Effects of Online Class Satisfaction, Professor-Student Interaction, and Learning Motivation on Self-Directed Learning Ability of Nursing Students Applying the Blended Learning

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ABSTRACT

The purpose of this study is to understand the effects of online class satisfaction, professor-student interaction, and learning motivation on self-directed learning ability of nursing students applying the blended learning. Using the SPSS 21.0 Program for data analysis, this study conducted the t-tests and one-way ANOVA. In the results of analyzing the correlations of online class satisfaction, professor-student interaction, learning motivation, and self-directed learning ability of research subjects, the online class satisfaction showed positive correlations with professor-student interaction(r=.625, p<.001), learning motivation(r=.352, p<.001), and self-directed learning ability(r=.200, p=.005). The professor-student interaction showed positive correlations with learning motivation(r=.358, p<.001) and self-directed learning ability(r=.285, p<.001). The learning motivation showed a positive correlation with self-directed learning ability(r=.849, p<.001). In the results of analyzing the factors affecting the self-directed learning ability, the learning motivation explained 74.5% of self-directed learning ability(F=38.049, p<.001). When the learning motivation(β=.807, p<.001) was higher, the self-directed learning ability was good. It would be necessary to establish the effective teaching/learning strategies through the expanded research on self-directed learning ability and the measures for increasing the learning motivation of nursing students in blended learning.

Keywords: blended learning, nursing students, online class satisfaction, professor-student interaction, learning ability, self-directed learning ability

1. INTRODUCTION

1.1 Introduce the Problem

In March 2020, the WHO declared the COVID-19 as a pandemic[1]. Even thought the Korean government declared 'With Corona' in November 2021, the newly-confirmed cases were rapidly increased, so the strong social distancing is executed again from December 2021. Like this, the prolonged COVID-19 pandemic and repeated spread of infection are bringing about a crisis in the economy, politics, culture, and healthcare system of Korea, which is also bringing about huge changes in nursing education[2].

1.2 Explore Importance of the Problem

As a learning method mixed with online and offline learning by combining two or more learning methods, blended learning was reported to be able to draw the best learning effect through learning in various dimensions[3]. Through not only the method of simply connecting offline learning and online learning, but also the method of connecting individual learning and cooperative learning, connecting real-time and non-real-time, and integrating various content, the best learning effect could be raised. Also, in the aspect of learner, it is known to have strengths such as convenience and accessibility [3].

1.3 Describe Relevant Scholarship

Learning motivation means the degree of drive, attitude, sense of purpose, and will of learners in relation to learning activities. It has functions to induce llearning, to continue learning activities, and to inform the learning direction, which exists when learners actively perform class activities[4]. Also, the learning motivation has effects on interaction between professor and student, so the role of professor gets more important in online class [5].

As an important factor of educational outcome variables, class satisfaction means the overall satisfaction with class content perceived by learners [6]. Class satisfaction is raised as an important variable of educational outcome because the recent class regards the social contact and interaction with learners as important[19,20]. As the class itself emphasizes the performativity more rather than the form of knowledge, learners are the center of class, so the satisfaction perceived by learners is working as an important variable [7].

Self-directed learning ability means that learners participate in learning for themselves in order to adapt themselves to various situations as the subject of decision-making and action in the whole processes of learning[8][17]. As one of the important competencies in online learning, self-directed learning ability was improved through online learning [9].

Thus, this study aims to understand the relations of online class satisfaction, professor-student interaction, and learning motivation of nursing students by applying the blended learning, and then to understand the effects on self-directed learning ability. This study aims to provide the basic data required for establishing the teaching/learning strategies by seeking for the measures for increasing the utilization and effects of blended learning.

2. METHOD

2.1 Participant (Subject) Characteristics

The subjects of this study were enrolled nursing students(1st, 2nd, 3rd-year) who learnt both online class and offline class and also completed the blended learning class for a semester or more by using the convenience sampling method. They were enrolled students from a university located in K province and two universities located in D city.

