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College students’ experience of emergency remote teaching due to COVID-19☆

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ABSTRACT

This study analyzed South Korean college students' experiences of emergency remote teaching as a result of COVID-19 utilizing thematic analysis, which is a flexible and in-depth qualitative method used to analyze the similarity and association between individually derived theme words and discover meaningful associative relationships. The subjects of the study were college students at D University selected by purposeful sampling technique. A semi-structured questionnaire focusing on students' satisfaction and dissatisfaction with emergency remote teaching as well as their desired improvement was distributed online, and a total of 393 student responses were collected for analysis. According to the results of the study, the most common environment and method for participating in classes were student homes and personal laptops. Students noted some positive features of emergency remote teaching such as comfortable educational environments, smooth interactions, and efficient time utilization, while network instability, unilateral interactions, and reduced concentration were shown to be causes of students' complaints. Areas students identified for improvement were closely related to the causes of complaints, such as network stabilization, recorded lecture sharing, and the activation of interactions. The results of this study concluded that college students' educational environments are important, and the quality of interactions can vary depending on the teachers and technology used. Based on the results of this study, an improved and effective emergency remote teaching system maintaining academic achievement similar to traditional classroom teaching can be designed in preparation for any possible future crisis like COVID 19.

1. Introduction

COVID-19 has completely changed lifestyles throughout the world. Social distancing has been advised or mandated, and authorities have cautioned people to limit travel as much as possible. Similar safety measures apply to education. In Germany, all schools were mandated to close by the federal government through April 20, 2020. State government then led the development of remote learning and supplementary learning materials through the Learn at Home menu on the Agency for Education’s website, which recommends the use of the Lernraum Berlin platform for online learning. In the United Kingdom, although the government did not issue guidelines for online education in response to COVID-19, this approach is being implemented at various, schools depending on their situation (Institute, 2020). After the first case of COVID-19 was reported in South Korea, the Ministry of Education postponed the beginning of the school year four times, and a phased online approach has now been put into place for the start of the term (Institute, 2020). Colleges have autonomy in decision-making, but protecting students and faculty from COVID-19 is of the utmost importance. Many colleges in China, as a result, have canceled face-to-face classes and implemented online learning to improve the safety of students and faculty (Wang, Zhang, Zhao, Zhanh, & Jianh, 2020). In South Korea, colleges canceled the on-campus classes that was scheduled to start on March 2, 2020, and have opted to move ahead with online learning instead of face-to-face instruction. Administrators, faculty, and students are adapting themselves to the novel online learning environment in a variety of ways.

However, online learning has not only been implemented in response to crisis. Since the development of the internet and networking technology enabled learners to study regardless of their location, online learning has been proposed as a possible substitute for face-to-face learning (Stacey, Peter, & Barty, 2004). A subset of online learning, video-based distance learning, which enables two-way interaction between different classrooms using remote imaging, has been in
widespread use since the 1990s (Jeong, 2010). Additionally, video-based distance education, a recognized method of online education, has been found to be suitable for the educational environment of the twenty-first century, facilitating two-way interactions, participation in learning, and class achievement, along with a similar level of satisfaction as that derived from face-to-face classes (Jeong, 2010). This form of distance education contains the greatest similarity of all existing forms of online learning to face-to-face classes. However, unlike existing online courses, which are conducted in a way that follows planned course designs, currently education in colleges is being done in the form of emergency remote teaching. This is an alternative, temporary method of teaching that is evolved in response to a specific crisis situation (Wang et al., 2020) and thus strictly differs from typical distance education. “By definition, distance education is characterized by the distance in time and/or space between learners and learning resources. While remote education refers to spatial distance, distance education considers distance within the perspective of different angles and strives to explain it through transactionaldistance” (Bozkurt & Sharma, 2020p. 2). However, according to Means, Bakia, and Murphy (2014), effective online learning should consider several factors, including pacing, student-teacher ratio, modality, pedagogy, the role of the student, the role of the teacher, online communication synchrony, the role of online assessments, and feedback. Because current class designs are understood to be only temporary responses to the emergency need for remote teaching, with greater authority given to administrators than professors in designing, developing, and implementing curricula, these classes do not demonstrate sufficient quality (Affouneh, Salha, & Khlaif, 2020; Hodges, Moore, Lockee, Trust, & Bond, 2020).

