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Investigating the link between engagement, readiness, and satisfaction in a synchronous online second language learning environment

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ABSTRACT

Despite the increasing number of synchronous online learning studies examining the links between engagement, readiness, and satisfaction, to the best of our knowledge, no previous research has focused on investigating second language (L2) learners' satisfaction in a synchronous online learning environment at two waves of data collection. The present study examines this issue by conducting a measurement at the beginning and toward the end of the semester on a sample of 82 Korean undergraduate students using self-report assessments. This study further explored the ways in which students engage in an online synchronous learning environment using qualitative data. Ordinary least squares regression analysis was utilized to examine the predictive relationships between engagement, readiness, and satisfaction. The results showed that higher readiness was associated with positive satisfaction levels at the start of the semester, while learner engagement predicted higher satisfaction levels toward the end of the course. Moreover, students' use of learning strategies such as note-taking, recording, and searching for additional materials increased their engagement, strengthening the positive relationship between engagement and satisfaction. These findings suggest that L2 learner engagement can effectively facilitate increases in satisfaction in synchronous remote learning over the course of a semester.

1. Introduction

Amid the coronavirus pandemic, many institutions of higher education around the globe have transitioned to online learning, and many expect that this transition will accelerate a learning paradigm shift in the post-corona era. The technologies adopted in the online learning environment can be divided into asynchronous online learning and synchronous online learning. Discussion boards, blogs, and podcasts are examples of tools for asynchronous online learning, in which a speaker (or a writer) and a listener (or a reader) do not communicate simultaneously. On the other hand, synchronous online learning takes advantage of communication technology such as chat rooms and videoconferencing and allows participants to interact in real time. As it resembles the real world with face-to-face interaction, a growing number of institutions have facilitated synchronous online learning environments. Kohnke and Moorhouse (2020) positively analyzed the synchronous online language learning experience in Hong Kong after the COVID 19 outbreak. They

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believe that synchronous online language learning could surpass the traditional classroom as it "has enormous potential" (p. 5). However, despite the technology assisting the learners to overcome the physical distance barriers during the pandemic, Carbajal-Carrera (2021) identified technology anxiety, self-consciousness, dissatisfaction with in-class or outside-the-class interaction, and lack of body language as new challenges in synchronous online learning.

Among various factors that shape online learning, student satisfaction has long been identified as vital (Alqurashi, 2016; Moore, 2005; Wurst et al., 2008; Yukselturk & Yildirim, 2008). A large body of research has found emphatically that student satisfaction impacts both academic and administrative aspects of higher education (Carr, 2000; Gibson, 2010; Ilgaz & Gülbahar, 2015). There also has been a growing interest in engagement and readiness, both crucial drivers of student satisfaction (Bower, 2019; Wei & Chou, 2020). Currently, however, there is a limited understanding of how different dimensions of engagement and readiness impact overall satisfaction in second language (L2) synchronous online learning. In particular, the existing research fails to answer how engagement and readiness affect satisfaction at different stages of second language learning. Furthermore, we assume that the sudden change in the mode of instruction due to the pandemic (i.e., from in-person to synchronous online instruction) has affected students' readiness to learn and satisfaction with how they are learning. Synchronous online learning environments are currently in the spotlight due to unprecedented school closures worldwide, and it seems valuable to investigate student engagement, readiness, and satisfaction in those learning environments.

1.1. Online language learning satisfaction

Among various measures of learning success, student satisfaction has long been identified as a key indicator of both program success and quality (Alqurashi, 2016; Horvat et al., 2015; Ke & Kwak, 2013; Moore, 2005; Wurst et al., 2008). Studies have also revealed that student satisfaction significantly influences several factors in online learning: willingness to continue learning (Park & Choi, 2009), drop-out rates (Zhu, 2012), and academic performance and retention (Dhaqane & Afrah, 2016). As such, student satisfaction continues to be a topic of considerable interest among educators and researchers.

Research from the general education literature supports the importance of student satisfaction in language learning, especially as an integral and critical element of any technology-assisted environment. To date, studies have largely focused on four types of online learning with respect to student language learning satisfaction: synchronous learning environments (Bailey, 2021), asynchronous learning environments (Gyamfi & Sukseemuang, 2018; Hui et al., 2008), mixed learning environments, which are a hybrid of synchronous and asynchronous opportunities (Almusharraf & Khahro, 2020; Asoodar et al., 2016; Chen & Adesope, 2016; Harsch et al., 2021) and blended learning environments (Al Hassan & Shukri, 2017; Bueno-Alastuey & López Pérez, 2014). Recent advances in high-speed internet and the development of collaborative software have made online learning possible.

Synchronous learning involves real-time interactions between learners and instructors that resemble face-to-face interactions. A growing number of studies on synchronous online learning have shown that learners perceive these interactions (e.g., discussions, question-and-answer activities) as an essential component of their learning experience (Altun et al., 2011; Kuo et al., 2014; Lee et al., 2011). For example, Lee et al. (2011) investigated an introductory online course for undergraduate students using Blackboard and reported that both teacher and peer support during online learning had a strong positive effect on overall course satisfaction. Similarly, Kuo et al. (2014) and Harsch et al. (2021) found that both learner-learner and learner-teacher interactions are strong determinants of learner satisfaction. Specifically, Harsch et al. (2021) reported somewhat successful results in online language courses at a language center in Germany, which had been forced to switch face-to-face instruction with little notice at the onset of the Covid-19 pandemic. While they found high overall satisfaction levels among students, indicating that student-teacher interactions had activated a feeling of social presence, this success was limited by the fact that fewer students were satisfied with the student-student interactions that occurred online. This suggests that instructors need to play close attention to creating opportunities for student-student interactions in an online language learning environment.

