A Comparative Analysis on the Outcomes of Synchronous and Asynchronous Online International Educational Exchange

Jong-Yeon Lee[1], Sang Hoon Park[2], Min Jung Chei[1], Yang Mi Koo[3]

[1] Konkuk University, Seoul 143-701, South Korea, {ljy, kyewks}@konkuk.ac.kr
[2] Sorabol College, Gyeongsangbuk-do 78-711, South Korea, pori0923@naver.com
[3] KNOU, Seoul 110-791, South Korea, yangmikoo@knou.ac.kr

Abstract. The purpose of the study was to compare the outcomes of synchronous and asynchronous online international educational exchange programs in terms of students' levels of learning satisfaction, English ability, and intercultural competence. These programs were administered to 9 schools in South Korea, under the support of the Korean Ministry of Education, and each participating school was matched with a partner school in either the United States or Australia. A survey of the 286 participants was conducted to measure program outcomes related to levels learning satisfaction, English ability, and intercultural competence. The Independent Samples t-Test showed significant differences in the outcomes of the synchronous and asynchronous programs, in terms of participants' gender, school level, and residential area. First, both male and female students recognized that the outcomes of synchronous programs were superior to asynchronous programs. Second, differences based on school levels were detected. Elementary school students recognized that synchronous programs were better than asynchronous ones in term of positive outcomes, while middle school students reported the superiority of asynchronous programs. Third, students who inhabited both rural and urban areas recognized the outcomes of synchronous programs to be better than those of asynchronous programs.

Keywords: online international educational exchange, synchronous, asynchronous, educational outcomes, learning satisfaction, English ability, intercultural competence.

1 Introduction

Advancements in information technology have disrupted the boundaries between nations, allowing for meaningful international exchanges in fields such as politics, economy, society, culture, and education. Given this context, this study focused on the effectiveness of online international educational exchanges. Online international educational exchanges allow students to remain in their own cultural and educational

environment while providing opportunities to exchange opinions about the contents of common curriculum with their foreign partners [5]. These exchanges take place using information communication technology such as e-mail, bulletin boards, websites, and/or videoconferencing systems [5], [6]. The Korean Ministry of Education designated 10 model schools to carry out online international educational exchange programs with partner schools in either the United States or Australia in 2013.

Online international educational exchange programs can be implemented using either synchronous or asynchronous methods of program delivery [5], [6], and the educational outcomes resulting from each method have been typically evaluated in terms of students' learning satisfaction [2], [3], [4], English ability [1], [5], [6], and intercultural competence [5], [6], [7].

Therefore, this study analyzed differences in the educational outcomes of synchronous and asynchronous online international educational exchange programs. The study considered the effects of gender, school level, and residential area on program results, and recommends how to choose between synchronous and asynchronous methods to produce better educational outcomes. The research questions were as follows:

1. Does gender significantly affect the student-reported outcomes of synchronous and asynchronous online international educational exchange programs?
2. Does school level significantly affect the student-reported outcomes of synchronous and asynchronous online international educational exchange programs?
3. Does residential area significantly affect the student-reported outcomes of synchronous and asynchronous online international educational exchange programs?

2   Research Method

2.1   Subject

Study participants included 283 students from seven elementary schools and two middle schools located throughout South Korea. Participating schools had been identified as model schools of online international educational exchange in 2013. Three elementary schools and one middle school out of the nine participating schools partnered with Australian schools, and ran class-to-class synchronous sessions every second week using the Cisco videoconferencing system. The remaining four elementary schools and one middle school partnered with American schools, and ran asynchronous programs. In these programs, students were divided into small groups, and each group was composed of both Korean and American students. Small group activities were implemented using MOODLE LMS, discussion bulletin boards, and other communication tools throughout an entire school semester. At the end of this semester, a class-to-class synchronous videoconference session was conducted using Skype videoconferencing software.

2.2 Instruments and Data Analysis Method

A questionnaire was developed to measure students' self-reported levels of learning satisfaction, English ability, and intercultural competence. The questionnaire was composed of 5-scale Likert-type questions, and was created by referencing and modifying a survey used in previous related studies. The reliability of the questionnaire is outlined in Table 1. SPSS 12.0, frequency analysis, descriptive statistics, and independent *t*-tests were used to analyze the data collected.

