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Design and Evaluation of a Social Networking Site (SNS) Supported Collaborative Learning Environment for Vocabulary Learning

Wanping YANG
Seoul Nat'l University
Korea

Yingying PAN*
Chonnam Nat'l University
Korea

Vocabulary learning plays an important role in language learning. This study explored a new paradigm based on social networking site (SNS) supported collaborative learning for vocabulary learning. SNS supported collaborative learning (SSCL) can effectively promote learners' engagement, interest and motivation by providing a more communicative and interactive environment. However, vocabulary learning studies on SSCL mainly focused on the effectiveness and influencing factors, lacking specific instructional strategies. Therefore, this study aims to develop instructional strategies that guide instructors to create an SSCL environment for facilitating vocabulary learning. The final instructional strategies are composed of three stages according to the course process, consisting of 8 general strategies and 21 specific guidelines. The content validity was ensured by four experts in the field of educational technology. The instructional strategies were then applied in an actual classroom with 16 students. The positive responses from the instructor and learners indicated that SSCL can be reasonably incorporated into the current curriculum to provide effective learning opportunities and to promote learners' vocabulary learning.

Keywords : SNS supported collaborative learning (SSCL), Vocabulary learning, Instructional strategies

* Corresponding author: Department of Education, Chonnam National University, 1055221013pyy@gmail.com

Introduction

The long-standing teaching and learning paradigm was greatly challenged after the outbreak of COVID-19 (Corell-Almuzara et al., 2021). To promote effective learning, social networking sites (SNSs), a product of Web 2.0, are increasingly being used for active interaction among learners. With the advantages of sociality, practicality, affordability, interactivity, and popularity, SNSs enable information sharing among learners and provide a collaborative environment for solving problems together through collective intelligence. Studies on SNS supported collaborative learning (SSCL) have been introduced to be effective in academic achievement and learning effectiveness (Alkhathlan & Al-Daraiseh, 2017; Chua & Liew, 2016; Kim & Kim, 2013). Recent research has shown that SNSs can serve as a meaningful and promising pedagogical tool to promote the quality of online language learning (Abrahim et al., 2018; Harrison & Thomas, 2009).

Vocabulary is essential for learners' overall language acquisition and plays a crucial role in the learning of other language skills. The critical role of vocabulary is reflected in the fact that it not only establishes cognitive systems of knowledge, but also facilitates communication and comprehensive interaction (Coady & Huckin,1997). Vocabulary learning and instruction should be designed with the aim of stimulating deep processing of vocabulary for learners through a higher degree of involvement load (Hulstijn & Laufer, 2001). Nevertheless, in the past, vocabulary has been considered secondary in the field of language teaching (Sinclair & Renouf, 1988). The low status of vocabulary teaching is mainly due to the widely held belief that learners rely on rote memorization and that learners play a very passive role in vocabulary learning (Li, 2004). In addition, instructional approaches for language teaching also place more emphasis on grammar and phonological structure (DeCarrico, 2001). However, a great body of scientific research supports the fact that vocabulary is one of the most important components of any language, and it must be treated with particular care and attention in the early stages of foreign language acquisition

(Rasouli & Jafari, 2016). Accordingly, it would be of great value to design vocabulary learning courses that can create practical real-life situations in which learners are highly involved, and that can provide opportunities for learners to communicate with each other to improve their ability to use vocabulary.

In recent years, a growing body of research has focused on interactions that occur in vocabulary learning, with the idea that they give learners a chance to learn vocabulary collaboratively, build upon each other's abilities, and co-construct new vocabulary knowledge (e.g., Ariffin, 2021; Lin et al., 2014). Collaborative learning conducts continuous meaning creation by placing an emphasis on providing the opportunity to form a learning community enabling learner-learner interaction or learner-instructor interaction and conduct continuous meaning creation (Gilbert & Driscoll, 2002). A number of studies advocating SNSs in support of collaborative learning revealed that the integration of SNSs into classrooms helps to increase collaborative behaviour and social interaction among learners (e.g., Huang et al., 2017; Wu & Wang, 2020).

However, to date, most of research has focused on the effectiveness of employing SSCLs, with few studies on how to design SSCL strategies to promote language learning. Since different designs of SSCLs can also greatly affect their effectiveness, this study aims to provide and design strategies that guide instructors to create an SSCL environment for facilitating vocabulary learning.

