

## Article

# Factors Affecting Learners' Academic Success in Online Liberal Arts Courses Offered by a Traditional Korean University

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**Abstract:** This study aimed to empirically examine the factors affecting full-time undergraduate students' satisfaction and academic performance measured by grades using an existing large administrative dataset. The sample consisted of 21,662 undergraduate students who took online liberal arts courses offered by a large traditional Korean university in the spring semester of 2020. The theoretical framework of this study was formulated by selectively adopting and slightly modifying some of the factors from Choi's conceptual model for adult dropout from online degree programs. The findings indicated that gender, previous GPA, campus, type of online course, the relevance of the course, adequacy of assignments and assessments, learner-instructor interaction, and learner-content interaction significantly affect students' degree of satisfaction with online liberal arts courses. This study also found that students who considered the course less relevant to their goals or interests, had a low previous GPA, had frequent learner-instructor interactions, few learner-content interactions, and a low level of course satisfaction are more likely to earn a grade of B, C, or lower than to receive an A in online liberal arts courses.



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## 1. Introduction

Since 2020, the Coronavirus Disease-19 (COVID-19) pandemic has made it difficult to offer traditional face-to-face courses to students in all types of academic institutions in South Korea. In response, most academic institutions have adopted distance education using information technology to develop online learning as the main mode of education delivery. This radical and sweeping change in education method has been quite difficult for many instructors and students in traditional academic institutions where teaching and learning are conducted in classrooms, largely because neither party had sufficient preparation to teach or learn effectively online before implementing distance education. Fortunately, however, both instructors and students in traditional academic institutions seem to be adapting to some degree to this chaotic educational environment due to their real classroom experience. In particular, many instructors in higher educational institutions have come to regard alternative education methods, including online learning and blended learning, as inevitable both during and after the cessation of the COVID-19 pandemic.

On the other hand, some students in traditional universities are still experiencing difficulties accepting and adjusting to this abrupt change in the learning environment in which the COVID-19 pandemic has forced them to conduct their studies online against their will. Students appear to feel more comfortable with and prefer face-to-face interactions with their instructors and peers in the same space to online distance learning. In South Korea, not only a few university students argue that online learning is causing a remarkable impoverishment of the quality of university education [1]. For this reason, they have recently been requesting the university authorities to reimburse some portion of the tuition they had already paid. This is a serious pending issue in South Korean higher education.

Students' rejection of and inability to adjust to online learning may negatively affect their learning outcomes regarding satisfaction and academic achievement.

Wood [2] contended that students who achieve good academic performance in traditional face-to-face learning settings might not be successful in online distance learning. This suggests that there might be key variables that can positively affect university students' learning outcomes in online learning, distinct from factors in traditional face-to-face learning environments. Consequently, examining the key variables associated with successful online learning outcomes is significant. It will provide administrators, instructors, and staff in traditional universities with critical insights into student learning and adaptation to online learning settings. Accordingly, this study aimed to identify the factors that positively affect university students' satisfaction and academic performance in online learning offered by a traditional Korean university.

### Theoretical Framework

Traditionally, most distance education courses and programs depended largely on the learner's voluntary participation, and high dropout rates were a critical issue to be resolved in distance education. As a result, some researchers focused on investigating the key factors that affected a learner's successful completion of distance education courses or programs [3–8]. Since the COVID-19 pandemic, however, it has been mandatory for students at all levels of education in South Korea—from elementary schools to universities—to take distance education courses. This has yielded a shift in the primary focus of concern in distance education from student attrition to student satisfaction and learning outcomes. Furthermore, this new focus involves all students engaged in distance learning, regardless of whether they are eager or reluctant. Researchers in distance education now need to focus much more on the dependent variables of student satisfaction and academic achievement than the dropout rate.

