

DIGITAL CAPACITY IN CURRENT EDUCATION 4.0 DEVELOPMENT TENDENCY

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ABSTRACT

The development of science and technology has had a strong impact on the education environment recently. The integration of digital technologies and tools in teaching and learning activities and curricula have renovated the role of the schools, educators, and learners. Accordingly, learners are at the center of the learning process while educators and schools create suitable conditions to promote creativity and autonomy in the learners' spirit. Both educators and learners need to have knowledge about digital capabilities which is one of the essential competencies in the 21st century.

Keyword: *Digital capacity, Education development tendency, Lifelong learning, Educational technology*

1. EDUCATIONAL ENVIRONMENT HAS CHANGED

In recent decades, the development of science and technology, especially digital technology has strongly impacted and profoundly changed in almost all fields of human society. Schwab (2016) introduced the concept of "Industrial Revolution 4.0" (IR4.0) to describe the role of digital technology in human activities such as research and development, production, sales, distribution, consumption, entertainment, transportation, education and training, etc. and even the way people communicate with each other.

Digital devices have become so familiar in human society and Rich (2019) pointed out that the digital revolution has changed children's approach to games, the way children and adults approach learning process, discover and create knowledge, and connect to social networks, etc., in specific. Besides, the use of technologies has strong effects on short-term changes in mood and excitement, as well as with long-term changes in intellect and behaviour. This affects adversely the flexibility of the human brain, especially that of children (Rich,

2019). However, Bavelier et al. (2010) argued that the negative effects or the effectiveness of digital technologies depend on how they are used.

Gottschalk (2019) pointed out that understanding how to use digital technologies and choosing the right devices for their intended uses are essential for educators and families to make the right decisions about the use of digital technology in the educational process for children and young people. Fullan & Langworthy (2014) showed that there was not a firm conclusion about the positive effects of using technology to support learners in learning performance. Therefore, in the 21st century, on the basis of modern technology, educators need to have knowledge about digital pedagogy to improve the effectiveness of teaching and learning activities in the new period. Specifically, digital pedagogy needs to be developed in a spirit of cooperation and sharing between educators and learners with positive incentives and ways to motivate learners to be creative and proactive in their learning progress (Fullan & Langworthy, 2014). Therefore, besides integrating assistive technologies, educators need to make improvements in designing the

teaching process, designing "learner-centered" teaching activities, supporting learners to develop their competencies and strengths, encouraging learning through experience, allowing learners to study through failure, using analytical and contractual assessment methods (Oliver, 2016; Blaschke, 2012; 2014a). This also means that educators need to develop their expertise and skills in order to collaborate well with colleagues and support learners (Schnellert & Butler, 2016).

In the present digital environment, the demands for learners, training forms and training programs in educational institutions are increasingly abundant and diverse. Learners require systems supporting them to study depending on their needs and preferences. Educational institutions aim to provide forms of online training and distance training with non-traditional teaching methods, modern pedagogical methods with digital technologies and tools. Thus, a trend of "borderless" training and education is becoming increasingly clear and popular. Currently, a lot of educational institutions have been building many collaborative programs to allow learners of one school to study some modules at its partners. Moreover, classes with few learners are becoming popular. This demand can be met by applying effective digital technologies in teaching activities. Furthermore, Price (2013) argued that the Global Learning Commons (GLC), Self-Determined Learning or Heutagogy based on Personal Learning Network (PLN) were being shaped and replacing Pedagogy and Andragogy. It can be said that the educational environment has been changing thoroughly and that change has had an important contribution to technology as described in Section 2.

2. ROLE OF TECHNOLOGY

Nowadays, technology plays a particularly important role in many fields and industries including education. To be detailed, technology has a great effect on the lifelong learning and relevant skills

development of learners, as well as supports learners to quickly respond to the requirements of organizations. Learners are equipped enough skills and knowledge to get a job after graduation (Becker et al., 2017; WEF, 2016). Technology in education plays as an essential factor for learners to improve their self-learning ability and take responsibility for their own learning. For example, Web 3.0 technology aims to assist learners in knowledge discovery, on-demand learning and personalizing their learning. Studies by Blaschke (2016), Gerstein (2013), Sharpe et al. (2010), Conole (2012) and McLoughlin & Lee (2007) pointed out that this Web 3.0 Technology fosters the capacity to innovate, share information and knowledge, create a cooperation environment among members in communities to co-create new information and knowledge, and foster a network of connections to bridge the gap between universities and enterprises; especially, this technology also helps create a personal learning environment and network for lifelong learning of learners. Blaschke (2014b; 2016) and Blaschke & Brindley (2015) reviewed many digital technologies and tools that support learners which is also a demonstration of the important role of technology in education.