Moreover, both teachers and learners have difficulty adapting to emergency remote teaching, as it does not have a planned class design in the way that existing online learning does. Institutions that are implementing emergency remote teaching should consider support that is easy to access, is effective, and addresses factors of distance learning such as interactions with students and their parents or guardians, required infrastructure, the ability of the personnel to operate emergency remote learning, meeting the needs for learning, navigating the difficulties experienced by students and personnel, and the outcomes, performance, and feedback of students and staff (Hodges et al., 2020). In addition, methods of emergency remote teaching differ from college to college, and some colleges are already equipped with online learning systems, although others are not, which has led to various perceptions of the process and effectiveness of learning among students, who are, ultimately, the consumers of education. Furthermore, other unpredictable changes in the environment may occur, such as war, regional conflict, and other natural disasters, so the need to prepare for and implement education using remote imaging systems will persist (Bozkurt & Sharma, 2020).

Thus far, there have been studies done focusing on online class experience. The results of one of these indicate that academic achievements at online schools are better than those at similar traditional schools (Shoaf, 2007). Barnett-Queen, Blair, and Merrick (2005) found many college students to be able to learn in online discussions and that such discussions are not inferior to those in traditional face-to-face discussions. Qiu and McDougall (2013) reported that in small online discussions, students do not spend a lot of time socializing as they would in a traditional face to face class, allowing them to stay focused, and text-based online subgroup discussions lead students to focus more on the discussions because they are all recorded. There are also findings discussing about the environment and experience of online classes. Such studies take account of the convenience of taking online classes. Students have been found to be satisfied with the flexibility they experience in remote learning, where they do not have to worry about what to wear for school, are not burdened by commuting, and can adjust their progress to fit their own pace and schedule (Alexander, Truell, & Zhao, 2012).

For studies that take the negative characteristics of online classes into account, findings indicate that students may misunderstand assignments when classes are not face-to-face, they experience difficulty when technical problems occur, and they can get distracted by engaging in activities not related to classes, such as checking Facebook while taking classes. In addition, it has been reported that class delays may occur, and the need for self-discipline has grown (Alexander et al., 2012). A study showed that unlike traditional college education, students cannot participate in online classes that require cooperation, interaction between students and professors is insufficient, and students cannot participate in discussions with diverse groups of students (Dumford & Miller, 2018). A study of online discussions that was conducted with graduate students did produce positive responses to online instruction but also reported that when given a choice, students preferred face-to-face discussions, and they considered online discussions to be a valuable additional method of having discussions but that they could not replace face-to-face discussions (Tiene, 2000). As shown, there have been studies demonstrating both positive and negative aspects of the experience of online classes. However, there are a limited number of studies that have been conducted on the experience of new emergency remote teaching, another type of online classes.

Therefore, this study analyzed the experiences of college students undergoing emergency remote teaching at D University in South Korea due to COVID-19, focusing on contents related to satisfaction, dissatisfaction, and needs for improvement, in an effort to providing meaningful data that can lead to further development in emergency remote teaching.

2. Method

This study adopted a flexible and in-depth qualitative and epistemological thematic analysis method to seek characteristic content by discovering any repetitive patterns in the data and obtain insights into complex phenomena (Braun & Clarke, 2006; Kiger & Varpio, 2020). Thematic analysis analyzes the similarity and association between individually derived theme words and has the advantage of enabling core themes to be grasped and meaningful associative relationships to be developed between them.

2.1. Subjects

The subjects of the study were college students at D University selected by purposeful sampling technique. A semi-structured questionnaire was distributed online to 894 students currently taking remote classes at D University, and a total of 393 responded. The survey was conducted between April 13 and 17, 2020, after the students had had four weeks of emergency remote learning using synchronous systems, implemented with the Webex system, which was developed for real-time video conferencing and online meetings. The 393 subjects were 208 freshmen, 59 sophomores, 54 juniors, and 72 seniors; there were 170 male students and 223 female students. There were 11 participants from the College of Business, 23 from the College of Police & Criminal Justice, 150 from the College of Engineering, 18 from the College of Humanities, 11 from the College of Future Convergence, 2 from the College of Life Science & Biotechnology, 6 from the College of Law, 12 from the College of Buddhist Studies, 9 from the College of Education, 92 from the College of Social Science, 43 from the College of Arts, and 16 from the College of Natural Science.

2.2. Research process

To obtain the respondents’ experience of emergency remote teaching, a survey was conducted with a semi-structured questionnaire. This questionnaire contained the following three questions: “What features of remote learning currently in progress are you satisfied with, and why?” “What features of remote learning currently in progress are you dissatisfied with, and why?” “What features of remote learning currently in progress are you in need of improvement, and why?”
you dissatisfied with, and why?” and “What features of remote learning currently in progress do you want to be improved, and why?” The data thus collected were then analyzed using thematic analysis, in six stages: familiarizing data, generating initial codes, searching for themes, reviewing themes, defining and naming themes, and producing the report (Braun & Clarke, 2006).