Some researchers subsume student satisfaction and/or academic achievement as a mediating variable under their models of the factors affecting learners' successful completion of distance education courses or programs [5,7,9]. This means that the models can still be used to investigate the factors affecting student satisfaction and academic achievement in online courses. In 2016, Choi [9] presented a conceptual model for adult dropouts from online degree programs, particularly in cyber-universities. Choi's conceptual model was customized for online degree programs and adult learners, including traditional full-time students. Accordingly, Choi's conceptual model is one of the most useful theoretical frameworks, including key predictive variables for student satisfaction and academic achievement in the online courses offered by a traditional university, even though there are differences in the students' characteristics between the two types of universities.

Choi's conceptual model entails four categories: learner, external, internal, and outcome factors [4,9]. Learner factors include age, gender, educational level, employment status, basic scholastic aptitude, and study motives. External factors include encouragement from superiors, colleagues, and/or family members; financial support; and physical constraints due to work, family, and/or personal (e.g., health) issues. Internal factors include social integration, academic integration, technology, technical, usability issues, and motivation. Lastly, GPA is included in the model as an outcome factor. However, the target audiences of Choi's conceptual model are cyber-university students, most of whom are over 30 and have various physical constraints [4,9,10]. Most students in the current study are young, full-time, and traditional university students. In addition, the terminal dependent variable in the model is students' decision to drop out or continue in an online degree program. In contrast, the dependent variables of the current study are student satisfaction and learning achievement. Accordingly, the researcher needed to selectively adopt and slightly modify some of the factors from Choi's conceptual model for the current study.

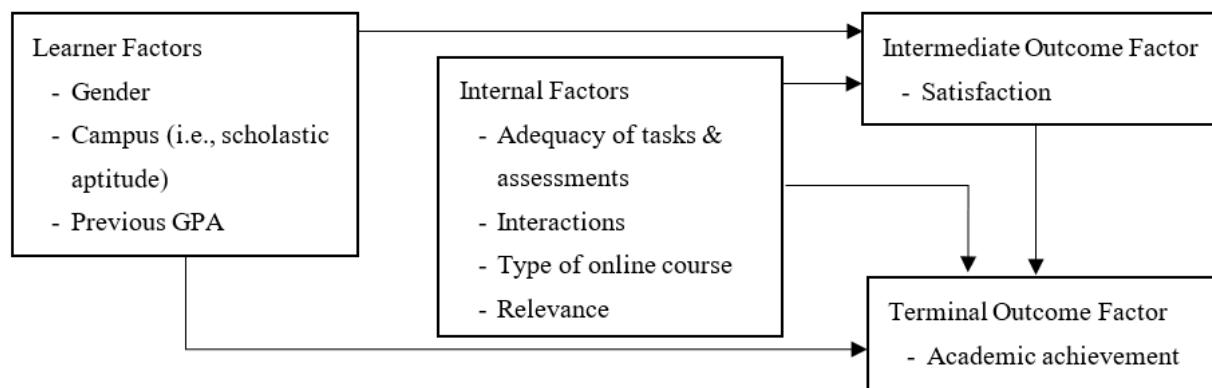
The researcher adopted gender and basic scholastic aptitude in terms of learner factors from Choi's conceptual model because there is not much difference in the other factors such as age, educational level, and employment status among traditional full-time university

students. More specifically, each student's campus information (i.e., the main campus or the regional branch campus) was used as a basic scholastic aptitude factor because students on the same campus had similar College Scholastic Aptitude Test (CSAT) scores and high school records, regardless of their majors. The researcher also adopted previous GPA as an additional learner factor because college students' previous academic performance tends to be related to ongoing academic success, such as student satisfaction and future GPA [11]. In summary, gender, campus, and previous GPA were adopted as learner factors for this study.

The current study did not examine external factors because the administrative data set the researcher used for this study did not include data related to those factors. Fortunately, the external factors from Choi's conceptual model that the researcher could not adopt mostly have relatively less to do with traditional full-time university students, such as encouragement from superiors and/or colleagues and physical constraints from work, family, and/or health issues.

