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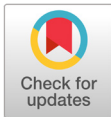
Original Article

Factors affecting satisfaction with online lectures for real-time learning

Seung-Hun Lee

Department of Dental Hygiene, Cheongam College

Corresponding Author: Seung-Hun Lee, Department of Dental Hygiene, Cheongam College, 1641 Noksae-ro, Suncheon, 57997, Korea. Tel : +82-61-740-7382, Fax : +82-61-740-7418, E-mail : smili@hanmail.net

ABSTRACT

Objectives: The purpose of this study is to investigate the interaction and satisfaction of with web-based lectures. In addition, it seeks identify their correlations as well as the factors that influence satisfaction. **Methods:** The study subjects consisted of 139 college students taking up dental hygiene from Suncheon. ANOVA, correlation analysis, and regression analysis were used on the data collected. The Cronbach's alpha for interaction and satisfaction were 0.949 and 0.921, respectively. **Results:** The interaction recorded was moderate compared to face-to-face lectures. In particular, interaction between students was higher among 3rd grade students compared to those in the 1st grade (p=0.002). Satisfaction with the appropriateness of lecture content and duration was high, but relatively low in terms of the quality of the lecture and the desire to broaden its scope. In particular, satisfaction was higher among students in higher grade levels than their more junior counterparts (p<0.05). It was also found to be positively correlated with interaction (p<0.01). Their respective presence on the educational platform had the greatest impact on satisfaction (β=0.495, p<0.001). **Conclusions:** Increased interaction results in greater levels of satisfaction. Furthermore, an improvement in the quality of the lectures and the students' perception of them would enable lectures to be conducted more effectively in situations wherein face-to-face lectures cannot be done.

Key Words: Distance learning, Educational measurement, Online educations, Scholarly communication, Schools

Introduction

In response to COVID-19 pandemic, the South Korean Ministry of Education pushed for home-based learning alternatives such as online lectures via videoconferencing and homework-intensive classes [1]. Accordingly, local universities have been developing digital lecture content suitable for distance learning; however, this is no easy task [2].

Essentially, videoconference discussions involve two-way, real-time communication from different locations [3]. In recent years, these technologies have gradually been applied to educational fields, with various levels of success [4,5]. In particular, videoconference lectures enable two-way communication with minimal restrictions in terms of location [5]. In addition, they can conducted in various formats (e.g., voice, photo, and video), and their educational effect is evaluated to be similar to that of standard face-to-face lectures [4]. The study seeks to look into its educational effect with regard to how it sustains student interaction in an isolated environment [6,7].

According to previous studies, Lee [8] reported that students prefer real-time online lectures than non-real-time ones, Park [9] claimed that videoconference lectures increase learning motivation and participation, and Kho and Nam [10] argued that aside from lectures, it could also be used for group counseling. Additionally, Kang and Kim [11] mentioned that it could be used for entrance examinations, counseling, and graduation ceremonies.

In college, dental hygiene students are required to practically apply their professional knowledge, attitudes, and skills. However, under current circumstances, most theoretical lectures are not being conducted in face, and practical training is severely limited [2]. If this situation persists, students are in grave need of an alternative; however, there is no clear solution in sight. If they do not receive adequate education and are unable to take classes that are on a par with face-to-face lectures, then this would certainly compromise their preparedness for the license exam.

In accordance with the recommendation of the Ministry of Education [1], distant lectures must be provided to students and subject to constant evaluation and improvement. However research on the effectiveness and utilization of such lectures on dental hygiene students is lacking. There is a need to provide fundamental data to further develop lectures by investigating student satisfaction, and identifying problems, and making improvements. Therefore, the study seeks to survey and analyze educational satisfaction. In addition, it intends to improve the perception and provide opportunities for the further promotion of online lectures.

Materials and Methods

1. Subjects

A total of 154 dental hygiene college students from Suncheon participated as subjects of this study. They were informed about the purpose and method of the study and subsequently asked to answer a questionnaire. This study was approved by the Institutional Review Board (CA17-200312-HR-001-02). The 14-day survey period was from June 22 to July 3, 2020, and the surveys were personally collected directly by the researcher.

The minimum number of required samples was calculated as 138 using the G*power 3.1 program [12,13] by the correlation analysis with the significance level of 0.05, test power 80%, and 0.3 effect size. Assuming a rate of elimination at 10%, at least 154 subjects were needed for the study. The effect size was based on the results of Kwon and Song [14].