For familiarizing data, the collected data were organized using an Excel spreadsheet for repeated review of the contents. When there were multiple responses for each question, each of those responses were organized into separate groups. To make the experiences of remote classes that were reported easier to understand, the common features were visualized using R programming into a word cloud, and the most commonly used words were noted.

While generating the initial codes, individual responses were changed into keywords, and the central ideas among the keywords were converted into initial codes. For example, in response to a question concerning the degree of satisfaction in remote classes, students said, “Interactions with the professor are carried out well,” “I like the fact that I can ask questions freely any time during the class,” and “I am satisfied with this type of class because I can comfortably listen while I am at home.” The individual initial codes derived in this way were then repeatedly examined and classified according to similar characteristics to search for themes. For example, the initial codes ‘communication’, ‘real-time communication’, ‘face to face communication’, and ‘multiple opinions can be expressed simultaneously’ were classified together due to their characteristic of interaction. To determine the importance of each thematic word classification item, content analysis was conducted using NodeXL, which normalized each item and determined the frequency of occurrence.

As the themes were being reviewed, a determination was made whether each initial codes appropriately belonged to its classification categories. Any initial codes judged to be inappropriately classified were reclassified.

The classification categories for each theme were then defined and given names reflecting their unique characteristics for the final report.

### 3. Results

#### 3.1. Use of Webex platform

##### 3.1.1. Locale of classes

A total of 430 responses were received to the question of what locations students used to participate in emergency remote learning. They identified their homes as the most common location, with 375 responses (87.21%), followed by cafés, with 45 responses (10.47%), reading rooms, with 5 responses (1.16%), dormitories, with 3 responses (0.70%), and offices, with 2 responses (0.47%).

##### 3.1.2. Technology used to take classes

A total of 434 responses were received to the question of what technology students used for participating in emergency remote learning. Laptops were identified as the most commonly used means, with 303 responses (70.44%), followed by desktop computers, with 150 responses (34.42%), phones, with 45 responses (10.47%), and iPads, with 36 responses (8.29%).

#### 3.2. Remote learning experience

##### 3.2.1. Advantages of remote learning

Students identified multiple advantages of using Webex for remote learning. Of the total 392 responses, excluding non-responses and inappropriate responses, the most commonly identified advantage was ‘comfortable educational environment’, with 27.04% (106) of the responses as shown in Table 1. Within this thematic word classification, convenience in class preparation (37), being able to take quality classes at home (31), and free learning environment (14) were considered to be meaningful. One student, who mentioned convenience, said, “I am satisfied with this type of class because I can comfortably listen while I am at home.” The contents belonging to this category include a focus on being flexible and able to adjust the physical environment to fit individuals’ own characteristics. The psychological comfort that results from not having to compete for seats or remaining with family members was also an advantage.

Table 1

| Areas of satisfaction with emergency remote teaching |
|-----------------------------------------------|
| Thematic word classification | Content coding | No. of occurrences | %  |
| Comfortable educational environment | Convenience for class preparation (37), taking quality classes at home (31), free learning environment (14), can select quiet place (11), reduced space constraints (6), reducing fatigue (2), avoiding competition for seats (2), reduced burden of movement on campus (2), and being able to be home with family (1) | 106 | 27.04 |
| Time utilization | Saving commuting time (62), saving time in general (28), can take classes immediately after waking up (6), reduction in travel time to campus (3), and making good use of the time in-between classes (3) | 102 | 26.02 |
| Smooth interaction | Improved communication with professors through the chat window (30), real-time communication (25), improved expression of opinions thanks to reduced pressure resulting from face to face communication (12), multiple opinions can be expressed simultaneously (8), guaranteed anonymity in communication (7), one-on-one conversations are possible (5), can communicate without noise from nearby people(3) | 90 | 22.96 |
| Social distancing | Prevention of COVID-19 (12), classes can be taken safely through videos (10), safe from infectious diseases (4), safety (2) | 29 | 7.40 |
| Data utilization | Data can always be shared (15), lecture content can be recorded (2), data or what are lacking can be searched immediately (3), recorded versions can be used (5) | 25 | 6.38 |
| Academic achievement | Feeling of one-on-one classes, feeling of taking a class alone (9), improved reviews through recorded versions (6), environment for solitary study (4), systematic teaching progress by teachers and experience of learning in new systems (2) | 21 | 5.36 |
| Psychological stability | Advantage of being able to talk comfortably (5), reduced burden in communication (4) | 10 | 2.55 |
| Transportation cost reduction | Reduction of transportation costs (9) | 9 | 2.30 |
| Total | | 392 | 100 |

3.2.2. Time utilization

‘Time utilization’ was the second most common theme, with a response rate of 26.02% (102). In this thematic word classification, saving commuting time (62) and saving time in general (28) were considered significant. The students who participated in this study considered it to be positive that they had reduced commuting time, travel time while on campus, and break time in between classes.