2.2 Sampling Procedures

2.2.1 Sample Size, Power, and Precision

The data was collected from August 1, 2021 to September 31, 2021. In the results of using the G power 3.1 software[10] to calculate the proper number of samples, when the differences between groups were verified in significance level as (α).05, test power as (1-β) .95, and effect size as (r) .25(moderate), the required minimum sample size was calculated as 114. Even though this study selected 200 people who understood the purpose of this study and agreed to participate in it, total 194 questionnaires were used for analysis after excluding the questionnaires with insincere responses.

2.2.2 Research Design

This is a descriptive study for understanding the effects of online class satisfaction, professor-student interaction, and learning motivation of nursing students by applying the blended learning.

2.3 RESEARCH INSTRUMENTS

2.3.1 Online Class Satisfaction

Online class satisfaction was measured by using the instrument that modified/complemented the instrument used by Yeo Min-Gu[11]. It is composed of total eight items based on the 5-point Likert Scale('Not at all'-'Very much so'). The higher score means high class satisfaction. In the research by Yeo Min-Gu[11], the Cronbach's alpha was .98. In this study, the Cronbach's alpha was .93.

2.3.2 Professor-Student Interaction

This study used the instrument used by Park Yeong-Ran[12] who modified/complemented it targeting the students of cyber university based on the interaction assessment criteria items for elementary/secondary e-learning. It is composed of total seven items based on the 5-point Likert Scale('Not at all'-'Very much so'). The higher score means high interaction. In the research by Park Yeong-Ran(2014)[9], the Chronbach's alpha was

.93. In this study, the Cronbach's alpha was .93.

2.3.3 Learning Motivation

To measure learning motivation, this study used the scale that was modified/complemented by Jang Eun-Hwa[13] targeting nursing students. It is composed of total 19 items based on the 5-point Likert Scale(1point for 'Very rare'- 5points for 'Very often'). The higher score means high learning motivation. In the research by Jang Eun-Hwa(2016)[10], it was .90. In this study, it was .91.

2.3.4 Self-Directed Learning Ability

This study used the self-directed learning ability scale for university students, which was developed by Lee Seok-Jae, Jang Yu-Kyeong, Lee Heon-Nam, and Park Gwang-Yeop. It was composed of three elements of ability such as learning plan, learning execution, and learning evaluation, and their sub-elements. It was composed of total 45 items of learning plan including three sub-elements such as diagnosis of learning needs, goal setting, and understanding resources for learning, learning execution including three sub-elements such as basic self-management ability, choice of learning strategy, and attributes of learning execution, and learning evaluation including two sub-elements such as attribution of effort for result and introspection. Based on the 5-point Likert Scale(1point for'Not at all'- 5points for'Very much so'), the higher score means high confidence in learning ability. The inversed items of this instrument were Item 1-1 in the area of learning needs of learning plan, Item 4-5 in the area of basic self-management of learning execution, Item 6-2, 6-4, and 6-5 in the area of continuity of learning execution, and Item 7-2 and 7-5 in the area of attribution of effort for result of learning evaluation. When the instrument was initially developed, the Chronbach's alpha was .96. In this study, the Cronbach's alpha was .91. And the reliability of each element was shown as learning plan(.84), learning execution(.80), and learning evaluation(.78).

2.4 Data Analysis Methods

The collected data was analyzed by using the SPSS 21.0 program. The general characteristics of nursing students and the learning characteristics of online lecture were analyzed by using the frequency and percentage. The degree of online class satisfaction, professor-student interaction, learning motivation, and self-directed learning ability was analyzed by using the mean and standard deviation. The differences in online class satisfaction, professor-student interaction, learning motivation, and self-directed learning ability according to the general characteristics of nursing students and the learning characteristics of online lecture, were analyzed through the t-test, ANOVA, and Scheffe. To understand the correlations of online class satisfaction, professor-student interaction, learning motivation, and self-directed learning ability of nursing students, this study used the Pearson correlation coefficient. The effects on self-directed learning ability were analyzed through the multiple linear regression analysis.