Many technologies are being widely used in today's educational activities which assist learners to decide their own learning process, discover, create, collaborate, connect, reflect and share their knowledge such as Facebook, Twitter, Blog, Google Sites, etc (Blaschke, 2014b; Chawinga, 2017), mobile devices and online communities (Cochrane et al., 2014; Gerstein, 2013), individual learning environments (Hicks & Sinkinson, 2015), ePortfolio and academic journals (Blaschke, 2014a; Blaschke & Brindley, 2011). In addition, technologies such as 3D printing, electronic publication, games, and virtual reality have also greatly supported learners' development of critical and creative thinking skills (Halupa, 2017). This is the reason why digital capability is one of the core

competencies of citizens in the 21st century as outlined in the next Section.

3. DIGITAL CAPACITY IN THE 21ST CENTURY

In the 2000s, when Europe considered lifelong learning, the term "digital competency" was proposed and became one of the eight main competencies published by the European Commission in 2006. Up to now, many concepts of "digital competence" were introduced. For example, Ilomäki et al. (2016) argued that digital capabilities are essential skills and knowledge for a citizen to learn and navigate in a digital society. Ferrari (2012) defined digital competency as the set of knowledge, skills, attitudes, abilities, strategies and perceptions required when using information and communication technologies as well as technical means to perform tasks, solve problems, communicate, manage information, collaborate, create and share content, build knowledge effectively, creatively, autonomously and flexibly, be ethical and relevant to work, leisure, learning and socialization. According to the European Commission (EC, 2018), Digital competence is defined as the confident, serious and creative use of information and communication technologies to achieve goals related to work, study, entertainment, inclusion and /or social participation. In reality, digital technology has brought many advantages and disadvantages. For instance, almost careers require high-quality human resources, especially high-tech proficiency, and many new jobs require specialized digital skills (Cedefop, 2016). Thus, there is a polarization in society between people with sufficient digital capabilities and others with little or no digital capacity (EC, 2017). Cachia et al. (2010) pointed out that the training of digital competencies gives learners a solid foundation to exploit effectively and safely the technologies and information sources according to their intended use of technologies. At present, there are not many studies looking at the impact of digital technologies on learning outcomes and their foundation have not been

consistent (Bulman & Fairlie, 2016; Escueta et al., 2017).

The application of digital technologies in education has a number of challenges that need to be addressed such as equipment quality, transmission quality, infrastructure, the impact of using computers on personal health, internet addiction, inappropriate information, fake information, phishing, privacy, data theft caused by malicious codes, viruses, etc. which are of interests to education organizations. However, the integration of technology into education helps make a learning environment that stimulates creativity, creates personal learning conditions and increases learning motivation for learners. The use of digital technology is seen as an extra value for teaching and for a better learning experience. Therefore, both learners and educators need to have the digital capacity to well adapt and respond in the present educational environment.

Nowadays, in the world, there are many digital capacity frameworks applied in different countries with various degrees of application depending on the level of science and technology development of those countries. According to research by the authors' group, the Digital Competency Framework issued by the European Commission is so detailed and specific that educational institutions in Vietnam can learn and apply it. Specifically, the European Commission issued the Digital Citizenship Framework called DigComp in 2013 and improved in 2016. This framework presents 21 digital competencies of knowledge, skills and attitudes that are divided into five areas of competency (Carretero et al., 2017). In addition, the European Commission also issued the Digital Competency Framework for educators, known as DigCompEdu, in 2017 with 22 competencies in six different competency clusters.

According to Redecker (2017), educators were seen as models for the young generation. Therefore, in order to assure the young generation to become digital citizens,

educators must be equipped with digital capabilities firstly. As a result, the DigComp Citizenship Framework, available at <https://ec.europa.eu/jrc/en/digcompedu>, has become a widely accepted tool for the measurement and certification of Digital Proficiency in Europe. Besides, DigComp has also been used as the criteria for teacher training and development across Europe. Besides the digital capabilities that citizens need, educators need to demonstrate their digital capabilities through the effective use of digital technologies for teaching and other activities. Hence, educators must possess the competencies in the DigCompEdu Framework.

4. ROLE OF SCHOOL, EDUCATOR AND LEARNER

With profound changes in the educational environment under the impact of technologies in general and digital technologies in particular, education systems and educational institutions are facing a big change towards "learner-centered" philosophy to adapt and respond well to the current educational environment as well as future development trends. In particular, it is necessary to have an accurate awareness about the current roles of all parties including schools, educators and learners in order to come up with appropriate strategies and plan (Blaschke & Hase, 2015).