In terms of internal factors, this study focused on the adequacy of assignments and assessments, learner-instructor interaction, learner-content interaction, type of online course, and course relevance. First, the adequacy of assignments and assessments referred to the degree to which students perceived the adequacy of assignments and assessments in the online courses as an academic integration [9]. Next, learner-instructor interaction was measured by students' perceptions of the interaction with instructors for knowledge acquisition and application while learner-content interaction was measured by students' perceptions of the interaction they had with the subject matter that was presented in online courses [12]. Further, the types of online courses were categorized into either synchronous distance education, which was implemented through real-time two-way communications, or asynchronous distance education, which was mainly implemented using prerecorded video lectures. This classification of online courses was made because the university from which the researcher obtained the data only offered these two distinct types of online courses, with no hybrid options. Lastly, course relevance was defined as students' perceptions of the relevance of the course to their goals or interests [6]. The researcher selected these variables because they have been considered critical internal factors in previous studies [4,6,12]. The information on other internal factors was not subsumed in the administrative dataset used for the current study.

Consequently, the theoretical framework that the researcher developed for this study varied from Choi's conceptual model in the following ways. First, satisfaction was separated from internal factors and reassigned to outcome factors. In addition, satisfaction was established as an intermediate outcome factor that affects learning achievement in terms of grades, a terminal outcome factor. For this change, the researcher reflected some of the findings of the path model that Choi and Park [10] revealed in their empirical study. Figure 1 illustrates the theoretical framework of this study that focuses on factors affecting university students' academic success in online learning, particularly in traditional universities. The intermediate and terminal outcome factors were regarded as constituting academic success.



**Figure 1.** A theoretical framework for learners' academic success in online courses.

University instructors and administrators who had to shift to online courses during the COVID-19 pandemic must be aware of how to enhance their students' degree of satisfaction and academic performance and, in turn, to change students' prevailing negative attitude toward conducting their studies online. Only a few studies have empirically investigated factors affecting undergraduate students' satisfaction and actual academic performance in terms of grades in online courses offered by a traditional university with large enough sample sizes to generalize the findings drawn from multiple online courses addressing diverse subjects. Accordingly, this study intended to examine those factors affecting full-time undergraduate students' satisfaction and academic achievement in terms of grades using an existing large administrative dataset drawn from a host of online liberal arts courses.

For this study, the following research questions were addressed:

1. Which variables are significant predictors of learner satisfaction in online liberal arts courses offered by a traditional university?
2. Which variables are significant predictors of learners' academic achievement in online liberal arts courses offered by a traditional university?

## 2. Methods

### 2.1. Population and Sample

The target population of this study was undergraduate students who took an online course offered by a large traditional university in South Korea. The sample consisted of 21,662 undergraduate students who took online liberal arts courses offered by a large traditional Korean university in the spring semester of 2020. The university has two campuses: the main campus and the regional branch campus. Of the 21,662 students, 14,783 students (68.2%) attended the main campus, and 6879 students (31.8%) attended the regional branch campus. Overall, the CSAT scores used for university admission of the students in the main campus were much higher than those of the regional branch campus. The sample included 10,501 male students (48.5%) and 11,161 female students (51.5%). Approximately 38% were seniors, while 30% were juniors, 31% were sophomores, and 1% were freshmen. Students in the humanities and social sciences made up 30.5% of the study sample, while students in science and engineering made up 29.9%. Finally, students in art, music, and physical education made up 31.1% of the study sample, and students in other disciplines made up 8.5%. All the students were full-time undergraduates.

### 2.2. Data Collection and Measures

This study employed a large administrative data set containing a variety of information related to learner factors (i.e., gender, campus, and previous GPA), internal factors (i.e., adequacy of assignments and assessments, learner-instructor interaction, learner-content interaction, type of online course, and course relevance), and outcome factors (i.e., satisfaction with courses and academic achievement in terms of grades) for students

who took online liberal arts courses in the spring semester of 2020. The university's academic affairs office collected the data. The students voluntarily agreed that information could be used anonymously for research to enhance the quality of education provided by the university. The researcher used this dataset with anonymous information that a university administrator made available for the study.

