



## Digital Transformation in Indonesian Higher Education: Challenges and Opportunities

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### Abstract

Digitalization in today's era becomes one of the major challenges faced by universities in Indonesia. Since the COVID-19 pandemic has brought transformation in which the use of digital technology has a significant role, hence the Indonesian Ministry of Education, Culture, Research, and Technology has launched three major strategies to accelerate the digital transformation in education; providing more digital infrastructure, setting up global vision in digital transformation, and establishing a national digital system of education. As the country with the fourth-largest population in the world, Indonesia nowadays has around 4500 universities with 9 million students, and 300 thousand teaching staff. In response to that, the digital transformation in Indonesian higher education not only creates huge opportunities in the future but also faces big barriers or challenges to cope with. Hence, this present study is carried out to figure out the opportunities and challenges of the implementation of digital transformation in Indonesian higher education. It also aims to share the best practices of digitalization in higher education, particularly in Universitas Pancasakti Tegal, by developing several web-based platforms that support the implementation of digital transformation to enhance the quality of education named Elsakti. Shortly, the use of ICT in higher education enables the university to maintain its sustainability agenda. However, universities face some challenges or barriers to cope with such as insufficient digital infrastructure, the low or weak digital literacy of both teachers and students, insufficient digital learning resources, and the demands for creating systems or platforms for learning and management.

**Keywords:** Indonesian Higher Education, Digital Transformation, Opportunities, Challenges or Barriers

### Background

The pandemic situation of COVID in 2019 has created a major transformation in the education context worldwide, including in Indonesia, as there was a shift from prominently conventional teaching and learning to online teaching and learning strategies (Rulandari,



2020). Since March 2020, students, parents, teachers, as well as university staff in Indonesia have been grappling with school closures affecting 62.5 million students from pre-primary to higher education. The implementation of online teaching and learning in Indonesia has had a major impact on the progress of education in Indonesia. For instance, referring to Mahmud and Koniyo (2023), there is a significant enhancement in terms of the digitalization of students as well as educators. This arises because of the compulsion to be able to carry out online teaching and learning by integrating technological developments such as the internet and other digital devices that support learning and teaching activities. Digitalization, thus, has been a very widespread influence on everyday lives since its emergence the internet as a form of mass communication, and the widespread use of computers and various kinds of technological devices such as smartphones, laptops, and other gadgets. Besides, referring to Prananingrum, Kurnia, and Astuti (2021), digitalization occurs everywhere around the world, hence, the study of digitalization has the potential to cover all aspects of everyday life, including education, and is not limited to the internet or modern communication technologies.

Aside from the enhancement of digital literacy in the educational fields, the implementation of online teaching was hindered by the inequality in educational support facilities in Indonesia. Learners without adaptive teachers, access to devices with adequate features, internet access, mentoring by parents, and facilities for online learning will lose the learning opportunities they would otherwise have in a normal situation. While in fact, the availability of technology has pierced nearly all aspects of primary, secondary, and especially higher education throughout the world. However, Akbari and Pratomo (2022) reported that the integration of technology in Indonesian universities is roundly low. This is indicated by the low usage of the applications of an e-learning platforms. To restore post-pandemic learning and avoid further gaps in education, the government of Indonesia is currently in an effort to publicize the need for developing digitalization in education. Hence, the Indonesian Ministry of Education, Culture, Research, and Technology has launched three major strategies to accelerate the digital transformation in education; providing more digital infrastructure, setting up a global vision for digital transformation, and establishing a national digital system of education.