‘Smooth interactions’ also had a high response rate, at 22.96% (90).
feel like I don’t have a good sense of bonding with people or a sense of
have uploaded questions to the chat room.” Another respondent said, “I
Although the school is providing classes while interacting remotely in
progress (18) were found to be meaningful. One respondent said, “Since the sound
was shown to be meaningful. One student said, “Since the sound
chronization between the teacher’s voice and teaching materials (48)
were shown to be meaningful. One student said, “Since the sound
quality is poor and the platform access is unstable, crosstalk is severe,
Constraints on practice or experiments
Constraints on practice or experiments (18), reduced understanding due to the lack of practice (12), inconvenience in practice classes (12), restrictions on practice classes (6), difficulty in writing reports on experiments due to the lack of firsthand participation in experiments (2),
Insufficient data provision
No provision of recorded lectures (9), no provision of learning materials (7), broken blackboard writing (4), lack of data in the case of some teachers (3)
Dissatisfaction with substitution of assignments
Dissatisfaction due to substitution of assignments (11), substitution of remote learning with assignments (9)
Constraints on team projects
Teamwork is not possible (4), team projects are not operated smoothly (3), group activities are inconvenient (3), lack of a sense of belonging and a sense of fellowship (3)
Reduced academic achievement
Reduced academic achievement compared to face-to-face lectures (6), teachers are not active in classes (2), determination of the quality of classes (2), provision of old lecture materials that are not helpful to the class (1)
Unprepared class design
Dissatisfaction with writing on the blackboard in internet lectures (3), insufficient system utilization (3), difficulty in writing reports due to the lack of explanations (2), and provision of existing videos during classes (2)
Reduced understanding of classes
Reduced understanding of learning (5), lower understanding compared to field lectures (3)
Dissatisfaction with assessment
Burden due to taking only the final exam without the midterm exam (6), ambiguity of the test evaluation (2)
Administrative dissatisfaction
Tuition cost-effectiveness is low (3), the same tuition fee is paid despite lack of practice classes (3), school facilities such as libraries cannot be used (1), mismatch between administrative and teacher communication (1)
Dissatisfaction with relationship formation
The chance to make friends disappeared (5), it is difficult to share information with students who take the same class (1)
Dissatisfaction with educational environments
The inconvenience of taking classes at home or a café (2), the burden of turning on the camera at home (2), low privacy (1)
Total
457 100.00

Table 3. Among the contents that belong to this thematic word classification, lagging phenomenon (102) and asynchroniztion between the teacher’s voice and teaching materials (48) were shown to be meaningful. One student said, “Since the sound quality is poor and the platform access is unstable, crosstalk is severe, and time is wasted.”

The second most frequent complaint was ‘unilateral interactions’, with a response rate of 17.29% (79). In this thematic word classification, no interaction, difficulty in sharing thoughts (29) and unilateral progress (18) were found to be meaningful. One respondent said, “Although the school is providing classes while interacting remotely in real time, I feel uncomfortable because some professors load only their recorded copies at class time and do not answer questions even when I have uploaded questions to the chat room.” Another respondent said, “I feel like I don’t have a good sense of bonding with people or a sense of belonging because we don’t see each other face to face or talk with the professors in depth.”

The third most frequent complaint was ‘reduced concentration’, in 13.13% (60) of responses. Many students said things like, “It is hard to concentrate on classes for a long period of time,” “Concentration is reduced while working on team projects due to the lack of a sense of belonging or a sense of fellowship,” and “the level of immersion is low.” Additionally, 10.94% (50) of responses reported ‘constraints on practice or experiments’, through statements including “I cannot take a practical subject properly through remote lectures,” “I cannot fully understand the subject because I cannot conduct experiments firsthand,” and “the subject is too difficult to practice alone.”

Other themes identified in these dissatisfaction responses were ‘in insufficient data provision’, ‘dissatisfaction with substitution of assignments’, ‘constraints on team projects’, ‘reduced academic achievement’, ‘unprepared class design’, ‘reduced understanding of classes’, ‘dissatisfaction with assessment’, ‘administrative dissatisfaction’, ‘dissatisfaction with relationship formation’, and ‘dissatisfaction with the educational environments’.

