EXPLORING ONLINE LEARNING AT PRIMARY SCHOOLS: STUDENTS' PERSPECTIVES ON CYBER HOME LEARNING SYSTEM THROUGH VIDEO CONFERENCING (CHLS-VC)

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ABSTRACT
The purposes of the study are to investigate CHLS (Cyber Home Learning System) in online video conferencing environment in primary school level and to explore the students' responses on CHLS-VC (Cyber Home Learning System through Video Conferencing) in order to explore the possibility of using CHLS-VC as a supportive online learning system. The subjects consisted of 96 primary school students from 4th to 6th grade in South Korea. The major findings of the study are as follows. First, the students preferred CHLS-VC over CHLS and showed positive perspectives toward CHLS-VC. Second, the students preferred the combination of voice and text chat over using voice or text chat, and the frequency of students' questions was higher in online than in offline classes. Finally, the students' perspectives on the effectiveness of CHLS-VC were positive in comprehension and increase in score. They thought that scores have increased in the respective academic subjects as well. Based on the results, it is concluded that CHLS-VC can fortify the learning process and foster student to teacher interaction. It seems that CHLS-VC is a useful supplementary online learning system for the formal curriculum, and implications based on pedagogical consideration, and suggestions for further studies are provided.
Keywords: Online learning, video conferencing, synchronous communication, student perspectives, primary education

INTRODUCTION

Online education has generally been offered in higher education or adult education (Simon, Smaldino, Albright & Zvacek, 2009) and the majority of previous studies on online video conferencing have targeted adult learners (Hearnshaw, 2000; Knipe & Lee, 2002; Smyth, 2005). Online education, in most cases, is accompanied with enormous amount of information, and students in primary and secondary schools have not developed complex learning strategies and meta-cognitive skills necessary to search and select the information that they need (Ko & Rossen, 2001; Perzylo, 1993; Woolfolk, 1995). Accordingly, there have been few researches conducted on online education in primary school level, and such research was made even more difficult due to lack of network access, face-to-face teaching culture, lack of teacher training, socio-political resistance, etc (Moore & Kearsley, 2005). It does not mean, however, that online education as a whole is incompatible for use with primary school classes. In fact, online education for primary and secondary schools are a growing trend around the world. For instance, Home Access Program provided to 5-19 year old children from low-income households in England from 2009 to 2010 showed positive impact and increased students' independent learning opportunities and engagement time (Jewitt & Parashart, 2011). Also Lee and Lee's (2005) research on Cyber Home Learning System (CHLS) for primary school students showed that online support system for primary school level has potential in promoting self-regulated learning, level-differentiated instruction, and interaction.

Utilizing real time interaction or synchronous interaction to assist the formal curriculum seems to have pedagogical potential for primary school students. In particular, it can be used to supplement the teacher-student interaction and feedback that may not be sufficient in the offline classrooms. Cyber Home Learning System through Video Conferencing (CHLS-VC) seem to be able to meet the need in providing much needed real time interaction to support the formal curriculum in primary school along with collaborative and cooperative learning environment. Therefore, this study aims to investigate the students' perspectives in CHLS-VC at primary school level, to explore the possibility of implementing CHLS-VC as a supportive online learning system, and to make suggestions on implementing the system for formal primary level curriculum. The research questions for the study are as follows:

- What are the students' preference and perspectives on learning in CHLS-VC?
- What is the students' preference on the types of interactions and perspectives on frequency of questions asked in CHLS-VC in comparison to the conventional classroom?
- What are the students' perspectives on the effectiveness of CHLS-VC?

CYBER HOME LEARNING SYSTEMS

Online education available for primary school students are few, and online supplement and support systems available for the formal school curriculum are even fewer. To make up for the lack, CHLS and CHLS-VC were developed by The Korea Education & Research Information Service (KERIS) and 16 metropolitan and provincial offices of education. Both CHLS and CHLS-VC target primary school students and provide Internet-based extracurricular learning support system (Ministry of Education, Science and Technology & KERIS, 2008a). They offer self-study contents gratis to provide opportunities for supplementary learning materials related to the formal school curriculum. By providing such contents, they aim to reduce the sky rocketing private education expenses while alleviating the tension and polarization of economic classes, and to provide academic support for students who have limited access to educational contents, especially in rural and remote areas. These cyber home learning systems are distinctive in that the target learners are primary school students whereas online education systems and programs developed for use in K-12 generally have targeted secondary school students.

