

# The Study on the Efficiency of Smart Learning in the COVID-19

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## Abstract

This paper raised the need to examine how the online education environment triggered by COVID-19 and the smart learning environment can be established in consideration of the improvement of education and learning through learning analysis. Many studies are being conducted in Korea, and the Ministry of Education is continuously striving to build a smart school by promoting strategies for promoting smart education on the way to a talent powerhouse. Nevertheless, there is no unified definition of smart learning, and it can be seen as customized (individualized) learning using smart devices. However, most of the discussions on the construction of smart schools so far have limitations in that they are limited to physical spaces. Accordingly, the opinions of teachers and learners were not sufficiently reflected in the establishment of the facility. This study intends to study smart learning in various departments. In addition, the subjects students in charge of the co-researcher of this study were analyzed. The total number of subjects was 951, and 434 responded to this study survey. In addition, students were well accepting the online environment, and in the future, regardless of COVID-19, research will be presented to improve mutual communication between professors and students in smart learning.

**Key Words:** Smart Learning, Artificial Intelligence, Digital Transformation, Teaching and Learning Methods, LMS.

## I. INTRODUCTION

As artificial intelligence, a key technology in the era of the 4th industrial revolution, is drawing attention, interest in artificial intelligence-based education that helps education and learning is increasing. In addition, interest in learning analysis that studies learning data to improve education and learning by utilizing learning data generated from online environment, Internet of Things, mobile, and physiological and psychological data is increasing [1]. Meanwhile, as digital transformation accelerates further due to the global spread of COVID-19, social interest in the remote education and online education environment is increasing. Accordingly, it was necessary to examine how artificial intelligence-based education, online education environment triggered by COVID-19, and smart learning environment considering improvement in education and learning through learning analysis can be established. In fact, many studies have been conducted on smart learning and smart learning environments over the past decade. Many studies are being conducted in Korea, and the Ministry of Education is continuously striving to build a smart school by promoting strategies for promoting smart education on

the way to a talent powerhouse. Nevertheless, there is no unified definition of smart learning, and it can be seen as customized (individualized) learning using smart devices [2]. However, most of the discussions on the construction of smart schools so far have limitations in that they are limited to physical spaces. Research on the construction of existing school facilities has stopped mainly at the level of presenting problems with school facilities and the environment, or partially reflecting the fact that learning activities can be carried out more flexibly and smoothly in terms of architecture and facilities [3]. In addition, research on the construction of existing school facilities is insufficient to reflect the opinions of teachers and learners who are the subjects of education and learning. Accordingly, the opinions of teachers and learners were not sufficiently reflected in the establishment of the facility. This study intends to study smart learning in various departments.

## II. RELATED RESEARCH

This paper intends to examine the strengths and limitations of recent online education, as well as smart education and digital transformation.

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### 2.1. Advantages and Limitations of Online Education

Currently, the term online education has become popular, but in the past, the expression non-face-to-face distance education was more commonly used as a concept in contrast to the traditional on-site face-to-face education method. Online education includes both simultaneity and asynchronous distance education that has relatively few temporal and spatial constraints and can utilize various media and teaching and learning materials, unlike field-to-face education, that is, offline education. According to recent studies, the biggest advantage of online education in the COVID-19 crisis is that online classes are free from the risk of exposure to infectious diseases [4]. In addition, another advantage of online classes is that in online classes, task-oriented classes and repetitive learning using various mediating tools such as video media are possible, and that learners are given more opportunities for self-directed learning [5]. In particular, online classes have the advantage of being relatively easy to motivate learning compared to offline classes because learners can adjust their learning speed according to their level, and if necessary, they can search for and use materials through internet searches, etc. On the contrary, online education still has various problems to be solved [6].