4.1 Role of school

The school plays an important role in assisting learners to choose, make their own decisions and develop themselves in their learning process. Thus, schools need to constantly monitor and improve in order to adapt to the external challenges and opportunities as well as changes in the educational environment (Kools & Stoll, 2016). Specifically, the school needs to establish and convey a common vision of learning, support the continuous professional development of educators and staff, and enhance advisory activities for learners as well as expand connections with businesses and industry associations, and integrate

technologies to support these activities (Kools & Stoll, 2016). With such a large network of operations and supports, the school becomes a source of creativity, collaboration and connection for educators and learners so that they can develop themselves, initiative learning, and self-determination in their own education (Andrews, 2014; Hexom, 2014; Price, 2014).

4.2 Role of Educator

As mentioned above, the educational environment has changed a lot and traditional pedagogical methods also need to be changed simultaneously. Today, learners can make their own decisions about learning, discovering, creating and managing knowledge instead of merely receiving one-way knowledge like in the traditional educational model. Therefore, educators must renovate the traditional pedagogical method towards digital pedagogy, pay more attention to the design of teaching-learning activities to guide learners according to the standards of modern society. The purpose of digital pedagogy is to make learners more active and responsible for their learning; therefore, digital pedagogy should be engaged, more interactive, encourage learners to be more creative and build up a passion for more and more knowledge discovery (Sani, 2017).

According to Hase & Kenyon (2016), putting learners at the center helped educators turn from the role of teacher into that of facilitator or councilor or supporter. In that case, educators have to have characteristics such as willingness to change, closeness, flexibility, empathy and optimism, and a desire to share (Blaschke & Hase, 2015). Moreover, Deci & Ryan (2002) and Dweck (2006) recommended that educators in the modern century need to have a continuously innovative mindset that means the educators must be able to demonstrate the capability to learn in their whole life and be a model of a lifelong learner for learners to follow. In addition, educators need to know how to promote learners' intrinsic motivation

by encouraging learners to self-motivate, solve problems by themselves, and stimulate learners to study from failures which help them experience more creative space and implement their ideas boldly. That means educators are required to know how to design non-traditional learning activities and settings so that learners can learn both independently and cooperatively in a creative way (Andrew, 2014; Becker et al., 2017). Furthermore, Caena (2017) also argued that the educators must be the builder of trusted relationships with the learners, coordinate individual learning and group learning activities, strategies, techniques and resources to inspire the creativeness of learners and participate in the learning activities to understand every learner to foster their potential, etc. According to Fullan & Langworthy (2014), if the educators could ensure the above characteristics, learners can not only create new knowledge but also orient their own learning and form lifelong learning capacity.

Giving self-decision to the learners seems to diminish the educator's role, but it does not. In fact, this further confirms how professional the educators are in guiding, orienting and designing teaching activities. In order for educators to fulfill such duty in this era, they must show an open mind, constant self-improvement and pursue consistent lifelong learning to gain more experience and extensive knowledge (Andrew, 2014; Becker et al., 2017; Frey, 2016; Gerstein, 2013).

4.3 Role of learner

With a huge source of knowledge available on the internet and strong support by the most modern digital technologies and tools, learners can definitely control their learning. Specifically, they are no longer passively absorbing knowledge but actively discovering it, finding knowledge sources, building learning goals, plans, methods and assessment for their own learning results. They can even create personal learning networks as described above. This also means that while in the traditional model,

learners are learning in a clearly structured environment with limited autonomy, now they are given greater autonomy in an unfixed environment (Luckin et al., 2010; Garnett, 2013). Therefore, they need to be empowered to make their own decisions and take responsibility for their own learning (Blaschke, 2014b). Many researchers such as Mezirow (1990), Stephenson & Weil (1992), Hase & Kenyon (2007), Glisczinski (2010) and Hase (2013; 2016) show that assigning learning responsibilities to learners is a good way to encourage the development of learners' abilities and confidence as well as foster cognitive skills and metacognitive skills such as critical thinking, design thinking and reflexes.

5. CONCLUSIONS

Currently, science and technology have been developing quickly. This has had a strong impact on almost all areas of social life including education. Accordingly, the integration of digital technologies and tools in teaching activities and training programs has become common. The educational environment has been changing dramatically and new educational models are gradually replacing traditional ones. The roles of school, educator and learner are being redefined. In the current educational development trend, learners are at the center of the learning process while educators and schools need to create favourable conditions to promote creativity and autonomy of learners. Both educators and learners need to be equipped with lifelong learning capacities in which digital capacity is one of the kernel competencies in the 21st century. In this research article, the authors only present the importance of digital capabilities for educators and learners in the present educational environment. The development of digital capabilities in the national education system in general or educational institutions, in particular, requires further research and investment to make decisions, policies and appropriate development models.

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