3. RESULTS

3.1 Differences in Online Class Satisfaction, Professor-Student Interaction, Learning Motivation, and Self-Directed Learning Ability According to the General Characteristics

The differences in online class satisfaction, professor-student interaction, learning motivation, and self-directed learning ability according to the general characteristics of subjects are as follows [Table 1]. In the general characteristics, the female respondents were the most(83.5%). The most responses were shown in 'moderate'(36.6%) for the satisfaction with blended learning class, and the 'technology and system management'(35.6%) for the improvements of online class.

Regarding differences in online class satisfaction, professor-student interaction, learning motivation, and self-directed learning ability according to the general characteristics of subjects, the differences in online class satisfaction were significant in smartphone and computer literacy(p=.005), confidence in online class(p<.001), satisfaction with online class(p<.001), and satisfaction with blended learning(p=.001). The differences in professor-student interaction were significant in confidence in online class(p<.001), satisfaction

with online class(p<.001), and satisfaction with blended learning(p<.001). The differences in learning motivation were significant in record of last semester(p<.001), satisfaction with nursing major(p<.001), smartphone and computer literacy(p=.005), confidence in online class(p<.001), satisfaction with online class(p<.001), and satisfaction with blended learning(p=.001). The differences in self-directed learning ability were significant in school year(p=.003), school record(p<.001), satisfaction with nursing major(p<.001), computer literacy(p=.013), confidence in online class(p<.001), satisfaction with online class(p=.002), and satisfaction with blended learning(p=.001)[Table 1].

Table 1. The General Characteristics with Online Class Satisfaction, Interaction between Professors and Students, Learning Motivation and Self-Directed Learning Ability (N=194)

		N(%)	Online Class Satisfaction		Interaction between professors and students		Learning Motivation		Self-directed learning ability	
			mean±sd	t or F (p)	mean±sd	t or F (p)	mean±sd	t or F (p)	mean±sd	t or F (p)
Gender	Male	32(16.5)	3.53±0.61	0.851 (.396)	3.57±0.67	-0.900 (.369)	3.45±0.50	1.122 (.263)	3.48±0.36	0.543 (.588)
	Female	162(83.5)	3.65±0.74		3.44±0.75		3.57±0.58		3.53±0.46	
Grade*	1st[a]	13(6.7)	3.43±0.45	0.800 (.451)	3.53±0.57	0.347 (.707)	3.60±0.35	1.508 (.224)	3.73±0.28	5.859 (.003) b<c<a
	2nd[b]	45(23.2)	3.58±0.46		3.38±0.51		3.42±0.34		3.34±0.23	
	3rd[c]	136(70.1)	3.67±0.80		3.48±0.81		3.59±0.64		3.56±0.49	
academic record	High	24(12.4)	3.90±0.96	1.872 (.157)	3.57±0.80	0.960 (.385)	4.22±0.56	32.744 (.000) c<b<a	4.07±0.49	32.575 (.000) c<b<a
	Middle	133(68.6)	3.61±0.65		3.48±0.64		3.54±0.51		3.50±0.41	
	Low	37(19.1)	3.56±0.76		3.32±0.97		3.17±0.39		3.25±0.20	
Satisfaction of Nursing major	Satisfies	101(52.1)	3.68±0.80	1.294 (.277)	3.45±0.85	0.424 (.655)	3.73±0.58	12.738 (.000) b<a	3.33±0.48	12.889 (.000) a<b
	Moderate	87(44.8)	3.56±0.61		3.45±0.59		3.34±0.47		3.35±0.34	
	Dissatisfied	6(3.1)	3.95±0.65		3.73±0.42		3.66±0.77		3.63±0.35	
Computer Skills	technical	69(35.6)	3.82±0.77	5.511 (.005)	3.61±0.76	4.446 (.013)	3.76±0.62	7.668 (.001) b<a	3.64±0.47	4.458 (.013) b<a
	ordinary	115(59.3)	3.50±0.63		3.34±0.70		3.44±0.50		3.47±0.40	
	non-technical	10(5.2)	3.96±0.96		3.84±0.69		3.40±0.60		3.31±0.57	
Confidence in online learning	Confidence	65(33.5)	4.10±0.61	27.438 (.000) b,c<a	3.81±0.69	12.144 (.000) b<c<a	3.93±0.65	28.892 (.000) c<b<a	3.76±0.51	15.932 (.000) c<b<a
	Moderate	109(56.2)	3.44±0.63		3.27±0.73		3.41±0.39		3.41±0.37	
	Non-confidence	20(10.3)	3.19±0.73		3.35±0.50		3.14±0.51		3.34±0.69	
Satisfaction of online learning	very satisfied	39(20.1)	4.35±0.59	39.674 (.000) b,c<a	4.02±0.73	15.918 (.000)	3.93±0.77	8.140 (.000)	3.74±0.62	4.270 (.002)
	satisfied	91(46.9)	3.73±0.44		3.54±0.53		3.52±0.49		3.48±0.42	
	Moderate	38(19.6)	3.22±0.55		3.07±0.81		3.27±0.25		3.36±0.24	
	unsatisfied	24(12.4)	2.88±0.72		2.94±0.59		3.48±0.52		3.53±0.35	
	very unsatisfied	2(1.0)	2.06±0.08		2.71±0.20		4.10±0.59		3.86±0.37	
Satisfaction of blended learning	very satisfied	35(18.0)	3.96±0.65	4.988 (.001) d<b,a	3.76±0.81	14.371 (.000) d<c,b,a	3.95±0.70	6.154 (.000) e,d,c,b<a	3.81±0.65	5.004 (.001) d,c,b<a
	satisfied	58(29.9)	3.72±0.67		3.64±0.62		3.50±0.53		3.48±0.35	
	Moderate	71(36.6)	3.56±0.68		3.47±0.60		3.49±0.43		3.45±0.35	
	unsatisfied	18(9.3)	3.11±0.91		2.46±0.15		3.41±0.63		3.41±0.26	
	very unsatisfied	12(6.2)	3.48±0.52		3.13±0.49		3.27±0.47		3.42±0.30	
Improvement in online classes	Content	23(11.9)	3.45±0.54	4.512 (.004) c<b	3.45±0.59	0.886 (.449)	3.56±0.40	0.212 (.888)	3.51±0.28	0.906 (.439)
	Technology and Systems	69(35.6)	3.80±0.65		3.40±0.73		3.57±0.67		3.55±0.48	