Literature Review

Vocabulary Learning in a Collaborative Learning Environment

Vygotsky (1934/1986) proposed that vocabulary learning is a fundamental component of foreign language acquisition. As one of the three elements of language learning, vocabulary is the main bearer of the meaning of language expression and an

important indicator for measuring the progress of learning. The vocabulary learning process can be divided into eight main aspects (Lessard-Clouston, 2013): (1) pronouncing it in a recognizable way; (2) spelling it correctly; (3) relating it to an appropriate grammatical form; (4) recognizing it in written and spoken forms; (5) recalling it at once; (6) using it in correct collocation; (7) using it at an appropriate level of formality; and (8) being aware of its connotation. Cultivating learners' ability to understand and use vocabulary is one of the most important goals of foreign language instruction (Lewis, 1993).

Vocabulary learning is generally considered to be an individual learning process. However, some research evidence has shown that pairs tend to produce linguistically more accurate texts than individual learners (Storch, 1999, 2005; Wigglesworth & Storch, 2009). Bandura (1997), who advocates social learning theory, believes that learners gain more knowledge by observing the actions of others, and Vygotsky (1934/1986) believes that by interacting with other more knowledgeable learners, learners can maximize their own potential to develop. On the basis of these theories, collaborative learning is a learner-centred activity that facilitates interaction between classmates in pairs or in groups where learners can develop questions, discuss solutions, complete projects and recall their own ideas and experiences (Laurillard, 2009; Stahl et al., 2006). Collaborative learning emphasizes active interactions and the activeness of members, requiring all members to have a shared cognitive responsibility for the learning process (Scardamalia, 2002).

Evidence obtained also has demonstrated that collaborative activities may create more language learning opportunities, particularly more vocabulary learning opportunities than individual activities. For example, Kim (2008) conducted a study that compared the effect of pair and individual work on the learning of 15 preselected vocabulary items. The results revealed that learners working in pairs performed significantly better on both an immediate and a delayed vocabulary posttest. Moreover, Swain (2000, 2021) revealed that collaborative learning enables collaborative dialogue between learners by requiring them to complete a common

subject through group activities. The rationale is that these activities encourage learners to think about language patterns while focusing on meaning and form. In this process, learners not only use more language patterns but also increase mutual responsibility to help each other, and ultimately improve the efficiency of learning (Cho, 2011). Other studies have shown that some specific forms of collaboration, such as collaborative techniques (Zarei & Gilani, 2013), gamified cooperation (Dindar et al., 2021), have a positive influence on creating meaningful connections among English vocabulary learners. Vocabulary learning is a process of repeated practice and constant creativity. Accordingly, vocabulary learning through collaborative learning, which is characterized by an interactive, social task-driven and learner-oriented focus, can benefit learners more than individual learning.

SNS Supported Vocabulary Learning

SNSs have attracted much attention in the field of education (Boyd & Ellison, 2008). SNSs has the flexibility of not adhering to traditional frameworks of learning, helping to increase student motivation and promote autonomous learning. Godwin-Jones (2006) highly recognised the possibility of using SNSs in language learning. He believed that SNSs had great potential as a tool for foreign language learning by exposing learners to live languages. Researchers who have been supportive of using SNSs in language learning also have undertaken various studies on this subject (Baralt, 2011; Blattner & Fiori, 2009; Brick, 2011; Clark & Gruba, 2010; Harrison & Thomas, 2009). According to Warschauer (1997), language learning through SNSs is effective for learners because expressing the purpose of language use allows learners to pay attention to certain linguistic points, participate in exchange activities, speak or write their opinions, increase their cultural sensitivity, and develop effective learning strategies. In addition, in the network environment of SNSs, learners of different levels can not only obtain equal opportunities to practice language, but also can use more regular and complex sentences to practice sentence structure in the process

of communication (Warschauer, 1996). This is consistent with Finocchiaro and Brumfit's (1983) view that the most important aspect of developing language skills is language use.

SNSs have also enjoyed significant results when used for vocabulary learning during the language learning process (Lu, 2008; Chen et al., 2008). Hasegawa et al. (2015) stated that SNSs have a positive impact on learning motivation in vocabulary learning research through e-learning. Wu (2018) demonstrated that SNSs have a positive impact on learning attitudes and interest in vocabulary learning. Chen and Li (2010) found that the use of SNSs contributes to meaningful vocabulary learning when the learning process is integrated with social, cultural and life contexts. Despite the growing body of research on SNS supported vocabulary learning, few studies have focused on instructional strategies in such settings.

