Factors Influencing Class Satisfaction in Online and Offline Blended Classes - Focusing on Digital Competence, Interactions between Teachers and Learners, and Interactions between Team-members

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Received: May 14, 2024 Accepted: June 24, 2024 Online Published: August 14, 2024

doi:10.5430/jct.v13n4p343 URL: https://doi.org/10.5430/jct.v13n4p343

Abstract

The class environment in 2022 is based on full face-to-face classes in accordance with the easing of social distancing, but many instructors and learners are conducting a mixture of non-face-to-face and face-to-face classes. In the post-COVID-19 class environment, a plan to effectively apply online and offline blended classes is needed. This study analyzes how college students' digital competence, teacher-learner interaction, and team-member interaction affect class satisfaction in online and offline blended classes. The research subjects of the study were students of four-year university E located in Gyeonggi-do. Data were collected through an online survey method between June and July 2022. The analysis method was frequency analysis and descriptive statistical analysis. In addition, correlation analysis was conducted to confirm the validity of variables and to confirm multicollinearity. Moreover, factor factor analysis was conducted to confirm the validity of the measurement tool developed in this study. Finally, multiple regression analysis was conducted to verify the influence of college students' digital competence, teacher-learner interaction, and team-member interaction on class satisfaction of online and offline blended classes. As a result of the study, it was found that interaction factors between teacher-learners and team-members, excluding digital competency, affect class satisfaction in online and offline blended classes. These results suggest that to improve class satisfaction in operating online and offline blended classes in the post-COVID-19 era, it is necessary to come up with teaching strategies that can enhance interaction between teacher-learners and team-members.

Keywords: online and offline blended classes, class satisfaction, digital competency, interaction between professor and learner, interaction between team-members

1. Introduction

Education policies such as Green Smart School have been strengthened according to the global impact of COVID-19 and the development of industrial technology. Fundamental changes are required for overall education, such as low-carbon, eco-friendly, future-oriented learning spaces, consumer-oriented space design, existing schools and classrooms, and the role and learning methods of instructors. In particular, due to COVID-19, most universities nationwide delayed the start of classes and repeated the postponement and withdrawal of face-to-face classes. Since then, in March 2020, universities nationwide have operated full online classes. In particular, as online classes have been prolonged due to COVID-19, improving the satisfaction of online and offline blended classes has become an important task.

The class environment in 2022 is based on full face-to-face classes in accordance with the easing of social distancing, but many instructors and learners are conducting a mixture of non-face-to-face and face-to-face classes. Entering the post-COVID-19 era, 42.8% of students answered that they expected “mixed implementation of non-face-to-face and face-to-face education” in a survey asking, “What do you think about non-face-to-face education?” (Korea University Newspaper, 2022 National Student Awareness Survey, 2022), the preference for online and offline parallel classes was high at 39.2%. The preference for offline classes (33.3%) was slightly higher than online classes (27.8%). Although the transition to face-to-face classes is taking place quickly, online and offline parallel classes are inevitable in an unpredictable situation. Therefore, in the post-COVID-19 class environment, a plan to effectively

apply online and offline blended classes is needed.

Blended learning, which is already used in the education field, is being tried in various ways. However, there are still different opinions about the concept. Some refer to 'effective blending of online and offline connections' (Lim, Morris, & Kupritz, 2007; Mrajca & Polok 2021), while others refer to 'mixing different media and methodologies in instruction (Kember, McNaught, & Chong et al. al., 2010; Owston, York, & Murtha, 2013)'. As such, the concept of blended learning is used in different ways by scholars.

Blended learning is difficult to achieve educational results without changes in the previous school environment, classroom instruction, and the roles of instructors and students (Cho, 2020; Zhao & Liang 2020). UNESCO (2020) did not highly evaluate the effectiveness of distance learning in educational settings due to COVID-19 in terms of the readiness of technology environments such as digital learning platforms, Internet environments, and broadcasting systems, teaching and learning materials to be provided on platforms, and contents such as broadcasting programs, online learning, remote learning through broadcasting, and text for learning at home (Brinia et al., 2020). It was pointed out that teachers' readiness to design and promote materials is still insufficient (UNESCO, 2020). This suggests that aspects of the educational environment in blended classes can affect learners' effectiveness and class satisfaction.