Interaction between tutor and student	63(32.5)	3.42±0.78		3.41±0.81		3.57±0.55		3.55±0.45	
None	39(20.1)	3.80±0.72		3.63±0.69		3.49±0.50		3.42±0.46	

3.2 Differences in Online Class Satisfaction, Professor-Student Interaction, and Self-Directed Learning Ability According to the Characteristics of Online Learning

The differences in online class satisfaction, professor-student interaction, learning motivation, and self-directed learning ability of research subjects according to the characteristics of online learning are as follows [Table 2]. In the characteristics of online learning, the most responses were shown in 'home'(92.3%) for place and 'recorded lecture'(76.8%) for the types of online lecture.

The differences in online class satisfaction according to the characteristics of online learning were significant in learning tools of online lecture($p<.001$), types of online lecture($p=.041$), matter of having tasks($p<.001$), amount of task($p=.048$), matter of having real-time tests($p=.035$), and inconvenience($p=.002$). The differences in professor-student interaction were significant in learning tools of online lecture($p<.001$), matter of having tasks($p<.001$), daily lecture hours($p=.007$), the number of courses taken($p=.008$), and inconvenience($p=.006$). The differences in learning motivation were significant in learning tools of online lecture($p=.028$), daily lecture hours($p=.015$), daily hours of courses taken($p=.009$), and inconvenience($p<.001$). The self-directed learning ability showed significant differences in types of online class($p=.003$), daily lecture hours($p=.015$), inconvenience($p<.001$), and efficiency of online lecture($p<.001$)[Table 2].

