



# A Study on the Operation of Education Using Library Using Flip Learning Techniques: Focusing on ubiquitous E-learning that reflects gaming elements

KiTae KIM<sup>1</sup>, HoSung WOO<sup>2</sup>

<sup>1</sup> *First Author* Librarian, School Library, YangSeong Elementary School, South Korea.  
E-mail: hukasy11@naver.com

<sup>2</sup> *Corresponding Author* Assistant Professor, Dept. of E-learning, Graduate School, Korea National Open University, South Korea.  
E-mail: hughwoo@mail.knou.ac.kr

Received: February 15, 2022. Revised: March 11, 2022. Accepted: March 21, 2022..

---

## Abstract

**Purpose** – The purpose is to present an efficient library-use education model in the form of flip learning, reflecting traditional teaching methods and gamification elements even in such non-face-to-face and face-to-face situations after COVID-19.

**Research design, data, and methodology** – Research on library use education, research on ubiquitous environment and gamification instructional design, flip the learning, and gamification elements are classified, compared, and analyzed to present educational models for library education, COVID-19 Pandemic situation, and subsequent library use education.

**Result** – We propose an e-learning content development strategy for flipped learning-based library education. First, benchmark and use the existing educational contents. Second, a user-friendly interface is configured so that learners can flexibly organize their learning contents. Third, it allows learners to experience it directly or indirectly in a virtual space.

**Conclusion** – If the e-learning environment can be standardized to the level of schools or educational institutions, a good educational model that can be used not only in library user education but also in other fields will be possible.

**Keywords:** Education for how to use a library, E-Learning, Flipped learning, and gamification

**JEL Classification Code:** I20, I21, I29

---

## **1. Necessity and purpose.**

### **1.1. The necessity of solving problems.**

By the national policy of fostering self-directed students in the era of the fourth Industrial Revolution, school libraries and professionals showed quantitative growth compared to the past, but in the special situation of COVID-19 Pandemic, school library services must increase existing books, active librarians, and support programs.

In a study by Noh and Chang (2020), as the COVID-19 pandemic is prolonged, society is shifting to a non-face-to-face society, affecting the service methodology of domestic and foreign library systems. Specifically, it includes preparing national library measures to jointly respond to infectious diseases, strengthening non-face-to-face and online services of various public libraries through government-level budget support, and thirdly, thorough prevention of infectious diseases and preemptive responses. Fourth, it is to expand library services to bridge the digital culture gap between classes, such as information unfairness.

Additionally, with the rapid spread of ICT and the expansion of information resources in online and offline spaces such as e-books and digital works, changes in school libraries must increase the convenience for users to use information. The school library, which is the starting point of information education, should not only identify the needs of students, connect schools and students, but also improve information use in non-face-to-face classes and create an Internet-based ubiquitous environment.

By supplementing library user education repeated at the beginning of each semester, a flipped learning-type teaching model suitable for students' level should be presented, and customized education models should be presented to actively cope with face-to-face situations in the mid and long-term.

### **1.2. Present and research purpose.**

Due to the COVID-19 pandemic situation, changes in the learning environment have become inevitable. However, the learning effect is excellent in traditional school-style classes. Nevertheless, the situation of the times, which has no choice but to be combined with non-face-to-face classes, is changing not only in library user education but also in overall learning. In addition to traditional school-style classes, non-face-to-face classes in infectious diseases such as COVID-19 Pandemic and special circumstances will be able to meet learners' needs for various environments. If the transfer of knowledge made during class in the existing educational method can be conducted and learned in a flipped learning method before class, the process of delivering basic knowledge will be omitted in this class, and activities that match the learner's learning status and level may be the main class activities. In the traditional learning model, the evaluation is performed when presenting assignments.

On the other hand, in the flip learning model, it is difficult for learners to evaluate various things during class because they acquire theories and perform tasks on their own. Therefore, it is necessary to add a process of improving assignments and evaluating based on improved results through activities during class. Learners can effectively acquire the theory and increase learning efficiency during class. Unlike the traditional method for evaluating after performing assignments, the flipped learning model reduces the burden on learners because problems with assignments are identified and corrected during class. Learners will experience self-directed learning through learning compensation along with prior learning reflecting the elements of gamification, thereby increasing satisfaction with the class. Instructors can secure lecture time and apply various learning models through learner-led lecture operations. In different situations, ubiquitous-based systems are used to provide learners with information accumulated in virtual space. Through this, learners will be able to learn according to their abilities. If various gamification elements are reflected in flipped learning-based learning activities and practical learning activities, customized education can be provided to learners at each level, and learning results will also appear effectively.