2. Methods

The questionnaire consisted of a total of 25 items with 2 questions on the characteristics of class subjects, 10 questions on interaction, and 13 questions on satisfaction. The questions on interaction and satisfaction were asked by means of a 5-point Likert scale: the higher the score, the higher the level. Although it was primarily based on the studies done by Kwon and Song [14] and Kang and Kim [15], the questionnaire was modified according to the purpose of the study.

3. Analysis

ANOVA were used to compare the differences among the variables. In addition, correlation and multiple regression analyses were performed.

The data were analyzed using SPSS (ver. 18.0, Chicago, IL, USA). Cronbach's alpha was calculated for the internal consensus of the question. The reliability of interaction and of educational satisfaction was calculated as 0.949 and 0.921, respectively.

Results

1. General charactersistic of study subjects

The general characteristics of the study subjects are presented in <Table 1>. Due to incomplete responses from 15 subjects, the study ended up with 139 valid subjects. Most of them were female (99.3%), with 37.4%, 30.2%, and 32.4% of them being 1st, 2nd, and 3rd graders, respectively.

Table 1. General characteristics of study subjects

Characteristics	Division	N	%
Gender	Male	1	0.7
	Female	138	99.3
Grade	1	52	37.4
	2	42	30.2
	3	45	32.4

2. Interaction during lectures

The interaction during lectures is presented in <Table 2>. The overall interaction was determined to be moderate (3.60 points), with the interaction between the professor and the students being at 3.65 points, that among students at 3.43 points, and their respective presence on the educational platform at 3.60 points.

There was no statistically significant difference in the level of interaction between the professor and the students and their respective presence on the educational platform according to grade. However, the interaction between students was higher among third graders than 1st graders (p=0.002).

Table 2. Interaction during lectures

Characteristics	Division	Mean	SD
Interaction between professor and students on the educational platform	Promotion	3.65	1.01
	Effectiveness	3.68	0.96
	Adequacy	3.64	1.04
Subtotal		3.65	0.96
Interaction between students on the educational platform	Promotion	3.35	1.13
	Effectiveness	3.47	1.06
	Adequacy	3.46	1.08
Subtotal		3.43	1.02
Presence on the educational platform	Professor presence	3.71	0.95
	Interest in student learning	3.74	1.00
	Influence of professor	3.65	1.03
	Student presence	3.76	1.03
Subtotal		3.72	0.89
Total		3.60	0.86

Table 3. Differences in the interaction according to grade

Variables	Grade	N	Mean	SD	p^*
Interaction between professor and students	1	52	3.67	0.92	0.899
	2	42	3.60	0.96	
	3	45	3.69	1.03	
Interaction between students	1	52	3.10	1.04[a]	0.002
	2	42	3.42	0.98[b]	
	3	45	3.81	0.93[c]	
Presence on the educational platform	1	52	3.76	0.84	0.702
	2	42	3.62	0.92	
	3	45	3.75	0.93	
Total	1	52	3.51	0.81	0.349
	2	42	3.55	0.86	
	3	45	3.75	0.90	

[a,b,c]The same subgroup by Scheffé multiple comparison test at $p<0.05$
[*]by one-way ANOVA

3. Satisfaction with videoconference lectures

The students' level of satisfaction with lectures is presented in <Table 4>. Overall, satisfaction was found to be moderate (3.68 points). The impact of the lecture content (4.21 points), appropriateness of lecture duration (4.20 points), appropriateness of evaluation criteria (3.99 points), and response to accidents (3.89 points) were high. However the quality of online lecture compared to face-to-face lectures (3.22 points), student participation (3.39 points), necessity of expanding application (3.42 points), and intention to gain multiple access (3.47 points) were relatively low.

Satisfaction varied significantly depending on grade ($p<0.05$). Satisfaction with the difficulty level of the lectures was higher for 3rd graders than 1st graders, the willingness to participate was higher in 3rd grade than 1st and 2nd grade, and the effectiveness of homework was higher for 3rd graders than 1st graders. Moreover, lecture satisfaction was higher for 3rd graders graders than 2nd graders, the intention to gain multiple access was higher 3rd graders than 2nd graders, and the desire to broaden the scope of the lecture was higher in the 3rd graders than 1st and 2nd graders.