The learner factor data were comprised, for each student, of the gender, the campus information (i.e., the main campus or the second campus), and the GPA obtained the previous semester. The internal factors included in this study model were type of online course, course relevance, adequacy of tasks and assessments, learner-instructor interaction, and learner-content interaction. First, regarding the type of online course, I used information indicating either synchronous distance education, which was implemented through real-time two-way communications allowing students and instructors to exchange voice, text, visuals, shared applications, and video, or asynchronous distance education, which was mainly implemented using prerecorded video lectures that students took as an online liberal arts course. The university had provided students with these two distinct types of distance education courses in the spring semester of 2020. Next, the relevance of the course to students' goals or interests was a straightforward binary variable consisting of yes or no. Also, I measured three other internal factors (i.e., adequacy of assignments and assessments, learner-instructor interaction, and learner-content interaction) and one intermediate outcome factor (i.e., overall course satisfaction) using the survey questionnaire, consisting of 12 items with a five-point Likert scale ranging from strongly agree (5) to strongly disagree (1). Faculty members who have expertise in course evaluation developed these measures. Cronbach's alphas for adequacy of tasks and assessments, learner-instructor interaction, learner-content interaction, and overall course satisfaction were 0.93, 0.72, 0.71, and 0.91, respectively. The terminal outcome factor data consisted of three possible grades (i.e., A, B, and C or lower) that students obtained in online courses.

### 2.3. Data Analysis

This study employed three statistical analysis methods: descriptive statistics, multiple regression analysis, and multinomial logistic regression analysis. The descriptive statistics method was adopted to provide a brief overview of the quantitative data, including means, standard deviations, skewness values, and kurtosis values. To answer the first research question, a multiple regression analysis was conducted. A multiple regression analysis was adopted because it allows for both an assessment of the strength of the relationship between multiple predictor variables and one dependent variable as well as an assessment of the significance of each predictor variable to the relationship by statistically eliminating the effects of other predictor variables. In other words, a multiple regression analysis was conducted to examine the relative strength of the effect of independent variables (i.e., gender, campus, previous GPA, adequacy of assignments and assessments, learner-instructor interaction, learner-content interaction, type of online course, and course relevance) on the dependent variable (i.e., learner satisfaction). To answer the second research question, a multinomial logistic regression analysis was conducted. A multinomial logistic regression is used when the dependent variable is nominal with more than two levels as a predictive analysis method. In this study, a multinomial logistic regression was adopted to examine which variables (i.e., gender, previous GPA, adequacy of tasks and assessments, learner-instructor interaction, learner-content interaction, course relevance, and satisfaction) are significant predictors of one categorical variable (i.e., students' academic achievement in terms of grades).

## 3. Results

Table 1 indicates the descriptive statistics of the continuous variables. I tested normality in terms of skewness and kurtosis because further analyses require that the normality of each variable should be satisfied. The normality assumptions of all continuous variables were satisfied as the criteria of non-normality are skewness >2 and kurtosis >7 [13].

**Table 1.** Descriptive statistics of the continuous variables.

Variables	M	SD	Skewness	Kurtosis
Previous GPA	3.27	0.58	-0.73	0.76
Task & assessment	4.10	0.91	-0.69	-0.34
L-I interaction	3.93	1.01	-0.48	-0.89
L-C interaction	4.09	0.76	-0.43	-0.61
Satisfaction	4.17	0.87	-0.79	-0.17

Note. L-I interaction = learner-instructor interaction, L-C interaction = learner-content interaction.

### 3.1. Research Question 1

A multiple regression analysis was conducted to examine the relative strength of the effects of learner factors (i.e., gender, campus, and previous GPA) and internal factors (i.e., type of online course, motivation in terms of relevance adequacy of assignments and assessments, learner-instructor interaction, and learner-content interaction) on students' overall satisfaction with the online liberal arts courses. In other words, I conducted a multiple regression analysis to answer the first research question. As shown in Table 2, gender, campus, previous GPA, type of online courses, motivation in terms of relevance, adequacy of tasks and assessments, learner-instructor interaction, and learner-content interaction accounted for 85% of the variance in students' overall satisfaction with the online liberal arts courses that took at a traditional university.