Table 2. The Characteristics of Online class Satisfaction, Interaction between Professors and Students, Learning Motivation and Self-Directed Learning Ability (N=194)									
				Online Class Satisfaction		Interaction between Professors and Students		Learning Motivation		Self-Directed Learning Ability	
			mean±sd	t or F (p)	mean±sd	t or F (p)	mean±sd	t or F (p)	mean±sd	t or F (p)
Learning place	Home	179(92.3)	3.66±0.74	1.425 (.243)	3.48±0.75	2.978 (.053)	3.57±0.58	1.787 (.170)	3.54±0.45	2.356 (.098)
	The cafe	5(2.6)	3.52±0.40		3.74±0.23		3.36±0.64		3.39±0.54	
	Dormitory	10(5.2)	3.27±0.28		2.94±0.43		3.25±0.26		3.24±0.24	
Learning Tools	Desktop PC	14(7.2)	4.14±0.69	8.074 (.000) b,c<a	4.09±0.81	5.468 (.001) b,c<a	3.69±0.73	3.094 (.028) b<d	3.51±0.58	1.478 (.222)
	Notebook	154(79.4)	3.58±0.67		3.43±0.71		3.49±0.49		3.49±0.38	
	Smartphone	3(1.5)	2.20±0.57		2.52±0.90		3.68±0.09		3.75±0.46	
	Tablet PC	23(11.9)	3.87±0.74		3.42±0.58		3.86±0.86		3.68±0.72	
Online classes learning Type	Take all the lectures at once	81(41.8)	3.81±0.79	2.805 (.041)	3.49±0.88	.358 (.783)	3.46±0.59	2.355 (.073)	3.39±0.41	4.805 (.003)a<b,c
	Take classes according to the schedule	62(32.0)	3.48±0.65		3.40±0.64		3.63±0.46		3.62±0.39	
	Course divided into several classes	27(13.9)	3.54±0.77		3.41±0.73		3.74±0.76		3.69±0.64	
	Repeat a lecture	24(12.4)	3.55±0.42		3.55±0.33		3.47±0.46		3.49±0.33	
Online lecture type	Recorded lecture	149(76.8)	3.62±0.73	0.922 (.400)	3.42±0.78	1.386 (.253)	3.55±0.60	0.132 (.877)	3.51±0.47	0.057 (.945)
	Live video	18(9.3)	3.50±0.61		3.72±0.47		3.54±0.41		3.53±0.40	