Table 4. Differences in satisfaction according to grade

Variables	Grade	N	Mean	SD	p^*
Convenience	1	52	3.81	1.10	0.702
	2	42	3.69	1.14	
	3	45	3.89	1.07	
	Suntotal	139	3.80	1.10	
Quality of lectures compared to face-to-face lectures	1	52	3.19	1.01	0.069
	2	42	2.95	1.13	
	3	45	3.49	1.10	
	Suntotal	139	3.22	1.09	
Participation	1	52	3.40	0.93	0.114
	2	42	3.14	1.07	
	3	45	3.60	1.05	
	Suntotal	139	3.39	1.03	
Impact of lecture content	1	52	4.06	1.11	0.217
	2	42	4.17	1.17	
	3	45	4.42	0.78	
	Suntotal	139	4.21	1.04	
Difficulty	1	52	3.23	0.96[a]	0.002
	2	42	3.69	0.92[b]	
	3	45	3.89	0.91[c]	
	Suntotal	139	3.58	0.97	
Willingness to participate	1	52	3.38	0.72[a]	0.006
	2	42	3.31	0.95[a]	
	3	45	3.84	0.88[b]	
	Suntotal	139	3.51	0.87	
Appropriateness of lecture duration	1	52	4.38	0.82	0.141
	2	42	4.00	1.10	
	3	45	4.18	0.89	
	Suntotal	139	4.20	0.94	
Effectiveness of homework	1	52	3.40	0.82[a]	0.042
	2	42	3.57	1.04[b]	
	3	45	3.87	0.84[c]	
	Suntotal	139	3.60	0.91	
Appropriateness of evaluation criteria	1	52	3.94	0.94	0.572
	2	42	3.90	1.14	
	3	45	4.11	0.86	
	Suntotal	139	3.99	0.98	
Response to accidents	1	52	3.94	0.90	0.572
	2	42	3.76	1.01	
	3	45	3.96	0.98	
	Suntotal	139	3.89	0.95	
Lecture satisfaction	1	52	3.46	0.98[a]	0.020
	2	42	3.38	1.08[b]	
	3	45	3.93	0.94[c]	
	Suntotal	139	3.59	1.02	
Intention to gain multiple access	1	52	3.31	1.26[a]	0.002
	2	42	3.14	1.07[b]	
	3	45	3.96	1.00[b]	
	Suntotal	139	3.47	1.17	
Desire to broaden the scope of the lecture	1	52	3.27	1.19[a]	0.003
	2	42	3.12	1.06[a]	
	3	45	3.89	1.03[b]	
	Suntotal	139	3.42	1.14	
Total	1	52	3.60	0.67[a]	0.022
	2	42	3.53	0.74[b]	
	3	45	3.93	0.74[c]	
	Suntotal	139	3.68	0.73	

[a,b,c]The same subgroup by Scheffé multiple comparison test at $p<0.05$
*by one-way ANOVA

4. Correlation between interaction and satisfaction

Student satisfaction with the lecture was determined to be positively correlated with the interaction between the professor and the students (r=0.771), the interaction between the students (r=0.706), and their respective presence on educational platform (r=0.808) <Table 5>.

Table 5. Correlation between interaction and satisfaction

Variables	Interaction between professor and students	Interaction between students	Presence on the educational platform	Satisfaction with the lecture
Interaction between professor and student	1			
Interaction between students	0.731[*]	1		
Presence on the education platform	0.772[*]	0.618[*]	1	
Satisfaction of lecture	0.771[*]	0.706[*]	0.808[*]	1

[*]$p<0.01$, by pearson correlation analysis

4. Influencing factors of satisfaction

Multiple regression analysis was performed to identify the factors that influence affect with lectures. The variance inflation factor (VIF) ranged from 2.179 to 3.330 (i.e., than 10) and the tolerance limit was less than 1. In addition, the Durbin-Watson test coefficient was 1.806, which indicates positive autocorrelation (F=124.765, $p<0.001$).

The factors that were found to affect satisfaction were the interaction between the professor and the students (β=0.207, p=0.012), the interaction between the students (β=0.248, $p<0.001$), and the presence of the professor (β=0.495, $p<0.001$). The explanatory power was 73.5% (R^2=0.735), and their respective presence on the educational platform was the most influential factor <Table 6>.

Table 6. Influencing factors of satisfaction

Variables	B	SE	β	t	p[*]	Tolerance	VIF
(constants)	0.985	0.144		6.860	<0.001		
Interaction between professor and students	0.158	0.062	0.207	2.558	0.012	0.300	3.330
Interaction between students	0.178	0.047	0.248	3.797	<0.001	0.459	2.179
Presence on the educational platform	0.407	0.058	0.495	7.049	<0.001	0.398	2.513

R^2=0.735, Adjusted R^2=0.729, F=124.765($p<0.001$), Durbin-Watson=1.806

[*]$p<0.05$, by multiple regression analysis

Discussion

This study analyzed the level of interaction to gain more into educational satisfaction with online lecture for real-time learning.