Methods

This study is based on the two stages of model development and model verification in the design development research method (Richey & Klein, 2014). First, we retrieved relevant papers from Web of Science, Google scholar and Scopus databases by using "Vocabulary learning", "Vocabulary teaching", "Social Networking Site", "SNS supported learning", "Collaborative learning" and "SNS supported collaborative learning" as keywords. A preliminary instructional strategy was formulated by reviewing and summarising related previous literature. Then, the content validity of the instructional strategy was tested through two rounds of expert evaluation, and the details of the instructional strategies were revised and supplemented based on the results of evaluation. Finally, to obtain the response to the strategies, the research was combined with real classroom practice to obtain the response of the learners and instructors.

Strategies Development

To export the strategies for promoting vocabulary learning in SSCLs, we first conducted a review of the previous literature. To investigate the feasibility of collaborative learning and SNSs in vocabulary learning, the concept and characteristics of vocabulary learning as well as prior research on vocabulary learning strategies were investigated, and the existing problems were identified. Then, according to the concept and characteristics of collaborative learning, SNSs explore their advantages in vocabulary learning. Finally, the concept, characteristics and existing research on SSCLs were investigated to understand the feasibility of SSCLs in vocabulary learning.

Strategies Validation

To test whether the design strategies derived through the literature review have content validity, interviews were conducted targeting four experts in the field of educational technology. The expert evaluation for content rationalization was mostly based on in-depth interviews in face-to-face situations but also was conducted via video conferencing when necessary. Before each interview, design strategies and related materials, such as research background, research issues and research purpose, were sent to each expert. We briefly introduced the research purpose, research problems and research methods to the four experts and then conducted in-depth interviews on the developed strategies. Subsequently, a survey with validation questions was conducted. We adapted Rha and Chung's (2001) questionnaire to the context of this study, which is shown in Table 1. A 4-point scale was used to measure the responses ranging from 1 indicating 'totally disagree' to 4 indicating 'agree.' After analysing the interview results, the support strategies were modified, and corresponding improvements were derived based on feedback collected from the interviews.

Table 1
Expert validation questionnaires for the strategies

Item	Content
Feasibility	This strategy is appropriate to be considered in facilitating vocabulary learning in an SSCL environment.
Explanatory	This strategy well illustrates the specifies specifics that should be considered in facilitating vocabulary learning in an SSCL environment.
Usability	This strategy can be useful in facilitating vocabulary learning in an SSCL environment.
Universality	This strategy can be universally applied in facilitating vocabulary learning in an SSCL environment.
Understandability	This strategy is easy to understand as a strategy facilitating vocabulary learning in an SSCL environment.

To receive feedback from both instructors and learners, a professor and one class of 16 students majoring in English education from Z university participated in the process of course implementation. Participants were given a detailed explanation of the study, as well as assurances of anonymity and confidentiality. To achieve collaboration, all students were randomly assigned to four groups. We use WeChat as an SNS tool, which is currently the most widely used SNS software in China. Students use their own electronic devices to log into WeChat for SSCLs. Learners' familiarity with the application's function ensures equal accessibility and means they do not require substantial time to familiarize themselves with its operations. The learning content was a unit named "Coping with an Educational Problem" in the English textbook in China called New College English Integrated Course 2. We implemented two SSCL sessions based on the revised design strategies and the instructional requirements of the textbook, each session lasting 45 minutes. Researchers and the instructor designed the teaching and learning activities, which consists of pre-, in-, and post-class activities that reflected the design strategies. Student activities also distinguish between individual and group tasks. After the implementation of the courses, the responses of the instructor and the learners were

collected through interviews. Each interview lasted for approximately 20 minutes and the interviews were recorded with the consent of the interviewers.

Results

Initial Instructional Strategies

Schmitt and McCarthy (2002) proposed four strategies for reviewing and using vocabulary to instructors: *social strategies, memory strategies, cognitive strategies and metacognitive strategies*. Social strategies can help improve students' ability to use vocabulary in social communication. Memory strategies incorporate new knowledge into old knowledge to practice and use vocabulary. Cognitive strategies can promote learners' ability to use and transform target languages. Metacognitive strategies, which are more biased towards the learning strategy, emphasize the generalization of the learning process and the decision to plan, monitor and reflect. The initial instructional strategy model synthesized the results of the literature review in terms of the above four dimensions. As shown in Table 2, the results consisted of 7 general strategies and 18 detailed guidelines.