**Table 2.** Results of multiple regression analyses.

Variables	B	SE	B	t	p	R <sup>2</sup> (adj. R <sup>2</sup> )	F (p)
Gender	0.04	0.01	0.02	7.54	0.000 ***	0.854 (0.854)	15,803.22 (0.000) ***
Campus	-0.02	0.01	-0.01	-3.10	0.002 **		
Previous GPA	0.03	0.00	0.02	7.49	0.000 ***		
Type of OC	-0.05	0.01	-0.03	-9.85	0.000 ***		
Relevance	0.08	0.01	0.05	14.16	0.000 ***		
Task & assessment	0.71	0.00	0.74	160.02	0.000 ***		
L-I interaction	0.13	0.00	0.15	32.70	0.000 ***		
L-C interaction	0.06	0.00	0.05	15.15	0.000 ***		
Constant	0.47	0.02		22.39	0.000 ***		

Note. Type of OC = type of online course, L-I interaction = learner-instructor interaction, L-C interaction = learner-content interaction, \*\* p < 0.01, \*\*\* p < 0.001.

The test of a single regression coefficient showed that seven variables (i.e., gender, previous GPA, type of online course, course relevance, adequacy of assignments and assessments, learner-instructor interaction, and learner-content interaction) accounted for a significant portion of the variance in students' overall level of satisfaction when controlling for other variables at the  $p < 0.001$  level. In addition, one variable, the campus that each student attended, accounted for a significant portion of the variance in the degree of satisfaction at the  $p < 0.01$  level. Consequently, each of the eight variables explained a significant amount of the variance in students' overall satisfaction with online liberal arts courses, even though other variables also had a significant explanatory role in the satisfaction with the courses.

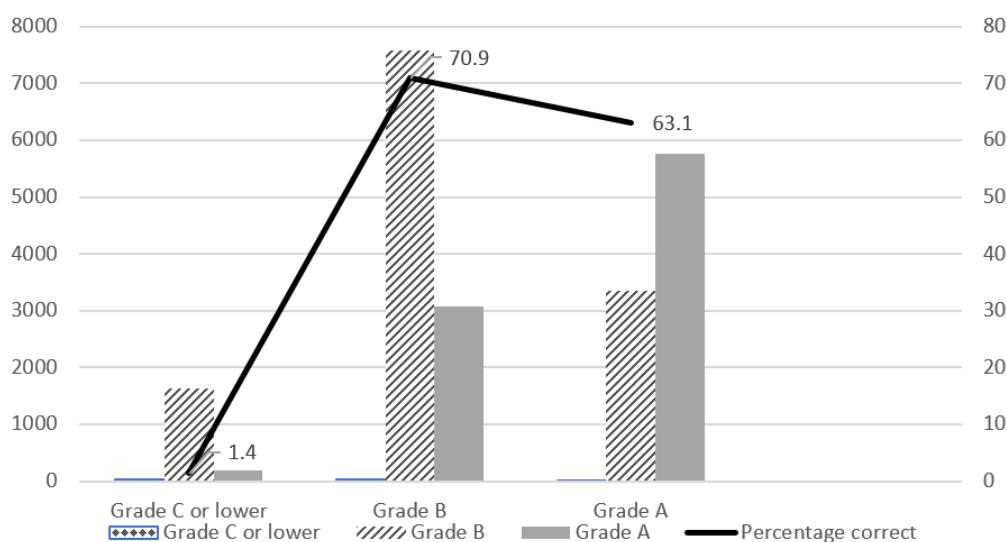
### 3.2. Research Question 2

A multinomial logistic regression analysis was performed to examine which variables are significant predictors of students' academic achievement (i.e., students' grades) in online learning. According to Table 3 and Figure 2, the multinomial logistic regression with the seven predictor variables predicts 61.7% of cases precisely. Of the cases used to create the model, 5763 of 9127 students who earned a grade A were classified correctly. 7577 of 10,690 students who earned a grade B were classified correctly. 25 of 1845 students who earned a grade C or lower were classified correctly. Consequently, the model may

be considered acceptable for predicting college students' academic achievement in online liberal arts courses [14,15].