3.2.2. Shortcomings of remote learning
A total of 457 responses, including duplicate responses, contained complaints about remote learning. The most frequent complaint of these was ‘network instability’, which appeared in 34.14% (156) of responses as shown in Table 2. Among the contents that belong to this thematic word classification, lagging phenomenon (102) and asynchronization between the teacher’s voice and teaching materials (48) were shown to be meaningful. One student said, “Since the sound quality is poor and the platform access is unstable, crosstalk is severe, and time is wasted.”

Contents that belonged to this thematic word classification included the fact that interactions were improved when the respondents took online classes with professors, as they could chat frequently through chat rooms, allowing them to speak comfortably with each other without needing to worry about what other people would think of them. One respondent said, “I would be nervous and afraid when I asked questions of the professor during offline classes, but now I feel more comfortable because I can turn off my camera and ask questions more easily.”

Other notable advantages that were cited less frequently were ‘social distancing is possible’, ‘data that can be recorded can be used’, ‘academic achievement’, ‘psychological stability’, and ‘transportation cost reduction’.

3.2.3. Desired improvements in remote learning
Students most commonly cited ‘network stabilization’ as an area for improvement, with a response rate of 43.31% (123) as shown in Table 3. Among the contents that belong to this thematic word classification, server stabilization (48), network error improvement (44), and disconnection phenomenon improvement (12) were shown to be meaningful. Some example comments surrounding improvement included, “It would be good if the sound quality or video quality were improved,” “I am upset when the screen has low video quality due to network instability,” and “the screen is severely asynchronous with voices.” In addition, 19.37% (55) of responses expressed a desire to share recorded lectures. Improvement to the ‘activation of interactions’
had the third highest response rate at 15.14% (43), as students wanted the opportunity to communicate with and give comments to professors and team members. Other suggestions included, “practice classes should be given,” “the assessment system should be switched to the absolute assessment system,” “attendance problems should be solved,” “systematic environments should be supported,” “the substitution of assignments should be improved,” “burdens due to increased quantities of assignments” had the third highest response rate at 15.14% (43), as students wanted the opportunity to communicate with and give comments to professors and team members. Other suggestions included, “practice classes should be given,” “the assessment system should be switched to the absolute assessment system,” “attendance problems should be solved,” “systematic environments should be supported,” “the substitution of assignments should be improved,” “burdens due to increased quantities of assignments” and “team project activities should be improved.”

4. Discussion

4.1. Learning environment

Students’ homes were the most common locale for participating in temporary remote learning as a result of COVID-19. Being able to learn in a personalized space was noted by students as a great advantage to distance learning. According to Earthman (2002), schools or classroom spaces that are too complex or are crowded can create various problems, and students’ academic achievement can suffer as a result. Our results show that the online learning environment is comfortable and convenient to most students, which can be an important element that positively affects academic achievement.

Although only a few number of students reported experiencing inconvenience because the existing school environment was not provided, these opinions are still worthy of consideration. In this group, the most common reasons for feeling dissatisfaction were ‘the inconvenience of taking classes at home or a café’, ‘the burden of turning on the camera at home’, and ‘exposure of privacy’. In particular, the distaste for the exposure of one’s privacy should be considered with interest. According to Baruh, Secinti, and Cemalcilar (2017), media users concerned about privacy hesitate to access online services or information and take measures to protect their privacy. As privacy can be exposed in spite of the will of those who use media as such, the provision of information for the protection of students’ privacy and systematic preparation for the foregoing are also necessary.

To enable successful academic achievement, it is necessary to understand how students utilize different means for study (Surry & Ensminger, 2001). Laptops were the most frequently used device for classes. Some students took classes through their mobile phones, although there were not many of them. Unlike the case of face-to-face classes, learning outcomes may rely on students’ access to high-quality media, which can differ by economic status. Students face challenges as a result of poorly designed classes in a crisis, and they become dissatisfied with the lack of perceived fairness in education and difficulty in obtaining educational resources (Affouneh et al., 2020). Consequently, measures of improving access to necessary educational materials should be considered to ensure that students’ academic achievements are not negatively impacted by their economic situation.

4.2. Satisfaction with remote learning

Students who participated in this study were satisfied with the available and comfortable educational environment offered by remote learning. El Mansour and Mupinga, 2007 showed that one advantage of online learning is that students can take classes from any location, so long as they have access to a computer; this is reiterated by this study. According to Daymont, Blau, and Campbell (2011), students who prefer online classes express the reasons of flexibility and convenience. This has similarity with the finding of this study that the ability to freely choose one’s environment for taking classes is considered a great advantage for emergency remote learning.