Content Validity

The experts scored for the initial instructional strategies according to their own understanding and proposed amendments in the interview. The average value, standard deviation, content validity index (CVI) and inter-rater agreement (IRA) were statistically analysed based on the collected data (see Table 3). The experts' opinions were almost unanimous, as seen from the IRA value of 0.86. The average value of 2.50 to 3.50 indicated that the overall evaluation of the design strategies remained neutral. In particular, it can be seen from the CVI values that, except for universality,

Table 2

Instructional strategies for vocabulary learning on SSCL

Instructional Strategy	Detailed Guideline	Reference
1. Explain vocabulary in multimodal form	1.1 The application of graphics, text, sound and images in the form of multimodal vocabulary explanation to reduce the burden of memory	Lund, 1991
	1.2 Provide preclass preview materials to stimulate previous knowledge structure	Zhang et al., 2011
2. Provide a collaborative learning guideline based on SNS	2.1 Provide guidelines for collaborative learning using SNS; identify grouping, learning goals, etc.	Collins et al., 1989; Kim & Hannafin, 2011
	2.2 Allow preparation time for practice and provide assistance appropriate to the student's level of use	Kollar et al., 2005
3. Provide support tools to meet the learning needs of query, communication and sharing	3.1 Enable online resource sharing so that learning materials can be accessed anytime, anywhere	Hämäläinen & Vähäsantanen, 2011; Jeong & Hmelo-Silver, 2016
	3.2 Fast online access to external learning resources	Thornton & Houser, 2005
4. Improve vocabulary application ability in the cultivation of listening and speaking skills	4.1 Organize repeated listening training to familiarize learners with the vocabulary	McNaughton et al., 1994
	4.2 Provide opportunities for oral practice to activate stored language elements so that students can become fluent in words and phrases and unconsciously become spontaneous language users	Harmer, 2010
5. Improve vocabulary application ability in the cultivation of reading and writing skills	5.1 Arrange reading tasks for practice by asking students to repeat new vocabulary as well as to memorize it, while also mastering the meaning and significance of sentences and becoming familiar with the structure of sentences	Elley, 1991
	5.2 Create context and present the subject of writing with vocabulary application requirements	Nagy et al., 1985
6. Assign collaborative tasks that can activate learners' advanced processing to enhance the long-term retention of vocabulary knowledge	6.1 Cultivate the ability to understand and use vocabulary in the process of communication and integration of new and old knowledge	Lewis, 1993; Craik & Lockhart, 1972
	6.2 Create context that is suitable for vocabulary; provide learners the opportunities to use vocabulary	Thornbury, 2002
	6.3 Encourage learners to have a higher level of classroom participation and interaction	Hulstijn & Laufer, 2001
	6.4 Create opportunities for interaction within group members and between groups for joint construction of new vocabulary knowledge	Ohta, 2001; Swain, 2000
7. Provide multiperspective and multidimensional evaluation criteria and evaluation methods	7.1 Objective evaluation of the sound, form and meaning of vocabulary to grasp its learning level	De Hei et al., 2016
	7.2 Provide criteria for instructor evaluation, peer mutual evaluation and self-evaluation	Tomcho & Foels, 2012
	7.3 Pay more attention to the evaluation of learners' learning process and increase the proportion of the influence of process evaluation results on the final evaluation	De Hei et al., 2016
	7.4 Share the results of each group online for mutual evaluation between groups	De Vries, 2003

the CVI values of other indicators were less than 0.8, which indicated that the experts agreed that these initial instructional strategies had some difficulties in usefulness.

In addition to the data, the interview results also include recommendations and suggestions for modifying the strategies. The evaluation results can be simply summarised into three parts: configuration, content and expression. First, from a structural perspective, the experts point out that the overall strategy lacks a certain degree of logic, and the features of SNSs and collaborative learning are not highlighted in the general strategies and guidelines. Therefore, it is necessary to add relevant content in subsequent amendments. Second, in terms of content, some guidelines are too general and repetitive and lack clarity. Finally, there are some problems with the accuracy and refinement of the description language. It is necessary to reconsider and modify the terms.