**Table 3.** Classification table of the proposed multinomial logistic regression model.

Observed	Predicted			Percentage Correct
	Grade A	Grade B	Grade C or Lower	
Grade A	5763	3361	3	63.1
Grade B	3076	7577	37	70.9
Grade C or lower	193	1627	25	1.4
Overall percentage				61.7



**Figure 2.** Classification graph of the proposed multinomial logistic regression model.

According to Table 4, the value of the final  $-2 \log$  likelihood is smaller than that of the intercept-only  $-2 \log$  likelihood, indicating that the final model is a significant improvement in fit over a null model ( $\chi^2(14) = 5094.98, p < 0.001$ , Nagelkerke  $R^2 = 0.25$ ). According to the likelihood ratio tests showing the overall contribution of each independent variable to the model, six variables (i.e., gender, previous GPA, course relevance, learner-instructor interaction, learner-content interaction, and satisfaction) were significant predictors of the students' grades in the online liberal arts courses at the  $p < 0.001$  level, while one variable, adequacy of assignments and assessments, was an insignificant predictor.

**Table 4.** Likelihood ratio tests and pseudo R-square.

Effect	Model Fitting Criteria		Likelihood Ratio Tests			Pseudo R <sup>2</sup>		
	−2 Log Likelihood of Reduced Model	Chi-Square	df	p	Cox & Snell	Nagelkerke	McFadden	
Intercept only	33,757.633	0.000	0					
Gender	28,677.914	15.257	2	0.000 ***				
Previous GPA	31,330.626	2667.970	2	0.000 ***				
Relevance	28,705.944	43.287	2	0.000 ***				
Task & assessment	28,667.858	5.201	2	0.074	0.210	0.249	0.127	
L-I interaction	28,757.576	94.919	2	0.000 ***				
L-C interaction	30,052.645	1389.988	2	0.000 ***				
Satisfaction	28,682.329	19.672	2	0.000 ***				
Final	28,662.657	5094.976	14	0.000 ***				

Note. L-I interaction = learner-instructor interaction, L-C interaction = learner-content interaction, \*\*\*  $p < 0.001$ .

Table 5 presents the results of the multinomial logistic regression analysis, including the estimated multinomial logistic regression coefficient (B), standard error (S.E.), Wald test, significance (*p*), and odds ratio (Exp[B]) for each of the variables. These results provide information comparing one group of students (i.e., the grade B group and the grade C or lower group) against the reference group (i.e., the grade A group). The multinomial logistic regression results indicated that gender, previous GPA, learner-instructor interaction, and learner-content interaction statistically significantly discriminated between college students who earned a B grade and those who earned an A grade in the liberal arts courses at *p* < 0.001. In addition, the relevance of the course and course satisfaction were significant predictors discriminating between the two groups of students at *p* < 0.01 and *p* < 0.05, respectively.

**Table 5.** Parameter estimates.

Grade	Variables	B	S.E.	Wald (df)	<i>p</i>	Exp (B)
Grade B	Intercept	7.320	0.165	1962.440 (1)	0.000 ***	
	Gender	-0.122	0.031	15.202 (1)	0.000 ***	0.885
	Previous GPA	-1.259	0.032	1512.252 (1)	0.000 ***	0.284
	Relevance	-0.115	0.038	8.995 (1)	0.003 **	0.892
	L-I interaction	0.177	0.027	44.170 (1)	0.000 ***	1.193
	L-C interaction	-0.845	0.027	971.967 (1)	0.000 ***	0.430
	Satisfaction	-0.105	0.046	5.105 (1)	0.024 *	0.901
Grade C or lower	Intercept	10.193	0.264	1494.089 (1)	0.000 ***	
	Gender	-0.074	0.056	1.729 (1)	0.189	0.929
	Previous GPA	-2.145	0.049	1887.152 (1)	0.000 ***	0.117
	Relevance	-0.462	0.071	42.541 (1)	0.000 ***	0.630
	L-I interaction	0.476	0.055	76.146 (1)	0.000 ***	1.610
	L-C interaction	-1.346	0.046	854.211 (1)	0.000 ***	0.260
	Satisfaction	-0.377	0.086	19.092 (1)	0.000 ***	0.686

Note. L-I interaction = learner-instructor interaction, L-C interaction = learner-content interaction, \* *p* < 0.05, \*\* *p* < 0.01, \*\*\* *p* < 0.001.

