Mohd Ayub A. F. et al. (Eds.) (2011). Workshop Proceedings of the 19th International Conference on Computers in Education. ChiangMai, Thailand: Asia-Pacific Society for Computers in Education.

Effects of Video Caption Modes on English Listening Comprehension and Vocabulary Acquisitions Using Handheld Devices

Ching-Kun Hsu[a], Gwo-Jen Hwang[b], Yu-Tzu Chang[a], Chih-Kai Chang[a]
[a]*Department of Information and Learning Technology, National University of Tainan, Taiwan*
[b]*Graduate Institute of Digital Learning and Education, National Taiwan University of Science and Technology, Taiwan*
gjhwang.academic@gmail.com

Abstract: This study used different display modes of video captions in mobile devices, including non-caption, full-caption, and target-words, for English comprehension and vocabulary acquisition of fifth graders. During the one-month experiment, the students' English listening comprehension and vocabulary acquisition status was evaluated per week. From the experimental results, it was found that the English target-word group had as satisfactory learning achievement as the full-caption group in terms of vocabulary acquisition, and both groups outperformed the non-caption group. Moreover, the visual style students in the English target-word group and full-caption group had better learning effectiveness in terms of vocabulary acquisition than those in the non-caption group. Furthermore, in terms of listening comprehension, the students in the three groups all made remarkable progress without significant difference.

Keywords: listening comprehension, vocabulary acquisition, captions, learning styles

1. Background and Objectives

English has been recognized as being an important international language for decades. Many non-native English countries have developed and utilized various computer systems to support those English as Foreign Language (EFL) learners. Most non-native English countries intend to have their people learn English as early as possible; therefore, the Ministry of Education in Taiwan extended regular English instruction down to the third grader in the elementary school. In the next decade, regular English instruction is considered to be extended down to the first grader in the elementary school. The policies of government in the nations whose mother tongue is not English, such as Taiwan and Korea show the importance of English instruction. Foreign language learning is often categorized into four parts which are listening, speaking, reading, and writing. Listening is an initial important aspect in social interaction to receive message or information from outside. Accordingly, Ministry of Education in Taiwan indicated that elementary schools should put emphasis on English listening first, and then reading or writing. Moreover, most of the English certifications today includes the listening proficiency examine. Due to these requirements and reasons, this study applied mobile and multimedia technologies to the learning activities of English listening for elementary school students. It is expected that such an approach can enrich the daily life input stimulus of listening opportunities in the non-English countries and environment as Taiwan.

With the advance of mobile technologies and multimedia, the instructional materials which can be used for English listening training are not restricted in school and presented in diverse forms. For example, many people have the habit of bringing an MP3 player so that they can learn via listening at anywhere. As for seeing videos, they can both have visual and aural input, such as YouTube videos and TED talks. Owing to the popular of mobile devices and the wireless network such as Wi-Fi and Wi-Max, it is convenient for most of students to do individual and independent learning by means of mobility aids. Therefore, it can be foreseen that students will eventually be equipped with a mobile device installed with proper leaning tools, systems, or materials so that they can have their own learning progress, and may set the difficulty degree of their learning content to meet their proficiency. Previous studies have shown that videos embedded with captions are helpful for students to learning second language reading [2] and listening [6]. Hsu and Chang (2010) have further reported that hiding part of the easier foreign vocabularies and showing only the more difficult words in the captions can contribute to undergraduates' listening comprehension [14]. Those selected vocabularies are presented when the students press the "pause" button of the video player during the process of listening to the foreign language courses; on the other hand, full captions are provided when the videos are played.

Accordingly, this study tries to provide different display modes of captions in the mobile devices for students to learn English via listening. A video without any caption of English and Chinese subtitle is used for the students in the control group one because previous studies indicated that no caption or subtitle help student get adaptive to various pronunciation appearances, such as reduced forms, assimilation, elision, and resyllabification [26]. On the other hand, a video with full English captions and Chinese subtitles of target vocabulary is used for the students in the control group two because a previous study showed such setting is helpful to training listening proficiency and comprehension, and confirmed that full Chinese subtitle is not needed [14]. Another video with both English caption of target vocabulary and Chinese subtitle of target vocabulary is used for the students in the experimental group.

The study aims at exploring whether different display modes of caption and subtitle result in different effectiveness on listening comprehension and vocabulary acquisition of elementary school students. Moreover, this study also investigates the learning performance of different learning style students in learning with different caption modes. The learning performance will be assessed by a test including listening comprehension and vocabulary acquisition examination in each week.