Instructors and learners who have experienced online classes due to COVID-19 are hoping to fundamentally improve their traditional notions about classes. In addition to the physical aspect, it is necessary to check how factors such as the digital competency level, which is the learner's personal aspect, and the level of interaction between teacher and learner, and the interaction between team-members, which are the teaching method aspect, affect the class satisfaction of blended classes. Although the educational environment necessary for online and offline blended classes after COVID-19 has been completed in university educational institutions, it is still necessary to review the improvement of class satisfaction. Therefore, it is necessary to supplement the problems of online and offline blended classes and to reinforce the strengths of online and offline classes.

To this end, this study analyzes the influence of the learner's personal aspect (learner's digital competency level) and class operation aspect (teacher-learner interaction, interaction between team-members) that affect the class satisfaction of online and offline blended classes. The research questions to achieve the purpose of this study are as follows:

> Research Questions 1. What is the relationship between class satisfaction, digital competency, interaction between teacher and learner, and interaction between team-members in online and offline blended classes?
>
> Research Question 2. What are the effects of digital competency, interaction between teacher and learner, and interaction between team-members on the class satisfaction of online and offline blended classes?

2. Theoretical Background

2.1 Prior Studies on Digital Competence and Class Satisfaction

An epidemic like COVID-19, which started in 2020, requires the ability to quickly find and utilize necessary information in the online space. To acquire information that is effective for oneself and adapt to society, it is important to enter the online space, so the level of digital informatization competency, which is a necessary and sufficient condition for entering the online space, is even more important. In particular, learners should be able to use various digital devices and media in online classes. The ability to acquire and utilize information in the digital environment must be exercised, and self-regulating and ethical mechanisms must be actively used. In this new trend of change, the educational environment is also facing a second period of change due to the development of information and communication technology, and classes using new devices and technologies are becoming more and more important (Collins & Halverson, 2018).

Online classes using digital devices increase opportunities for participation by students who are not actively participating in face-to-face classes. In addition, team activity classes can increase active learning and promote interaction and participation among team-members (Fitch, 2004; Partee, 1996; Stephens, 2005). Furthemore, using using computers connected to wireless LANs promotes active exploratory learning and facilitated communication between students and teachers in large classrooms (Barak, Lipson, & Lerman, 2006). Mobile devices have also been used to facilitate instant communication between teachers and students (Wang, Shen, Novak, & Pan, 2009).

Many countries, such as Korea, Japan, Hong Kong, Belgium, Australia and the United States are showing great interest in the impact of information and communication technologies on schools and education (Cha et al., 2011;

Zhong, 2011). In the EU, digital competence was presented as one of the eight competencies required in lifelong education (Instefjord & Munthe, 2016). In addition, most countries view digital competencies as necessary competencies in the information age. In particular, efforts are being made to address digital competencies as a national education policy (Van de Oudeweetering & Voogt, 2018).

According to Lee et al. (2018), there is a difference in the level of digital competency among students, and in the case of elementary school students, those with experience in information education showed higher achievement. In the case of middle middle school students, the level of digital competency of female students was high in all areas except the area of ICT, indicating that there were differences by gender. Therefore, even in online and offline classes, it is necessary to take into account the digital capabilities of learners and improve class satisfaction.

2.2 Prior Studies on Interaction between Teacher-Learners and Class Satisfaction

In the realm of education, teachers and students have a very close relationship. In school education, instructors are an important factor that directly or indirectly affects students. Therefore, from the point of view of student communication, the teacher's behavior affects the students' behavior. Interaction between professor and student is the degree to which students feel that the teacher is interested in them, tries to understand them, and is a close, trustworthy, and competent person (Kim, 2006). The relationship between professor and student increases students' learning motivation, increases their trust in professor and school education, leads to improvement in academic ability, and has a positive effect on students' attitude (Pianta & Steinberg, 1992).

The effect of teacher-student interaction can be largely divided into cognitive performance and non-cognitive performance of university students. First of all, in the cognitive aspect, students who interacted a lot with professors showed high analytical thinking skills (Choi and Shin, 2010). In addition, comprehensive thinking ability was high (Yoo et al., 2012). Also, it was found that the grades were high (Amelink, 2005), and the students themselves felt that they had grown up (Kuh & Hu, 2001). Interactions between professors and students have a significant effect on learning outcomes such as academic achievement, passion for learning, intellectual growth, and class satisfaction (Kim, 2014; Bae and Kim, 2013; Kuh & Hu, 2001).