In recent times, the various development that has taken place is quite astonishing, especially in the field of technology. Technological development has reached all aspects in terms of business, economy, healthcare, public sector, and even in the process of learning activities at school. Along with the enhancement of digitization in various sectors, Yuliana (2022) asserts that technology integration in the process of learning and teaching activities needs to be improved at all levels of education. Bejinaru (2019) also points out the importance of digitalization in education as the process of digitalization will have huge



and diverse impacts on the world of education. Furthermore, digital transformation has become an unavoidable fact that all universities have to deal with and use digital technology in a massive way. Even though higher education in Indonesia was then previously reported to still have low technological integration, as reported by Akbari and Pratomo (2022) and Kusdibyo and Leo (2018), all educators are immediately in charged run rapid and adaptive transformations to continue the learning and education process after the outbreak of covid-19 pandemic. Hence, in spite of the negative effects resulting from the covid-19, it has had positive effects because it yields the precise momentum for a rapid digital transformation. It has become a stimulus to motivate all higher education institutions to adapt and change their views on working and communicating. The moment when digital transformation occurs swiftly will bring beneficial opportunities, but there must be some challenges to implementing digital transformation, especially in the world of higher education which need to be explored.

Following the foregoing background, this present study is thus carried out to figure out the opportunities and challenges of the implementation of digital transformation in Indonesian higher education, which has not yet been much explored by previous studies. The results of this study are used to explain the absolute and possible outcomes offered by the implementation of digital transformation in the educational context. The outcomes are then expected to give benefits that can contribute to the development of education, particularly higher education in Indonesia. Besides, this study will be also beneficial to inform the challenges that appeared during and after the implementation of digital transformation in the educational context. These pieces of information are expected to allow the government as well as educators to set up great effort and determination in order to face the digital transformation. Furthermore, the researchers also aim to share the best practices of digitalization in higher education, particularly in Universitas Pancasakti Tegal, by developing several web-based platforms that support the implementation of digital transformation to enhance the quality of education.

## Review Of Related Literature

### Previous studies

Some studies have explored the implementation of digital transformation in various aspects of life such as in the economic field and business environment (Grab et al., 2019; Putu et al., 2022), in the healthcare sectors (Belliger & Krieger, 2018), and the education field (Akbari & Pratomo, 2022; Yuliana, 2022). That strand of research has attested that digital transformation, or so-called digitalization, has developed and reached many aspects of everyday human life. Related to its conceptualization, there was a broad notion of digital transformation. Another strand of research has demonstrated the results



of studies concerning the impact of digital transformation. (Grab et al. , 2019) conducted a study to identify key drivers of strategic business management development impacted by digital transformation that impressed by firms and enterprises around the globe. The results revealed that digital transformation is a worldwide phenomenon; however, the regional impact differs significantly, depending on the regulatory environment and the level of economic sophistication.

In essence, digital transformation has the power to shift the balance between firms competing in the same market environment. Also in the field of the business environment, Bouwman et al. (2018) explore how digitalization and the development of technologies, particularly social media, have directed a big number of companies worldwide to reconsider and experiment with their business models and how this contributes to their innovativeness and performance. The results of the study reported that the use of social media and big data in business models is mainly driven by strategic and innovation-related internal motives. Besides, the development of technology is also found to have important roles and positive impacts on business performance. These studies have implied that digitalization has positively influenced the development of the economic and business environment.

### **Digital transformation in education**

Digital transformation in education generally means digitizing the processes and products of educational services to enhance the learning experience for all parties involved. According to Cem Dilmegani (2022), digital transformation in the world of education currently focuses on three things. The first is related to accessibility. Digital technology allows students to access learning resources easier and cheaper. Today, people all over the world, of all ages, and different socioeconomic statuses have access to classrooms and learning resources via the internet. At the same time, technology such as text-to-speech has removed barriers for students with disabilities, who have so far faced obstacles in participating in the learning process. The second is interactive learning. Thanks to technology and the availability of various applications, learning formats are more interactive. For example, language learning is carried out interactively through various application platforms and is able to reach more participants. The third is adaptive learning. Computer technology and artificial intelligence (AI) allow educational methods to be aligned with the wishes of students.