2. Related Literature

Subtitles are the on-screen text in the students' native language combined with a second language soundtrack in the video. *Captions* are the on-screen text in a given language combined with a soundtrack in the same language [21]. In this study, subtitles refer to the on-screen Chinese text combined with an English soundtrack, and captions refer to the on-screen English text combined with an English soundtrack. In addition, *bilingual subtitling* refers to the on-screen texts in both students' native and target languages combined with the target language soundtrack [15]. For example, in this study, *bilingual subtitling* refers to the English audio with simultaneous appearance of English and Chinese texts on the screen. These clear definitions of terms are helpful in the following description of the study instrument. The definition of *target-word* in the study refers to the new or key vocabulary which the learners need to know well in the new lesson or unit of the listening instructional material or video.

2.1 Caption and English Listening Comprehension

Krashen (1985) indicated that students need to receive a great quantity of comprehensible input so as to achieve the objective of language learning when they learn foreign or second language [19][20]. When students watch videos with foreign language, the contribution of comprehending and connecting foreign learning and its meaning is limited while students cannot understand what they heard at all. Therefore, using caption and subtitle to assist listening comprehension is helpful for learners to reserve more effectiveness after learning. Scholars confirmed that combining captions with audio-visual materials is an effective instructional method to enhance listening and reading comprehension of second language [1][6]. Captions visualize the information of foreign language which learners heard in the video [6]. Videos with captions facilitate listening comprehension [5][21]. On the contrary, another scholar stated that providing native subtitle for learners will obstruct their listening familiarity of pronunciations [26]. Therefore, the study designed control group one as a both non-caption and non-subtitle group, and control group two as the full caption and target-word subtitle group while the study design the experimental group as the target-word caption and target-word subtitle group. The study observed the effects of different display modes of caption and subtitle on listening comprehension and vocabulary acquisition of elementary school students.

2.2 Learning style

Learning style refers to individual preference way of learning, which affects how individuals accept stimulus, memories, thinking, and problem-solving. There are many different scholars proposing diverse categories of learning styles [7][9][10][11][13][16][17][18][22][24][25]. If teachers realize the difference of learning styles among learners and design appropriate instructional methods or media, learners will possibly be benefited.

This study utilized the scales of learning style proposed by Felder and Soloman (1991) who developed the Index of Learning Style (i.e., ILS) based on Felder and Silverman (1988) [7][8]. The ILS consists of 4 dimensions (i.e., active/reflective, sensing/intuitive, visual/verbal and sequential/global), each of which has 11 items. This study employed the visual/verbal dimension to evaluate the learning styles of the participants since this dimension is highly relevant to the use of videos in training the listening competence or vocabulary acquisition of foreign language.

3. Method

3.1.Participants

The experiments were conducted in an elementary school in an Asia country. The people there learn English as foreign language. There were nine classes of fifth graders in the elementary school. The fifth graders consisting of 11-year old students on average in the school were divided into three levels, A, B, and C, based on their English proficiency in the school. There were three classes in each level. The study selected the three classes which were the same level and are all the lowest level C among the nine classes. Therefore, totally eighty-one low-achievement fifth graders in English participated in the learning activity. The number of the students in the three classes was 26, 27, and 28 respectively. The study did not adjust the original number of students in each class. One

class in which there are 27 students, including 16 males and 11 females, is called the control group one, one class in which there are 28 students, including 12 males and 16 females, is named the experimental group one, and the last one class in which there are 26 students, including 15 males and 11 females, is called the experimental group two. Each group had different treatments which will be explained in the following section.

3.2. Research design

The participants used PDA to play the instructional video related to the lesson they study each week. Each student was equipped with one PDA. After watching the video, the students immediately took a test for evaluating their listening comprehension proficiency and vocabulary acquisition. The experiment was conducted for a month as shown in Figure 1.

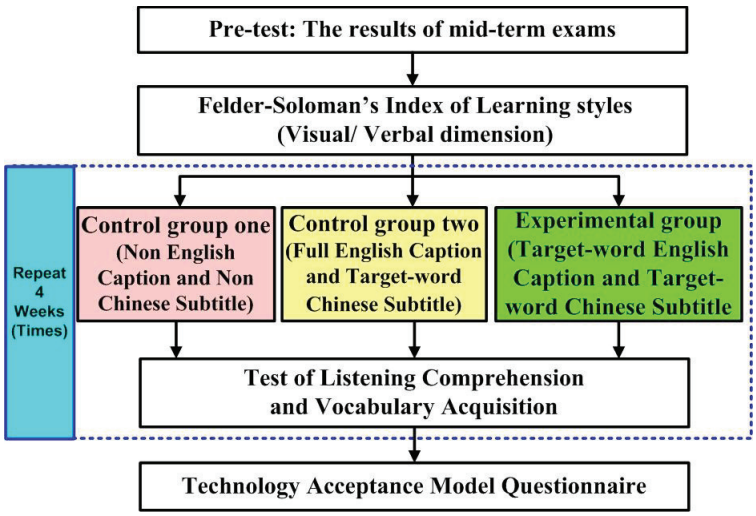

Figure 1. Experimental procedure

The videos for the three groups had the same content with different caption modes. No caption was provided for control group one, while full English caption and Chinese target words were provided to control group two, and English and Chinese target words were provided to the experimental group. Figure 2 shows an example of the caption modes for control group two (left) and the experimental group (right).