In addition, the participants said that the class interactions through emergency remote learning were smooth, they were easily able to use the class materials, and they could concentrate better on classes. The fact that the participants foregrounded their satisfaction with online class interactions, which are a typical advantage of face-to-face classes, may indicate a potential shift towards remote learning in the future. Additionally, some student responses indicated that they would be better satisfied with being able to listen to questions and feedback through one-on-one chatrooms than in face-to-face classes, indicating that there are advantages unique to remote learning. These characteristics highlight differences among face-to-face classes, existing online classes, and emergency remote classes. In particular, in discussions, face-to-face classes have the advantages of emotional content, energy, fluidity, ease, ability to read non-verbal signs, and more immediate feedback, while online classes have the advantages of allowing students to take their time to think and reflect to find and analyze more in-depth information and being better suited for more introverted students (Meyer, 2007). However, in real-time emergency remote classes, students experience the advantages of both face-to-face classes and online classes, learning outcomes may rely on students’ access to high-quality media, which can differ by economic status. Students face challenges as a result of poorly designed classes in a crisis, and they become dissatisfied with the lack of perceived fairness in education and difficulty in obtaining educational resources (Affouneh et al., 2020). Consequently, measures of improving access to necessary educational materials should be considered to ensure that students’ academic achievements are not negatively impacted by their economic situation.
classes because free communication is made possible through a chatroom. Expression of opinions in the chatroom enables interactions with the professor that can take place individually as well as communication with all participants, making interactive interactions possible even with the use of media, and the fact that communication using texts allows time to think is also considered an advantage.

Students were also satisfied with the fact that remote learning allowed them to reduce their commuting time to school, letting them use that time for other activities. Although students were unable to freely select their class time, they were still satisfied with the fact that they could meaningfully use the time they had previously had to invest in commuting between face-to-face classes. In addition, some students reported that they felt that remote learning actually help them with their academic achievement due to a number of reasons including the fact that they could repeatedly review recorded class videos as well as focus better studying alone. Weidemeyer presented independent, convenient environments that fit the learner and provided a sense of individuality and responsibility as major important characteristics of online learning (Simonson, Schlosser, & Hanson, 1999). Moreover, Buchanan (1999) stated that the qualities for success in remote learning include independence, understanding of data, and the ability to manage time. These qualities may vary by student, but with the advantages of remote learning in relation to academic achievement as demonstrated in this study, it is important to provide students with the necessary information and skills to better approach and take advantage of remote learning.

Furthermore, the high student to professor ratio in colleges is often cited as an issue in relation to academic achievement. The fact that students in this study showed satisfaction with real-time emergency remote teaching because it made them feel as if they were taking one-on-one classes is a new finding and a potential solution to the aforementioned issue. Therefore, the advantages of this form of teaching method for students is worth preserving for possible future combination with face-to-face classes.

4.3. Dissatisfaction with remote learning and improvement

Students suggested improvements around areas of dissatisfaction, such as improving network instability, activating interactions through the improvement of unilateral interactions, and conducting face-to-face classes for hands-on classroom activities.

The largest dissatisfaction with remote learning related to network instability, and students cited experiences of network difficulties that disrupted their classes. In remote learning, networks are both a means of distributing educational materials and a means of promoting interaction between the teacher and students or among students (Trentin, 2007). Therefore, networks are important to the online learning environment and one of the most significant areas for improvement.

Dissatisfaction with the interactions in online learning included poor communication with the instructor as well as inability to collaborate effectively with classmates and a lack of possible feedback to be exchanged between students. According to Tu and McIsaac (2002), online communication can vary by typing skill. They add that because appropriate communication is difficult if typing is insufficient, teachers should assess the levels of this skill in their classes. This demonstrates the need for additional, helpful resources that can be provided to students enabling to develop technical skills involved in remote learning.

Moreover, results indicate that interactions are influenced more by the personal characteristics of the students than by the system of remote teaching. As a result, teachers and learners consider themselves satisfied with interactions only when they are able to master the functions of the online platforms and use them seamlessly, participate actively, and invest sufficient time in communication. According to Kathleen and Christopher (2020), the foremost driver of students’ intellectual development is their peers in the same class, and the online educational system thus comes at a huge loss. Therefore, measures to enable smooth interactions among peers through online media should be devised, and teachers’ ability to lead such interactions should be developed.