## **2. Literature Review**

### **2.1. A study related to the education of library users.**

According to a study by Lee (2011), information is a knowledge-based society with a core value, and the amount of information and knowledge has exploded, leading to various problems in society, especially affecting not only individual life but also national competitiveness.

A study by Kang and Jung (2019) confirmed that interest in maker space and maker education services is increasing in terms of expanding the contents of information use education and enhancing the role of community services, and that public and university libraries in North America and Europe are already providing universal services. However, unlike the active movement in the library education community for maker education, there were few cases of introducing maker spaces and operating maker education in school libraries in Korea.

Kim (2015) confirmed in a study of Japan, which has a similar school education system and environment to Korea, that the revision of the national curriculum has a total impact on school library education activities and cannot limit changes in school library education. Kim, Roh, and Yoo (2007) confirmed that a library librarian can inspire interest in learners, improve education completion, provide educational tools, and help revitalize the library.

## **2.2. A Study on the Ubiquitous Learning Environment and Gamification Teaching Design.**

Due to the COVID-19 incident, many Internet-based changes have occurred in our daily lives.

A study by Park and Lee (2020) confirmed that services are provided to learners using cloud-based Learning Management Systems (LMS) in the field of education, and that video classes linked to LMS and Zoom are commonly used. Smart learning service platform SLoT1.0 is a cloud-based e-learning system used to help learners study in the learning field. In the academic field, it was found that the online learning management system was introduced to improve learners' academic achievement, strengthen E-learning, and freely use non-face-to-face classes using Ubiquitous Environment as non-face-to-face and computer-based classes are activated.

In a study on the design of public libraries in a Ubiquitous Environment, Han and Kim (2010) confirmed that libraries are required not only as traditional information providers but also as intellectual and cultural service institutions that satisfy users' mental abundance, and that the rapidly spreading ubiquitous trend in society is also affected.

Ahn, Yeom, Kim, and Jung (2020) selected 77 documents through literature analysis procedures and analyzed the analysis criteria by dividing them into general elements, educational elements, and game elements. As a result of the main analysis derived through this, domestic game-based learning and gamification design studies are on the rise, and most studies aimed at design-effect measurement are on the rise. In the case of research subjects, research on infants and elementary schools was actively conducted, and because of educational element analysis, interest in CS/IT, science, and language was high in learning topics. In the case of the learning area, the usage of knowledge-oriented narrative knowledge was high, and the frequency of use in psychological movement, high-dimensional thinking, and interpersonal relationships was relatively low, and it was confirmed that research using theoretical background or systematic design principles or models was insufficient in the design process. Additionally, for more effective educational use of games, an integrated design model in the form of integrating the microscopic instructional design principles of educational engineering and the game design model is needed. The necessity of a design plan that integrates the design principles of various learners and learning areas, instructional design of educational engineering, and game cycle design was suggested.

Lee and Choi (2020) studied the need to develop a systematic instructional design model with gamification so that museum educators focusing on history and art can understand the educational use of digital technology and access instructional design. To this end, the design principles of digital learning in museums were derived by referring to theories and studies on museum education, learning, teaching, and psychology, and final models and tools were developed by conducting usability evaluations for museum educators. Educators were educating learners in the field and grasping learner characteristics, preferences, and satisfaction through qualitative and quantitative research, and played the role of learners by referring to learner profiles in usability evaluation, but there was a problem that it was difficult to fully represent elementary and middle school learners. In the future, additional research is needed to ensure the effectiveness of the design model by conducting usability evaluations for actual learners and evaluating experts. Additionally, only museum educators from national and public museums participated in the study, but it was analyzed that models and tools need to be further elaborated based on the opinions of private museums, science museums, and art museum research participants in the future.

## **2.3. A study on the application of flipped learning and gamification learning.**

Flip learning refers to a learning method in which learning conducted during and before and after classes in traditional learning methods is literally 'flipped'.