Figure 2. The playing interfaces of control group two (left) and the experimental group (right)

Researchers have indicated that, for the students to get used to the tempo of usual conversation, there is no need to provide the fast forward or slow play function; instead, the function of play, pause, and replay is necessary for listening training [12]. In order to

meet the practice of mobile assisted listening training, students in each group can use a stylus to operate the function of play, pause, and replay to listen in the limited time.

3.3. Research tool

The measuring tool of learning styles used in this study is the visual/verbal dimension of Felder-Soloman's Index of Learning styles [8].The visual/verbal dimension contains 11 items to evaluate the learning styles of the students. Its Cronbach's alpha value is 0.76.

As for the test items in each week, all the questions and items are verified by two English teachers so as to have similar difficulty degree. Each test of listening comprehension has five multiple-choice questions broadcasted from audio. The students are asked to listen to the questions and fill out the answers in the answer sheet. In addition, there are five multiple-chose questions for testing their vocabularies learned in the lesson. Both the perfect scores of the listening comprehension test and the vocabulary test are 100.

4. Results and Discussions

4.1. Analysis of pre-test and post-test

The study used the mid-term test conducted one week before the experiment as the pre-test, which was used to evaluate the students' listening comprehension and vocabulary proficiency. The ANOVA analysis results of the pre-test among the three groups are not significant difference ($p=0.94 > .05$); that is, the three groups of the students had equivalent prior knowledge before the learning activity.

After using mobile devices with the three different caption modes to learn, the students in the three groups all made remarkable progress in comparison with their pre-test results during one month. Figure 3 shows the students' progress in listening comprehension and vocabulary acquisition. It was found that both experimental group and control group two had significantly better learning effectiveness than control group one, especially after the third week; moreover, experimental group had similar learning effectiveness in comparison with control group two.

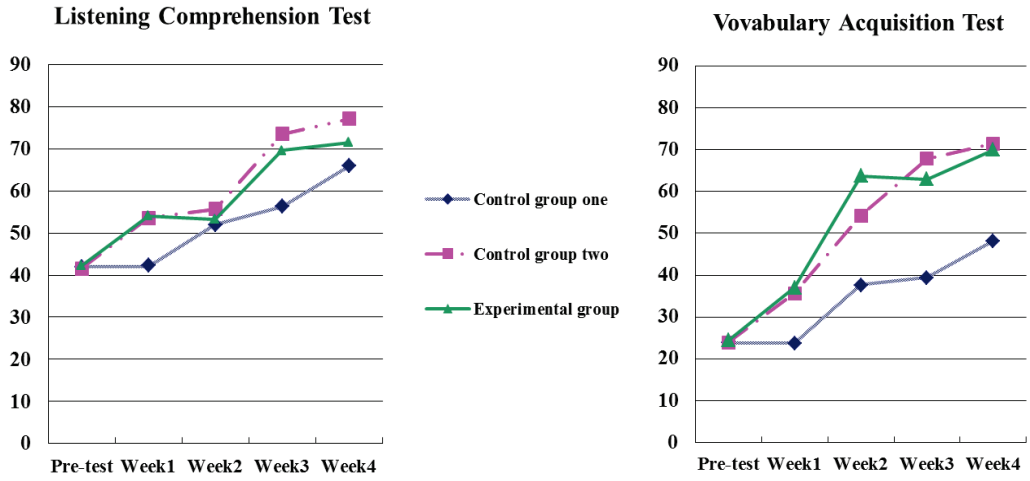

Figure 3. The improvement progress of listening comprehension (left) and vocabulary acquisition (right)

By employing ANCOVA on the post-test scores of the three groups no significant difference was found between the listening comprehension scores of the three groups. On the other hand, the ANCOVA analysis on vocabulary acquisition showed significant differences between the experimental group and the control group one as well as the two control groups, as shown in Table 1. That is, the students who watched to the videos with captions (no matter Full English caption or only English target words with Chinese target words) revealed significantly better learning achievements in English vocabularies than those who learned without captions.