There is a number of previous studies that have put great attention to the implementation of digitalization in education. Muskania, & Zulela (2021) for instance, conducted a study to explore the practice of digital transformation after the outbreak of covid-19 pandemic by observing, using field notes, and interviewing primary school



students and teachers. Findings reported that there were the majority, particularly 80.8%, of parents who controlled and helped their children that are enrolled in the primary schools during the learning process. The results of this study provide an illustration that the reality of primary education in Indonesia is not ready yet in terms of human resources and technology application, especially in remote areas. The reality of educational technology transformation in Indonesia provides an important role so important that requires teachers and students to have ICT literacy qualified to be able to apply the appropriate distance learning process with expectations.

## Method

This study aimed to provide a theoretical framework for opportunities and challenges in the implementation of digital transformation in Indonesian higher. This study also provides an in-depth understanding of digital transformation in the field of education by conducting a comprehensive search of the relevant theories and empirical findings related to digitalization in education contexts. Building upon the mentioned objectives, this study employed a descriptive approach as the design of the study. Referring to Atmowardoyo (2018) a descriptive study seeks to describe a symptom, event and event that is happening at the present time where the researcher tries to photograph the events and incidents that are the center of attention to then describe them as they really are. Descriptive study is conducted with the aim of describing or describing facts about populations in a systematic and accurate manner. To collect the data of this study, the researcher conducted library research. According to George (2008), library research is carried out using literature (library) which can be in the forms of research reports, notes, or books. It involves the process of analyzing, identifying, and locating sources that provide factual information or personal/ expert opinion on a research question.

Library research can also be defined as research that aims to collect data and information through the help of various materials found in the library, for example: books, magazines, documents, records and historical stories and others. As a data collection method, library research has several aims such as exploring the basic theories and concepts that have been found by previous researchers, following the development of research in the field to be studied, and more importantly, gaining a broader orientation on the chosen topic. Besides, the data collected through library research serve as the source of data which do not only give information but also contexts that can be justified as the main sources due to its reliability and validity (Sintayani & Adnyayanti 2022). The data were taken from previous research that was related to the topic of this study, namely digital transformation in educational contexts which particularly presents the reports of practices, opportunities, and challenges or obstacles of the implementation of digitalization in



education contexts.

There are several steps of conducting library research to collect the data as proposed by Miles and Huberman (1994). With several adjustments, this study is started with searching for and collecting information from various sources of research reports such as journal articles, thesis, and news. All of that information that has been collected were reviewed and studied, sorted, and reduced to make sure that only necessary and related data were used in this study. Then, in the data display stage, the data were systematically and descriptively presented in the results and discussion sections by portraying the results of a comprehensive search of the relevant theories and empirical findings related to digitalization in the education context. Finally, to conclude the study, a conclusion was drawn in the conclusion drawing stage by summarizing the key arguments made in the body.

## Results and Discussion

This section discusses the results of the literature review that aims to figure out possible opportunities and challenges of the implementation of digital transformation in Indonesian higher education.

### Opportunities

Digital transformation in education simply means implementing or making use of modern technologies in educational processes to enhance learning and teaching experiences for all parties involved. It opens up a world of endless possibilities and opportunities that allow rapid and significant development in the education field, especially in higher education. The results of this study found that there were some opportunities for implementing digital transformation in higher education. Results of a study conducted by Comi et al. (2017) revealed that due to digital transformation, some potential theoretical insights can enhance the students' achievement. It was further reported that digital transformation in education can assist teachers to effectively manage the materials for teaching in the class. Similarly, Yuliana (2022) also avers that successfully prepared materials such as PowerPoint slides, for instance, will positively affect the students' learning and achievement. She further explains that other good audiovisual learning materials and their content help the learning and teaching situations become more interesting which can attract students' eagerness and enhance their learning interest.