Most of the previous studies on online language learning have assessed learner satisfaction either at the beginning or toward the end of a course (e.g., Bailey, 2021; Chen & Adesope, 2016; Harsch et al., 2021). However, learner satisfaction is not static and can vary at different stages of learning (Osman & Saputra, 2019; Royal & Bradley, 2005). Herbert (2006) suggested that a longitudinal satisfaction study in an online learning environment is needed, and we agree. To thoroughly understand satisfaction of students in synchronous online learning environments, this study was designed to assess learner satisfaction at the start and end of the semester, using multiple data sources through multiple measurements, and a combination of quantitative and qualitative methods.

1.2. Online language learning engagement and satisfaction

Student engagement is central to the success of any educational process, including language learning (Mercer, 2019; Mercer & Dörnyei, 2020). The concept of engagement in language learning originates from educational psychology research, and there is wide consensus on the multifaceted nature of engagement. Relatedly, a recent research synthesis on engagement in language learning studies revealed that the cognitive, behavioral, and emotional dimensions were the most researched facets of engagement (Hiver, Al-Hoorie, et al., 2021). Over 90 percent of the studies reviewed focused on these dimensions. However, language researchers are increasingly exploring the various dimensions of language learners' engagement, building on the existing framework from the general educational domain (Hiver et al., 2021a), research has consistently identified engagement in terms of cognitive, behavioral, and emotional dimensions.

In the current study, we conceptualized engagement as a collection of behavioral, cognitive, and emotional engagement strategies, based on Hiver et al.'s (2021a) synthesis of language learning studies. These dimensions are explained by Fredricks et al. (2004), where

the central aspect of behavioral engagement is participation, which includes a student's involvement and actions taken to learn (e.g., taking notes, raising a hand to ask a question). Cognitive engagement encompasses a student's investment in learning and appreciation of challenges, which includes a willingness to put effort into understanding complicated ideas and mastering difficult skills. Finally, emotional engagement reflects a student's overall positive affective reaction to learning.

Furthermore, Bower (2019) found that engagement is a growing topic of interest in technology-enhanced learning environments. It is well documented that engagement plays a fundamental role in online language learning environments (Egbert et al., 2002; Yang, 2011). However, although Fredricks et al.'s (2004) dimensions of engagement (behavioral, cognitive, emotional) are widely accepted among educational researchers, it is not yet clear whether these dimensions are a good framework when evaluating learning environments that employ today's technology (Bergdahl et al., 2020), particularly when it comes to online language learning. This issue needs further investigation. For example, Hu and Li (2017) identified four related limitations in their review of studies on learner engagement in online learning environments. The limitations were ignorance on the multidimensionality of engagement, the prevalence of qualitative research (versus quantitative and mixed methods), lack of consideration of emotional and psychological external reflection, and an overfocus on behavioral engagement. To resolve these issues, Hu and Li proposed that future studies combine quantitative and qualitative methods and consider different dimensions of student engagement throughout the learning process.

Studies in higher education literature outside the language learning field have consistently shown that greater satisfaction among learners indicates higher engagement during online instruction (Gray & DiLoreto, 2016; Kahu et al., 2013; Kucuk & Richardson, 2019; Murillo-Zamorano et al., 2019). For example, Murillo-Zamorano et al. (2019) developed a measurement scale to investigate the roles of core elements of skills-oriented learning—knowledge, skills, and engagement—in a flipped classroom. Using structural equation modeling, Murillo-Zamorano et al. confirmed a causal relationship between these three elements and student satisfaction.

In another study, Gray and DiLoreto (2016) examined whether engagement mediates the relationship between learner interaction and instructor presence on student satisfaction and perceived student learning. It was found that engagement had a mediating effect of learner interaction on perceived student learning but no effect of learner interaction on student satisfaction. Gray and DiLoreto reasoned that graduate students, the population they studied, are often self-motivated and may not require peer interaction for satisfaction. Considering the growing number of language learning courses offered fully online in higher education, and the importance of satisfaction in successful higher education outcomes, more studies are needed that offer explanations for how language learners' engagement in different dimensions is associated with satisfaction in an online learning environment. Therefore, it is very timely to investigate language learner engagement and satisfaction in an online context.

1.3. Online language learning readiness and satisfaction

Online learning readiness is a term coined by Warner et al. (1998). The definition includes students' preferences in terms of forms of instruction, confidence in the learning environment, and the ability to engage in learning. Expanding on this definition, multiple strands of research have offered instruments to measure online learning readiness and understand its multidimensionality (Kuo et al., 2014; Wei & Chou, 2020; Yilmaz, 2017). For instance, Rahimi and Katal (2012) identified three factors that are most relevant to language learning readiness: familiarity, attitude, and experience. In a study with 141 undergraduate students receiving instruction in English as a foreign language, perceived readiness had a positive and significant correlation with technology use (in this case, a podcast). It was also reported that students with higher readiness better recognized their own metacognitive learning strategies.

According to Wei and Chou (2020), while previous studies (Horzum et al., 2015; Kuo et al., 2014) determined factors deemed to be influential on student performance or course satisfaction in an online learning environment, little research has explored the relationships between online learning readiness and course satisfaction. Prasetya et al. (2021) investigated the relationship between online readiness and satisfaction in EFL settings during the pandemic and found a positive relationship between learning readiness and student satisfaction. They revealed that a higher level of student readiness leads to a higher level of learning satisfaction. (However, the study did not explicitly mention how they defined readiness.) Martin (2020) also examined learner readiness in online settings and how factors such as student attributes, time management, communication, and technical competencies relate to students' perception of readiness. Like the former study, dimensions of readiness related to online learning specifically were examined at the end of the course. Consequently, there is still limited understanding of how online learning readiness affects student satisfaction at all different stages of an online course.