		N(%)	Mean±SD	F(p)	Mean±SD	F(p)	Mean±SD	F(p)	Mean±SD	F(p)
	lecture									
	Mixed lecture	27(13.9)	3.79±0.71		3.51±0.57		3.61±0.50		3.54±0.36	
Homework	yes	172(88.7)	3.73±0.68	5.421 (.000)	3.59±0.64	8.053 (.000)	3.56±0.59	0.771 (.441)	3.52±0.45	-0.026 (.979)
	no	22(11.3)	2.90±0.59		2.42±0.63		3.46±0.40		3.52±0.42	
Assignment amount	a lot	90(46.4)	3.50±0.74	3.082 (.048)	3.40±0.82	0.732 (.482)	3.53±0.60	0.272 (.762)	3.47±0.46	1.203 (.303)
	Appropriate	103(53.1)	3.75±0.68		3.51±0.66		3.57±0.54		3.56±0.44	
	Few	1(0.5)	3.75±0.00		3.85±0.00		3.89±0.00		3.92±0.00	
Time required for task	Less than 60 minutes	13(6.7)	3.79±0.24		3.42±0.53		3.26±0.39		3.40±0.40	
	60~180 minutes	65(33.5)	3.63±0.69	0.584 (.626)	3.38±0.61	0.683 (.561)	3.63±0.56	2.264 (.082)	3.54±0.52	0.884 (.451)
	180 ~ 360 minutes	97(50.0)	3.65±0.71		3.53±0.82		3.51±0.52		3.50±0.39	
	More than 360 minutes	19(9.8)	3.46±1.05		3.36±0.81		3.71±0.84		3.64±0.51	
Real-time tests for online lectures	yes	104(53.6)	3.74±0.66	2.127 (.035)	3.53±0.63	1.431 (.154)	3.52±0.47	-0.874 (.383)	3.49±0.38	-1.007 (.315)
	no	90(46.4)	3.52±0.77		3.38±0.83		3.59±0.67		3.56±0.51	
Tests Types	Face-to-paper test	168(86.6)	3.66±0.75		3.46±0.77		3.58±0.59		3.54±0.46	
	Face to face - practice	11(5.7)	3.27±0.64	1.593 (.206)	3.20±0.42	0.918 (.401)	3.48±0.33	1.515 (.222)	3.37±0.39	1.425 (.243)
	Real-time – Testing	15(7.7)	3.58±0.29		3.60±0.43		3.32±0.35		3.39±0.25	
Lecture hours per day	Less than 60 minutes	16(8.2)	3.40±0.63		2.85±1.06		3.25±0.38		3.18±0.33	
	60~180 minutes	92(47.4)	3.64±0.76	0.731 (.534)	3.52±0.75	4.205 (.007) a<b,c,d	3.49±0.54	3.567 (.015) a<c	3.49±0.39	5.017 (.002) a<c
	180~360 minutes	64(33.0)	3.65±0.67		3.54±0.50		3.71±0.58		3.64±0.45	
	More than 360 minutes	22(11.3)	3.75±0.75		3.44±0.78		3.58±0.65		3.52±0.59	
Lecture hours per day week	Less than 60 minutes	1(0.5)	3.00±0.00		2.85±0.00		2.84±0.00		2.90±0.00	
	60~180 minutes	20(10.3)	3.26±0.75	2.496 (.061)	3.15±0.57	1.733 (.162)	3.30±0.54	2.524 (.059)	3.40±0.41	1.892 (.132)
	180~360 minutes	62(32.0)	3.63±0.62		3.54±0.62		3.52±0.54		3.47±0.37	
	More than 360 minutes	111(57.2)	3.71±0.75		3.47±0.81		3.62±0.58		3.57±0.48	
Number of lecture	1~4	3(1.5)	3.79±1.06		2.71±0.00		3.36±0.34		3.10±0.30	
	5~8	36(18.6)	3.52±0.69		3.19±0.86		3.52±0.37		3.47±0.23	
	over 9	155(79.9)	3.66±0.72		3.54±0.69		3.56±0.61		3.54±0.48	
Appropriate	Less than 60	60(30.9)	3.67±0.78	0.946	3.45±0.67	1.643	3.50±0.60	3.953	3.47±0.40	1.511

		N(%)	mean±SD	F(p)	mean±SD	F(p)	mean±SD	F(p)	mean±SD	F(p)
lecture time	minutes			(.420)		(.181)		(.009) b<c		(.213)
	60~120 minutes	69(35.6)	3.61±0.58		3.33±0.77		3.42±0.39		3.47±0.39	
	120~180 minutes	56(58.9)	3.57±0.78		3.56±0.72		3.73±0.63		3.60±0.53	
	More than 180 minutes	9(4.6)	3.98±0.90		3.79±0.86		3.79±0.83		3.69±0.54	
Used program	Campus Learning Platform	132(68.0)	3.59±0.73	1.037 (.377)	3.42±0.76	2.387 (.070)	3.53±0.61	1.037 (.377)	3.51±0.47	.624 (.600)
	Zoom	59(30.4)	3.75±0.70		3.59±0.64		3.62±0.48		3.57±0.39	
	Google Meet	1(0.5)	3.12±0.00		1.85±0.00		3.47±0.00		3.30±0.00	
	Google Class Room	2(1.0)	3.25±0.00		3.28±0.00		2.94±0.00		3.22±0.00	
Inconvenience	Connection failure or slow speed	62(32.0)	3.89±0.63	4.077 (.002) b<a	3.73±0.67	3.365 (.006) b<a	3.48±0.63	6.504 (.000) a<d	3.46±0.51	6.294 (.000) a<d
	Difficulty in continuous concentration	70(36.1)	3.42±0.76		3.31±0.82		3.61±0.46		3.52±0.33	
	Difficulty learning on your own	29(14.9)	3.51±0.78		3.44±0.69		3.24±0.44		3.38±0.21	
	Difficulty in preparing learning tools	8(4.1)	4.12±0.53		3.60±0.64		4.40±0.88		4.25±0.83	
	Difficult to ask questions	14(7.2)	3.58±0.47		3.09±0.56		3.71±0.49		3.70±0.49	
	Unable to get an answer after asking	11(5.7)	3.59±0.62		3.31±0.29		3.59±0.27		3.46±0.20	
Effectiveness of Online Lecture Training	very non-effective	3(1.5)	1.91±0.07	61.451 (.000) a<b<c<d<e	2.19±0.32	15.704 (.000) a,b<c,d,e	4.00±0.45	6.385 (.000) c<d	4.05±0.05	6.701 (.000) c<d
	not effective	34(17.5)	2.90±0.57		2.91±0.80		3.45±0.52		3.47±0.31	
	Moderate	77(39.7)	3.46±0.47		3.38±0.53		3.37±0.45		3.38±0.36	
	effective	57(29.4)	4.04±0.43		3.80±0.66		3.81±0.62		3.73±0.51	
	very effective	23(11.9)	4.52±0.47		3.88±0.69		3.65±0.65		3.47±0.52	