Another line of research, such as Kaur (2019) has explored that digitalization in education could bring about advantages such as increased productivity of the students and teachers, cost efficiency, high accessibility to learning sources and learning chances, as well as a competitive learning mindset. Related to the accessibility to learning opportunities, Fernando, Patrizia, and Tiziana (2020) also suggested that due to digital



transformation in education, students are allowed to study anywhere, anytime, and repeatedly by using various supporting technological tools such as computers, laptops, or smartphones that also have advantages of saving travel time. This also corresponds to a study conducted by Sung, Chang, and Liu (2016) that attempts to conduct a meta-analysis and research synthesis of 110 experimental journal articles. The results of their study revealed that mobile devices, particularly smartphones and laptops, have become learning tools with big potential in enhancing the learning process and essential tools that can be utilized both in the classrooms and in outdoor learning.

Digital transformation in the education field is closely related to the use of information and communications technology (ICT) in the process of learning and teaching. This is supported by Yuliana (2022) who denotes that the ICT integration in the learning and teaching activities allows an increase in the potency of the student's learning. She further asserts that digital transformation is essential for increasing communication in education. Due to the emergency situation of online learning since the outbreak of COVID-19, students get significantly higher opportunities to advance their ICT skills in the learning process. Furthermore, the students also could enhance their performance when they are managed to utilize ICT, such as the internet along with other gadgets like smartphones which nearly all students own nowadays, critically and appropriately (Amez & Baert 2020; Comi et al. 2017). However, Comi et al. (2017) proclaimed that despite the plenty of benefits offered by ICT in terms of the high accessibility of information and communications, teachers are still in charge to look for teaching strategies and adopt various styles of teaching which can motivate students to be more active and aware in using ICT for learning and communicating both in the classroom or outside the classrooms situations.

Discussing the use of ICT in the learning and teaching process cannot be separated from its impact on the assessment since they are inseparable. Due to the developing number of research that has put great attention on the integration of ICT in learning and teaching activities, there is also a growing interest in the use of technology in language assessment in classroom practices (Dalby & Swan 2019; Deeley 2018; Ningsih & Mulyono 2019). Deeley (2018) suggested that technology can help teachers in providing feedback such as the use of audio-visual technology that can increase the quality of feedback. Ningsih and Mulyono (2019) also investigated the EFL teachers' views on the integration of technology tools for language assessment. The result showed that they are encouraged to use Kahoot! and ZipGrade as digital assessment tools due to their promising merits such as the creation of a delight learning environment, practicality, easy to score and give feedback. In addition, as studied by Dalby and Swan (2019) the integration of technology by using the iPad to administer formative assessment was also found to allow learners to



have higher motivation in learning and contribute to learners' effective learning.

Another opportunity offered by digital transformation in education is promoting students' learning autonomy. Zhong (2018) declares that with the existence of technologies, language learners have a wide range of opportunities and alternatives to engage with in their self-directed learning. The results of Zhong's (2018) study revealed that students were found to be more capable of regulating their self-directed study and have become critical users of multiple online sources that then enhance their so-called learning autonomy. Learning autonomy is essential since it has been proven to be one of the driving factors affecting success in learning both in classroom settings (Hsieh & Hsieh, 2019; Rahman, 2018). A number of studies have also confirmed the need of stressing learner autonomy such as Orawiatnakul and Wichadee (2017) and Koirala (2020) who have studied the implementation of autonomous learning through various treatments in different learning contexts. Findings showed that autonomous learners obtained better achievement than those who learned traditionally.

In practices, responding to the digital transformation program proposed by the Indonesian Ministry of Education, Culture, Research, and Technology to enhance the quality of higher education management, Indonesian universities have developed internet-based application platforms to implement the three pillars of higher education; learning, research, and community services as well as its supporting aspects. Universitas Pancasakti Tegal, in particular, has developed some online platforms that have been used in the universities, some of which will be further as follows.