1.4. Engagement strategies in online learning

As in conventional classrooms, learners in online classrooms engage in learning processes with different engagement strategies and different attitudes. In a comparative study of online and traditional classrooms, McFarland and Hamilton (2005) found that the factors that influence student performance and satisfaction differ significantly. Also, one of the most notable factors to have a significant impact on online learning but not classroom learning was the creation of a discussion board.

For years now, researchers have looked at students' perceptions, beliefs, challenges, and engagement strategies in web-based learning (Chang, 2007; Hwang et al., 2008; Song et al., 2004). Hwang et al. (2008) argued that research on student behavior could assist teachers by offering more constructive suggestions on how to enhance the learning experience. Researchers have continued similar investigations into online learning environments and how they impact on learning outcomes and student satisfaction (Bolliger & Martin, 2018; Lee et al., 2011; Martin & Bolliger, 2018; Wu et al., 2010). With the belief that acquiring more knowledge about learner engagement strategies could lead to the creation of more positive learning experiences, Martin and Bolliger (2018) examined engagement strategies in terms of different interaction patterns: learner-to-learner, learner-to-instructor, and learner-to-content

engagement. It was found that the learners valued learner-to-instructor engagement more than the other two patterns, which highlighted the importance of instructor presence. Similarly, Harsch et al. (2021) investigated language learner satisfaction in terms of interaction types and found that students showed more satisfaction with learner-instructor interaction than any other type of interaction. The researchers added that the findings could be due to the lack of opportunities for student interaction. Another interesting study by Bolliger and Martin (2018) compared instructor and learner perceptions of the importance of different engagement strategies and demonstrated that instructors and learners seem to have different perspectives. For instance, instructors rated certain strategies, including icebreaker and peer review activities, markedly higher than learners did.

Although the aforementioned studies offer valuable insights about online learning, the instruction in those studies was mostly or entirely asynchronous. Less is known about whether learners exploit similar engagement strategies in synchronous online learning environments.

1.5. The present study

Learner satisfaction has yet to be investigated from a longitudinal perspective in online learning environments, and this study aims to fill the research gap by examining how online learning readiness and engagement affect learner satisfaction over time in a language course during the emergency remote learning. Additionally, we investigate which aspects of synchronous online learning affect each subdimension of learner engagement and contribute to overall course satisfaction. We employ a convergent mixed methods design, which seeks to combine both quantitative and qualitative data in order to provide a more comprehensive analysis. Our research questions are as follows:

(1) To what extent do L2 learners' evaluations of their perceived readiness and engagement in an online synchronous learning environment predict their initial and end-of-semester levels of satisfaction?
(2) In what ways do L2 learners engage in an online synchronous learning environment, and how do different engagement strategies influence their satisfaction?

2. Method

2.1. Participants and sampling

The participants in this study were 105 undergraduate students (68% female) enrolled in a university in Seoul. The sample spanned the four years of undergraduate study (23% freshman, 39% sophomore, 8% junior, 30% senior). As we collected the participant sample under the emergency remote learning situation without advance preparation for a semester of online learning, we employed a non-probabilistic purposive sampling technique (Battaglia, 2008). The purpose of our study, then, is not to generalize the results or make inferences from the population but to describe and uncover their learning experiences during COVID-19.

These participants were invited to complete a study survey two times during the spring semester. Of the 105 students who completed the first questionnaire, 82 also completed the second questionnaire, for which they received bonus course credit. Data analyses were conducted on students who completed both two questionnaires ($n = 82$).

2.2. Data collection procedure

Students completed two surveys, with the first questionnaire given two weeks into the semester, which began in mid-March (2020), and the second survey administered towards the end of the semester in June of the same year. Whereas the first questionnaire had only Likert-scale items, the second questionnaire contained both Likert-scale items and open-ended questions. The question items were both asked and answered in the target language, English.

Students had one week to complete and return each survey, for which Google Forms was used. Normally, the spring semester starts on the first week of March; however, with the rapid spread of the coronavirus in South Korea, the Korea Disease Control and Prevention Agency (KDCA) raised the national infectious-disease disaster alert to its highest level on February 23. Accordingly, many Korean colleges and universities delayed the start of the semester by two weeks and decided to conduct classes online for the first two weeks of the semester, and with the continued worldwide spread of COVID-19, they continued to hold classes online in accordance with recommendations from the Korean Ministry of Education and the university's own administration. In the end, classes were held remotely for the entirety of the semester; the semester comprised 15 weeks of classes, including midterms and final examinations.

2.3. Instruments

As noted above, students completed two questionnaires to assess their satisfaction, engagement, and readiness of synchronous online second language learning. The first questionnaire comprised a total of 24 items, with satisfaction assessed at both the start and end of the semester. In addition to the satisfaction scale, the second questionnaire consisted of four open-ended questions. All relevant dimensions and corresponding items in the questionnaires are described below. Appendix also summarizes each individual item.

Engagement was measured with a 12-item scale encompassing subdimensions of engagement, an inventory developed by Bergdahl et al. (2020). They devised the inventory items based on the responses from students' interviews on different dimensions of engagement in a technology-enhanced learning environment; then they validated their engagement construct using confirmatory

factor analysis. These items reflect three subdimensions: behavioral (sample item*: I usually read or view what my teacher publishes (e.g., links, PowerPoints, podcasts, videos, announcements).*), cognitive (sample item: *I can easily concentrate when using a mobile phone or other digital technologies for teaching and learning.*), and emotional (sample item: *When my teachers publish material about the lessons (e.g., links, PowerPoints, podcasts, videos, announcements), I get frustrated because it is unclear what the teacher expects me to know.*). A Likert scale was adopted ranging from 1 (*not at all like me*) to 6 (*very much like me*). Item analysis identified three items with item-total correlations lower than 0.10. and therefore, we removed these items. The final number of items after the removal of three items was nine items. Internal consistency in the current sample is .60 ($k = 9$).