Table 1. The reliability of the questionnaire

item category	number of items	Cronbach′s α
learning satisfaction	5	.94
English ability	5	.93
Intercultural competence	22	.97

3 Results

3.1 Differences in Educational Outcomes Based on Gender

Table 2. Differences in educational outcomes based on gender

Item category	Male students			Female students		
	Asynchro (n=71)	synchro (n=54)	t value	asynchro (n=92)	Synchro (n=66)	t value
	M(SD)	M(SD)		M(SD)	M(SD)	
Learning satisfaction	3.69 (.92)	4.31 (.82)	-3.91*	4.05 (.79)	4.38 (.69)	-2.77*
English ability	3.67 (.75)	4.14 (.87)	-3.21*	3.92 (.74)	4.18 (.73)	-2.23*
Intercultural competence	3.82 (.69)	4.16 (.70)	-2.76*	3.98 (.61)	4.30 (.58)	-3.26*

*.p<.05

The effects of gender on educational outcomes were examined and no significant differences were found. The results are summarized in Table 2. Regarding male students, those who had participated synchronous programs reported greater positive educational outcomes than those who participated in asynchronous programs. The difference between synchronous and asynchronous male groups was statistically significant in terms of level of learning satisfaction (*t*=-3.91, *p*<.05), English ability

(t=-3.21, p<.05), and intercultural competence (t=-2.76, p<.05.) The female students reported similar results. The difference between synchronous and asynchronous female groups was statistically significant in terms of level of learning satisfaction (t=-2.77, p<.05), English ability (t=-2.23, p<.05), and intercultural competence (t=-3.26, p<.05.)

3.2 Differences in Educational Outcomes Based on School Level

The effects of school level on educational outcomes were examined and statistically significant differences were found. The results are summarized in Table 3. Regarding elementary school students, those who had participated in synchronous programs reported greater positive educational outcomes than those who participated in asynchronous programs. The difference between synchronous and asynchronous elementary school groups was statistically significant in terms of level of learning satisfaction (t=-6.23, p<.05), English ability (t=-5.16, p<.05), and intercultural competence (t=-5.80, p<.05.) However, middle school students showed the opposite tendency to the results reported by male students. Those who had participated in asynchronous programs reported greater positive educational outcomes than those who participated in synchronous programs. The difference between synchronous and asynchronous female groups was statistically significant in terms of level of learning satisfaction (t=3.58, p<.05), English ability (t=2.96, p<.05), and intercultural competence (t=3.58, p<.05.)

Table 3. Differences in educational outcomes based on school level

Item category	Elementary school students			Middle school students		
	Asynchro (n=138)	synchro (n=79)	t value	asynchro (n=25)	synchro (n=41)	t value
	M(SD)	M(SD)		M(SD)	M(SD)	
Learning satisfaction	3.76 (.86)	4.48 (.77)	-6.23*	4.60 (.48)	4.10 (.64)	3.58*
English ability	3.71 (.75)	4.28 (.84)	-5.16*	4.38 (.47)	3.94 (.65)	2.96*
Intercultural competence	3.81 (.63)	4.33 (.67)	-5.80*	4.05 (.41)	4.04 (.52)	3.58*

*. p<.05

3.3 Differences in Educational Outcomes Based on Residential Area

The effects of residential area on educational outcomes were examined and no significant differences were found. The results are summarized in Table 4. Regarding students in rural areas, those who had participated in synchronous programs reported greater positive educational outcomes than those who participated in asynchronous programs. The difference between synchronous and asynchronous rural groups was statistically significant in terms of level of learning satisfaction (t=-3.14, p<.05) and

intercultural competence (t=-3.06, p<.05.) Students in urban areas reported the same tendencies as those in rural areas. The difference between synchronous and asynchronous urban groups was statistically significant in terms of level of learning satisfaction (t=-3.68, p<.05), English ability (t =-3.54, p<.05), and intercultural competence (t=-3.18, p<.05.)

Table 4. Differences in educational outcomes based on residential area

Item category	Students in rural areas			Students in urban areas		
	Asynchro (n=45)	synchro (n=29)	t value	asynchro (n=118)	synchro (n=91)	t value
	M(SD)	M(SD)		M(SD)	M(SD)	
Learning satisfaction	3.76 (.60)	4.28 (.75)	-3.14*	3.94 (.95)	4.37 (.75)	-3.68*
English ability	3.73 (.62)	3.97 (.93)	-1.33	3.84 (.80)	4.22 (.74)	-3.54*
Intercultural competence	3.77 (.49)	4.14 (.54)	-3.06*	3.96 (.70)	4.27 (.66)	-3.18*

*.p<.05

4   Conclusion

This study examined the effectiveness of online international educational exchange programs, and measured the quality of educational outcomes that resulted from synchronous and asynchronous formats. Specifically, the study considered the effects of students' gender, school level, and residential area on self-reported levels of learning satisfaction, English ability, and intercultural competence. Regardless of students' gender or residential area, those who had participated in synchronous programs (which provided real-time class-to-class video interaction), reported greater positive educational outcomes than those who participated in asynchronous programs.

Therefore, the study suggests that synchronous methods for international educational exchange should be encouraged and expanded. Effective information infrastructures and supportive educational environments are required to successfully introduce synchronous online international educational exchange programs to schools interested in implementing these programs.

It is also necessary to adjust program delivery according to school levels. Synchronous programs are recommended at the elementary school level, with the goal of increasing student interest and motivation to learn, while asynchronous programs are recommended for middle school students, as this format allows students to engage in more systematic and profound learning.

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