Interaction between professors and students can help with various issues such as academics and careers (Pascarella & Terenzini, 2005; Pearson & Bowman 2000). Astin (1993) said that the higher the number of interactions with the professor in class and extracurricular activities, the higher the student's development and satisfaction. Pascarella and Terenzini (2005) reported that formal or informal interactions between professors and students affect students' academic skills, social confidence, self-concept, leadership, satisfaction, and maintenance of academic work. As such, the interaction between teacher and learner was found to have a significant effect on class satisfaction.

2.3 Prior Studies on Interaction among Team-Members and Class Satisfaction

Kilpatrick (1918) introduced the project method based on Dewey's educational philosophy and explained the educational value of the project in school education. He defined a project as an activity with a clear purpose. Also, since stimulating human pursuit of purpose is an important task of education, it was argued that instructors should help learners to carry out nomadic activities wholeheartedly in a social context. Obviously, since human intelligence is developed through cooperation, it is desirable for projects to be carried out as a team in a social context (Lee, 2003).

Experimental studies on interaction confirmed that interaction between learners has a positive effect on promoting class satisfaction and team performance (Yoo, 2014; Wen, 1998). (Park, Jang, 2015). In a study that explored the relationship between team-members' interactions and learning outcomes (Yoo, 2014), it was found that cooperative self-efficacy through team-members' interactions had a positive effect on class satisfaction. In particular, it was found that the interaction between web-based team-members had a significant effect on class satisfaction even in online and offline blended classes. In addition, interaction between learners in web-based collaborative learning using blogs can affect satisfaction and achievement. In a study by Kang, Eom, and Lee (2010), which dealt with interactions in web-based collaborative learning, the resulst revealed that interaction that interaction affects satisfaction and achievement. In the study of Jeong (2005), the result that interaction was highly correlated with academic achievement was derived.

On the other hand, there was also a study in which the interaction between team-members did not have a significant effect on class satisfaction. Oh et al. (2015) conducted a team project class for university students and analyzed variables predicting learning outcomes. Results showed that the iteraction between, it was found that the interaction between team-members had no effect on class satisfaction. The cause is not that the interaction between team-members is not a significant predictor of class satisfaction satisfaction, rather the cooperative self-efficacy as

a cooperative self-efficacy as a mediating factor in interactions between team-members can affect class satisfaction. As such, there are not many studies that have clearly identified the relationship between interaction among team-members and class satisfaction.

3. Research method

3.1 Participant Characteristics

This study was conducted on subjects (oriental spirit walk, eyeglass dispensing optics, clinical contact lenses, local culture and festivals, community nursing practice II) conducted through online and offline blended classes among students attending E university in the fourth year of S city, Gyeonggi-do. Class satisfaction, digital competency, interaction between teacher and learner, and level of interaction between team-members were investigated. The number of students, the valid sample used in this study, was 162. In addition, to comply with research ethics standards, consent forms from research participants were collected and submitted in electronic form during online surveys. The general characteristics of the study subjects are presented in Table 1.

Table 1. General Characteristic (N=162)

Observational variable		Frequency	%
Sex	Male	38	23.5
	Female	124	76.5
Grade	1st	16	9.9
	2nd	19	11.7
	3rd	37	22.8
	4th	90	55.6
Credits of the previous semester	less than 3.0	9	5.6
	More than 3.1 ~ less than 4.0	103	63.6
	More than 4.1	50	30.9
Department	Department of Nursing Science	47	29.0
	Department of Beauty and Cosmetic Science	2	1.2
	Department of Physical Therapy	5	3.1
	Department of Radiology	9	5.6
	Department of Sports Outdoor	6	3.7
	Department of Food and Nutrition	4	2.5
	Department of Children	1	.6
	Department of Optics	56	34.6
	Department of Medical Engineering	7	4.3
	Department of Medical Management	1	.6
	Department of Health Promotion and Design	3	1.9
	Department of Medical IT	11	6.8
	Department of Clinical Pathology	6	3.7
	Department of Funeral Guidance	4	2.5

3.2 Research Tool

The independent variables of this study are digital competency, interaction between instructors and learners, and interaction between team-members. The dependent variable is class satisfaction. The item composition of the variables is shown in Table 2.