The cyber home learning systems are set up so that the students who wish to join the cyber home learning systems can apply through their respective school with the principal's endorsement. The regional offices of education review the applications based on family and financial background, academic ability, etc. for selecting students for cyber classes and priority is given to the students from low-income and under privileged families that cannot afford private education expenses. The selected students are put into beginning, intermediate, and advanced level classes based on diagnostic tests given on relevant subjects. Many schools under each regional educational office participate, so each cyber classes are composed of students from different schools of the area. Between CHLS and CHLS-VC, CHLS was developed first and was put into operation in 2005 by regional offices of education (KERIS, 2010; Ministry of Education, Science and Technology & KERIS, 2008a). The characteristics of CHLS are seen in figure 1.

CHLS has two different modules as presented in figure 1—cyber home learning module and individual course module. In cyber home learning module, cyber classes are formed where one class consists of 10 to 20 students and a teacher (Ministry of Education, Science and Technology & KERIS, 2008a). Individual study module is different from cyber home learning module in that it is open to all primary and secondary school students who wish to enroll in CHLS (Ministry of Education, Science and Technology & KERIS, 2008a). Students can sign-up as a member through the website and take the course of their choice. For this module, there is no homeroom teacher, and students can study independently.

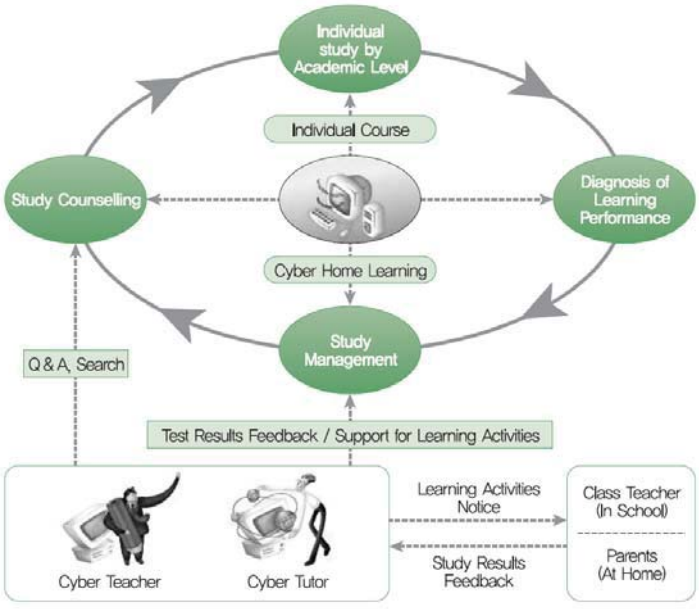

Figure 1. Cyber Home Learning System
(Ministry of Education, Science and Technology & KERIS, 2008a, p. 27)

In the individual course module of CHLS, cyber classes are not formed so there are no homeroom teachers per se; however, there are teachers who are specifically in charge for Questions and Answers board (Q and A) for each subject. In cyber home module, the classes are managed similarly to offline classes in schools and each class has a teacher, referred to as cyber teacher. The teachers for cyber home learning module are volunteers who are currently in-service primary and secondary school teachers. They are in charge of their respective classes where they manage and teach the students, and they are responsible for the students' learning progress, assignments, assessments, attendance taken at the time of login, etc for a semester. The teachers' roles include answering students' questions, giving assignments, evaluating students, and managing the cyber classrooms as they would in offline classrooms (Ministry of Education, Science and Technology & KERIS, 2008a). The teachers can upload teaching materials and resources in addition to the contents already provided in CHLS. Q and A is opened to all students in cyber classes, and messages can be sent to selected students. In addition to Q and A and messages, student–teacher interaction can occur through assignments as well. The assignments are uploaded by the teachers, which the students download, complete, and upload. The teachers then can give feedback and comments on the assignments.

CHLS-VC follows a similar suit in how the system operates. In CHLS, online interaction between students and teachers played a significant role in teaching and learning and students and teachers used the Bulletin Board System (BBS), phone, or email for communication and interaction. However, it is commonly accepted that face to face interaction is the most effective type of student to teacher interaction. In addition, asynchronous and synchronous CMC tools in online environment are found to facilitate communication as well as collaborative and cooperative learning in primary and secondary school students (Lee, 2004). Moreover, the teachers who volunteered for CHLS have also expressed that it was difficult to overcome the limitations of online environment in having in-depth interaction with students in comparison to offline classrooms. To overcome such limitations, video conferencing function was added to CHLS, which resulted in CHLS-VC in 2009, and CHLS-VC began service in 2010 (KERIS, 2010). In other words, CHLS-VC is an expansion of CHLS with an addition of video conferencing, and it serves to provide learning support as well as consultations for marginalized students and those from low-income families. Figure 2 shows the main screen of the CHLS-VC class.