Readiness was measured using the 9-item scale developed by Walls et al. (2010), Rahimi and Katal (2012), and Ho and Kuo (2010). The items assess familiarity (sample item: *Prior to the coronavirus outbreak, I had taken live virtual classes.*), attitude (sample item: *I think live virtual classes are a valuable resource for learning.*), and experience (sample item: *I have had live virtual classes before the coronavirus outbreak.*), using a Likert scale ranging from 1 (*strongly disagree*) to 7 (*strongly agree*). Internal consistency for the composite readiness scale is 0.78 ($k = 9$).

Satisfaction regarding the online synchronous learning environment was measured with a scale based on the one developed by Gray and Meister (2004). Our scale had three items (sample item: *The live virtual classes offered by the university are close to my ideal live virtual classes.*). It also employed a Likert scale (1, *strongly disagree* to 7, *strongly agree*). Self-evaluation of satisfaction yielded Cronbach's alpha of .74 ($k = 3$). Coefficient alpha from the second satisfaction scale was 0.88 ($k = 3$).

Four open-ended questions presented in Table 1 were also used to measure satisfaction[1] and the three dimensions (i.e., behavioral, cognitive, emotional) of engagement.

2.4. Data analysis

Analysis was conducted in two phases. First, quantitative analysis was conducted using Ordinary Least Square (OLS) regression with the Stata 16 software program[2] (StataCorp., 2019). Regression analysis allows us to examine the contribution of students' engagement and readiness in predicting their satisfaction toward online second language learning. This analytical technique which estimates the relationship between variables and the method used to obtain the result is known as the method of least square (Agresti & Finlay, 2009). We employed the same predictors as in the previous regression model but with a different dependent variable at each time point (i.e., satisfaction assessed at the beginning of the semester versus satisfaction assessed toward the end of the semester). Thus, the hypothesized OLS regression model is:

$$SAT_i = \beta_0 + \beta_1 FAM_1 + \beta_2 ATT_2 + + \beta_3 EXP_3 + \beta_4 BE_4 + \beta_5 EB_5 + \beta_6 CE_6 + \beta_7 YIC_7 + \beta_8 HRS_8 + \varepsilon_i$$

where SAT_i represents the satisfaction outcome score for the student *i*. Coefficient β_0 represents the intercept for student *i*, and slope coefficients β_1 to β_6 represent the independent variables, familiarity, attitude, experience, behavioral engagement, emotional engagement, and cognitive engagement, respectively. Coefficient β_7 and β_8 represent control variables, year in college and hours online, respectively. Residual ε_i is the error term for student *i*. The R-squared statistics serve as measures of model fit, and Cohen's *d* determines the standardized effect size statistic (Cohen, 1988). The assumptions of the hypothesized regression model were tested including linearity, normality, homoskedasticity, and multicollinearity. There were no indications of violations of the assumptions.

Second, qualitative data collected from four open-ended questions were analyzed following the procedures for qualitative content analysis as suggested by Mayring (2000). To maintain the essential contents in a manageable size, at first, the data was generally categorized with the level of abstraction. Then, the categories were gradually elaborated with the revision of categories. During this procedure, the authors identified 418 and 534 codes, respectively, and grouped these codes into 110 and 134 concepts, respectively, which were related to satisfaction, engagement, and readiness. Coding for categories to include the behavioral, cognitive, or emotional engagement was accomplished through two rounds of analysis. Any discrepancies in the coding were resolved by continuous discussion until a consensus was reached, as recommended by Hill et al. (1997).

3. Results

3.1. Descriptive statistics and preliminary data analysis

Prior to the estimation of the regression analysis, descriptive statistics and correlations were evaluated for the measures. As shown in Table 2, the mean readiness responses were in the low-average range ($1.92 \leq Ms \leq 2.32$) for attitude and experience subscales. A preliminary analysis of the skewness and kurtosis values suggests that study measure values did not depart from normality. Strengths of relations were significant and positive, with students' attitude and satisfaction at the start of the semester ($r = 0.43$) and behavioral, cognitive, and emotional engagement and satisfaction towards the end of the semester ($rs = 0.29$-0.41) moderately related.

[1] There were no open-ended questions for readiness since the open-ended questions were asked at the end of the semester, and the readiness survey was conducted only at the beginning of the semester.

[2] Stata is a statistical software, like SPSS, R, or MPLUS, that enables users to manage, analyze, and visualize data.

Table 1
Open-ended questions for engagement and satisfaction.

Dimension	Questions
Behavioral engagement	What do you do for this online class other than required tasks (e.g., taking notes, raising your hand, recording the class, researching online)? How does this help your learning?
Cognitive engagement	When compared to offline classes, how much effort and time do you put into this online class? Please explain the differences in detail.
Emotional engagement	What adjective would you use to describe this online class? (e.g., joyful, interesting, frustrating, boring, etc.). Write one adjective and explain why you chose it.
Satisfaction	Will you recommend this online class to your friend? Why or why not? Please explain in detail.

Table 2
Descriptive Statistics and Correlations of Study Variables ($n = 82$).