After the first-round evaluation, the instructional strategies and specific guidelines were modified based on the suggestions from the experts. Then, the experts participating in the first evaluation performed the second-round evaluation. The evaluation results (see Table 3) show that the experts' comments are almost in perfect agreement (IRA = 0.98). The average value of 3.50 to 4.00 indicated that the experts have a relatively agreeable attitude to the revised design strategies. Meanwhile, the CVI values are all displayed as 1.00, which also showed positive feedback from the experts on the revised design strategy. After making small modifications according to the suggestions made by the experts in the second-round interview, the final

Table 3
First- and second-round overall expert evaluation results

	First-round evaluation				Second-round evaluation			
	M	SD	CVI	IRA	M	SD	CVI	IRA
Feasibility	3.25	.96	0.75		4.00	.00	1.00	
Explanatory	3.25	.96	0.75		3.50	.58	1.00	
Usability	2.75	.50	0.67	0.86	4.00	.00	1.00	0.98
Universality	3.50	.58	1.00		3.50	.58	1.00	
Understanding	2.50	.58	0.50		4.00	.00	1.00	

instructional strategies for vocabulary learning based on SSCL were derived (see Table 4). These strategies were divided into three stages according to the course process, consisting of 8 general strategies and 21 specific guidelines.

Table 4

Final instructional strategies for vocabulary learning based on SSCL

Stage	General instructional strategies and specific guidelines
Preclass Preparation Stage	**1. Establish mobile vocabulary resource to illustrate vocabulary in multimodal form**
	1.1 Apply the diverse functions in SNS to present vocabulary explanations in the form of multimodality such as textual interpretation, pronunciation, related pictures or videos
	1.2 Deliver the content in the vocabulary explanation resource to learners through the 'group chatting room' function of SNS before and after class, so that it is easy to review or preview at any time
	2. Provide instructions to direct learners to conduct SSCL to ensure the correct use of learning tools and the effective completion of collaborative tasks
	2.1 Send the operation instruction of SNS as a specific learning tool in the chatting room and urge learners to be familiar with the operation before class
	2.2 Evaluate learners' engagement in advance and determine group composition based on participation; set learning objectives with the desired interaction; clarify assessment content and assessment criteria
	3. Check the stability of the network environment and the situation of learning tools in advance to ensure the favourable implementation of instruction
	3.1 Ensure that each participant has a mobile electronic device with the appropriate SNS application downloaded, and that class members and instructors have added each other's SNS accounts and joined the groups as needed.
	3.2 Have students check the stable connection of the network of mobile devices to ensure a seamless network during the course
	4. Flexible use of the SNS functions to meet the various needs of the collaborative learning process (e.g., WeChat's 'search', 'chat', 'sharing', 'note' functions)
	4.1 Utilize SNS to enable fast online access to external learning resources to assist with collaborative tasks
	4.2 Communicate with learners and provide timely support, while encouraging learners to discuss learning content in groups since the 'private chat' and 'group chat' features offer a platform for multidirectional communication
	4.3 Group members, group-group, instructor-learner can share learning resources in the form of files or chats in the group chatting room at any time

Table 4

Final instructional strategies for vocabulary learning based on SSCL (continued)

Stage	General instructional strategies and specific guidelines
In-class Activities Stage	**5. Guide each group to conduct repeated listening and speaking training, and mutual supervision to achieve common progress**
	5.1 The 'voice' function in SNS provides learners with repeated listening and speaking opportunities to master the pronunciation of vocabulary
	5.2 Conduct collaborative tasks centred on listening and speaking in various forms to activate students' stored vocabulary elements and make them spontaneous vocabulary users
	6. Integrate vocabulary into reading and writing tasks; achieve the purpose of learning through the combination of group collaboration and personal tasks
	6.1 Through individual reading followed by group discussion, understand the meaning and significance of the vocabulary in the paragraph and apply it flexibly
	6.2 Create paragraph writing assignments within each group to complete the contextual dialogue
	7. Facilitate learners' motivation for collaboration and increase their engagement in learning to enhance long-term retention of vocabulary knowledge
	7.1 Implement incentives and monitoring mechanisms to sustain learning motivation
	7.2 Create task situations and set up collaborative tasks for group-group competition to drive collaboration motivation, share responsibility and solve problems
	7.3 Enrich learning materials to enhance interest and enthusiasm in integrating old and new knowledge
	7.4 Observe the collaborative learning process of each group at any time in the group chatting room; give guidance and provide supplementary materials when necessary
Evaluation And Feedback Stage	**8. Provide multiperspective and multidimensional assessment criteria and evaluation methods**
	8.1 Develop an evaluation scale for instructor assessment, peer assessment
	8.2 Send questions in group chat rooms to objectively check and evaluate the mastery of vocabulary usage
	8.3 Increase the proportion of the influence of process evaluation results on the final evaluation, and pay more attention to the evaluation of the learners' learning process
	8.4 Set evaluation criteria for all collaborative learning outcomes and synthesize the evaluation results into the final grade

