Empirical Article

Transformation of Korean Higher Education in the Digital Era: Achievements and Challenges

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Abstract

This essay addresses the transformation of Korean higher education (HE) that has occurred since COVID-19, with a focus on the digitization of teaching and learning. Digitization has impacted both remote and traditional universities and colleges. While remote higher education institutions (HEIs) have been quick responding to the changed situation, traditional universities and colleges have also been searching for various instructional methods in their online as well as traditional classrooms, experimenting for the best methods for learners. National policies have also supported this digital transformation of HEIs which has had results of the engagement of more adult learners in HE gaining credits, certificates, and academic degrees online. While new ways of being 'learner-centered' have been intensively explored in these processes, some concerns such as the competency gap of institutions and instructors, and the deepening digital divide among learners have emerged, which needs attention from policymakers, researchers and practitioners in HE.

Keywords: adult learners, COVID-19, digital divide, digital teaching and learning, higher education institutions, Korean higher education

Introduction

Higher education (HE) in Korea has faced two different challenges. First, the educational system in Korea has been mandated with providing excellent quality education for its students, not only Koreans but also international students (Byun et al., 2013; Cho, 2015; Auh & Jeung, 2021). Second, decreasing enrollment originating from Korea's rapid aging and super-low birthrate has negatively affected many of its institutions and has become a 'life or death' issue for them (Lee, 2021).

Digitized teaching and learning are deeply involved in both. On the one hand, many Korean HE institutions (HEIs) have now reached out to their students as well as potential learners in the world and have collaborated with emerging

global HE stakeholders using information technology (IT) (Yonhap News TV, 2014). On the other hand, many have worked with their regions, delivering their courses to adult learners online and offline and playing a meaningful role in the community development and regeneration (Bae, 2021). In this wide spectrum where globalization and localization are situated at both ends, the current digitization has been much expedited by COVID-19 and engendered many changes related to teaching and learning in Korean HE.

The current essay addresses these two important areas of transformation of Korean HE that have occurred over the last several years since COVID-19, with a focus on the digitization of teaching and learning. Document analysis was used to analyze and synthesize various types of documents such as research papers, government reports, reports from international organizations, and others to understand digitization in Korean HE before and after COVID-19 (Glaser & Strauss, 1967). First, the current digital teaching and learning state in Korean universities and colleges will be addressed. We shall describe the changes in HE that have been accelerated due to COVID-19, related HE policies as well as some specific cases studies. Second, we discuss the achievements and challenges of digital teaching and learning in Korean HE. While new ways of being 'learner-centered' have been much explored, other issues such as the competency gap of institutions and instructors, and the deepening digital divide among learners, are emerging that need attention.

The Backgrounds of Korean Higher Education

One of the distinctive characteristics of Korean HE is the control of the national government (Ministry of Education, 2023a). Most HEIs are subsidized by the Ministry of Education (ME), even though 85% of HE institutions are private (Ministry of Education, 2023b). A highly vertical stratification by reputation among the institutions drives the country-wide eagerness for university education, which is even acknowledged internationally (Nam, 2011). The tendency to prefer schools in metropolitan areas has also been an interesting feature of Korean HE. HEIs located in the regions other than metropolitan areas are the very ones that are the most affected by the upcoming elderly society where fertility hits 0.78, lowest in the Organization of Economic Cooperation and Development (OECD) countries (Kim, H. & Kim, S., 2023). The decreasing number of potential students increases anxiety within these institutions (S. Lee, 2022).

The increasing demand for lifelong education, however, has provided new opportunities for many of these HEIs, which call for some structural changes for these HEIs to serve adult learners as their new and alternative clientele. Therefore, the ME has supported HEIs to reach out to adult learners in the communities who look for upskilling and/or reskilling. The current ME policies have been enacted as a form of cooperation among the local government, HEIs, and local industry, which is located at the center of the local sustainability drive (Ministry of Education, 2022a).

This line of policies and practices in HE can roughly be categorized by three keywords – global excellence, localization, and lifelong learning. First, the development of globally competitive human resources is actively pursued. Korea's public investment in HE in 2020 is 0.7%. While this is lower than the OECD average (1.05%), it also is significantly lower than that in its primary and secondary education (OECD, 2021). Therefore, the current ME policy focuses on investing more in HE for research and education, lifting unnecessary regulations for institutions, and educating more people in wider life span, particularly in high-tech through industry-university cooperation (H. Lee, 2022).