First, one of the practical reasons why the spread of online education has traditionally been difficult in the education field is that it takes a lot of budget to build infrastructure for online education (eg, personal computers, learning management systems, interactive platforms, etc.). This was not easy to enforce in that it was not only required for the main body of education, such as schools and teachers, but also for students who are the demand for education. In fact, in the first half of 2020, due to the spread of COVID-19, classes in front-line schools were suddenly switched to online, and the Ministry of Education also provided equipment to students who did not have equipment such as personal computers [7].

Second, interactive communication between instructors and learners in online classes is more limited than in offline classes [8]. Therefore, for smooth communication, the instructor must develop and provide additional auxiliary learning materials, and the problem of the instructor's burden of work remains a task to be solved by online education [9].

Third, in order to check the learning performance of the learners in the online class, the current instructor requires that the learners submit various assignments. Accordingly, the increase in the number of assignments for each subject is causing an excessive learning burden on the learners. Another aspect of online education is that considered to be a problem. This is because the reliability or fairness of online evaluation has not been sufficiently secured to check learning performance through assignments, and this is considered a limitation of online classes [10].

Fourth, unstable internet connection due to server overload as a result of the full online class conversion after Corona 19 is also a factor that aggravates learners' anxiety

about learning. Fifth, the use of a new medium has the effect of inducing the learner's interest in the early stage, but as time goes by, the interest decreases and the fatigue of using the medium relatively increases [11].

Finally, the most serious problem is that the problems of online education mentioned so far can eventually reduce the learner's concentration in learning, and the difference in the online learning environment at home can deepen the learning performance gap for each individual [12].

### 2.2. Smart Education

Several years have already passed since the word "smart education" came out. Nevertheless, smart education has emerged as the most important topic in the education world because of the expectation that the paradigm of education will change from school-centered to student-centered [13]. On the other hand, this is because educational subjects have expanded from simple teachers and students to industries that provide smart devices and SNS services, as well as complex ecosystems such as structuralism, informal learning, and social learning. Some researchers have suggested the definition of 'smart education'. It also defined smart learning as "intelligent customized learning" and emphasized smartness considering learners' abilities, and defined learner-led and people-centered learning methods effectively support interactions between learners and teachers and enable the design of self-directed learning environments [14]. In addition, it emphasized the learning system, defined it as a "learning system that optimizes learning outcomes," focused on learning outcomes, and maximized learning interactions with social media using smart devices [15]. Emphasizing the learning environment is because it is the convergence of formal and informal learning, strengthening presence, expanding learning, and learning environment of various app-based learning activities [16].

As such, smart learning is a learner-led learning method that maximizes learning outcomes along the learning system using intelligent information and communication technology, and provides various sources, interactions, and presence. In addition, smart education has limited its scope to school public education by inheriting the characteristics of smart learning [17].

However, while it is urgent to break through educational innovation, smart education is being used as an alternative, so there is also an aspect of promoting smart education with a weak academic foundation. Above all, governments such as the Ministry of Education defined smart education as a global leader by efficiently utilizing educational systems such as school education, educational content, educational method, educational evaluation, and educational environment using information and communication technology and Smart education is an intelligent customized learning system to strengthen learners' competencies in the 21st century,

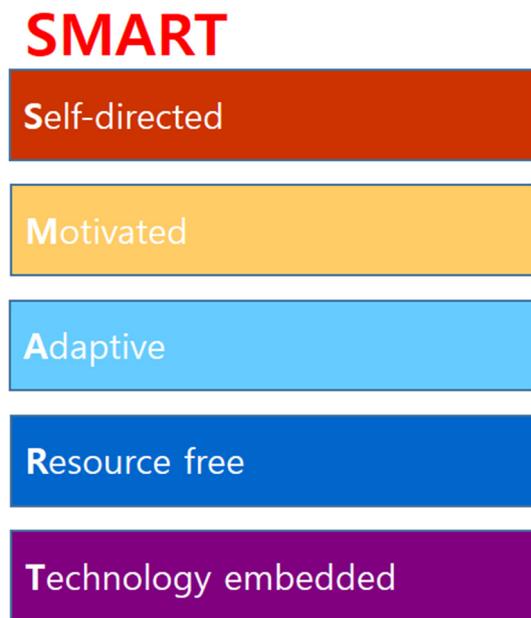


Fig. 1. Definition of smart education.  
Sources: <http://www.sjpost.co.kr/news/articleView.html?idxno=8733>  
(2019.1.7.)