External Validity

After applying the modified strategies to actual vocabulary learning courses, we conducted in-depth interviews with the instructor and learners to obtain more

information. Four learners from four groups were randomly selected for the face-to-face interviews. Eleven structured questions were used for the interviews with the learners. The content of the interview mainly contained learners' views on specific guidelines for design strategies, specifically the strengths, weaknesses and modification suggestions of the design strategies, as well as overall satisfaction with the courses. Example questions are: "What do you think are the advantages of SNS supported collaborative learning?"; "What was your most impressive learning activity during the learning process? Why?"; "What effect does group work have on your vocabulary learning?"; "Do you have any suggestions to improve the instructional strategies?". The results showed that learners maintained a positive attitude towards the overall design strategies. First, learners mentioned that the form of collaborative learning had a positive effect on the motivation of learning. In particular, the supervision of the group leader effectively strengthened the participation of the group members. In SSCL, the group leader assigns tasks online and urges group members to complete them together. In this way, learners who have negative learning attitudes can be motivated to learn as well. Meanwhile, in the process of completing group tasks and repeatedly discussing problems with group members, vocabulary is repeatedly mentioned and used, providing learners with opportunities to apply and practice.

> *Vocabulary learning is always very boring, but if there are group members together, it will make me more motivated to learn because the final grade not only affects me but also affects my group members, so I have to work hard for collective honour.* (Learner A)

> *I need to complete group tasks before class. This repeated application and repeated memory process can deepen my understanding of vocabulary.* (Learner C)

Some learners mentioned that preclass previews improved class efficiency. When previewing key vocabulary in advance and using the vocabulary purposefully to complete the learning task, learners can be familiar with or even master the

vocabulary in advance, at least with a certain understanding of the semantics and usage of the vocabulary. In this way, when the teacher puts the vocabulary into the reading paragraph during the course, the learner can master them more effectively.

> *Preclass previews allow me to clearly understand what to preview and to what extent, so that I have a general understanding of the content of the class and can discuss it with the group members if I feel unsure. The process of discussion also allows me to have a deeper understanding…* (Learner C)

In the interviews, all four learners stated that they had not taken SNS supported learning classes before, but they said that this mode of study improves efficiency to a certain extent. They all expressed their affirmation of the effectiveness of the functions in WeChat.

> *I did not know that there was a Note function in WeChat before, but after using it this time, it feels quite easy to use. It is very convenient and can help me record some simple notes and use this presenting task more clearly… (Learner D)*

> *I often use WeChat, so methods like voice discussions are convenient and can be discussed anytime, anywhere… (Learner A)*

When asked questions about the weakness of the course, many learners mentioned the imperfection of the supervision mechanism and the lack of detailed evaluation standards. This supervision mechanism includes control over student participation and supervision of task completion.

> *It is difficult to control the supervision mechanism, and it is easy to speculate. (Learner B)*

> *I think discussion may not be as effective as face-to-face, because we cannot guarantee that each group member actively participates in the online discussion... (Learner D)*

Therefore, more detailed monitoring mechanisms and more specific evaluation standards are necessary. Overall, the suggestions of learners focus on the improvement of the supervision mechanism, the refinement of evaluation standards, and the presentation of learning output.