### E-learning Pancasakti Tegal (Elsakti)



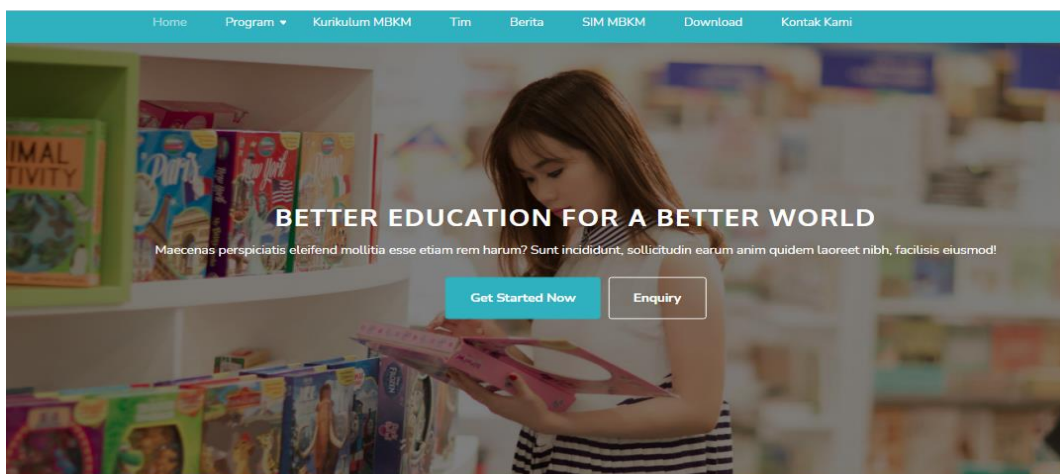
Figure 1: The main page of Elsakti





Universitas Pancasakti Tegal has developed a learning management system named Elsakti. It is a web-based application that becomes a powerful tool to support learning and teaching activities, especially in online contexts. The utilization of Elsakti enables lecturers to check and record attendance lists, post materials which can be in the forms of files, videos, links, or articles, post assignments, open discussions or forums, give scores, and provide feedback. Furthermore, Elsakti is in the form of web-based software focusing on educational purposes that allows interactive online teaching and learning activities between university staff and students that can be accessed everywhere and anytime. Despite the majority of classes has been run offline currently, Elsakti remains beneficial since it is equipped with some features such as managing courses, making a course calendar, administration, sending and receiving many types of files. More importantly, Elsakti can also be used to conduct assessments since the university staff are enabled to track students' work, share knowledge and comments, give certification and show students' scores and transcripts, and help the implementation of teaching and assessment to be more effective since everything is completely online and does not require paper.

### Merdeka Belajar Kampus Merdeka (MBKM)



### Merdeka Belajar Kampus Merdeka

Figure 2: The main page of MBKM

The second web-based platform developed by Universitas Pancasakti Tegal is MBKM Pancasakti Tegal. MBKM is a program launched by the Minister of Education and Culture which aims to achieve eight key performance indicators for higher education proposed by the Indonesian Ministry of Education, Culture, Research, and Technology. The eighth performance encompasses graduates getting decent jobs, students gaining off-campus experience, lecturer activities outside campus, practitioner teaching on-campus,

lecturer's work being used by the society, study programs in collaboration with world-class partners, collaborative and participatory class, and international standard study program. It is also to maintain and enhance the quality of the three main pillars of Indonesian higher education; learning, research, and community services as well as its supporting factors. This highly accessed website equips university students with the opportunities to carry out student exchange programs, internships, teaching assistance, research, humanitarian projects, independent projects, entrepreneurial activities, and community service programs.