and is a driving force to innovate the educational system such as educational environment, educational content, educational methods, and evaluation (Fig. 1). Internet resources. As an educational paradigm in the 21st century, discovering and nurturing talent is almost the only definition created for the government's policy purposes. In addition, the government is focusing on the spread of digital textbooks, phased development of digital textbooks, development and application of smart learning models, and revision of laws/systems of digital textbooks. Detailed missions are limited to public education schools compared to intellectual learning discussed above, but contain the willingness to innovate all education-related contents using information and communication technology. In other words, if wisdom learning is a learning method, it can be said that smart education encompasses the overall learning environment and also includes the aspect of wisdom learning method. The success of smart education means that all elements or ecosystems that make up it must be considered.

### 2.3. Digital Transformation (DT)

Digital Transformation (DT) refers to a strategy in which a company integrates digital and physical elements to change its business model and establish a new direction for the industry. Digital transformation also refers to the use of new, fast, and frequently changing digital technologies to solve problems by utilizing cloud computing and reduce dependence on hardware users in possession, but increase dependence on subscription-based cloud services. Some of these

digital solutions enhance the functionality of traditional software products (e.g., Microsoft Office comparable to Office 365), while others are entirely cloud-based.

As service providers are guaranteed to earn regular income through subscriptions, they can reduce risks (history, most software companies have gained most of their income through user upgrades and have to invest enough in developing new features and advantages to encourage users' upgrades), and use agile software development internally to deliver shorter cycle updates. International Data Corporation (IDC), a market research consulting firm, viewed DT as a "continuous process in which companies adapt to or promote disruptive changes in customers and markets (external ecosystems) by utilizing digital capabilities to create new business models, products, and services." In addition, A.T. Kearney saw this as a corporate activity that dramatically increases the competitiveness of the current business or pursues new growth through new businesses by proactively responding to changes in the business environment triggered by digital new technologies such as Mobile, Cloud, Big data, AI, and IoT. Major companies and institutions define DT from various perspectives.

DT can be divided into three stages according to changes in the digital paradigm, when digital products were released and digital infrastructure within the company was established as the Internet was introduced in the late 1990s. The second stage is the "Digital Business Promotion Stage" in the early 2000s, where e-commerce was activated based on the Internet and marketing and business reinforcement were promoted. The third stage is the "digital transformation stage," in which the industrial structure changed with the development of digital technologies such as mobile, IoT, and artificial intelligence in the early 2010s, and digital transformation took place in all aspects of corporate management strategies such as organizations, processes, strategies, and business models. Meanwhile, Forester Research predicted that in the upcoming 2020, all companies will face the fate of either digital predator or digital free. In order for a company or organization to form DT, digital and leadership competencies are required. Digital competency refers to the interest and vision of management to change the operating process of a company, and leadership competency refers to speed, governance, and ways to promote change. The components of digital competency consist of HRD intensive development areas of recent digital transformation organizations, such as strong customer experience creation capabilities, core operating capabilities, and business model crafting capabilities. Leadership competency consists of the ability to establish a digital vision, the ability to induce large-scale participation of the organization, and the ability to build digital governance. Also, the proportion of men and women is shown in Table 3.

Table 1. Instructors for each subject.