Figure 2. Screenshot of CHLS-VC class
(Ministry of Education, Science and Technology & KERIS, 2008b, p. 53)

It should be noted that in the earlier studies on computer-mediated learning, it was generally found that female students responded more negatively than male students to computer and technology (Dambrot, 1985; Gutek & Bikson, 1985; Neuman, 1991), and female and male students approached online environment differently

(Chyung, 2007; Gunn, McSporran, Macleod & French, 2003; Price, 2006; Rovai & Baker, 2005; Sullivan, 2001; Zimmerman, 1990). According to these studies, it seems that the gender differences come from social factors (Lee, 2002; Morris & Venkatesh, 2000; Price, 2006; Tannen, 1990; Zimermann & Martinez-Pons, 1990). On the other hand, others argue that as technology advanced and the availability of CMC has increased, the gender differences seemed to have decreased and have become insignificant (Ory, Bullock & Burnaska, 1997; William & Humphrey, 2007; Yukselturk & Bulut, 2009). The conflicting findings of the literatures show that there are various factors that can cause gender differences. In view of such conflict, gender differences in CHLS-VC in primary school level should be considered.

METHODOLOGY

Participants

This study is based on the project of the D Metropolitan Office of Education on CHLS-VC to investigate the students' preference on learning in CHLS-VC and perspectives on modes of interaction and effectiveness. The participants were 96 students in 4th, 5th, and 6th grades who participated in CHLS-VC. The details of the participants are provided in Table 1. The participants were given choices in academic subjects among Korean, mathematics, English, science, and social studies.

Table 1. Participants

	Characteristics	*Number*	*Percentage (%)*	*Total (%)*
Grade	4th grade	15	15.6	
	5th grade	44	45.8	100
	6th grade	37	38.5	
Gender	Male	29	30.2	100
	Female	67	69.8	

Data collection and procedures

The questionnaire consists of questions on learner preference and perspectives on CHLS-VC. First, the students' responses on preference between CHLS and CHLS-VC were investigated, whether it is recommendable, the friendliness of the teachers, and the convenience of CHLS-VC. Second, students' preference on modes of interaction among text chat, voice, and text and voice were explored as well as the frequency of student questions in comparison to conventional classrooms. Last, perspectives on interest, comprehension and learner achievements were explored to investigate the learner perspectives on the effectiveness of CHLS-VC.

The procedure of the study is as follows. CHLS-VC was administered to the primary school students in one of the 16 educational districts in Korea, in conjunction with the cyber home module of CHLS. Each CHLS-VC class was composed of approximately 10 participants and the classes were held from 8 p.m. to 9 p.m. from Monday to Friday. In order to reduce technical difficulties and equipment insufficiency, headsets and webcams were supplied to all participants, including teachers. At the end of the study, the questionnaire was distributed to the participants. Out of 101, 100 were returned, and 4 questionnaires from 3rd grade students were excluded due to lack of representation. 96 of the returned questionnaires were analyzed to investigate the students' perspectives on CHLS-VC.

Method of data analysis

The questionnaire was administered at the end of the study. Of the 101 who participated in the study, 96 participants, excluding 3rd graders, completed and returned the questionnaire. The data gathered from the questionnaire were analyzed using SPSS for frequency, cross-tabulation, and Chi-square for testing association. The significance level was set at 95% (p<0.05). The reliability analysis for the questionnaire was also conducted, and Cronbach's alpha values for the items in the questionnaire were over 0.8, showing high reliability.