		1	2	3	4	5	6	7	8
1	Familiarity	1.00							
2	Attitude	-.07	1.00						
3	Experience	.67*	-.04	1.00					
4	Behavioral Engagement	-.09	-.08	-.09	1.00				
5	Emotional Engagement	-.16	.13	-.13	.09	1.00			
6	Cognitive Engagement	.13	.12	.10	.14	-.12	1.00		
7	Satisfaction 1	.15	.43*	.14	.04	-.09	.18	1.00	
8	Satisfaction 2	.03	.04	.01	.25*	-.11	.41*	.31*	1.00
	M	2.32	4.35	1.92	4.83	3.67	4.12	3.68	4.41
	SD	1.11	.64	1.21	.77	.53	.76	.15	1.33
	Skewness	.56	-.14	1.29	-.44	-.15	-.81	.42	-.25
	Kurtosis	2.26	2.19	3.86	2.99	3.09	4.02	3.30	2.84

Note. Satisfaction 1 = satisfaction at the beginning; Satisfaction 2 = satisfaction at the end $\dagger p < .10$, $^{*}p < .05$, $^{**}p < .01$; $^{***}p < .001$.

3.2. Relationships of perceived readiness and engagement with initial and end-of-semester satisfaction

We conducted OLS regression analysis on student satisfaction across the two time points. Six independent subscales were of interest: behavioral engagement, emotional engagement, cognitive engagement, familiarity, attitude, and experience. As can be seen in Table 3, among all students, 25% of the variance in satisfaction at the beginning of the semester was predicted by a single variable: attitude, $\beta = 0.26$, $p < .001$. Effect size for attitude was small ($d = 0.20$) at the start of the semester. Toward the end of the semester, we found that among the students, three predictors explained 27% of the variance in satisfaction: behavioral engagement, $\beta = 0.10$, $p < .10$; emotional engagement, $\beta = 0.12$, $p < .05$; and cognitive engagement, $\beta = 0.13$, $p < .01$. Effects on these measures near the end of the semester were small ($d = 0.01$-0.26).(Fig. 1)

The qualitative responses from several students corroborate the quantitative findings that satisfaction later in the course was predicted by engagement throughout the course, and not by readiness. No student answered that readiness affected their later satisfaction.

Example 1. Student 13 (male, sophomore)

At first, the new method was unfamiliar and difficult, but it was interesting and quite fun to interact with professors and classmates through the collaboration program in real time. Not everyone can face each other in face-to-face lectures, but in online lectures, it was good to see everyone face-to-face when Cam turned on.

Example 2. Student 59 (female, junior)

At first I had a very negative feeling because technical problems or connection problems were too serious. However, as we went through the semester, it was quite interesting to have a group debate online. (…) We could search for information if we get curious and I think it was easier to change from base group to expert groups as well using the collaborate function.

Example 3. Student 28 (female, sophomore)

At first, I was really worried and was not satisfied about the courses going online. However, taking an online class motivated me to study more. I could have access to various materials more easily, and there were many useful functions that we can utilize in an online class. Also, having an online class saves much time commuting to school.

Student 37 (male, senior) even responded that their perception about online learning itself had changed positively through group work and easy access to online resources. At the beginning of the course, he thought that online classes could not effectively substitute for face-to-face classes, but his engagement in the class led to him feeling that online classes could be more beneficial than offline classes.

3.3. Identifying learner engagement strategies in synchronous learning environments

In addition to the quantitative findings that revealed the association between online learning readiness, engagement and

Table 3
Coefficients from regression analyses investigating changes in synchronous learning satisfaction.

	Satisfaction	
	Beginning of Course	End of Course
Intercept	159.17	98.32
Familiarity	.06	.01
Attitude	.26***	-.01
Experience	.01	-.02
Behavioral Engagement	.06	.10†
Emotional Engagement	-.01	.12*
Cognitive Engagement	.03	.13**
Year in College	-.08	-.05
Hours Online	.00	-.00
R^2	.25	.27
N classes	5	5
N students	82	82