Subject name	This is the distinction	Professor in charge	The number of students	The number of people who responded to the questionnaire
Security operating system, blockchain technology and application, malicious code analysis, and living with artificial intelligence	Major	Seong-Kyu-Kim	272 viewers	168 people (61.8%)
Impromptu acting, performance production practice	Major	YoungEun Lee	33 people	33 people (100%)
Writing and reading	Basic liberal arts	Mi-Jeong Lee	322 viewers	114 (35.4%)
Computing-based problem solving	Basic liberal arts	Eun-Sil Jang	324 viewers	119 people (36.7%)

Table 2. Basic information for each grade.

Sortation	The number of people who responded to the questionnaire
1st grade	249 people (57.4%)
2nd grade	65 people (15.0%)
3rd grade	85 people (19.6%)
4th grade	35 people (8.0%)

Table 3. Gender basic information.

Sortation	The number of people who responded to the questionnaire
Man	222 people (51.2%)
Woman	212 people (48.8%)

### III. RESEARCH METHOD

#### 3.1. Research Subjects

The purpose of this study is to obtain insights accordingly by looking at responses to non-variant education in various departments.

The subjects students in charge of the co-researcher of this study were analyzed. The total number of subjects was 951, and 434 responded to this study survey. The basic information of the study subjects is shown in Table 1.

There were 249 first-year students and 185 second-year to fourth-year students who responded to the survey. The reason why there are many first-year students is that there are many research subjects of professors in charge of basic liberal arts subjects. 222 male students and 212 female students responded to the survey. The detailed information of the study subjects is shown in Table 2.

#### 3.2. Research Methods

Due to COVID-19, the non-face-to-face class environment has become inevitable. Several meetings were held to

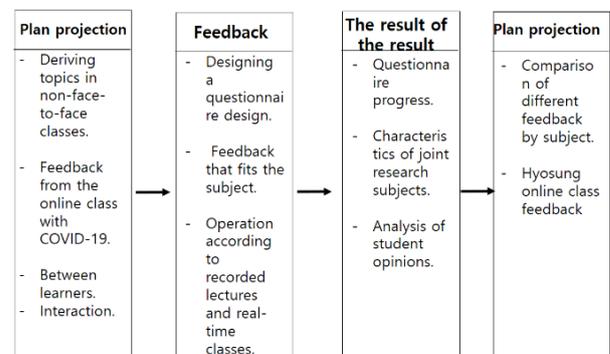


Fig. 2. Research procedure.

derive the topic of measures to proceed for efficient teaching in non-face-to-face class situations, and the research was decided as follows.

Courses were operated online for non-face-to-face classes, and online teaching methods included providing recorded videos or real-time classes. There was also an advantage of being able to take recorded videos repeatedly, but there were many opinions that it was difficult to interact (communicate) with professors and learners when learning was difficult. Among the professor-learner interactions (communication), each subject was operated and a questionnaire was conducted to students, focusing on feedback. Through the survey response results, we intend to derive an efficient feedback plan for online classes by analyzing the characteristics of feedback and opinions of students for each subject. The detailed information of the research procedure is shown in Fig. 2.

### IV. RESEARCH RESULTS

#### 4.1. How to Use Video Media

##### 4.1.1. Characteristics of education using video media

Summarized the characteristics of education using video media into seven categories as follows.

First, the meaning or content is presented in the form of an image. Video media can show the process of change, and the flow of cause→process (state)→results can be presented through images in the form closest to reality.

Second, the temporal elements included in ideas and phenomena can be controlled. Through high-speed photo graphing techniques or low-speed photographing techniques, fast movements or slow changes can be easily expressed and presented as images.

Third, depending on the intention of the manufacturer, it can be presented by showing the real thing small or greatly expanding it.

Fourth, spatial elements can be controlled and presented realistically in various spaces.

Fifth, reality can be reconstructed and presented in an easy-to-understand form. A reconstructed video of reality can present the nature of thoughts and ideologies easily to learners.

Sixth, learner-centered images can attract learners' attention, focus attention, and induce interest.

Seventh, you can share and understand the experiences of fellow learners, including learners.