Table 1. ANCOVA analysis results of vocabulary acquisition tests

Group	N	Mean	SD	Adjusted Mean	F	Pairwise comparisons
Control group one (a)	27	48.15	24.34	51.10	3.71*	(b)> (a)*
Control group two (b)	28	71.43	26.35	68.81		(c)> (a)*
Experimental group (c)	26	70.00	33.11	67.17		

*$p<.05$

4.2. Analysis of learning style

This study further compared the learning achievement of the verbal style and visual style students in the three groups. In terms of listening comprehension, no significant difference was found. Therefore, the listening comprehension of the students in the target-word group had similar performance with the listening comprehension of the students in the full-caption group. As a result, it is no need to provide full-caption for the purpose of training students to have more opportunities of practicing various pronunciation appearances, such as reduced forms, assimilation, elision, and resyllabification. Because the listening materials of the elementary school students is relatively easier, such pronunciation attributes were rare happened in the video used in the study, resulting unremarkable difference influence between the full-caption group and the target-word group on the effectiveness .

As for vocabulary acquisition for visual style students, a significant difference was found between the experimental group and control group one, and between the control group two and control group one, as shown in Table 2. On the other hand, no significant difference was found between the three groups of verbal style students. Therefore, the students with visual learning style in the target-word group performed as good as the students with visual learning style in full-caption group in the vocabulary acquisition, and both the target-word group and full-caption group outperform the non-caption group. As a result, for visual style students, it is suggested to provide both English and Chinese target words to them; in particular, for those low-achievement students.

Table 2. ANCOVA analysis of vocabulary acquisition of different learning style students

Learning style	Group	N	Mean	SD	Adjusted Mean	F	Pairwise comparisons
Verbal (L)	Control group one(L1)	8	50.00	26.19	50.17	0.89	
	Control group two(L2)	9	73.33	33.17	68.64		
	Experimental group(L3)	9	62.22	38.01	66.39		
Visual (V)	Control group one(V1)	19	47.37	24.23	51.55	3.23*	(V1)<(V3)*
	Control group two(V2)	19	70.53	23.45	68.71		(V1)<(V2)*
	Experimental group(V3)	17	74.12	30.63	70.30		

*$p<.05$

5. Discussions and Conclusions

This study found that the target-word strategies have better effects on vocabulary acquisition rather than on listening comprehension for low-achievement elementary school students. As those low-achievement elementary school students in non-English speaking countries do not know enough English words, they especially need the assistance of the target words when watching the videos for vocabulary acquisition. On the other hand, the results concerning listening comprehension are different from those of previous study carried out in the universities since undergraduates have learned the frequently-used 2200 English vocabularies while elementary school students have only learned few of the words; therefore, the undergraduates benefited (Hsu, & Chang, 2010). Therefore, this study suggests that the partial hidden mechanisms of captions can be used in an adaptive way that presents the selected vocabularies with different difficulty degrees based on the learning level of the students.

Furthermore, in terms of English vocabulary acquisition for visual style students, it was found that the students in the full caption and the target-word groups had significantly better learning achievement than those in the non-caption group one, while no significant difference was found between the three groups of verbal style students. Therefore, it is suggested that, for visual style students with low learning achievement, the provision of both English and Chinese target words are needed.

From the interview results, we have several interesting findings. For example, the students in the control group two (the full English caption group) indicated that it was not necessary to provide full English captions to them; moreover, they stated that showing full captions interfere with their listening to the learning materials. They believed that providing only target words were sufficient to assist them in improving listening comprehension, which conforms to the results of the perception investigation toward using the system in learning English listening. In addition, some students said that they would like to learn from watching videos and playing computer games related to the topics of their textbooks.

In the future, we plan to conduct more experiments from three perspectives. The first is the longer broadcasting time of videos and not limited to use in the classroom. The present study only applied short-term videos in an elementary school. It is suitable to elementary school students with low learning achievement, but may not be appropriate to advanced learners. Therefore, secondly, the study suggests future researchers can set and show the target words and hide the other words in the caption of different video length for the learners in different ages. Thirdly, English listening proficiency needs learners to spend more time on exercising and training so as to make remarkable progress easier. Therefore, in the future, we plan to extend the experiment in a seamless learning environment to accelerate the listening proficiency of learners. It is inferred that the extended time of self-learning may have contributions to listening proficiency.

Acknowledgement

This study is supported in part by the National Science Council of the Republic of China under contract numbers: NSC 99-2511-S-011-011-MY3 and NSC 99-2631-S-011-002.