Table 2. Composition of Measurement Items

Variable		Question Content
Digital competence	1	I can collect information necessary for learning.
	2	I can find and use appropriate information for problem solving.
	3	I can classify the collected information by setting it as a standard.
	4	I can effectively manage (keep and utilize) the information collected for learning.
	5	I can use the information I collected to create new information.
	6	I can find and use online information for learning.
	7	I collect information for learning and then evaluate and utilize the accuracy of the information.
	8	I organize the data collected for learning and create and manage graphs or diagrams.
	9	I can use various media (Internet, mobile devices, etc.) to get new ideas.
	10	I can critically understand the various information delivered through the media (TV, Internet).
	11	I can choose the appropriate media (Internet, mobile device, etc.) to solve the challenge.
	12	I can critically understand the information about the problem being delivered through the media (TV, Internet).
	13	I find and use applications that are helpful for learning.
	14	I know the advantages and disadvantages of each medium (computer, smartphone, smart pad) when collecting information from the Internet, etc.
	15	I can exchange information with other people online for learning.
	16	I reveal the source when I use other people's photos, images, or ideas.
	17	I don't use other people's writing as it is, but I rewrite it into my own words.
	18	I am aware of the problems that may arise when infringing on other people's copyrights.
	19	I don't say bad things to the other person online or attack without grounds.
	20	I think copyright should not be violated when accessing and using information.
	21	I know about etiquette to follow online.
	22	I know about the ethics that must be followed when collecting information and doing assignments.
	23	I think I should be protected from copyright on a project.
Interaction between professor and learner	1	The instructor responded quickly to the student's questions or requests.
	2	The instructor gave appropriate answers and explanations to students' questions regarding the class content.
	3	There was active communication between the students and the instructor.
	4	Specific feedback was received from the instructor on the submitted task.
	5	The professor actively participated in the students' learning and tried to interact.
Interaction between team-members	1	I helped each other when needed while performing the team assignment.
	2	I shared the necessary materials and information with each other.
	3	I actively participated in each other's thoughts and came up with a better solution.
	4	I shared my thoughts with each other and thought together.
	5	I worked by trusting each other
	6	I encouraged each other to carry out the assignment.
	7	I participated fairly in the assignment.
	8	I worked hard for the assignment.
	9	I focused on team activities.
	10	I respected each other's opinions and thoughts.
Class Satisfaction of Online and Offline Blended Classes	1	Online and offline classes were valuable experiences for me.
	2	I could learn a lot from online and offline classes.
	3	I am generally satisfied with the online and offline classes.
	4	I was able to understand the learning contents well through online and offline classes.
	5	I want to take online and offline classes again.
	6	I would like to recommend to another friend of the online and offline class.

The digital competency measurement tool was partially modified and used in the digital literacy question of information and utilization ability among the "Awareness Analysis of Learner Competencies in the 21st Century" questions developed by the Korea Educational Research Information Institute (2014). The measurement tool consisted of a total of 23 questions. The reliability of this measurement tool was found to be Cronbach's α = .918, and it was judged to be suitable for use in this study.

Interactions between instructors and learners, interactions between team-members, and class satisfaction questions were developed for this study. First of all, the questions measuring the interaction between instructors and learners consisted of 5 questions. The reliability of Cronbach's α of this measurement tool was found to be .908. In addition, the interaction measurement questions between team-members consisted of 10 questions. The reliability of Cronbach's α of this measurement tool was found to be .899. The class satisfaction measurement questions consisted of 6 questions. The reliability of Cronbach's α of this measurement tool was found to be .921. All three measurement tools developed were evaluated to be suitable for use in this study.

Factor analysis was conducted to secure the validity of the developed teaching-learner interaction, interaction between team-members, and class satisfaction questions. The results are shown in Table 3.