Therefore, educational activities using videos can be used as a medium and tool for communication in classes by presenting videos. It acts as a new level of education through video with a system different from the existing text language. The image performs a process of adding voice to the image taken through perspective and the camera angle. Various visual elements are composed and arranged to use editing functions, and brightness and saturation can be adjusted.

#### *4.1.2. How to communicate using video media in art subjects*

In order to maximize artistic experience, instructors must consider the changes, effects, and possibilities of art and science and technology. It is possible to communicate in a wide variety of ways through video media in art subjects. Its method is as follows.

##### *4.1.2.1. Process*

Instructor's learning materials production, upload → learner's assignment submission → instructor's feedback video production, upload → learner's self-evaluation, peer evaluation, etc. → Internet surveys, questionnaire records, individual in-depth interviews.

##### *4.1.2.2. Feedback method according to each medium*

###### ① School e-Class (LMS)

Students majoring in theater and film submitted assignments or test videos through LMS. The video is within 3

minutes, and the instructor downloads each video and evaluates it.

The back video is comprehensively included in one video uploaded in the LMS lecture content, and for the student's personal information, a personal message is sent in a random order without mentioning the real name. Students check the number assigned to them and check the instructor's feedback. The feedback image varies depending on the amount of comments, and on average, it is about 5 minutes per person. If there were many people, a 100-minute video was divided and posted. Afterward, students' questions about feedback were made through LMS messages, text messages, SNS, or oral methods.

###### ② Youtube

Video classes and feedback were conducted using YouTube video sites. Video feedback was conducted among practical subjects of students majoring in theater film and acting by accessing the instructor's personal channel, and each student was also given a personal number and individual feedback was possible by checking each number. The advantage was that attendance check and communication were possible in real time through comments. While giving feedback, I accessed the related site, searched for materials together, searched for musical videos, watched them together, and used them as reference materials.

###### ③ Text message or social media (Kakaotalk)

It is possible to communicate with each other through text messages or SNS, and feedback was conducted using Kakaotalk, one of the representative SNS applications. In this case, since they communicated individually, more immediate communication was possible and whether or not the message was checked was possible. The disadvantage is that the number of images increases because the video is produced and uploaded individually, so if the video is omitted or the capacity is large from the instructor's point of view, transmission failure may occur.

###### ④ E-mail

Feedback was conducted to exchange videos through personal e-mail. When students majoring in musicals send actual practice videos by e-mail, the instructor downloads them, evaluates the videos, produces and shares feedback videos. In this case, it was advantageous not to be affected by capacity limitation or transmission speed because the video was integrated into the email, and feedback by text was also possible at the same time. However, the disadvantage was that the list of classes was not quickly identified.

#### 4.1.3. Results

As a preferred method of mutual communication in group activities, 17 text or SNS (51.5%) and LMS (message function, etc.) responded the most with 12 (36.4%), followed by 2 phone calls (6.1%) and 2 not applicable (6.1%). When asked if feedback was possible and satisfied by themselves, 12 people (36.4%) answered yes the most, followed by 10 people (30.3%), 8 people (24.2%), 2 people (6.1%), and 1 person (2.5%) who did not.

As a question of whether mutual communication and feedback with colleagues (others) are needed in group activities, 12 respondents (36.4%) answered yes the most, followed by 10 respondents (30.3%), 8 respondents (24.2%), 2 respondents (6.1%), and 1 respondent not applicable (2.5%). The feedback from colleagues (others) was the most answered yes with 12 (36.4%), followed by 10 (30.3%), 8 (24.2%), 2 (6.1%), and 1 (2.5%) who did not.

When asked if it is helpful to study when someone is close to a member of the group, 12 people (36.4%) answered yes the most, followed by 10 people (30.3%), 8 people (24.2%), 2 people (6.1%), and 1 person (2.5%) who are not. In response to whether they think there are many difficulties in studying when there are no close friends as a member of the team, 12 respondents (36.4%) answered yes the most, followed by 10 respondents (30.3%), 8 respondents (24.2%), 2 respondents (6.1%), and 1 not applicable (2.5%).