Note.
†$p < .10$, $p < .05$, *$p < .01$, ***$p < .00$

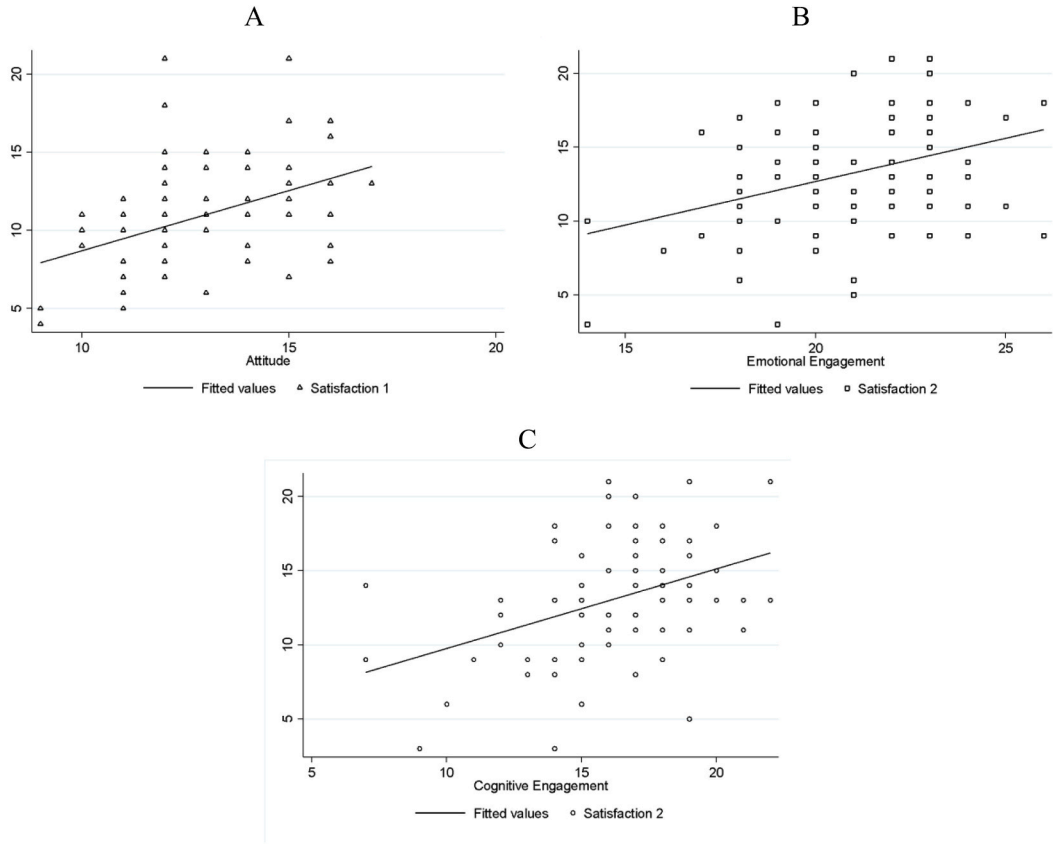

Fig. 1. Graphical Representation of Regression Model Results
Note. Displaying the three regression models predicting student satisfaction as a function of readiness and engagement in a synchronous learning environment. Fig. 1A: Fitted model predicting initial satisfaction as a function of attitude. Fig. 1B: Fitted model predicting satisfaction towards the end of semester as a function of emotional engagement. Fig. 1C: Fitted model predicting satisfaction towards the end of semester as a function of cognitive engagement.

satisfaction, the responses to the open-ended survey included L2 learners' various strategies to enhance their learning experience and increase satisfaction. These strategies were categorized into the three dimensions of engagement (i.e., behavioral, cognitive, emotional) based on the definition of Fredricks et al. (2004). Table 4 shows the number of responses related to each strategy.

Table 4
Learner engagement strategies of each dimension.

Dimension	Strategies	No. of responses	Percentage
Behavioral engagement	note-taking/recording	28	36.8
	preview and review of the material	13	17.1
	asking questions during class	13	17.1
	using online dictionaries	12	15.8
	using additional software/apps/devices	5	6.6
	technical preparation	3	3.9
	voluntarily answering questions	1	1.3
	leading a discussion	1	1.3
	total	76	100
Cognitive engagement	searching for additional materials (e.g., new articles)	28	60.9
	reflective writing	7	15.2
	connecting to real-world examples	4	8.7
	generating questions before class	2	4.3
	sharing additional materials with classmates	2	4.3
	self-monitoring	2	4.3
	learning from peers	1	2.2
	total	46	100
Emotional engagement	searching for additional materials (e.g., new articles)	2	66.7
	technical preparation	1	33.3
	Total	3	100

3.3.1. Behavioral engagement strategies

Behavioral engagement strategies were used throughout the course by many different students. During class, they took notes, made recordings, and asked questions. They said that these strategies helped them to participate more in discussions, understand better, organize their thoughts, and get new perspectives. Also, two students mentioned that they actively participated in class by volunteering to answer the instructor's questions ($n = 1$, 1.3%) and by taking the initiative to act as a discussion leader ($n = 1$, 1.3%). In addition, five students ($n = 5$, 6.6%) utilized additional technology such as screen-sharing, one-on-one chat rooms,[3] and digital sticky notes to motivate themselves.

Also, many learners identified technical problems as the main challenge during class. Sixteen learners mentioned that they needed to solve technical difficulties, while some of the students ($n = 3$, 3.9%) confirmed that they took precautions against technical difficulties before and after class to participate better in class, meaning they ensured beforehand that their computer accessories and internet connection were working well. In addition, 17.1% ($n = 13$) of participants mentioned they found they could get themselves ready to learn, participate better in class, and create more opportunities to talk by previewing and reviewing the instructor-provided learning material, while 15.8% ($n = 12$) responded that they used online dictionaries during class to understand and discuss more actively and to improve their English skills.

3.3.2. Cognitive engagement strategies

Among cognitive engagement strategies, searching for additional resources (60.9%; $n = 28$) was the most common. This group of students believed that additional materials could expand their knowledge, fulfill their curiosity, and enable in-depth discussion. Also, two students (4.3%) answered that they generated some questions by themselves in advance to ask during class, which helped them to focus and participate better.

Seven students (15.2%) answered that they wrote summaries or short essays to organize their thoughts about what they had learned. Four students (8.7%) responded that they tried to apply the knowledge they had gained to real-world problems. For instance, Student 59 wrote, "Starting to think in this aspect also helped me to think of ways I can apply these theories."

In addition, it was observed that students used self-monitoring ($n = 2$, 4.3%) and peer explanation ($n = 1$, 2.2%) to make up for their shortcomings and to notice and improve on their weaknesses. Student 28 (female, sophomore) reported, "In online classes, we don't usually have time for individual feedback. Therefore, I sometimes recorded my speech during a group debate. Through listening to it after class, I could check grammatical errors and work on my pronunciation." This student tried to overcome the lack of instant feedback from a professor by taking advantage of a cognitive learning strategy.

3.3.3. Emotional engagement strategies

There were only three students who mentioned that they used a couple of behavioral or cognitive engagement strategies to increase their emotional engagement as well. Two types of emotional engagement strategies were observed from their responses. The first emotional engagement strategy was technical preparation ($n = 1$, 33.3%). Student 81 answered that he/she needed to be technically prepared before the class because issues related to poor Internet connection, speakers, and a mic made the learner stressed. Technical problems affected both learners' quality of participation and emotions throughout the class. The response showed that the learner was

[3] The Zoom platform features instantaneous messaging to connect with the instructor or classmates in one-on-one or group chats. Documents, photos, and videos can be sent and received through the chat room.

aware of the fact that technical problems could influence their feeling and purposely checked the devices and the Internet connection in advance to reduce negative feelings.