Table 3 presents Kaiser-Meyer-Olkin (KMO) values that measure the appropriateness of the sample that measures professor-learner interaction, team-member interaction, and class satisfaction. This is a value indicating the degree to which the correlation between variables is well explained by other variables. If this value is small, it indicates that the selection of variables for factor analysis is not good.

Table 3. Results of the Adequacy Analysis of the Sample Being Measured

		Interaction between professor and learner	Interaction between team-members	Class satisfaction
Kaiser-Meyer-Olkin measure of sample adequacy		0.789	0.903	0.914
Bartlett's Sphericity Test	Approximate Chi Square	573.708	1743.744	1223.151
	df	10	45	15
	p	0.000	0.000	0.000

As a result of this data analysis, the KMO values of professor-learner interaction, team-member interaction, and class satisfaction were high at .789, .903, and .914, respectively, confirming that the sample was appropriate. Bartlett's sphericity test indicates whether the factor analysis model is suitable, and the significance probability value at the significance level of .05. It can be said that all 000 are suitable.

The factor extraction method was principal component analysis, and the basis for factor extraction was based on the Eigen value 1.0. The results of factor analysis on the factors of measuring teaching-learner interaction, interaction between team-members, and class satisfaction are as follows.

First, the question measuring the interaction between instructors and learners was identified as one factor. It accounts for 71.46% of the total variance. In general, if the component matrix value is .3 or higher, it is interpreted that the correlation with the factor is high, and all five questions that measure the interaction between professors and learners are suitable.755 to.907.

Second, the question measuring the interaction between team-members was identified as one factor and explains 71.91% of the total variance. In general, if the component matrix value is .3 or higher, it is interpreted that the correlation with the factor is high, and all 10 items that measure the interaction between team-members are suitable.755 to.864.

Third, the question measuring class satisfaction was identified as one factor and explained 86.03% of the total variance. In general, if the component matrix value is more than or equal to .3, it is interpreted that the correlation with the factor is high, and all six items that measure class satisfaction are suitable questions ranging from .815 to 890.

3.3 Data Analysis

To test this research problem, the IBM SPSS Statistics 25 program was used to analyze the collected data. First,

frequency analysis and descriptive statistical analysis were conducted to calculate the mean and standard deviation of the demographic factors and measurement variables of the survey subjects. Second, to confirm how consistently the measurement tool was measured, the Cronbach's α coefficient value was calculated to confirm the reliability. Third, a factor analysis was conducted to analyze the convergent validity among the detailed indicators within each area of the teaching-learner interaction, team-member interaction, and class satisfaction measurement tool. Factor Analysis is a multivariate analysis technique that analyzes how several variables are connected to each other and explains the relationship between these variables using common factors (internal dimensions). In addition, in some cases, correlation between variables is high, and a principal component analysis was conducted to implicitly reduce the number of variables by combining variables with similar meanings to form new variables that are not related to each other. The indicators were reviewed and adjusted through principal component analysis to increase the validity of the indicators, and sub-factors by area were reclassified through Common Factor Analysis.

Finally, a multiple regression analysis was conducted to determine which of the digital competency level, professor-learner interaction level, and team-member interaction factors influencing class satisfaction in an online and offline class environment. At this time, when variables were added one by one as a method of selecting variables to be included in the most suitable regression model, variables were selected as the most commonly used step selection method as a method of testing the significance of each variable already included in the model and removing it if it is not significant. In addition, to increase the predictive power of the heavy regression equation, the correlation between the dependent variable and each independent variable should be high and the correlation between the independent variables should be low. In other words, tolerance and variance inflation factor (VIF) were calculated to confirm multicollinearity between independent variables. When both the tolerance and the VIF approach 1, it is judged that there is no multicollinearity, and for the VIF, if it is 10 or higher, it is considered that there is multicollinearity. It was confirmed that the correlation between the independent variables was not so high that the tolerance limit and the VIF were both 1.000. In other words, both tolerances and VIFs met the basic assumptions for heavy regression analysis.

4. Results

4.1 The Relationship between the Digital Competence of College Students, the Interaction between Professors and Learners, the Interaction between Team-Members, and the Class Satisfaction of Online and Offline Blended Classes

Descriptive statistics of each variable were calculated and correlated analysis was conducted to examine the relationship between the class satisfaction of online and offline blended classes, the digital competence of college students, the interaction between professors and learners, and the interaction between team-members. The analysis results are presented in Tables 4 and 5.