## 4.2. Liberal Arts "Writing and Reading" Subject Questionnaire

Of the 322 students in the <Writing and Reading> course, 114 responded to the "Effective Feedback Plan Survey in Online Classes". Group and individual paper feedback was conducted three times, and this is the result of responding to the survey after conducting individual feedback through ZOOM.

#### 4.2.1. Basic information on participants

Since the <Writing and Reading> subject is an essential liberal arts subject for first graders, all 114 subjects who participated in the survey were first graders, and 54 male students (47%) and 60 female students (53%) responded to the survey.

#### 4.2.2. Online teaching method

As a preferred online class method, 68 recorded videos (60%), 32 mixed (28%), 12 real-time classes (11%), and 2 others (2%). In the case of guitar, they responded to the survey that all online methods are good.

#### 4.2.3. Results

As for whether the class plan and detailed information are appropriate, 111 (98%) answered yes, and 3 students answered that it was normal or not. 108 (95%) answered

yes to whether the class was conducted according to the proposed plan, while 5 (4%) answered normal, and the rest of the students did not. (1 person).

As for whether the learning period and attendance recognition period are appropriate, 112 (98%) answered yes, while 1 (1%) answered that it was normal, and the rest of the students said it was not. As for whether the theory and practice of the class are appropriate, 107 (94%) answered yes, while 5 (4%) answered that it was normal, and the rest of the students did not.

104 (92%) answered yes to whether the test (including quizzes) was fairly evaluated, while 9 (8%) answered normal and the rest of the students did not. As to whether rules for cheating were guided during the test, 108 (95%) said yes, while 4 (4%) said yes, and the rest of the students said no.

As for whether online class communication and feedback guidance are appropriate, 107 (96%) said yes, while 3 (3%) said yes, and the rest of the students said no. There were 71 students (62%) in LMS (comments or messages, etc.), 39 (34%) in text or SNS, and 4 others, while other contents included oral, mail, and real-time classes (ZOOM).

The results of responses to the subject of <Writing and Reading> are summarized as a need for positive perception of mutual feedback and adaptation to all conditions. Due to the nature of the class called writing, personal activities are bound to be premised. In addition to the importance of communication, students show transitional characteristics in that they expressed limitations in online communication while greatly sympathizing with the efficiency of feedback. This is recognized as an adaptation process to online classes, and is interpreted as a goal to implement the process of self-awareness of the goals and outcomes of the class.

## 4.3. Analysis of Response Results of a Questionnaire on Computing-Based Problem Solving Subjects

Of the 324 students in the computing-based problem-solving course, 119 responded to the "Effective Feedback Plan Survey in Online Classes." The data collected through the closed questionnaire were analyzed by descriptive statistics, and the data collected through the open questionnaire were analyzed by categorizing the coding method.

#### 4.3.1. Online class environment information

The devices used to participate in online classes were 83 laptops (70%) and 25 desktop PCs (21%), followed by tablets, smartphones, and others (multiple uses). When participating in online classes, 105 people (88%) at home and 8 students at school (7%) were the most common places, followed by others (dormitory, company), and cafes.

#### 4.3.2. Online teaching method

As a preferred online class method, 73 recorded videos (60%), 42 mixed (35%), and 6 real-time classes (5%) appeared in order.

