrate, evaluate, create, and communicate (Tohara 2021). *Define* is a person's ability to use digital tools to identify and represent information needs. *Access* is the ability to collect and obtain information in a digital environment. *Manage* is the skill of using digital tools to apply or classify schemes for information. *Integrate* is a person's ability to interpret and represent, such as using digital tools to synthesize, infer, and compare information from various sources. *Evaluate* is the skill of assessing the extent to which digital information meets the needs of information problems, including determining the authority, bias, and accuracy of materials. *Create* is the ability to adapt, apply, design, or construct information in a digital environment. Finally, *communicate* skills, namely the ability of a person to disseminate, publish, or disseminate relevant information to certain audiences in an effective digital format (Tejedor et al. 2020; Siddiq and Scherer 2019).

Another important thing that deserves attention in ICT literacy is that there is a gap that is still quite significant in Indonesia. On a broader scale, the Lee Kuan Yew School of Public Policy reports that the level of internet access in the Asian region is quite diverse. Conditions, networks, equipment, and prices are several factors that cause different literacy levels in several countries. One fact that must be the focus is that two neighboring countries, which incidentally are not much different geographically and culturally, will also have different levels of digital literacy (Helaluddin 2019).

Talking about the Southeast Asian region as a region inhabited by developing countries certainly cannot be compared to the European region in terms of digital literacy. However, what is quite interesting is the fact that Singapore is one of the countries with the high digital capabilities in the world. Based on various sources of literature and research results, the digital divide in the Southeast Asia region is caused by two things: (1) government policies that are not on target, thus failing to provide infrastructure for easy digital access; and (2) low per capita income, which causes individuals to afford digital access (Mubah et al. 2017).

CONCLUSION

In general, universities in Indonesia, both public and private, have taken a step forward in terms of technology-based educational innovation. This policy resulted in several programs, such as (1) an ICT-based selection process; (2) management of electronic scientific journals; (3) online libraries; (4) higher education academic systems; and (5) use of the Internet in learning. This policy has implications for increasing the digital literacy skills of the academic community, which regards ICT as an integral part of their daily activities. They realize that ICT either directly or indirectly influences their behavior and lives.

This research has implications for the importance of the government providing complete and easily accessible ICT-based educational infrastructure. It should not be difficult for educational institutions and the public to finance their digital access. Therefore, it is important for further research to examine the Indonesian government's policy regarding the procurement of ICT-based educational infrastructure and its accessibility for educational institutions and the community, especially those with low economic status.

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