On the other hand, previous GPA, relevance, learner-instructor interaction, learner-content interaction, and course satisfaction statistically significantly discriminated between students getting a grade C or lower and those getting a grade A at *p* < 0.001, while one learner variable, gender, was a not significant predictor discriminating between the two groups of students.

#### 4. Discussion

##### 4.1. Predictors of Student Satisfaction with Online Liberal Arts Courses

This study found that all eight variables (i.e., gender, previous GPA, campus, type of online course, relevance, adequacy of tasks and assessments, learner-instructor interaction, and learner-content interaction) in the theoretical framework significantly affected students' degree of satisfaction with the online liberal arts courses of a traditional Korean university. Specifically, the findings regarding learner factors (i.e., gender, previous GPA, and campus) demonstrated that female students and students with a previous high GPA and scholastic aptitude test scores were more likely to be satisfied with the online liberal arts courses. Additionally, findings regarding the internal factors (i.e., type of online course, relevance, adequacy of assignments and assessments, learner-instructor interaction, and learner-content interaction) showed that students are more likely to be satisfied with synchronous online liberal arts courses than asynchronous courses. The study also found that students who found the course content more relevant to their goals or interests had positive perceptions of the adequacy of the course assignments and assessments, and those who considered the course to have frequent learner-instructor and learner-content interactions were more likely to be satisfied with the online liberal arts courses.

As for gender differences in student satisfaction with online learning, the findings of previous studies were inconsistent. Liaw and Huang [16] found that male college students tended to have more positive attitudes toward e-learning than female college students. In contrast, some research studies concluded that gender did not affect students' satisfaction with online learning [17–19]. Uniquely, the result of the current study showed that female university students were more satisfied with the online liberal arts courses than their male counterparts. The reason for this result may be because a considerable number of female university students had already become accustomed to information technology through diverse learning experiences and enjoyed the flexibility and convenience of online learning more than male students.

This study's results also showed that students with previous high GPAs and scholastic aptitude test scores were more satisfied with the online liberal arts courses. These results are consistent with Billings' conceptual model demonstrating that scholastic aptitude test scores and GPA are direct predictors of students' satisfaction with distance learning courses [20]. These findings imply that instructors and teaching assistants should pay attention to students who have a lower basic scholastic aptitude and previous GPA and provide them with additional learning supports to be more satisfied with online learning.

Interestingly, this study revealed that students were more satisfied with the synchronous online liberal arts courses than asynchronous online courses. Synchronous distance education enables instructors and students to interact in real-time, immediately exchanging thoughts and opinions through voice, text, visuals, shared applications, and video. This feature can be used as an effective means to reduce the sense of isolation that many distant students have and to generate a feeling of community and class rapport. In addition, synchronous online classes might help students be more effective in paying attention to the instructor's lectures or their peers' comments by creating a tension for learning, in turn positively influencing satisfaction with synchronous online courses.

On the other hand, previous research findings were consistent with this study's results, i.e., that students who found a course more relevant to their goals or interests [21,22] had positive perceptions of the adequacy of assignments and assessments [23], and those who had frequent learner-instructor and learner-content interactions [10,24] were more satisfied with the online liberal arts courses. These findings may be useful for instructors or course designers, providing insights into improving student satisfaction with distance learning. First, online courses should include learning materials, lectures, and learning tasks closely related to students' goals or interests [6]. Second, the assignments and assessments in the online courses should be aligned with the stated learning objectives of the course [23], and the degree of difficulty of assignments and assessments should be suitable for students' academic level and prior knowledge. Lastly, an instructor should strive to increase opportunities for learner-instructor and learner-content interactions by actively helping students incorporate new information into their existing cognitive structures and convert it into personal knowledge through elaborate course design [12].