### 4.3.3. Results

112 (94.1%) answered yes to whether class plans and detailed guidance were appropriate, while 3 (2.5%) answered normal and the rest of the students said no. As to whether the class was conducted according to the proposed plan, 116 (97.4%) answered yes, and 3 (2.5%) answered no. 113 (95.0%) answered yes as to whether the learning period and attendance recognition period were appropriate, while 3 (2.5%) answered normal, and the rest of the students said no. As for whether the theory and practice of the class are appropriate, 112 (94.1%) said yes, while 4 (3.4%) said yes, and the rest of the students said no. 113 (95.0%) answered yes to the fair evaluation of the test (including quizzes), while 3 (2.5%) answered normal, and the rest of the students did not. 106 (89.1%) answered yes to whether the rules for cheating were guided at the time of the test, while 9 (7.6%) answered normal and the rest of the students did not. As for whether they are generally satisfied with the class, 113 (95.0%) answered yes, while 3 (2.5%) said yes, and the rest of the students said no.

In the subject of <Computing-based Problem Solving>, the most common response was that personal learning through recorded videos was preferred even though practice was conducted using a computer. Some responded that they knew that mutual communication was necessary, but felt burdened with questions about participating in real-time classes. It was a part that made us realize the need to study various methods for mutual communication. Zoom's annotation function was used as a way to replace mutual communication through individual questions. When the students were asked a common question, they all had time to answer the screen together with annotations. There was an effect of increasing interest and participation in such mutual communication.

About 95% answered positively to most closed questionnaires, but about 90% answered positively to the speed of Q&A feedback. This is a problem with mutual communication and feedback in online classes and is consistent with opinions on slow speed. It is interpreted as a negative opinion that immediate question and answer are not possible as in face-to-face classes.

## 4.4. Information Security, Artificial Intelligence, and Blockchain Subjects

Information security, artificial intelligence, and blockchain surveyed 4th graders in college. Due to the nature of information security, computer engineering is also a parallel study, and it can be said to be a survey at a professional engineering college.

### 4.4.1. Online Class Environment Information

The devices used to participate in online classes were 150 laptops (75%) and 29 desktop PCs (20%), followed by

tablets, smartphones, and others (multiple uses). When participating in online classes, 119 people (90%) at home and 8 students at school (4%) were the most common places, followed by others (dormitory, company), and cafes.

### 4.4.2. Online teaching method

As a preferred online class method, 272 recorded videos (64%), 42 mixed (30%), and 6 real-time classes (4%) appeared in order.

### 4.4.3. Results

272 (91.1%) answered yes to whether class plans and detailed guidance were appropriate, while 3 (3.6%) answered normal and the rest of the students said no. As to whether the class was conducted according to the proposed plan, 272 (97.4%) answered yes, and 3 (5.2%) answered no. 272 (94.0%) answered yes as to whether the learning period and attendance recognition period were appropriate, while 3 (3.1%) answered normal, and the rest of the students said no. As for whether the theory and practice of the class are appropriate, 270 (98.1%) said yes, while 4 (4.2%) said yes, and the rest of the students said no. 272 (95.6%) answered yes to the fair evaluation of the test (including quizzes), while 3 (2.1%) answered normal, and the rest of the students did not. 106 (90.5%) answered yes to whether the rules for cheating were guided at the time of the test, while 9 (9.6%) answered normal and the rest of the students did not. As for whether they are generally satisfied with the class, 260 (98.0%) answered yes, while 3 (1.5%) said yes, and the rest of the students said no.

Due to the nature of information security, artificial intelligence, and blockchain subjects, most students are familiar with the online environment and computer, so the speed of adaptation to online untact is very fast. So, I quickly adapted using these characteristics.

## V. CONCLUSION

This paper after discussing the characteristics of class management in non-face-to-face class situations for each subject in charge, the research topic was derived, "With Corona Era, Comparative Research on Feedback Methods in Online Classes: Focusing on Interaction between Professors and Learners."

In addition, the questionnaire was designed, feedback was conducted for each subject in charge, and the response results were analyzed to derive an efficient feedback plan for online classes.