The second emotional engagement strategy was searching for additional learning materials ($n = 2$, 66.7%). This strategy was used by a considerable number of learners ($n = 28$, 60.9%) as a cognitive engagement strategy. These learners mentioned that the purpose of searching for additional materials was to expand their knowledge, to have an in-depth discussion, and to fulfill their curiosity. Meanwhile, the purpose of this in terms of emotional engagement was to foster positive feelings during class. One of the two learners mentioned that having a variety of references helped them to understand the content of the class more easily. Similarly, the other learner said that they could be more confident in speaking in English by searching for relevant but new information. The responses revealed that searching for additional materials could positively influence learners' confidence and emotions by expanding their knowledge.

3.3.4. Emotional engagement and online-specific factors

While most of the behavioral and cognitive engagement strategies mentioned could be applied in offline classes as well, the emotional engagement strategies we observed were more online-specific. Learners were affected by technical issues, physical effort, interaction through webcam screens, discussion activities, and breakout sessions, and they displayed mixed or sometimes fully "negative" views on how these issues played out online.

The majority of emotional engagement-related responses had to do with technical issues. Learners felt that they were wasting time fixing problems, which hindered their concentration, increased anxiety, and lowered satisfaction. Thirty-five percent ($n = 29$) of participants said that technical problems caused negative feelings (adjectives used included: *stressful, worried, nervous, suffering, uncomfortable, bothersome, frustrating*). However, 0.4% ($n = 3$) felt that other factors (e.g., accessibility, lack of physical constraints) offset their negative feelings caused by these technical problems.

In regard to online discussion activities and breakout sessions during class, 58.5% ($n = 48$) of participants expressed a range of emotions and opinions. For example, 32.9% ($n = 27$) agreed that discussion was necessary and mentioned positive feelings (*joyful, enjoying, interesting, safe*) that indicate satisfaction, and 19.5% ($n = 16$) were grateful that they could still have discussions even during a pandemic. Further, 0.9% ($n = 7$) specifically said they felt joyful and interested because they could have smooth communication, while others stated that it was less "burdensome" not to have an audience in front of them. On the other hand, 17.1% ($n = 14$) wrote that they felt frustrated, lonely, bored, awkward, or uncomfortable because there was no in-person interaction.

Among the participants in our study, 23.2% ($n = 19$) focused on the breakout room feature of online discussions. During breakout sessions, learners were randomly broken up into small discussion groups. These students were excited to have breakout discussions and said that interacting with different classmates and sharing opinions was meaningful. Student 84 (female, senior) stated, "*I also like how we can be in breakout groups without hearing others' voices like in offline classrooms.*" Meanwhile, some students felt it was rather demanding and burdensome to meet students whom they had not talked to before because they needed to spend more time introducing themselves.

Lastly, 18.3% ($n = 15$) of participants wrote considerable responses about their overall experience of online learning. There were some negative opinions about online learning, including that it was demanding, unfamiliar, and difficult to adjust to; nevertheless, some students stated that it was motivating, eye-opening, valuable, enjoyable, and interesting.

Example 4. Student 61 (female, junior)

I think this is a time when we have to experience online classes due to the development of technology.

Example 5. Student 83 (female, senior) A live online class is something that we should adopt as one of the new useful vehicles for teaching and learning.

4. Discussion

This study responded to the challenges students face during the pandemic period and serve to inform and build research on synchronous online learning. To do this, we assessed the satisfaction of students in second language learning and acquisition in the domain of English from the beginning of the semester through the end of the semester at the start of the COVID-19. This study revealed that, among undergraduate students, engagement is a significant predictor of satisfaction at the end, but not necessarily at the start, of a college term. By considering student satisfaction at two time intervals in relation to engagement and readiness, the present research contributes to the literature on student satisfaction. Additionally, the findings indicated that student engagement in every dimension (behavioral, cognitive, emotional) predicts later satisfaction. Previous studies have shown that engagement during online learning positively affects course satisfaction (Kucuk & Richardson, 2019; Martin & Bolliger, 2018). Furthermore, it is also evidenced that readiness plays an important role in online course satisfaction (Wei & Chou, 2020). Our study findings were consistent with the literature in that language learners' engagement and readiness both affected online course satisfaction (Prasetya et al., 2021). The findings further provided evidence that attitude is the most prominent variable for predicting a student's initial satisfaction in an online course.

Moreover, qualitative data from the open-ended survey revealed the engagement strategies adopted by online learners, which we categorized into behavioral, cognitive, and emotional engagement strategies. Although the data were collected in a synchronous learning environment, a considerable number of strategies used by students overlapped with those found in web-based or asynchronous online learning environments (Chang, 2007; Hwang et al., 2008; Martin & Bolliger, 2018; Song et al., 2004). Martin and Bolliger suggested that students in online learning environments where most of the instruction is asynchronous may want to feel like

"someone 'on the other end' is paying attention" (p. 218). However, unlike the findings of Martin and Bolliger (2018), learner-to-instructor engagement strategies did not appear prominently in our study, and only a few responses were related to the importance of instructor presence. Thus, it can be inferred that during synchronous learning, learners feel less isolated from their instructor or peers than during asynchronous learning. Moreover, our study participants were college students whose instruction mode was suddenly changed, whereas Bolliger and Martin's participants were graduate students who had deliberately enrolled in an online class, a difference that may also have contributed to the discrepancy in the findings.