Concentration is another significant issue that students complain about, stating that long classes and lack of a sense of belonging or fellowship led to reduced levels of concentration. According to Wei (2020), adjusting the pace of online classes can reduce concentration issues along with being able to deliver class content more effectively. In addition, Kathleen and Christopher (2020) stated that in the case of emergency remote online classes, not only are students unable to acquire specialized skills, but also they cannot improve their level of comprehension and do not feel that they are involved in their classes. Therefore, innovative teaching methods should be pursued to create a more effective learning environment in remote teaching. The roles of teachers and learners are an important element for improving the effectiveness of remote learning. Students seek to be provided with the necessary tools for classes to take place in a realistic environment that allows for smooth participation and active teaching.

Furthermore, remote learning is unfamiliar and challenging for both teachers and students. According to Trust and Whalen (2020), teachers also feel burdened and unprepared for online instruction and suffer from internet connectivity issues and unclear educational policies, similar to their students. Therefore, to improve remote learning, the difficulties experienced by both students and faculty should be understood, and ways should be sought to solve them. According to Schleselman (2020), the potential for future crises requiring the implementation of remote classes is high. For this reason, it is time to prepare online learning environments where students can actively participate in place of the poor class designs currently being used. In addition, Cavanaugh (2005) stated that online learning takes more time to prepare, revise, and interact with than face-to-face classes. Therefore, a more systematic and effectively planned remote learning system should be devised tackling the disadvantages of emergency remote learning presented in this study.

5. Limitations

This study was conducted only four weeks after the initiation of emergency remote learning. The experiences reported here may not apply to students who have experienced more remote instruction. Therefore, student perspectives from multiple periods during which emergency remote learning was put into practice should be examined. In addition, a limited number of students participated in this study, so it cannot be indicative of all students’ experiences. Since this study was conducted at one institution, its results do not account for any emergency remote learning occurring in other colleges or countries. Furthermore, this study only accounted for students, so faculty and staff experiences were excluded. Thus, the perspectives of diverse educational administrators and school personnel should be studied in the examination of emergency remote learning moving forward.

6. Conclusion

The data surrounding students’ perceptions of emergency remote teaching in this study indicate that students have a high interest in learning how to utilize this new system better to perform well academically. To aid student learning and achievement, a proper educational environment and system that facilitate academic achievement must be prepared. In addition, it is necessary to provide an easily comprehensible, practical manual for teachers and students, as they are unfamiliar with this educational method, and make further developments in effective class designs, improving the disadvantages, strengthening the existing advantages and taking into consideration the students’ suggestions all mentioned in this study for a more successful emergency remote teaching moving forward.
CRediT authorship contribution statement

Tae Eun Shim: Conceptualization, Supervision, Methodology, Data curation, Software, Resources. Song Yi Lee: Conceptualization, Visualization, Investigation, Writing - original draft, Writing - review & editing, Resources.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Appendix A. Supplementary material

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References

Affouneh, S., Salha, S., & Khlaif, Z. N. (2020). Designing quality e-learning environments for emergency remote teaching in Coronavirus crisis. *Interdisciplinary Journal of Virtual Learning in Medical Sciences*, 11(2), 1–3. doi:10.1080/10494820.2020.1739976.

Alexander, M. W., Truell, A. D., & Zhao, J. J. (2012). Expected advantages and disadvantages of online learning: Perceptions from college students who have not taken online courses. *Issues in Information Systems*, 13(2), 193–200. https://aisc.org/ais-
2012/114.js.2012.193.200.pdf.

Barnett-Queen, T., Blair, R., & Merrick, M. (2005). Student perspectives of online discussions: Strengths and weaknesses. *Journal of Technology in Human Services*, 23(3–4), 229–244. doi:10.1080/105488805.03.05.

Baruth, L., Secinti, E., & Gemelaciz, Z. (2017). Online privacy concerns and privacy management: A meta-analytical review. *Journal of Communication*, 67(1), 26–53. doi:10.1111/jcom.12276.

Boukurt, A., & Sharma, R. (2020). Emergency remote teaching in a time of global crisis due to Corona Virus pandemic. *Asian Journal of Distance Education*, 15(1), 1–6. https://doi.org/10.5281/zenodo.3778083.

Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology*, 3(1), 77–101. https://www.tandfonline.com/doi/abs/10.1191/1478887406pq063oa.

Buchanan, E. A. (1999). Assessment measures: Pre-tests for successful distance teaching and learning. *Online Journal of Distance Learning Administration*, 2(4), 85–94. http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.573.767&rep=rep1&type=pdf.