3.3 Degree of Online Class Satisfaction, Professor-Student Interaction, Learning Motivation, and Self-Directed Learning Ability

The online class satisfaction of subjects was 3.63±0.72; the professor-student interaction was 3.46±0.73, the learning motivation was 3.55±0.57 and the self-directed learning ability was 3.52±0.45. As the sub-areas of self-directed learning ability, the learning plan was 3.44±0.53, the learning execution was 3.59±0.49 and the learning evaluation was 3.53±0.56 [Table 3].

Table 3. The status of Online Class Satisfaction, Interaction between Professors and Students, Learning Motivation and Self-Directed Learning Ability (N=194)			
	mean±sd	Max	Min
Online Class Satisfaction	3.63±0.72	5.00	1.88
Interaction between professors and students	3.46±0.73	5.00	1.86
Learning Motivation	3.55±0.57	5.00	2.37
Self-directed learning ability	3.52±0.45	4.85	2.45
Learning plan	3.44±0.53	4.87	2.00
Diagnosing learning needs	3.45±0.54	5.00	2.20
Learning goal setting	3.48±0.78	5.00	1.00
Identifying resources for learning	3.39±0.68	5.00	1.60
Learning execution	3.59±0.49	4.80	2.67
Self-management ability	3.67±0.64	5.00	2.40
Selection of learning strategies	3.54±0.51	4.80	2.20
Continuity of learning execution	3.57±0.66	5.00	2.00
Learning evaluation	3.53±0.56	5.00	2.30
Effort for results	3.60±0.62	5.00	2.00
Introspection	3.45±0.69	5.00	1.40

3.4 Correlations of Online Class Satisfaction, Professor-Student Interaction, Learning Motivation, and Self-Directed Learning Ability

In the results of analyzing the correlations of online class satisfaction, professor-student interaction, learning motivation, and self-directed learning ability of research subjects, the online class satisfaction showed positive correlations with professor-student interaction($r=.625$, $p<.001$), learning motivation($r=.352$, $p<.001$), and self-directed learning ability($r=.200$, $p=.005$). The professor-student interaction showed positive correlations with learning motivation($r=.358$, $p<.001$) and self-directed learning ability($r=.285$, $p<.001$). The learning motivation showed a positive correlation with self-directed learning ability($r=.849$, $p<.001$)[Table 4].