Kim and Yoo (2020) developed a design-specific flip learning model (DFLM) and applied it to design subjects that are evaluated to have a high theoretical class ratio and difficulty. Subjects with a higher ratio of theoretical classes than practical subjects were selected, and theoretical subjects were selected and studied as <UX & Interaction Design>

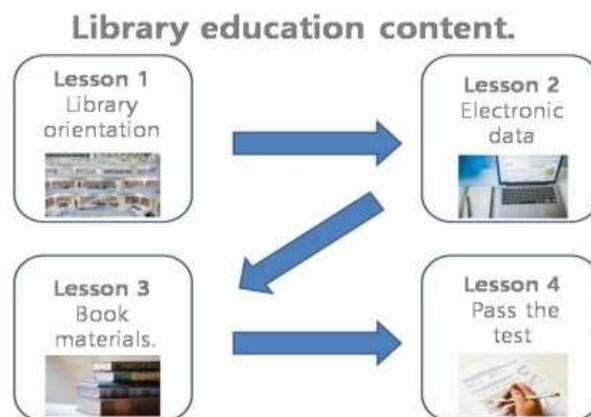
subjects taken by third-year industrial design students with relatively weaker learning skills than practical subjects. After selecting the subject, it was applied for 5 weeks through the development and improvement plan of the flipped learning model, presented problems and corrections that occurred during the study, and identified the difficulties of instructors in the class, proving the effectiveness of the flipped learning teaching method. The part to be reinforced was changed to the narrative form of the lecture materials, used to ask questions in advance before class, and needed time to check the elements learned in advance during class.

Lee and Yoo (2016) developed gamification to provide fun and enjoyment to users using elements such as points, rankings, and badges, and to provide differential scores to students' participation activities and systems. It was found that the design principles applied to system development were presented, the experience of user satisfaction and gamification after system use was surveyed, positive satisfaction with system utilization, and students perceived achievement and motivation improvement through gamification factors. Additionally, by discussing the effects and improvements of gamification application, implications for future comparison and integrated management system development and operation were confirmed.

### 3. Library education e-learning contents Strategy to develop e-learning contents

#### 3.1. Proposal of an educational model in the form of flipped learning

In the traditional learning model, the evaluation is performed when presenting assignments. However, in the flip learning model, it is difficult for learners to evaluate various things during class because they acquire theories and perform tasks on their own. Therefore, it is necessary to add a process of improving assignments and evaluations based on improved results through activities during class. Learners can effectively acquire the theory and increase learning efficiency during class. Unlike the traditional method for evaluating after performing assignments, the flipped learning model reduces the burden on learners because problems with assignments are identified and corrected during class. Learners will experience self-directed learning through learning compensation along with prior learning reflecting the elements of gamification, thereby increasing satisfaction with the class. Instructors can secure lecture time and apply various learning models through learner-led lecture operations. In different situations, ubiquitous-based systems are used to provide learners with information accumulated in virtual space. Through this, learners will be able to learn according to their abilities. If various gamification elements are reflected in flipped learning-based learning activities and practical learning activities, customized education can be provided to learners at each level, and learning results will also appear effectively.



**Figure 1:** Library education contents.

The school library, the starting point of this information education, should identify students' needs, connect with schools, improve their ability to use information in non-face-to-face classes, and create an Internet-based ubiquitous environment. It is necessary to present an E-learning education model in the form of flipped learning that can actively

cope with face-to-face situations in the mid-to long-term by supplementing library user education that is repeated at the beginning of each semester. By presenting an E-learning education model using flipped learning methods suitable for the learner's level rather than repeated collective education, it will be possible to increase the level of learners through non-face-to-face learning along with face-to-face education. The learning model to be presented consists of Library Orientation 2, Electronic Materials Usage, Lesson 3, Book Materials Usage, Lesson 4, Formative Evaluation, and is explained in <Figure 1>.