Cavanaugh, J. (2005). Teaching online—A time comparison. *Online Journal of Distance Learning Administration*, 8(1)[https://www.westga.edu/~distance/odjla/spring01/cavanaugh81.htm].

Daymont, T., Blau, G., & Campbell, D. (2011). Deciding between traditional and online formats: Exploring the role of learning advantages, flexibility, and compensatory adaptation. *Journal of Behavioral and Applied Management*, 12(2), 156–175. https://doi.org/10.4103/0974-8763.95204.

Dumford, A. D., & Miller, A. L. (2018). Online learning in higher education: Exploring advantages and disadvantages for engagement. *Journal of Computing in Higher Education*, 30(3), 452–465.

Earthman, G. I. (2002). School facility conditions and student academic achievement. https://escholarship.org/uc/item/5w56439.

El Mansour, B., & Mupinga, D. M. (2007). Students’ positive and negative experiences in hybrid and online classes. College Student Journal, 41(1), 242–248. https://dl.pdx.edu/d2l/cas/viewer/viewFile.d2lfile:6605/824/modules/3-planning/3-teaching/online/1-online-learning-facilitation/articles/Mansour_and_Mupinga.pdf.

Hodges, C., Moore, S., Locke, B., Trut, T., & Bond, A. (2020). The difference between emergency remote teaching and online learning. *Educate Review*, 27, 7. doi.org/10.1108/jrheB2.191.

Jeong, J. (2010). Students’ responses to emergency remote teaching. *Interdisciplinary Journal of Psychological Research*, 7, 97–106. https://www.tandfonline.com/doi/full/10.1080/16838610.2009.1087669.

Kiger, M. E., & Varpio, L. (2009). Thematic analysis of qualitative data: AMEE Guide No. 131. *Medical Teacher*, 31(9), 846–854. https://www.researchgate.net/publication/241067949_Thematic_analysis_of_qualitative_data.

Schleselman, L. S. (2020). Perspective from a teaching and learning center during emergency remote teaching. *American Journal of Pharmaceutical Education*, 84(9), 11–29. https://www.journaloftechnologyinhumanServices.com/97/2012/114.js.2012.193.200.pdf.

Shim, T. E., & Lee, S. Y. (2020). COVID 19 response trend report in education. *Korean Educational Development Institute* (2020). COVID 19 response trend report in education. Overseas online education response status. Korean Educational Development Institute. https://www.kedi.re.kr/khome/main/annonce/ selectCoronaAnnounceForm.do?article_sq_no=33509&board_sq_no=51.

Means, B., Bakia, M., & Murphy, R. (2014). Learning online: What research tells us about whether, when and how. *New York: Routledge.

Meyer, K. A. (2007). Student perceptions of face-to-face and online discussions: The advantage goes to…., *Journal of Asynchronous Learning Networks*, 11(4), 53–69.

Qiu, M., & McDougall, D. (2013). Foster strengths and circumvent weaknesses: Advantages and disadvantages of online versus face-to-face subgroup discourse. *Computers & Education*, 67, 1–11. doi:10.1016/j.compedu.2013.02.005.

Simorsson, M., Schlosser, C., & Hanson, D. (1999). Theory and distance education: A new discussion. *American Journal of Distance Education*, 13(1), 60–75. https://www.tandfonline.com/doi/abs/10.1080/0892364992000212486.

Surry, D., & Ensminger, D. (2001). What's wrong with media comparison studies? *Educational Technology*, 41(4), 32–35. doi:10.1080/01587910.2000212486.

Trentin, G. (2007). Pedagogical sustainability of network-based distance education in university teaching. In E. P. Bailey (Ed.), Focus on distance education development (pp. 79–106). Nova Science Publishers Inc.

Tsai, T., & Whalen, J. (2009). Schools teachers be trained in emergency remote teaching? Lessons learned from the COVID-19 pandemic. *Journal of Technology and Teacher Education*, 28(2), 189–199. https://www.learntechtib.com/primary/p/v25995/

Tu, C., & McIseac, M. (2002). The relationship of social presence and interaction in online classes. *The American Journal of Distance Education*, 16(3), 131–150. doi:10.1207/s15389286ade1603_2.

Wei, B. (2020). COVID-19 and online teaching in higher education: A case study of Peking University, *Human Behavior and Emerging Technologies*, 2(2), 113–115. https://doi.org/10.1002/hbe2.191.

Wing, Y., Zhang, Y., Zhao, J., Zhanh, J., & Jianh, F. (2020). Mitigate the effects of home confinement on children during the COVID-19 outbreak. *The Lancet*, 395(10228), 21–27. doi:10.1016/S0140-6736(20)30547-X.