An in-depth face-to-face interview was conducted with the instructor on issues related to instructional strategies such as feasibility, usability, universality and understandability, as well as overall satisfaction with the courses. Twelve structured questions were used, and example questions are: "What is the probability that these instructional strategies will be widely used in practical class? Why?"; "Do the instructional strategies promote vocabulary learning? Why?"; "What improvements do you think are needed?". In general, the instructor was satisfied with the results brought about by the implementation of the developed specific strategies, but there also were areas that need to be improved. First, the instructor considered that the presentation of specific guidelines was not detailed enough when connected with the actual classroom. Subsequent improvements can continue to deepen the application strategies according to the different characteristics of the specific SNS actually applied. It is necessary to consider practical feasibility as much as possible when designing such collaborative tasks. Second, from the perspective of the instructor, regarding the design strategy in the actual classroom presentation, whether before, during, or after class, the discussion atmosphere in the collaborative group is not well established, which is detrimental for task-driven collaborative learning. Therefore, how to motivate students more in such SNS supported non face-to-face classes and make them actively participate in learning needs to be reflected in subsequent research. Finally, similar to the feedback from learners, the instructor also found it difficult to take full account of all the supervision mechanisms, especially the level of engagement of each group member.

Discussion

This study aims to provide and design strategies that guide instructors in creating an SSCL mode for facilitating vocabulary learning. It is hoped that it can help learners improve their vocabulary skills through various social group learning activities using a collaborative learning environment created by SNS. The specific effects are as follows.

Firstly, the designed instructional strategies have a positive effect on SSCL based vocabulary learning. From the result of the interview, we can see that the students have always maintained a positive attitude towards these instructional strategies. Compared to traditional vocabulary teaching, the SNS supported course has increased learners' interest, timeliness, and interaction, which is consistent with Jin's (2018) findings. Combined with the characteristics of SNS, learners are more likely to interact with others, thus constantly generating new learning. In addition, collaborative learning can promote communication between learners, learn from each other's learning methods and attitudes, and promote their own learning initiative. SNS further guarantees the efficiency, timeliness and openness of interaction during collaborative learning.

Secondly, SSCL as a new kind of instruction method was helpful and useful in increasing learners' motivation and engagement to vocabulary learning. As a large and widely used SNS, it has the advantages of sociality, practicality, affordability, interactivity, and popularity (Boyd & Ellison, 2008; Godwin & Jones, 2006). The audiovisual, multisensory, multimodal three-dimensional presentation and output of vocabulary, and the effective combination of language input and output, not only increases the interest of vocabulary learning and stimulates students' interest but also helps to realize the transformation from traditional receptive learning to innovative and constructive learning. This input-absorption-output mode gradually changes students from passive learning to active learning and helps students truly master the deep knowledge of vocabulary. On the other hand, collaborative learning can create

more effective communication and interaction environment for vocabulary learning, enabling learners to create more vocabulary learning opportunities while using vocabulary continuously. The collaborative learning also allows learners to compete in groups, motivate themselves within the group, and improve their learning skills.

Conclusion

This study developed the instructional strategies of SSCL for vocabulary learning and tested its validity. The content validity of the initial teaching strategy obtained is tested by four experts in the field of educational technology. The revised design strategies are divided into three stages according to the course process, consisting of 8 general instructional strategies and 21 specific guidelines. The design strategies were then applied to actual SNS supported classrooms. After conducting in-depth interviews with learners and the instructor, we can draw the conclusions that the SSCL mode has practical application significance for vocabulary learning and the design strategy has validity.

Different from the traditional learning mode, SNS breaks through the limitation of time and space and realizes the synchronization and asynchronization of learning. The learning mode of SSCL, on the premise of ensuring the overall stability of the entire teaching activity structure and activity procedures, also reflects a certain degree of flexibility, and is a useful aid to classroom teaching. Group collaborative learning develops students' ability to learn independently and cooperatively.

This study also has some limitations. Due to the relatively small sample participating in this experiment, this study applied qualitative research methods to analyse the validity of the model in this experiment. Effectiveness research requires a large amount of data to draw the results. Therefore, a large number of regular course implementations are needed in subsequent studies. To better validate the effectiveness of the instructional strategies, future research could conduct

quantitative studies to compare whether the SSNL learning groups applying the instructional strategies were statistically significant in terms of learning outcomes, motivation and engagement.

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Wanping YANG

Master Graduate, Dept. of Education, College of Education, Seoul National University.

Interests: Educational Technology, Mobile Learning, Technology Supported Language Learning

E-mail: ywp0908@163.com

Yingying PAN

Doctoral Candidate, Dept. of Education, College of Education, Chonnam National University.

Interests: Educational Technology, Instructional Design, Online Learning, Learning Science, Human-Computer Interaction

E-mail: 1055221013pyy@gmail.com

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