RESULTS AND DISCUSSION

Preference and Perspectives on learning in CHLS-VC

In order to explore students' preference and perspectives on learning in CHLS-VC, students' preference between CHLS and CHLS-VC, recommendation, teacher's friendliness, and convenience were investigated as presented in Table 2. First, the students' preference between CHLS and CHLS-VC was investigated. The results show that 91.7% of the students who have used both CHLS and CHLS-VC preferred CHLS-VC over CHLS while 8.3% showed preference for CHLS. Second, when asked whether they would recommend CHLS-VC to their peers, 79.2% of the students answered positively, 17.7% were neutral, and 3.1% answered negatively. Third, the

friendliness of the teachers in CHLS-VC was investigated, and 99.0% of the students answered that they felt that the teachers were friendly, and only 1.0% responded negatively. The highly positive responses from the students seem to be due to positive interaction with teachers. Lastly, students' response on convenience in using CHLS-VC was investigated. Neutral was the highest with 62.5%, followed by convenient with 25.5% and inconvenient with 12.5%. In the questionnaire, the students were asked to specify the causes for inconveniences, if any. According to their answers, technical difficulties were the biggest factor in causing inconvenience. The most frequently mentioned difficulties were related to audio, such as ringing sounds and disconnected speech, followed by pausing and freezing of the screen.

The primary school students who have used both CHLS and CHLS-VC preferred CHLS-VC over CHLS. They also responded that they would recommend CHLS-VC to others. The students responded positively on convenience in using CHLS-VC, 99% of the students considering the teachers to be very friendly. Teacher friendliness seemed to have an effect on students' positive responses. It seems that synchronous video conferencing increased the humanness aspect of online learning system. It appears that online education was found to be suitable for use for primary school learners and fit well into primary school curriculum as a supplemental learning system. According to studies, intimacy to the teachers seemed to have caused students' affinity-seeking behaviors and positively affected students' performance in respective academic subjects (Mottet, Richmond, & McCroskey, 2006). Likewise, the kindness of the teacher in online video conferencing environment seems to be an important factor more so than in conventional classroom setting. It implies that teachers should be provided with teacher training on instigating and maintaining positive student–teacher interaction in online environment before engaging in the online tutoring as well as video conferencing. In terms of convenience, high-speed internet access and user friendly interface of the learning system are essential for video conferencing.

Table 2. Student Preference and Perspectives on learning in CHLS-VC

Items	*Frequencies (%)*			*Chi-square tests*		
	Male	*Female*	*Total*	*Value*	*df*	*Sig.*
Preferred methods						
CHLS-VC	23 (24.0%)	65 (67.7%)	88 (91.7%)	8.305	1	.004
CHLS	6 (6.2%)	2 (2.1%)	8 (8.3%)			
Total			96 (100%)			
Recommendation						
I would recommended it	20 (20.8%)	56 (58.3%)	76 (79.2%)			
Neutral	7 (7.3%)	10 (10.4%)	17 (17.7%)	3.408	2	.182
I don't recommended it	2 (2.1%)	1 (1.0%)	3 (3.1%)			
Total			96 (100%)			
Teacher's friendliness						
Yes	28 (29.2%)	67 (69.8%)	95 (99.0%)	2.335	1	.127
No	1 (1.0%)	0 (0%)	1 (1.0%)			
Total			96 (100%)			
Convenience						
Convenient	14 (14.6%)	10 (10.4%)	24 (25.0%)			
Neutral	14 (14.6%)	46 (47.9%)	60 (62.5%)	13.073	2	.001
Inconvenient	1 (1.0%)	11 (11.5%)	12 (12.5%)			
Total			96 (100%)			

Preferred modes of interaction in CHLS-VC and frequency of questions

Students' response on the preferred modes of interaction in CHLS-VC was investigated. According to the data presented in Table 3, interaction using both text and voice was found to be the most preferred type of interaction with 71.9%, followed by voice with 19.8%, and text chat was found to be the least preferred modes of interaction

among the three modes of interaction observed in both CHLS and CHLS-VC. This result is in agreement with the previously presented data. The students preferred CHLS-VC on the whole, and the results show that voice chat is preferred over text chat. Not surprisingly, the students preferred using both text and voice chat the most for efficient communication.

Table 3. Preferred modes of interaction in CHLS-VC

Items	*Frequencies (%)*			*Chi-square tests*		
	Male	*Female*	*Total*	*Value*	*df*	*Sig.*
Interaction modes						
Text chat	3(3.1%)	5(5.2%)	8 (8.3%)			
Voice chat	7(7.3%)	12(12.5%)	19(19.8%)	0.832	2	.660
Text & voice chat	19(19.8%)	50(52.1%)	69(71.9%)			
Total			96 (100%)			

The students preferred to interact with teachers using voice conferencing and text chat simultaneously rather than using voice or text separately. It is suggested that even in online video conferencing programs, the possibilities for various types of interaction should be provided to foster active participation and interaction. One of the concerns regarding online learning of young students is that students are easily distracted, so they may not learn and benefit much from their courses. The dual channel interaction of the video conferencing may have strong effect on maintaining students' attention. If a multimode communication facilitates teacher-student interaction, then the learning management system for the online tutoring must provide functional support, a factor which policy makers should enforce in advance. In addition, teachers should be trained for using various interaction tools. It seems that the various possibilities in modes of interaction as well as teacher friendliness in CHLS-VC encouraged participation as well as students-teacher interaction.