Table 4. Descriptive Statistics (N=162)

Variable	M	SD
Class satisfaction	4.57	0.629
Digital Competence	3.8935	0.47815
Interaction between professor and learner	4.5704	0.50253
Interactions between team-members	4.4642	0.60808

In Table 4, the overall average of class satisfaction for online and offline blended classes was high at 4.57 points out of 5 points. Digital competency was 3.89, which was average. The average of the teacher-learner interaction was high at 4.57. The average of interactions between team-members was high at 4.46.

In Table 4, the correlation between online and offline blended class satisfaction and digital competency of college students showed a negative correlation (r=-.142) with a significance probability of .03 (p<.05). The correlation between class satisfaction and teacher-learner interaction showed a high positive correlation (r=.838) with a significance probability of .000 (p<.001). The correlation between class satisfaction and interaction between team-members also showed a high positive correlation (r=.675) with a significance probability of .000 (p<.001).

Table 5. Correlation between Variables (N=162)

Variable	Class satisfaction	Digital Competence	Interaction between professor and learner	Interactions between team-members
Class satisfaction	1.000			
Digital Competence	-0.142*	1.000		
Interaction between professor and learner	0.838***	-0.142	1.000	
Interactions between team-members	0.675***	-0.068***	0.759***	1.000

** p<.05, *** p<.001*

4.2 The Effects of College Students' Digital Competence, Teacher-Learner Interaction, and Team-member Interaction on Class Satisfaction of Online and Offline Blended Classes

The statistical significance of the model measuring the effects of university students' digital competency, teacher-learner interaction, and team-member interaction on online/offline blended class satisfaction was verified. The measured results are presented in Tables 6 and 7.

Table 6. ANOVA for Regression Model (N=162)

	Sum of squares	df	Mean square	F	p
Regression Model	39.364	3	13.121	85.001	.000
Residual	24.390	158	0.154		
Total	63.753	161			
		R^2(adj. R^2) = .617(.610)			

In Table 6, the significance probability for the regression model was .000, which is lower than .05, suggesting that college students' digital competence, teacher-learner interaction, and team-member interaction affect class satisfaction in online and offline blended classes. It was found that the hypothesis was established. The R^2 value is the explanatory power in which the dependent variable is explained by the independent variable. In the table above, the explanatory power of university students' digital competency, teacher-learner interaction, and team-member interaction to explain class satisfaction can be said to be 61.7%.

Table 7. Multiple Regression Analysis on Class Satisfaction of Online and Offline Blended Classes (N=162)

Independent variable	Unstandardized regression coefficients		Standardized regression coefficients	t	p	Collinearity Statistics	
	B	Standard error	β			tolerance	VIF
(constant)	0.311	0.409		0.761	0.448		
Interaction between professor and learner	0.794	0.096	0.634	8.312	0.000	0.416	2.404
Interactions between team-members	0.186	0.078	0.180	2.378	0.019	0.423	2.366

As a result of multiple regression analysis on class satisfaction of online and offline blended classes, it was confirmed that there was no multicollinearity with tolerance and VIF of 0.1 or more and less than 10, respectively. Next, as a result of confirming the significance of each path, except for the digital competency of university students, the interaction between teacher-learners (p<.001) and the interaction between team-members (p<.001) showed the class satisfaction of online and offline blended classes. effect was confirmed to be valid. As a result of checking the non-standardized coefficients for significant variables, both the teacher-learner interaction (B=.794) and the

team-member interaction (B=.186) are positive numbers, indicating that the teacher-learner interaction and team-member interaction will increase. It was found that the class satisfaction of online and offline blended classes increased as the class increased.

The regression equation showing the relationship between digital competency of college students, interaction between teacher and learner, and interaction between team-members, which explains the class satisfaction of online and offline blended classes, is as follows.