### 3.2. Strategy to develop and e-learning content

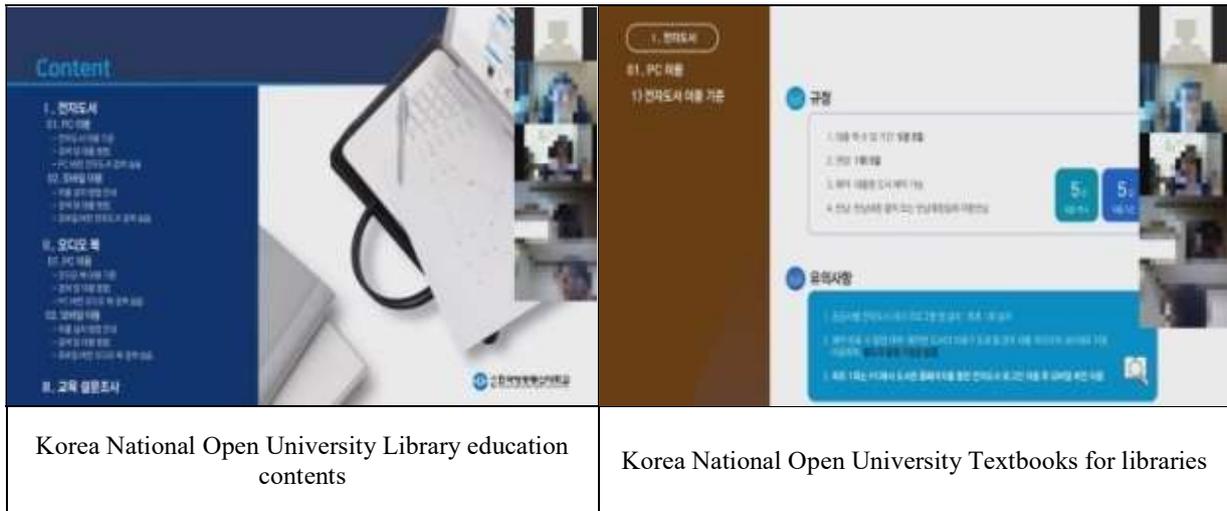
As a result of examining previous studies, changes in the learning environment become inevitable due to the COVID-19 pandemic situation. However, the learning effect is excellent in traditional school-style classes. Nevertheless, the situation of the times, which has no choice but to be combined with non-face-to-face classes, is changing not only in library user education but also in overall learning. In addition to traditional school-style classes, non-face-to-face classes in infectious diseases such as COVID-19 Pandemic and special circumstances will be able to meet the needs of users in various environments. If knowledge transfer in class is created in the existing educational method and a motivational environment reflecting gamification elements before class, it will be conducted in a flip-learning method, which will omit the process of delivering basic knowledge in regular class hours, and activities that match the learner's learning status and level can be the main class activities. In the traditional learning model, the evaluation is performed when presenting assignments. On the other hand, in the flip learning model, it is difficult for learners to evaluate various things during class because they acquire theories and perform tasks on their own.

Therefore, a process of improving assignments and evaluating based on improved results through activities during class should be added. Learners can effectively acquire theory and increase learning efficiency during class. Unlike the traditional method for evaluating after performing assignments, the flipped learning model reduces the burden on learners because problems with assignments are identified and corrected during class. As learners experience self-directed learning through prior learning, satisfaction with classes increases, and instructors can secure lecture time through learner-led lecture management, and apply various learning models. In different situations, using ubiquitous-based systems to provide learners with information accumulated in virtual space, and reflecting elements of gamification, learners can learn prior tailored to their abilities. If various learning methods are applied by combining flipped learning and practical learning along with motivation using gamification, the results of the learning effect will be systematized by level and effectively appeared.



**Figure 2:** Benchmarking contents of KERIS(Korea Educational Research Information Service, 2021)

Using the book education content of the Korea Educational Research and Information Service in <Figure 2>, the traditional class-style reading support system will be used to present a more advanced form of program in the existing system.

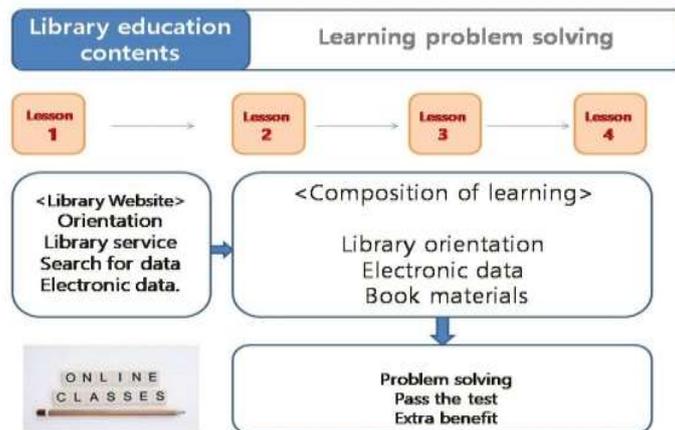


**Figure 3:** Benchmarking Contents of KNOU(Korea National Open University)

Additionally, on a similar basis to the information utilization education textbook of the Korea National Open University in <Figure 3>, we will construct content design strategies for AR, VR, Metaverse, and hologram technologies that will be implemented in the future.