In addition to the preferred types of interaction, students' response on the frequency of questions asked to the teacher while participating in CHLS-VC in comparison to the conventional classrooms was investigated. The results in Table 4 shows that 51.0% answered that there was no difference, 32.3% thought that they asked more questions in CHLS-VC than in conventional classrooms, and 16.7% of the students felt that they asked less questions in CHLS-VC.

Table 4. Frequency of questions asked in CHLS-VC

Items	*Frequencies (%)*			*Chi-square tests*		
	Male	*Female*	*Total*	*Value*	*df*	*Sig.*
Frequency of questions						
More than school	7(7.3%)	24(25%)	31(32.3%)			
No difference	13(13.5%)	36(37.5%)	49(51%)	6.317	2	.042
Less than school	9(9.4%)	7(7.3%)	16(16.7%)			
Total			96 (100%)			

The students who responded that they asked questions more frequently in CHLS-VC than in conventional offline classes were 32.3%. As students figure out how to ask their own questions, they take greater ownership of their learning and deepen comprehension. In conventional classroom, students may not had enough chance to ask questions, especially in the timid students. For these students, raising their hand in front of the entire class can be a highly stressful experience. Such students may prefer to communicate with their teacher via online using different modes of CMC which can draw less attention from others physically. In the whole, the students felt that instigating in online interaction is similar, if not better, to that of conventional classroom. Taking this into consideration, it may be useful to provide environment for online interaction for students in general, especially those who seem self-conscious in conventional classrooms through video conferencing or BBS as provided in CHLS-VC.

Perspectives on the effectiveness of CHLS-VC

The students' perspectives on the effectiveness of CHLS-VC were explored and their perspectives on comprehension of the academic contents and increase in scores are presented in Table 5. It shows that the students' perspectives for the two items were positive in general. Specifically, 90.6% felt that their comprehension for the academic contents increased, and 85.4% believed that their scores have increased in the respective academic subjects they have studied through CHLS-VC. The students who showed negative perspectives were 9.4% and 14.6%, respectively.

The students' perspectives on effectiveness of CHLS-VC were very positive. The students responded positively for comprehension of the academic subjects studied through CHLS-VS, and they thought that their scores on the respective subjects in their offline classrooms have increased as well. It appears that online video conferencing can be used as an effective alternative for supplementary education program, and it seems to boost learner confidence in the academic subjects studied through CHLS-VC. CHLS-VC can also provide students who like to work at their own pace with a learning opportunity as an after school program. CHLS-VC seems to show potential for further applications in lowering students' affective filter in learning which can be extended to the student's progress in the conventional classrooms.

Table 5. Perspectives on the effectiveness of CHLS-VC

Items	*Frequencies*			*Chi-square tests*		
	Male	*Female*	*Total*	*Value*	*df*	*Sig.*
Comprehension						
Yes	23 (24.0%)	64 (66.7%)	87 (90.6%)	6.261	1	.012
No	6 (6.2%)	3 (3.1%)	9 (9.4%)			
Total			96 (100%)			
Increase in scores						
Yes	20 (20.8%)	62 (64.6%)	82 (85.4%)	9.028	1	.003
No	9 (9.4%)	5 (5.2%)	14 (14.6%)			
Total			96 (100%)			