Satisfaction level of online/offline blended classes = .311 + .794 (interaction between teacher and learner) + .186 (interaction between team-members)

In this equation, .794 and .186 are called standardized regression coefficients when each variable is standardized. According to the derived regression equation, when the interaction between teacher-learner and the interaction between team-members is 0, the average class satisfaction of online and offline blended classes is .311, and when other independent variables are the same, the interaction between teacher-learner. It can be predicted that if this 1 point increases, class satisfaction will increase by .794 points, and if the interaction between team-members increases by 1 point, class satisfaction will increase by .186 points on average. Therefore, to improve class satisfaction in online and offline blended classes, it is necessary to develop educational methods and strategies that can increase the interaction between teacher-learners and team-members.

5. Discussion

In this study, it was confirmed that the interaction between teacher-learners and team-members should be increased to improve class satisfaction in online and offline blended classes. In other words, active interaction between instructor and learner and between learner and learner can be said to be a success factor in learning. This is an important consideration when planning blended learning. Blended learning enables synchronous or asynchronous interaction, and has the advantage of enabling various types of interactions by increasing interactions between teachers and learners as well as learners through various forms of learning activities in online and classroom environments (Lee, 2007). Therefore, instructors must flexibly utilize the space and time for teaching-learning by utilizing the environmental characteristics of online and offline setups. In addition, it should be possible to induce various interactions among learners by weakening the dependence on a single teacher by utilizing various types of learning resources or external experts.

Even in traditional classroom classes, interaction is a major factor in determining successful classes, but especially in a blended learning environment that crosses online and offline environments, interaction can increase learners' satisfaction with learning and a sense of security that learning is progressing seamlessly. In an online/offline blended learning environment, opinions can be delivered evenly to all learners, and instructors can provide immediate feedback to learners online. Also, since delayed feedback is possible, it is easy to encourage learners to participate in online classes through continuous feedback (Kwon, 2020). In addition, this continuous interaction ensures that learners do not feel alienated from online learning by maintaining a sense of social presence (Lai et al., 2016).

In particular, the promotion of interaction through cooperative learning in online learning makes it possible to more directly secure opportunities for communication that are lacking between learners. Furthermore, social and emotional deficiencies can be supplemented through the formation of human relationships (Park and Heo, 2020). However, at the same time, in the online learning environment, there is a limit that some learners may appear who are maladapted, disengaged or alienated from learning due to restrictions in communication or relationships. Therefore, it is necessary for instructors to actively communicate with these learners and form a rapport to create an atmosphere where they can overcome emotional difficulties and participate in learning (Oh, 2020).

6. Conclusion

The purpose of this study was to analyze which factors among university students' digital competency, teacher-learner interaction, and team-member interaction affect class satisfaction in online and offline blended classes.

First, as a result of analyzing the correlation between class satisfaction of online and offline blended classes, university students' digital competency, teacher-learner interaction, and team-member interaction, all variables except

for the digital competency level showed a positive correlation. This suggests that the interaction between teacher-learners and team-members is more important than the digital competency of college students in online and offline blended classes. In other words, as the educational field is becoming digitalized and edu-tech in line with the era of the 4th industrial revolution, learners' digital capabilities have become important. A teaching strategy that enhances interaction among team-members is needed.

Second, as a result of analyzing the effects of digital competency, teacher-learner interaction, and team-member interaction on class satisfaction in online and offline blended classes, excluding digital competency, teacher-learner interaction and team-member interaction, it was found that the action affects the class satisfaction of online and offline blended classes. In particular, the interaction between teacher and learner showed the highest influence on class satisfaction. This suggests that interaction between instructor and learner has a greater influence on class satisfaction than interaction between team-members in class.

In conclusion, to improve the class satisfaction of online and offline blended classes, it is necessary to seek a teaching strategy that can increase the interaction between teachers and learners. In addition, when operating a team project, a team project operation plan that can increase interaction among team-members must be prepared.

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Acknowledgments

This paper was supported by Eulji University in 2020(EJBS-20-04).

Authors contributions

Not applicable.

Funding

Not applicable.

Competing interests

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

Informed consent

Obtained.

Ethics approval

The Publication Ethics Committee of the Sciedu Press.

The journal's policies adhere to the Core Practices established by the Committee on Publication Ethics (COPE).

Provenance and peer review

Not commissioned; externally double-blind peer reviewed.

Data availability statement

The data that support the findings of this study are available on request from the corresponding author. The data are not publicly available due to privacy or ethical restrictions.

Data sharing statement

No additional data are available.