### 3.3. Design interface and Technology needed for content development

The U-Library is based on an intelligent space in which digital spaces with electronic information are combined into physical spaces with a user-centered approach. In this spatial background, information commons can be said to be the physical space base of the ubiquitous library. Therefore, to develop into a practical ubiquitous environment from the library's viewpoint, it is essential to introduce an information-sharing space as a physical space where users can directly acquire and experience information, and a systematic learning model design reflecting gamification elements.



**Figure 4:** Composition of the study

The flow of library use education content gradually accesses the library website and conduct orientation in a virtual space. After that, it is classified into electronic and book materials by the type of library material. It will be held in the

online class at each stage, and special benefits will be given if the formation evaluation is met. In <Figure 4>, a flowchart can be confirmed.



Figure 5: Virtual interface design for learning content

Design and interface design are essential so that learners can access more conveniently and easily accessible configurations by producing learning programs. The virtual interface of library-based educational content is configured similar to a web-based Internet homepage. The curriculum name and unit name are displayed at the top, and the order of lessons is displayed. At the bottom of the video content, it is composed of a timeline, etc., so that the learner can adjust the speed. In addition, images and keywords presented in learning are placed on the side so that learners can explain and review them at any time. At the bottom, it is configured so that you can solve the practice questions along with a banner that connects to the online classroom. In the following <Figure 5>, you will be able to check the design and virtual interface of library education. It is necessary to add various skills so that these educational programs can be implemented more realistically. When learners use data or search for electronic data in the field, for example, more realistic technologies than videos can be used to induce learning motivation and overcome the limitations of theoretical education.

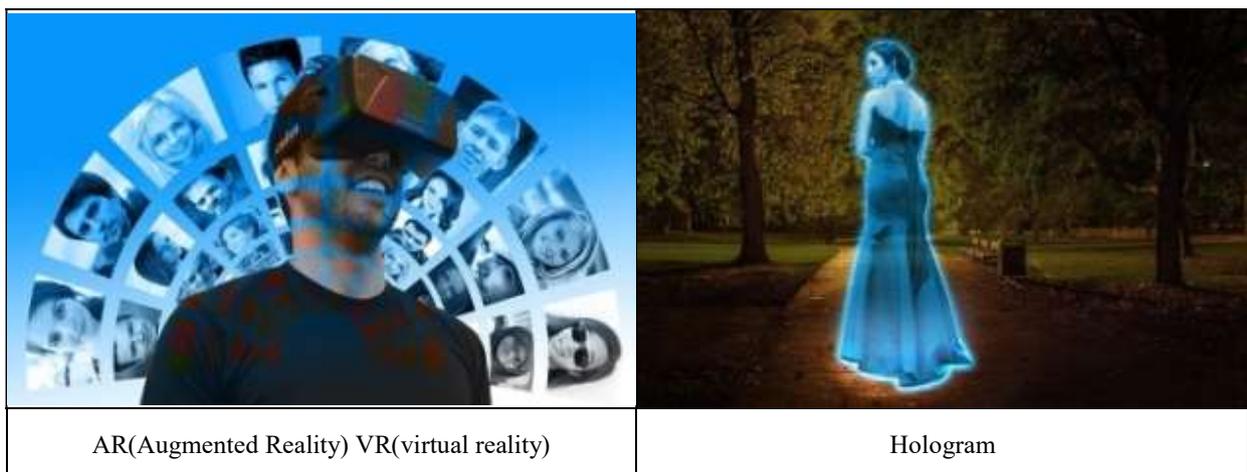


Figure 6: Virtual space realization technology

Virtual reality and augmented reality technologies are needed for content development. Although it is a virtual space, learners can save time with realistic composition, and indirect experience opportunities can also be provided with characters and virtual characters implemented in holograms. <Figure 6> describes the image of content technology.

It is not just a lecture-style learning method, but a virtual space (AR, VR) and hologram technology to develop content using technology. In addition to the non-face-to-face method, practical information utilization education contents using the latest technology will be developed so that you can access it anytime, anywhere, and get the necessary information. Learners can access content using individual devices or using learning equipment.