### Sistem Informasi Surat Menyurat (SIMRAT)

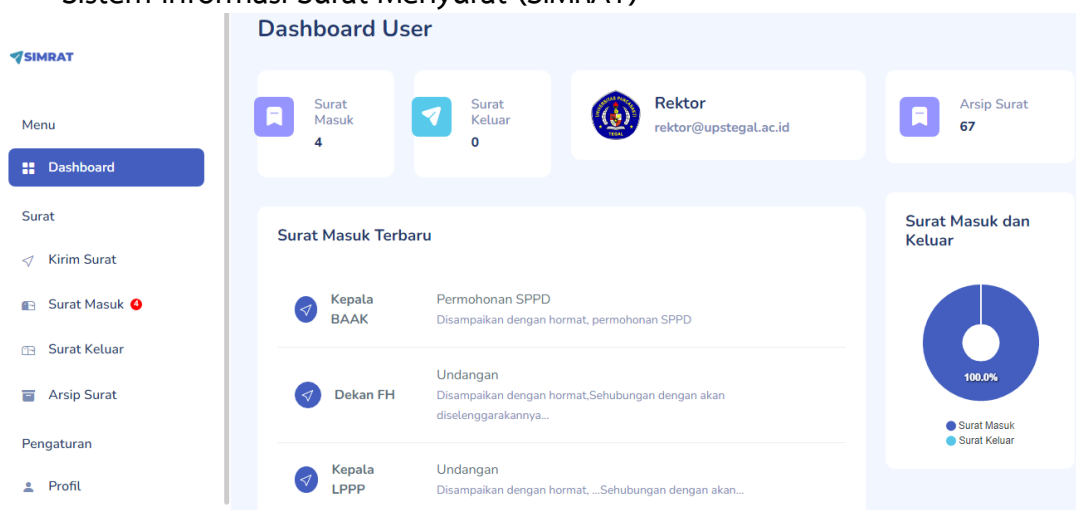


Figure 3: The main page of SIMRAT

The third web-based program developed by Universitas Pancasakti Tegal is SIMRAT. It is a program used to facilitate the correspondence system within the university. This program simplifies the process of sending, receiving, and archiving documents. Apart from being effective in terms of saving time and being paperless, SIMRAT is also a very helpful website program for seeking archival documents and, more importantly, the low risk of lost or damaged documents. Furthermore, the availability of SIMRAT website is highly accessible and is also in accordance with the concept of digital transformation to enhance the quality of the university.

## Sistem Informasi Akademik (SIAP)



**Figure 4:** The main page of SIAP

The last example of the web-based platform developed by Universitas Pancasakti Tegal is SIAP. It is a website that can be accessed by university students as well as university staff. For university students of Universitas Pancasakti Tegal, the website of SIAP helps them with academic concerns such as checking schedules, filling in course selection sheets, viewing exam schedules, viewing the reports of course selection sheets and course result sheets, as well as other financial concerns. Meanwhile, the website of SIAP is also very helpful for university staff of Universitas Pancasakti Tegal. It allows the staff to check teaching schedules, process course selection sheets, as well as to upload the students' course results. From the aforementioned features of SIAP website, it further also makes the academic processes more effective and efficient, especially in terms of saving time and being paperless.

### Challenges

Despite its multiple opportunities, digital transformation in education may not always go smoothly. The implementation of digital assessment encounter various obstacles in parallel with the challenges in digital learning activities. The results of the literature review revealed that there are certain challenges or barriers that have to be dealt with to implement digital transformation in education. Akbari and Pratomo (2022) have explored the implementation of digital transformation in higher education contexts during the COVID-19 pandemic. They found that three fundamental challenges appeared during the digital transformation implementation, namely culture and mindset, human resource competence, as well as infrastructure. This is also in line with some previous studies discussing that changing mindsets to integrate or make changes in learning strategies from conventional to digital does not always come easy.



(Hasanah and Setiawan 2020) reported that 64% of students in their study were unhappy because they had to follow the online learning due to covid-19 pandemic which makes all learning activities conduct in-home. They further explained that there are at least three reasons why students prefer conventional learning and teaching situations, namely the lack of face-to-face intensity with lecturers, signal and internet problems, and the number of assignments from lecturers.

This study found that another challenge in the implementation of digital transformation in education is the need for paying attention to the infrastructure that supports digitalization in learning and teaching activities. Pratiwi (2020) suggested that the implementation of digitalization in education needs adequate infrastructure, particularly the internet network. Meanwhile, there are various obstacles during the implementation of digitalization in terms of communication via the internet such as slow internet speed and lost connectivity. On a similar issue, Ainun et al (2022) also found that the lack of facilities, location geographic, economic issues, as well differences in the mindset of students located in remote areas of the regional urban areas become the major challenges in the implementation of digital transformation in education that is happening today. While in fact, infrastructure has become one of the key factors that must be determined in the implementation of digital learning (Escuenta et al., 2017).