As mentioned previously, gender differences were considered in the study, and it is worth noticing there were a number of significant gender differences found in the students' perspectives in CHLS-VC. First, as for the preferred method in cyber home learning, more female students showed preference for CHLS-VC than male students, although both showed positive perspectives, as seen in table 2. Consequently, more male students were found to prefer CHLS which does not use video conferencing, than female students. Second, for convenience, more male students found it convenient than female students, as presented in table 3. It seems that the female students have positive perspectives towards video conferencing in the whole, but they reacted more sensitively toward technical difficulties that interrupted the interaction. Third, as found in table 4, significantly more female students thought that they asked more questions in CHLS-VC than male students, and said that there was no difference between CHLS-VC and conventional classrooms. Last, more female students showed positive perspectives on effectiveness across the board in convenience, preferred method, frequency or questions, comprehension, and increase in score as seen in table 5. The findings in significant differences in gender difference are compatible to previous studies where female students responded positively to the social interaction in online environment (Gunn et al., 2003; Price, 2006; Wu & Hiltz, 2004; Zimermann & Martinez-Pons, 1990). The result is considered to be influenced by socio-psychological factors, and the female students embraced CHLS-VC more readily than the male students. In conjunction with previously presented studies, the female students seemed to be more interested in engaging in interaction by and large, which naturally led to active participation and increased frequency of questions asked than in offline classes. It should be noted that although there are significant differences between genders, both male and female students have considered CHLS-VC positively.

CONCLUSION

This study investigated the students' perspectives on online education system using video conferencing and the possibility of implementing CHLS-VC in primary level education as supportive online learning system. CHLS-VC was developed and offered as extracurricular learning program in support of the regular curriculum for

public primary schools in Korea. The students' responses on preference, perspectives on learning in CHLS-VC, preferred modes of interaction, frequency of questions asked, and perspectives on effectiveness, in CHLS-VC were investigated. The key findings and policy implications that would be useful for educational policy makers to consider in respect to adapting online video conferencing as an instructional method for primary school students are highlighted.

First, it was found that primary level students preferred CHLS-VC over CHLS and found it recommendable. The teacher's friendliness was considered highly positive with 99.0%. Making synchronous interaction available seems to have increased the humanness in the online environment, which seemed to have cause the students to appreciate the video conferencing feature of the CHLS-VC. These results show that CHLS-VC has high potential as a supplementary online learning system to assist the formal curriculum in primary level if technical difficulties related to audio are reduced.

Second, the students preferred to interact using both text and voice in online environment, followed by voice then text. It seems that spoken interaction is preferred over using text, but the combination of the two is the most preferred type of interaction. 51% of the students also felt that the frequency of questions asked in CHLS-VC was not much different from that of conventional classrooms, and 32.3% felt that they asked more questions in CHLS-VC. It is worth noticing that there is vigorous student-teacher interaction that goes on in CHLS-VC where students can actively engage in. Implications made based on the results are that the various modes of interaction need to be provided in online environment and teacher training on using the various interaction tools should be provided to the teachers of CHLS-VC. To make multimodal interaction available, various use of Computer Mediated Communication (CMC) tools such as video conferencing, BBS, text chat, etc as used in CHLS-VC should be provided in developing online education system for primary school students. The teachers should be trained in using the online education system and CMC tools to effectively and efficiently utilize them to the maximum capacity. In addition, the teachers should be able to show students in how to use CMC tools such as voice conferencing tools and text chat.

Third, students felt that participation in CHLS-VC was effective and thought that their comprehension in the subject matters studied through CHLS-VC increased. Well designed online learning systems can provide the opportunities to engage in live collaboration, individual work, and meaningful learning as in conventional classes. Such systems then can be used as an option to supplement the conventional classroom instruction, offering experiences otherwise impossible for students who are highly motivated and want to receive remedial instruction after class, live in remote areas, experience frequent hospitalization, extracurricular support, etc. It should be noted in implementing an online learning system like CHLS-VC, considerations need to be made to reduce teachers' workload and to bring about positive results. The results of the study and previous literatures suggests that learner training, teacher training, and development of level-differentiated content be provided to enriched learning experience and to assist the teachers in the online learning system. Specifically, as Lee and Lee (2005) pointed out, there needs to be considerations on learner and teacher training, level-differentiated content, application of motivational strategies, the use of CMC tools including video conferencing tools, etc. for effective implementation of online learning systems.

Based on the findings and implications from primary school students' responses on CHLS-VC, further studies are suggested. True experiment on the effectiveness of CHLS-VC through investigating students' achievement in CHLS-VC and studies on the impact of CHLS-VC as a support system to conventional classroom are recommended as follow up studies. Also further studies in exploring the effectiveness of CHLS-VC in K-12 in other geographical areas and in varied cultural backgrounds, and observations and interview exploring the students' perspectives and affective factors such beliefs and feelings as well as studies investigating various modes of student-student and teacher-student interaction are suggested.

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