Most of the behavioral engagement strategies (e.g., note-taking/recording, preview and review of the material) we found were those that could also be applicable to an offline learning environment. Nonetheless, technical problems (e.g., poor internet connection) seemed to have impacted learner engagement and satisfaction significantly. Many learners answered that technical problems hindered their behavioral, cognitive, and emotional engagement and satisfaction and that they took precautions against them. Song et al. (2004) also emphasized the importance of technical preparation of students in enhancing student engagement in an online learning environment, where more than half of the participants in the study thought technical problems were the biggest challenge they faced. Learners in our study also utilized several strategies to enhance cognitive engagement, and some articulated that searching for additional materials during and after class helped them expand their knowledge, fulfill their curiosity, and enable in-depth discussion. These perceptions are in line with previous studies (Ghosh et al., 2018; Hwang et al., 2008), which reported that web searches could foster good learning experiences. In addition, we found that student emotions and satisfaction were more associated with online-specific factors than behavioral and cognitive engagement strategies. McFarland and Hamilton (2005) reported that the majority of students in their study were satisfied with online discussion boards and that students viewed online discussion as an important component of an online course.

4.1. Pedagogical implications

The current study provided empirical evidence that college-level L2 learners' satisfaction in synchronous online learning environments is affected by both readiness and engagement and that engagement plays a more significant role on end-of-semester level of satisfaction than initial satisfaction. Specifically, among the three sub-constructs (familiarity, attitude, experience) of readiness, attitude was significantly correlated with initial learner satisfaction. When compared to familiarity and experience, attitude is an area where teachers can help enhance without having to provide learners with an actual online learning experience. Teachers may consider presenting successful examples of online learning to learners or having learners discuss useful features of an online learning platform to increase online learner readiness and in turn, initial satisfaction. The findings also imply that there is room for educators and administrators of higher education to increase L2 learners' satisfaction even if their initial satisfaction was low.

Our qualitative findings can provide some practical suggestions in this regard. First, it was observed that many L2 learners in our study were able to apply suitable engagement strategies by themselves. Nonetheless, it was also found that some learners were not aware of how they should utilize such strategies to their learning. Thus, teachers should guide learners to develop useful and suitable engagement strategies by providing exemplary strategies. Second, a great number of L2 learners expressed concerns about technical problems during synchronous online learning, which significantly affected their emotional engagement. Many learners in our study found technical preparation before class as a helpful strategy to better tackle the technical problems they might encounter in class. Therefore, teachers may want to remind learners to check whether their devices and the Internet are working properly prior to the class. At the same time, schools and institutions should set up an accessible task force or hotline to provide students with instant and helpful solutions when they face a technical problem. Last but not least, it is necessary to continue to train both teachers and learners on how to best teach and learn under a synchronous online learning environment. Given that learners who first experienced synchronous online learning encountered several difficulties that hindered their engagement, future learners should be exposed to and educated in a variety of online learning conditions, while teachers should develop and share their skills by participating in conferences, forums, or communities of practice in order to prepare for current or possible force majeure such as the COVID-19 pandemic.

4.2. Limitations and suggestions for future studies

Some limitations of the present study need to be acknowledged when interpreting its findings. First, we relied mainly on participants' self-reports of engagement, readiness, and satisfaction. As with other self-report measures, the data might have been subject to participant bias. Learning analytics data such as log and mouse click data on a bigger population could be incorporated in future studies. Other types of qualitative measures such as in-depth interviews would also contribute to a deeper understanding of student engagement, readiness, and satisfaction.

Second, while the engagement measure was adapted from a reliable assessment by Bergdahl et al. (2020), it showed a relatively low internal consistency value ($\alpha = 0.60$) within the target population of learners. This is partly because we used a modified version of Bergdahl et al.'s. Also, we only asked one open-ended question for each type of engagement. Future studies might want to use all of the items to increase reliability of the measurement.

Next, information pertaining to students' proficiency levels and characteristic traits could not be obtained. While we reached out to all students who were willing to provide the survey information by the virtue of their experience, with the limited resources and time, additional information other than their gender was inaccessible at the start of COVID-19.

Lastly, we did not consider different levels of student motivation, which might have affected student engagement. In an answer to the open-ended question, one student mentioned that highly motivated students may perceive online classes as more useful and convenient. Future studies may take motivational impact into account while investigating the interplay among student engagement,

readiness, and satisfaction.

5. Conclusion

This mixed-method research on L2 learners' engagement, readiness, and satisfaction examined how online learner readiness and learner engagement in three different dimensions (i.e., behavioral, cognitive, emotional engagement) are associated with initial and end-of-semester satisfaction. A total of 82 Korean undergraduate students participated in the study. The quantitative findings from the self-report measures revealed that L2 learners' initial level of satisfaction is associated with learners' attitude. Meanwhile, end-of-semester satisfaction was affected by all three dimensions of engagement. As the first attempt to investigate college-level L2 learners' satisfaction in synchronous online learning environments at different time points, the findings of this study imply that both learners themselves and teachers need to strive to increase engagement in every dimension even when learners' initial attitude has negatively affected their satisfaction. From the qualitative data, we also found that some learners in our study adopted a wide variety of learning strategies to increase engagement and were highly aware of the benefits of these strategies. At the same time, many learners still encountered several challenges in learning online and staying engaged. It is imperative for language teachers to train themselves to better address L2 learners' challenges and guide learners to utilize different engagement strategies.

Author statement

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Appendix

Table A
Item Statistics and Internal Consistency of Dimensions ($k = 24$)

Dimension	Item	Item-Total Correlation	Cronbach's Alpha
Engagement	E1	.29	
	E2	.16	
	E3	.42	
	E4	.35	
	E5	.27	
	E6	.55	
	E7	.17	
	E8	.16	
	E9	.24	.60
Readiness	R1	.39	
	R2	.43	
	R3	.59	
	R4	.23	
	R5	.37	
	R6	.41	
	R7	.64	
	R8	.68	
	R9	.58	.78
Satisfaction 1	S1	.54	
	S2	.52	
	S3	.70	.74
Satisfaction 2	S1	.75	
	S2	.76	
	S3	.77	.88

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