Second, these policies encourage more HE graduates to settle locally rather than heading to the metropolitan area to seek jobs. ME policies, therefore, support students' increased participation in various learning opportunities at the local level, such as educational programs at local and regional universities and internships with local employers (Ministry of Education, 2022b). Naturally, HEIs are now asked to position themselves to be centered on human resource development (HRD) by functioning as a learning hub in the very regions they are located.

Third, changes in HEIs toward lifelong learning institutions are also actively pursued. The need for this change is obvious under disadvantageous circumstances such as the population decrease and local extinction crisis (Ministry of Education, 2017). The digital revolution also serves as one of the important reasons, particularly for baby boomers to go 'back to school' to learn for work opportunities in their later life, which is much longer than that of their parents (Choi et al., 2018). One of the main policy measures of the ME for this is the 'LiFE project' - 'LiFE' being an abbreviation of 'Lifelong education at universities for Future Education,' meaning the expansion of universities and colleges toward adult learners. With this active policy measure, more and more HEIs are now being transformed to include lifelong learners, i.e., non-traditional students (NILE, 2022a).

Changes in Digital Teaching and Learning in Korean Universities and Colleges Before and After COVID-19

According to earlier analysis of OECD on digitization in administrative services in many countries, education, particularly teaching and learning, was found but developed at a slow pace while "insight from distance, blended and collaborative learning were emerging" (OECD, 2016, p.24). The introduction of Learning Management Systems (LMS) and online course content in Korean HE gradually increased in the past decades, which brought not only instructional advancement but also increased diversity and openness in Korean HE overall. One of the most prominent changes in HE in this aspect was the emergence of remote HEIs named 'cyber universities.' This new type of HEI was approved and became popular in the early 2000s (Park, 2006). The Korea National Open University (KNOU), established in 1972, had been the only one of this kind until then.

The COVID-19 pandemic was key in introducing digitized instruction into the entire school system, from primary to post-secondary (Kalenzi, et al., 2020). The change in teaching and learning in HE has been carried forward in line with Korea's national strategy, 'digital transformation' of its industries, represented as DNA (Data, Network, AI) (Ministry of Education, 2021). Below is a summary of the digital teaching and learning conducted in general as well as in remote HEIs.

The Korea National Open University and Cyber Universities

For the last 50 years, the number of graduates of Korea National Open University (KNOU) has reached 800,000, expanding the access of HE to adult learners. All the courses of KNOU are delivered online through its LMS named U-KNOU Campus (https://ucampus.knou.ac.kr/). Some face-to-face instruction is given as an auxiliary measure on its 13 regional campuses. KNOU maintained its status as the only remote HEI until the Millennium when 'cyber universities' started to serve the learning needs of adults with increased online support features. Consequently, the number of students at KNOU has gradually decreased. For example, from 171,692 in 2017 to 123,110 in 2022(Statistics Korea, 2023).

In 2001, the legal foundation for 'cyber universities' was created, and 7 undergraduate schools and two professional undergraduate programs started operation in March 2001 (Park, 2006). With the revision of the Higher Education Act in 2008, these virtual universities were added as an official HEI category, with KNOU as the only public one and all the others as private. As of 2023, there are 21 cyber universities in Korea (Table 1) and the cumulative number of graduates is about 320,000 (CU info, 2023).

Table 1

The Statistics of Private Cyber Universities in Korea

Number of Private Cyber Universities	Number of Departments	Number of Students	Number of Enrolments in 2022	Number of Graduates in 2022
21	443	148,770	38,526	33,298

Source: Korean Statistical Information Service (2022).

For the earlier part of the pandemic, the offline part of instruction at KNOU was entirely replaced with real-time online video conferencing such as Zoom and final examinations were also replaced with tablet-based tests. KNOU also took the initiative to share its thousands of online courses with general HEIs, which had to find a way to deliver their previously offline courses online with no time to prepare (KNOU Weekly, 2020). Cyber universities have also grown exponentially at the same time, proving that online education can be a quality alternative to traditional offline teaching and learning (Chang, 2020).