#### 4. Discussion

There have also been papers published in the last five years with references suitable for the research topic, but there have also been papers published long after five years of research using library education, ubiquitous environment, and web resources. Rather than reflecting on the current situation, these papers should be referred to the reasons and principles for causing the past and present situation. If prior research and future situations can be predicted based on the past and present, Korea's educational environment will be further developed, and the direction can be presented as an information-use education model for school libraries reflecting E-learning elements at the center.

If flip learning techniques reflecting gamification elements are used for information education in school libraries and ubiquitous environments, the possibility can be confirmed. If an educational environment necessary for prior learning or practice is created and a system suitable for the user's level is provided, the practical studies of the comparative department can also be conducted as much as possible. If the E-learning environment can be standardized at the level of schools or educational institutions, it will be possible to provide a good educational model that can be used not only in school library user education but also in other disciplines. Considering the specificity of the target subject and learners compared to many subjects with various practical or practical subjects, I think a more solid educational model can be born. In flipped learning, communication and communication between instructors and learners are also an essential part, and due to the class, statistics that can express thoughts or visually about instructors, as well as learners, should be supported. If a new learning model is presented beyond the existing traditional teaching and learning model of education, and its effectiveness and validity are proved, it will show significant results.

In this study, only the curriculum and education systems were presented. There is a limit to applying this situation to all libraries. It is expected that future research will be conducted to compare and analyze learners who have conducted library use education with general educational models and non-face-to-face flipped learning education models, and to present effective educational models suitable for learners and grades.

#### References

- Ahn, M.R., Yeom, J. Y., Kim, S. Y., & Jung, J.Y. (2020). Systematic literature analysis on domestic game-based learning and educational gamification design research. *Journal of Korean Association for Educational Information and Media*, 26(3). 425-454
- Comprehensive Support System for Reading Education(2019). Gyeonggi-do, Korea: Retrieved from <http://reading.gglec.go.kr/r/newReading/main/main.jsp#reading2>
- Han, H. J. & Kim, Y. (2010). A study on the spatial design of public libraries in a ubiquitous environment. *Journal of the Korean Society for Information Management*, 27(4), 193-217.
- Kang, B. S. & Jung, Y. M. (2019). Development and operation case analysis of school library maker education programs. *Journal of the Korean Society for Library and Information Science*, 53(2), 117-137
- Kim, H. A., & Yoo, Y. S. (2020). A Study on the Development of a Flip Learning Model for Design Education: Focusing on the effect of applying design education. *Journal of Basic Design & Art*, 21(1), 113-125.
- Kim, M. K., Roh, J. H., & Yoo, G. H. (2007) A study on the implementation of a library-use education system based on SDG (Single Display Groupware). *Journal of the Korean Society for Library and Information Science*, 41(4), 217-227.

- Kim, S. Y. (2015). Transformation of information utilization education in Japanese school libraries. *Journal of the Korean Biblia Society for Library and Information Science*, 26(4), 201-219.
- Korea Educational Research Information Service (2021). Retrieved from <http://www.keris.or.kr/main/main.do>
- Korea National Open University Library education contents(2020). Retrieved from [http://library.knou.ac.kr/docs/knou/education/2020\\_edo.pdf](http://library.knou.ac.kr/docs/knou/education/2020_edo.pdf)
- Lee, E. B., & Choi, S. Y. (2020). A study on the development of a gamification instructional design model for digital learning design in museums. *Journal of Korean Association for Educational Information and Media*, 26 (1), 237-259.
- Lee, M. S. (2011). Effective operation plan of education for users of school libraries. *Journal of Korean Library and Information Science Society*, 42(3), 165-187.
- Lee, M. N., & Yoo, J. W. (2016). Case of development and use of an integrated management system and comparison of universities applying gamification. *Journal of Korean Association for Educational Information and Media*, 22(4), 805-834.
- Noh, Y. H., & Chang, R. S.(2020). A Study on the Librarians' Perception of Public Library about the Response to the COVID-19. *Journal of the Korean Society for Information Management*, 37(3), 203-220.
- Park, B. W., & Lee, C. W. (2020). A study on the effect of the system environment of LMS users on the intention to use it in the non-face-to. *Logos Management Review*, 18(4), 193-208.