The interaction between the professor and the students (3.65 points), as well as among students (3.43 points) during lectures and their respective presence on the educational platform (3.72 points) were found to be moderate. The level of interaction during online lectures was similar to that of standard in-person lectures. These results corroborate the results of Lim et al. [16]. Other previous studies [8,9] claim that such lectures are more effective than non-real-time cyber lectures and provides horizontal interaction for students [17]. This study recorded high levels of presence for professors and students alike on the educational platform, although the promotion and effectiveness of interaction between students was relatively low. In addition, it was noted that interaction between students in the third grade was higher than in the first grade. A solution for this would be to employ a teaching method that utilizes both one-way and two-way communication through the latest educational media.

Although overall satisfaction with the lecture was only moderate, satisfaction with the effectiveness of lecturecontent, lecture duration, evaluation criteria, and response to accidents were high. However, perceived quality of the lectures, attendance, expansion, and re-attendance were only moderate. Again, these results were similar to those of Lim et al. [16]. In addition, this setup was conducive to increasing students' interest, intention to recommend, and participation in various learning activities. However, they indicated that they experienced some difficulty in understanding the lesson, concentrate on lectures, and applying various educational methods compared to face-to-face lectures. The study by Kwon and Song [14] recorded high results for overall satisfaction as well as student participation and lecture duration, content, and difficulty; however, the use of educational platforms, quality of the lectures, evaluation criteria, and recommendations were only moderate. Similarly, Kang and Kim [15] recorded a high level of overall satisfaction and of the educational platform was moderate.

Satisfaction varied depending on the students' grade level. Satisfaction with lecture difficulty, willingness to participate, effectiveness of homework, intention to gain multiple access, and the desire to broaden the scope of the lecture were higher among upperclassmen than their juniors. Generally, satisfaction only varied slightly depending on the college, grade, gender, course of the subject, and educational environment of the subjects of previous studies [14-16]; nonetheless, these findings could still help improve the quality of lectures, adjust the difficulty of lectures, and increase learning motivation.

Satisfaction increased as interaction increased, and students' and professor's presence on the educational platform was the biggest factor affecting interaction. Kwon and Song [14] stated that satisfaction increases when there is an improvement in the teaching method, environment, and student understanding, and that the teaching environment is the biggest factor influencing satisfaction. On the other hand, Kang and Kim [15] claimed that the presence of the professor and the interaction between professor and students are the main factors influencing lecture evaluation. These results indicate that for online lectures, it is necessary to support the educational environment (e.g., network access and application utilization) and to maintain a certain level of interaction. In particular, creating a harmonious environment for both the professor and the students is crucial in promoting interaction.

Given the limitations due to the rather narrow sample of the study, it is necessary to increase the sample size in future studies and extend the research scope to cover professors as well. Moreover, looking into the effect of the videoconference lecture platforms and the teaching method on the interaction and the satisfaction could also be helpful.

The findings of this study could be used as a starting point to improve web-based lecture. However, in order to improve the perception of lectures and promote them further, it is necessary to refine existing platform use methods, lecture materials, pre-learning activities, student-level lectures, and online environments.

Conclusions

This study examines the levels of interaction and satisfaction of students and professor in web-based lecture for real time learning. In addition, the correlations between variables and the factors affecting the satisfaction were analyzed. A total of 139 subjects completed the questionnaire and a ANOVA, correlation analysis, and the regression analysis were conducted on the collected data. The results of the investigation and analysis are as follows:

1. The interaction during online lectures was at a moderate level (3.60 points) compared to face-to-face lectures. The interaction between students was higher for students in the 3rd grade than those in the 1st grade (p=0.002).

2. The satisfaction level was moderate (3.68 points). The impact of the lecture content (4.21 points) and the appropriateness of the lecture duration (4.20 points) were high, but the quality of lecture (3.22 points) and desire to expand its application (3.39 points) were low. Generally, the satisfaction was higher among the upperclassmen than their juniors (p<0.05).

3. The higher the interaction, the greater the satisfaction (p<0.01).

4. The main factor that influenced satisfaction was the professor's and students' presence on the educational platform (β=0.495, p<0.001).

Increased interaction results in greater levels of satisfaction. In order to expand its application, the quality and perception of the importance of online lectures should be improved. It is necessary to deliver the utilization method of platform, provide comprehensive lecture content, and take the students' year level into consideration. The online experience for real time learning must also be upgraded.

Conflicts of Interest

The author declared no conflict of interest.

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