As can be seen from the previous discussions, the learning environment after COVID-19 will increase the possibility that blended and hybrid learning will become more common and expand. Therefore, related guidelines and curriculums need to be reorganized in all directions so that they

can be stably incorporated into the school environment, not in a one-time or temporary part. In fact, there were many inquiries from school sites related to attendance, evaluation, and records due to remote classes conducted after the outbreak of COVID-19, and the Ministry of Education proposed a new guideline for this (Ministry of Education, 2020c). It is necessary to reorganize the guidelines so that this part can be used stably even in situations where blended and hybrid learning become common in the future. In addition, it is necessary to consider and prepare for some flexibility in the operation of the timetable in the short term and flexibility of the curriculum in the long term. According to the design principle of this study, flexibility of learning time and space is one of the components of a smart learning environment, and in the long run.

The school environment should gradually change within this context, just like the direction that future education aims for. Therefore, in the short term, various digital learning contents and materials for autonomous curriculum operation should be secured, and in the long term, foundations such as system maintenance should be established so that autonomous curriculum can be appropriately melted within our public education environment. In addition, it was a good study to compare students from various departments.

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He has international certifications such as CISA(Certified Information Systems Auditor), CISSP(Certified Information Systems Security Professional), PMP(Project Management Professiona), ITIL Foundation, CCNP, SCJP, ISE, CPPG, ISO 27001, ISO 19011, ISO 20000, ISO 9000, ISO 22301 has etc.

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**Mi-Jung Lee** was born in Seoul, Republic of Korea. In Aug. 2003, she received her master's degree in Korean Language and Literature from Sogang University. In Feb. 2011, she received Ph.D. in Korean Language and Literature from Sogang University.

She started teaching at Sogang University in 2011. She taught liberal arts and critical writing. Since 2014, she has taken liberal arts classes at Chungbuk National University. And since 2016, she has taught writing and discussion classes at Soongsil University.

Since 2013, she has participated in the development of a foreign writing curriculum at Sogang University, and researched the operation of foreign language classes. In addition to she conducted several studies on the writing process at Sogang University.

She received research grants from the National Research Foundation of Korea from 2012 to 2016. She mainly studied writing textbooks and creative theory in the 1950s. She had been a researcher at Kangwon National University since 2017. During this time, she did research on the Gangwon-do region.

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**Young-Eun Lee** was born in Seoul, Republic of Korea. After graduating from Dongguk University's Department of Theater, she worked as an actor at Daehakro Theater Company. In addition to plays, I learned the process of creating culture and arts through various activities such as broadcasting, movies, CFs, and fashion shows. He became an acting

instructor at various acting academies, a youth leader at the Korea Scout Federation, a creative arts educator (TA) at the Seoul Foundation for Cultural Heritage, and a theater play instructor, and taught acting education to students of various ages, from infants to adults, for 15 years. She received a master's degree in performing arts (M.F.A) in 2011 from Dongguk University Graduate School of Culture and Arts, and completed a doctorate in performing arts at Sejong University in February 2020.

She appeared at the Vladivostok Youth Theater as an actor (starring) in the 2018 Maxim Goriki 150th Anniversary Festival hosted by Russia, and was invited to the Maxim Goriki Russia International Theater Festival in 2019 to perform at the Nizhny Novgorosi Academy Drama Theater. In February 2020, he was invited to the 3rd Egyptian International Monodrama Festival to perform a one-person play in English for his play "HOME" and won the Best Acting Award for the first time in Asia.

As she is interested in the relationship between art, society, and education, the title of my master's thesis is "Research on Theater Play Programs Using Smartphones." She gave birth to the first paper that combines Smartlearning with a play. In February 2020, the journal of the Korean Society of Acting and Arts published a paper titled "Research on the Components and Development of Acting Education Contents Using SNS - Focusing on YouTube." It was recognized for its originality in that it was the first paper to analyze the acting education content of a video medium called YouTube, and was highly evaluated for analyzing educational videos in detail according to appropriate standards. To this day, she is still interested in developing programs for acting education such as online education, e-learning, smart (S) learning, and acting video education.