Reference

[1] Borras, Isabel; Lafayette, Robert C.(1994). Effects of Multimedia Courseware Subtitling on the Speaking Performance of College Students of French. *Modern Language Journal, 78* (1),61-75.
[2] Chun, D. M., & Plass, J. L. (1997). Research on text comprehension in multimedia environments. *Language Learning & Technology, 1* (1), 1-35.
[3] Chu, H. C., Hwang, G. J., Tsai, C. C., & Tseng, Judy C. R. (2010). A two-tier test approach to developing location-aware mobile learning systems for natural science courses. *Computers & Education, 55*(4), 1618-1627.
[4] Chu, H. C., Hwang, G. J., & Tsai, C. C. (2010). A knowledge engineering approach to developing Mindtools for context-aware ubiquitous learning. *Computers & Education*, 54(1), 289-297.
[5] Danan, M. (1992). Reversed subtitling and dual coding theory: New directions for foreign language instruction. *Language Learning, 42*(4), 497-527.
[6] Danan, M. (2004). Captioning and subtitling: Undervalued language learning strategies. *Meta, 49*(1), 67-77.
[7] Felder, R. M. & Silverman, L. K. (1988). Learning and teaching Styles in engineering education. *Journal of Engineering Education, 78*(7), 674-681.
[8] Felder, R. M., & Soloman, B. A. (1991). *Index of learning styles*. Retrieved May 1, 2011, from http://www.ncsu.edu/felder-public/ILSpage.html
[9] Felder, R. M. & J. Spurlin, (2005). Reliability and Validity of the Index of Learning Styles: A Meta-analysis. *International Journal of Engineering Education, 21*(1), 103-112.
[10] Fischer, B. B., & Fischer, L. (1979). Styles in teaching and learning. *Educational Leadership*, 36(4), 245-254.
[11] Gregorc, A. F. (1979). Learning/teaching styles: Their nature and effects. In J. W. Keefe (Ed.), *Student learning styles: Diagnosing and prescribing programs* (pp. 19-26). Reston, VA: National Association of Secondary School Principals.
[12] Grgurovi, M., & Hegelheimer, V. (2007). Help options and multimedia listening: students' use of subtitles and the transcript. *Language learning & technology*, *11*(1), 45-66.
[13] Honey, P., & Mumford, A. (1986). The Manual of Learning Styles. 10 Linden Avenue, Maidenhead: Peter Honey.
[14] Hsu, C.-K., & Chang, C.-K. (2010). Effects of Automatic Hidden Caption Classification on a Content-based Computer-Assisted Language Learning System for Foreign Language Listening. *ICCE2010*, Putrajaya, Malaysia.
[15] Katchen, J. E., Fox, T., Lin, L., & Chun, V. (2001). *Developments in digital video.* Paper presented at the Third Pan-Asian Conference 2001: A Language Odyssey, Kitakyushu, Japan. .
[16] Keefe, J.W. (1979a). Learning style: An overview. In J. W. Keefe (Ed.), *Student learning styles: Diagnosing and prescribing programs* (pp. 1-17). Reston, VA: National Association of Secondary School Principals.
[17] Keefe, *J. W.* (Ed.). (1979b). *Student learning styles: Diagnosing and prescribing programs.* Reston, VA: National Association of Secondary School Principals.
[18] Kolb, D. (1984). *Experiential learning: Experience as the source of learning and development*. Englewood Cliffs , NJ : Prentice-Hall.
[19] Krashen, S. D. (1981). *Second language acquisition and second language learning*: Oxford University Press.
[20] Krashen, S. D. (1985). *The input hypothesis: Issues and implications*: Longman London.
[21] Markham, P., Peter, L. & McCarthy, T. (2001). The effects of native language vs. target language captions on foreign language students' DVD video comprehension. *Foreign Language Annals, 34(*5), 439–445.
[22] Myers, I. B., & McCaulley, M. H. (1985). *Manual: A guide to the development and use of the Myers-Briggs Type Indicator*: Consulting Psychologists Press, Palo Alto, Ca.
[23] Paivio, A (1986). *Mental representations: a dual coding approach*. Oxford. England: Oxford University Press.
[24] Reichmann, S. W., & Grasha, A. F. (1974). A rational approach to developing and assessing the construct validity of a study learning styles scale inventory. *Journal of Psychology, 87*, 213-223.
[25] Schmeck, R. R. (1982). Teaching students through their individual learning styles: A research report. In J. W. Keefe (Ed.), *Student learning styles and brain behavior* (pp. 73-80). Reston, VA: National Association of Secondary School Principals.
[26] Vandergrift, L. (2007). Recent developments in second and foreign language listening comprehension research. *Language teaching*, *40*(03), 191-210.