Online Teaching and Learning in Traditional Universities and Colleges

The outbreak of COVID-19 has somehow blurred the boundaries between traditional and remote HEIs, and even between HEIs and large online learning platforms, all of which have intensified competition in HE among these players.

The changed practices of traditional HEIs in Korea are summarized in two ways. First, traditional universities and colleges had to go completely online during the pandemic. In 2021, the online learning platform installation rate in these institutions reached almost 100%. It was 98.2% for colleges and 96.3% for 4-year universities, as shown in Table 2 below. Digital teaching and learning were considered a standard auxiliary method before COVID-19 while it has become a common practice after the outbreak.

Table 2

E-Learning Rates at Korean Universities and Colleges

School Level	2017	2018	2019	2020	2021	Increase over the previous year
Colleges	75.2	75.6	78.5	90.7	98.2	7.5
Universities	84.0	84.2	85.3	92.4	96.3	3.9

Source: Korean Statistical Information Service (2022).

In the initial phase of COVID-19, online learning provision in many institutions was not much more than basic, for example, uploading instructor-created video clips to the platforms to be watched by the students asynchronously. However, evolution has been rapid. Even though most HEIs have now returned to face-to-face classes, many have newly introduced courses organized as blended and/or hybrid learning, or even more experimental ones with constantly evolving educational technology (so-called 'edu-tech') Some leading universities have concentrated on innovating their learning platforms based on developed IT infrastructures that support various types of learning, searching for better ways to help their students (Yoon, 2022). These newer teaching and learning trials have changed Korean HE classrooms to give students more choices for participation in learning, enhancement of their learning outcomes, and increase communication between and among instructors and learners in expanded online community spaces for cooperative learning and team learning (University Distance Education Center, 2022).

Second, joint networking of universities among themselves or with global online learning platforms has emerged since COVID-19. For example, Yonsei University and 16 other universities have established an online lecture network and jointly operated online lectures since 2022 (Yonsei University, 2022). The emergence of this network can be interpreted as a self-help action for Korean universities to overcome difficulties through sharing online course content. Some universities have cooperated with commercial learning platforms such as Coursera, edX, or Udacity. For example, Sungkyunkwan University agreed with Coursera to allow its instructors and students to take 3,000 courses for free and gain extracurricular credits. It has also created eight courses in Korean language education, Korean philosophy, big data, energy, and software and provided them through Coursera for thousands of learners around the globe (University News Network, 2021). While concerns and questions have arisen regarding the boundary between HEIs and these alternative HE suppliers, efforts of Korean HE to work with competitive players and utilize their platforms and resources for their students and more are considered meaningful as it can be considered as an effort to generate value through innovative practices (Shaughnessy, 2018).

National Platforms of Online Learning in HE

Government-supported online learning at the HE level has also increased. First, Korea Open Courseware (KOCW) is a system for the joint utilization of teaching and learning materials operated by Korea Education and Research Information Service (KERIS), an organization for projects and academic research affiliated with the ME. It provides free lecture video

clips and materials shared by Korean and foreign universities and institutions. It started as Korea's open educational resources (OER) movement in 2007. As an e-learning service at the HE level, it aims to spread a knowledge-sharing culture by expanding opportunities beyond HE (KERIS, 2020). According to KOCW's official website (www.kocw.net), it has three core goals: First, 'improving the quality of HE through joint utilization of e-learning contents'; second, 'securing excellence in educational contents and methods by the power of sharing'; and third, 'expanding lifelong learning opportunities by improving public accessibility to university-level lectures.'

KOCW currently operates a curation service categorized by these themes to meet various learning demands, such as English, liberal arts seminars, and job training with other topics. It serves every person's right to learn more and better, not only HE students but also adult learners who look for higher learning outside of HE. The numbers related to KOCW in 2022 are shown in Table 3 below. During the COVID-19 period, many HEIs have actively utilized KOCW contents, so the usage rate has increased rapidly.

Table 3

KOCW Contents

Category		Institutions	Lectures	Resources
Korea	University	188	16,824	282,795
	Others	33	3,939	7,173
	Total	220	20,763	289,968
International	HEIs	9	4,278	5,320
	Open Archive Initiative (OAI)	3	-	133,180
	Total	12	4,278	138,500
Total		232	25,041	428,468

Source: KOCW homepage http://www.kocw.net (2022).