Table 4. Correlation with Online Class Satisfaction, Interaction between Professors and Students, Learning Motivation, and Self-Directed Learning Ability (N=194)				
	Online Class Satisfaction	Interaction between Professors and Students	Learning Motivation	Self-Directed Learning Ability
	r(p)	r(p)	r(p)	r(p)
Online Class Satisfaction	1	.625(.000)	.352(.000)	.200(.005)
Interaction between professors and students		1	.358(.000)	.285(.000)
Learning Motivation			1	.849(.000)
Self-directed learning ability				1

3.5 Factors Affecting the Self-Directed Learning Ability

In the results of analyzing the factors affecting the self-directed learning ability, among the variables($p<.05$) that were statistically significant in the general characteristics of research subjects, and online class satisfaction, professor-student interaction, and learning motivation, the learning motivation explained 74.2% of self-directed learning ability($F=38.049$, $p<.001$). When the learning motivation was higher($\beta=.807$, $p<.001$), the self-directed learning ability was good[Table 5].

Table 5. Effective factor of Self-Directed Learning Ability (N=194)							
		B	β	t(p)	R	Adjusted R^2	F(p)
Self-directed learning ability	Content	1.124		4.554(.000)	.873	.742	38.049 (.000)
	Grade*	.012	.016	0.423(.673)			
	Academic record	-.072	-.089	-1.896(.060)			
	Satisfaction of Nursing major	.029	.036	.836(.404)			
	Computer Skills	.001	.001	.023(.981)			
	Confidence in online learning	-.026	-.036	-.750(.454)			
	Satisfaction of online learning	-.015	-.032	-.581(.562)			
	Satisfaction of blended learning	-.035	-.084	-1.782(.076)			
	Online classes learning Type	.020	.032	.838(.403)			
	Lecture hours per day	.013	.023	.560(.576)			
	Inconvenience	.013	.040	1.017(.311)			
	Effectiveness of online lecture training	.021	.043	.738(.461)			
	Online Satisfaction	-.052	-.083	-1.138(.257)			
	Interaction between professors and students	.033	.054	.994(.321)			
	Learning Motivation	.636	.807	15.657(.000)			

4. DISCUSSION

Due to the COVID-19 pandemic, the educational paradigm was changed, which was also led to changes in nursing education. Because the precious traditional class method could not cope with the change, the blended learning mixed with the strengths of online and offline class was utilized as the measures for it. This is a descriptive research for understanding the relations of online class satisfaction, professor-student interaction, and learning motivation targeting the nursing students(1st, 2nd, 3rd-year) who have experienced the blended learning class for a semester or more.

In the results of verifying differences according to the general characteristics, the students with high confidence and satisfaction with online class showed high online class satisfaction, professor-teacher interaction, and learning motivation. To overcome fear of online class and to increase confidence in it, the preliminary education and promotion of online class would be needed.

In the results of verifying differences according to the characteristics of online learning, when there was no task and when the daily average hours of online lecture were less than 60 minutes, there were significant differences in professor-student interaction. As the online learning is not restricted to place, lots of tasks or a large amount of class are hindrance factors of professor-student interaction. When the daily lecture hours were less than 60 minutes, the learning motivation showed significant differences. Thus, the online class would also

need the proper distribution of class and break time just like offline class.

In correlations of online class satisfaction, professor-student interaction, and learning motivation, the online class satisfaction showed positive correlations with professor-student interaction and learning motivation. The professor-student interaction showed a positive correlation with learning motivation. In the results of a research by Kim Mi-Eun [15] and Yoon et al., 2019 [18], the variables that showed correlations with class satisfaction were learning motivation and interaction. The learning motivation of learners who participate in online class provides the will to continue study, so professors would need to understand the characteristics of learning motivation in advance. The learning motivation could be boosted by professor's active role[16]. Thus, it would be necessary to seek for the measures for increasing the online class satisfaction and learning motivation. The online class satisfaction should be improved by understanding and excluding the factors that have negative effects on it. The self-directed learning ability showed a positive correlation with learning motivation. When the learning motivation was higher, the self-directed learning ability was high. There should be the measures for raising the learning motivation, which expects the qualitative effects of blended learning.

As the research subjects, the nursing students in some regions were selected by using the random convenience sampling method, so it is difficult to generalize the results of this study to whole nursing students. In further researches, the research variables and subjects should be expanded.

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