The availability of adequate infrastructure and supporting technological devices such as the internet, laptops, computers, tablets, or smartphones are not sufficient to be the driving factors of the student's achievement. Teachers have important roles to set up interactive and active classes to engage students' motivation and willingness to learn. This corresponds to Apriani's et al., (2020) study that attractive audiovisual content is essential for successful classes. In a similar line, teachers are demanded to put great concern into selecting, preparing, integrating, assessing, and evaluating types of technology being employed in classroom instruction (Tanjung, 2020). Thus, for the successful implementation of digitalization, teachers as well as students need digital literacy and ICT skills. This is also supported by Goh and Abdul-Wahab (2020) that teachers represent the front line in the training of students, and they need to be trained to use mobile-assisted and other digital technologies in the process of learning and teaching. Referring to Honggonegoro & Nuryanto (2020), teachers' assistance in guiding students in using digital is also very critical to boosting the students' achievement. Educational institutions, on the other hand, need to support the digitalization and the enhancement of ICT skills of the teachers and students by moving away from conventional ways of teaching activities and thus serving adequate supporting facilities (Katyeyudo & de Souza, 2022).



Another major of research has found that some teachers appear troublesome in integrating technology into language teaching (Diningrat, Nindya, & Salwa 2020; Safitry et al., 2015) . Diningrat et al. (2020) reported that during the implementation of online learning in higher education, there are some barriers perceived by lecturers related to technology, some of which are related to limited bandwidth, connectivity, and security. These technological barriers were found to be hindrances in the learning and teaching process since they may lead to inconvenient processes and inconducive atmospheres. In addition, Safitry et al. (2015) have also investigated teachers' perspectives and their practices in implementing technology in language classrooms. The result shows that teachers have a positive attitude towards the integration of technology during learning and teaching activities, however, teachers committed that they lack ICT proficiency because they never got any formal training on the use of ICT and other technological supports from the school. The digital transformation in education must consider the training of teachers and the organization of educational institutions.

Another opportunity offered by digital transformation in education is promoting students' learning autonomy which has been proven to be one of the driving factors affecting success in learning in online settings (Bedoya 2014; Yosintha & Yuniantil, 2021) and helps them to be more capable of regulating their self-directed study and have become critical users of multiple online sources. However, a study conducted by Mulyah et al. (2020) found that students under their study are not ready and they do not have sufficient learning autonomy especially in the online learning situations. It was further reported that students prefer having a face-to-face class and direct guidance from the teacher. Awang (2022) also similarly reported that during online learning, students feel a loss of support from peers in the learning process and struggle during the learning activities. Hence, it becomes a considerable challenge because teachers need to manage to apply the most appropriate strategies with the aim to promote their students' learning autonomy as well as foster their motivation to achieve learning objectives.

## Conclusion

The digital transformation of educational processes can bring about a host of positive changes for students and educators. In essence, previous studies have manifested the benefits of digital transformation that can foster new and effective pedagogies to expand learning opportunities, enable more flexible and personalized learning everywhere and anytime by using mobile-assisted learning, and grant teachers and learners precious experience to improve the quality of education. Even though the impact of digital



transformation on education is mostly positive and the benefits range is quite vast, there are still several challenges that face some challenges or barriers to cope with such as insufficient digital infrastructure, the low or weak digital literacy of both teachers and students, insufficient digital learning resources, and the demands for creating systems or platforms for learning and management. The momentum of rapid digital transformation, thus, should be supported by the government, the Indonesian ministry of education and culture in particular, by developing various options for comprehensive learning resources (such as digital platforms, protocols, and support for online teaching and learning) and developing appropriate curriculum from primary, secondary, and higher education.

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