K-MOOC (Korean Massive Open Online Course), started in 2015, is also referred to as one of the major remote lifelong education services operated by the National Institute of Lifelong Education (NILE), a headquarter organization of lifelong learning affiliated with the ME (Ministry of Education, 2023d). As of 2023, 1,870 courses have been provided, with 2.8 million people enrolled (NILE, 2023). While KOCW mainly provides online lecture clips, K-MOOC provides an interactive online course service with lectures and learning activities such as quizzes and assignments. After COVID-19 started, many HEIs have discovered K-MOOC as a quality alternative to their conventional course provisions (NILE, 2022a). Adult learners outside HEIs have also actively taken its courses and used their credits in the Credit Bank System to earn HE degrees. NILE has now provided opportunities for its subscribers to take courses in Coursera and Udemy. The number of K-MOOC lectures sorted by academic disciplines as of 2021 is shown in Table 4 below.

Table 4

Number of K-MOOC Lectures by Academic Disciplines

Discipline	Humanities	Social Science	Education	Engineering	Science	Medicine	Art	Total*
Number of Lectures (%)	360 (26.5)	340 (25.0)	51 (3.8)	297 (21.9)	131 (9.6)	88 (6.5)	91 (6.7)	1,358 (100)

Source: NILE (2022a).

K-MOOC represents the increased opening of Korean HE through digital teaching and learning in that it serves excellent quality HE to anyone for free. The maximum number of students granted per class is 800 for quality control. And the course registration is operated on a first-come, first-served basis (NILE, 2022a). K-MOOC has become increasingly popular during the COVID-19 period and has been developed further by introducing content customization by analyzing individual learning patterns and preferences based on artificial intelligence (AI) big data as well as mobile learning services (University News Network, 2020). In addition, there are increasing cases of universities operating their own MOOCs such as KAIST, POSTEC, Yonsei University and so on (Ministry of Education, 2023).

Other National Remote HE for Lifelong Education Services

More services at the national level for lifelong learning in HE by NILE need to be introduced related to the increasing role of digital teaching and learning (Kim, 2020). First, the Credit Bank System (CBS) was created with the vision to promote the development of an open lifelong learning society. It was implemented in 1998 as a system that enables adult learners to acquire bachelor's degrees by accumulating credits from various educational institutions certified by the ME. The purpose of this system is to guarantee the people's right to learn and therefore to provide opportunities to acquire HE degrees in an alternative way, particularly for the groups of adults who did not participate in HE (Ministry of Education, 2023c). By introducing online education, CBS has benefited more people who want to take courses and get HE credits regardless of time and space. In 2022, over 40 thousand people have obtained their bachelor's degrees through the CBS. There are 416 CBS operating institutions which include 94 online education institutions (NILE, 2022b).

Second, there is a Match-Up program which is another program of remote HE services at the national level for lifelong learners based on the demand for flexible job training programs (Ministry of Education, 2023c). This is a short-term vocational certification program that includes online training courses tailored to the needs of some hi-tech industries. The majority of participants are HE students, job seekers, and current employees who wish to improve their job skills particularly for the jobs in the Internet of Things (IoT), AI, or big data, smart logistics and so on. Those who complete these training courses in Match-up program gain up-to-date skills in the fields that are certifiable through following the designated evaluation process by representative companies as well as HEIs in each industry.

Achievements and Challenges in Digital Teaching and Learning in Korean Higher Education

Digital teaching and learning in Korean HE are now considered as an essential development that has accelerated since the time of COVID-19. This rapid change has exposed both positive and negative aspects. Achievements and challenges of the current development of digital teaching and learning in Korean HE are explored below.

Achievements Gained from Fast Digitalization in Korean Higher Education

Due to the unprecedented emergency in which face-to-face instruction was not possible at all, the lack of knowledge, methods, and experiences about digital teaching and learning became apparent. There was a lot of trial-and-error, particularly in the early days of COVID-19. Three years later since then, the progress is remarkable upon expedited efforts.