#### 4.2. Predictors of Student Academic Achievement in Online Liberal Arts Courses

This study found that male students and students who found the course less relevant to their goals or interests, had a previous low GPA, had frequent learner-instructor interactions but few learner-content interactions, and a low level of course satisfaction were more likely to earn a grade B than to earn a grade A in the online liberal arts courses. In addition, students who considered the course less relevant to their goals or interests, had a previous low GPA, had frequent learner-instructor interactions but few learner-content interactions, and had a low level of course satisfaction were more likely to achieve a grade C or lower than a grade A in the online liberal arts courses.

There are inconsistencies with prior research findings regarding the role of gender in students' academic performance in online courses. Nistor [25] concluded that there are no significant gender differences in online learning performance among university students. However, Alghamdi and his colleagues [26] found that female students outperformed male

students in academic performance due to higher self-efficacy for self-regulated learning than male students. These research findings by Alghamdi and his colleagues support the current study results that male students are more likely to receive a B than an A. On the other hand, this study's findings that there was no gender difference in academic achievement between students getting a grade A and students receiving a C or lower are consistent with those of Nistor [25]. Consequently, the results of this study regarding gender differences in online learning performance tend to be synthetically supported by prior inconsistent research findings. The findings of this study imply that instructors need to give more attention to male students and apply more effective learning activities in their online classes so that male students can be actively engaged in online learning.

Some previous research findings [27,28] support the findings of this study, i.e., that students who consider a course to be less relevant to their goals or interests are more likely to receive a grade of B, C, or lower than an A in online liberal arts courses. These findings suggest that instructors should try to develop course content relevant to their students' lives by providing detailed expositions for how the course applies to real-life situations and work. In addition, the findings that students with a low previous GPA are more likely to get a grade B, C, or lower than an A were aligned with prior research finding that college students' previous academic performance is a significant predictor of their academic success [11]. The findings imply that online instructors should help students with poor previous academic performance keep up with the class and enjoy online learning. They can do so by carefully monitoring students' learning progress and providing them with timely and detailed feedback and including words of encouragement and suggestions for improvement to enhance learning motivation.

This study also found that students who have few learner-content interactions and a low level of course satisfaction are more likely to earn a grade of B, C, or lower in the online liberal arts courses than to receive an A grade. These findings are supported by previous research [10]. Choi and Park [10] revealed that students' interaction with course content and their satisfaction positively affected their academic performance in online courses. These findings suggest that online instructors should provide opportunities for students to interact easily and actively with course content through the course design and feedback based on students' prior knowledge and interests. These interactions can positively affect student satisfaction and, in turn, their academic performance. However, surprisingly, this study demonstrated that students who have frequent learner-instructor interactions are more likely to get a grade B, C, or lower than a grade A. These findings can be interpreted that students who had more difficulty in understanding course content or who found the learning activities or assignments to be ambiguous might have needed to interact with their instructors more frequently. However, it would appear that such students failed to completely resolve the difficulties that they experienced despite their frequent interaction with the instructor. This interpretation implies that online instructors should increase their efforts to interact with students more effectively and clearly.

This study had the following limitations that future studies should address. First, this study used an administrative data set that had limited information. Thus, this study could not include certain variables that have the potential to positively affect student satisfaction and academic performance in online courses. For instance, instructors' efforts to proactively resolve their students' grievances can be one of the critical variables to enhance student satisfaction and academic performance in online courses. In particular, such efforts might be most effective when an instructor uses a systematic intervention reflecting the multistage process that was developed by Korzh and his colleagues [29] as an initial effort to develop a threat avoidance method. Accordingly, future studies should include more diverse variables affecting student satisfaction and academic performance in online courses. Second, the sample in this study included a much smaller number of freshmen than those in other grades. Although such an imbalance of the sample size of each subgroup is a common problem with administrative data sets, it could lead to biased results. Accordingly, future studies need to adopt more systematic sampling procedures. Third, this

study did not identify the detailed relationships between the variables affecting student satisfaction and academic performance in online courses. Therefore, future studies should seek to explain the direct and indirect relationships between them. Lastly, the findings of this study might be generalizable to students only in traditional Korean universities. Future studies might consider collecting data from multiple universities in other countries with diverse cultural backgrounds to enhance the cross-country generalizability of the findings.

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