First, one of the biggest achievements of the fast and expanded digitization of teaching and learning is the increased knowledge and practice to make the teaching and learning in HE more effective for learners. New 'learner-centered' pedagogical models have actively been explored during the pandemic with the utilization of digital teaching and learning. On the one hand, a high level of excellence in increased efficiency of digitization has been pursued mainly by leading universities. Many instructors have tried to facilitate their own classrooms both online and offline and have come up with optimized solutions in which learners can better participate (University Distance Education Center, 2022). Both instructors and students also have had more chances to discover learning online not as an auxiliary, but as a meaningful way of learning in HE. On the other hand, virtual HEIs have an opportunity to prove the value of online learning in HE level. Overall, the pandemic was a principal factor of these rapid developments in learner-centered teaching and learning with the adoption of various technologies.

Second, there are now increased options for learners who want to pursue higher learning outside HE campuses. On the one hand, national online learning platforms and programs such as KOCW and K-MOOC have provided increased higher learning contents and methods, all of which enhance the possibilities for people outside HE to get an education they want. Therefore, KOCW and K-MOOC have increased the Korean people's rights to learn in HE level and widen the

opportunities of lifelong learning (Jun, 2023). The ME and NILE have played a key role in enabling such changes for these lifelong learners who need HE.

Challenges Experienced from Fast Digitization in Korean Higher Education

Problems arising from fast digitization of teaching and learning in Korean HE are as many as the number of achievements. Fast changes to move onto online teaching and learning have resulted in various unexpected issues and problems such as platform delays and errors, lack of online class contents, insufficient institutional fundamentals for online class operation and evaluation, lack of teaching competencies of instructors in online teaching, and more. Among them, the issues of 'gaps' seem bigger than others.

First, various problems of HEIs as well as faculty in provision of digital teaching and learning as suppliers have been pointed out. Server instability as well as instructors' capabilities to deal with online as well as hybrid classes were addressed as major issues particularly at the early transition to non-face-to-face classes (Lee & Shin, 2020; Kang, 2020; Lee, et al., 2022). According to a survey in 2021, four out of ten students prefer online class over face-to-face or hybrid (ET News, 2021) but their preference for online classes is not based on their awareness or experiences of online learning but on the convenience such as saving time on travelling to the classroom. Instructors also respond that it is still the most difficult to check students' understanding on the taught contents in online classes, which requires competency building in online and hybrid formats of teaching and learning (Chong & Woo, 2022). In addition, some HEIs may welcome digitization just to reduce costs in hiring instructions and securing classrooms, which would possibly make their students more vulnerable (Shin, 2022).

Second, there have been many issues from a learner's aspect as well. The digital divide among learners seems to be one of the most serious issues. For example, possession of appropriate digital devices, high-speed internet access, and personal spaces for learning have been among the major reasons behind inequality of educational opportunities of the learners in the digital era. Learners' varying level in digital competency intensifies the digital divide, too. Particularly, many learners in their mid-to-late adulthood show a low level of digital literacy. Thus, many adult students in the LiFE Project show low readiness for digital learning (Yang, 2020), which is considered a big problem in their higher learning. Therefore, supporting them to get accustomed to an online education environment as early as possible is a key to their fruitful learning in HE (Yoon & Lee, 2022). The same concern applies to competency in digital teaching and learning for lifelong learners outside of HEIs. While inequality is a long-standing issue in Korean education, income is now less determined by HE degree (Jung, 2021). Since online teaching and learning has been fully implemented, 'digital divide' would possibly exacerbate income advantages or disadvantages of the HE graduates.

Conclusion

In the 2000, Korean HE experienced changes regarding digitization such as the emergence of cyber universities, e-learning platforms and open coursewares. Before COVID-19, however, all of these could be discussed as incremental. On the one hand, searching for various instructional methods in both online and traditional face-to-face classrooms has become an implemented practice in traditional universities and colleges. Remote HEIs such as KNOU as well as cyber universities, on the other hand, have been quick responding to the changed situation and therefore become successful HEIs. Policies by the ME in support of a digital transformation of HEIs had the result of more adult learners in HE gaining credits, certificates, and academic degrees online.

There are still challenges following the rapid digitization in HE. Institutional competency to lead excellence in digital teaching and learning with technology vary, as does digital literacy of the learners. While the 'digital divide' is a major concern in Korean HE, more and diverse attempts are found in both policies and practices, in which future directions of Korean HE and its digital teaching and learning can be seen as bright.

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