

Multimedia Teaching Material with Text-to-Speech (TTS) on English Learning

Yi-Ching HUANG

*Department of Applied Foreign Languages, Central Taiwan University of Science and Technology
, Taiwan*

*getyiching@yahoo.com

Abstract: This study aimed to explore the effects of the multimedia teaching material incorporated with TTS on college students' English learning. 44 sophomore participants enrolled in the course "English Reading" were selected as volunteers at one selected university in Taiwan. The techniques of data collection in this study included (a) questionnaire, (b) open-ended questions, and (c) pre-test and post-test of vocabulary tests. This study found that the multimedia teaching material (a) enhanced students' vocabulary learning, (b) facilitated students' pronunciation and listening, (c) constructed knowledge, and (d) raised learning motivation. The effects of multimedia teaching material found in this study can be linked to students' autonomous learning and teacher autonomy.

Keywords: Text-to-speech; multimedia teaching material; student learning; teacher autonomy

1. Introduction

Since multimedia teaching material plays a key role in language learning, this study presented an instructional technique which revolutionized the teaching and learning landscape across the world. Namely, this study incorporated text-to-speech software embedded in the lecture slides assisted with teaching aids such as videos, animations and music to investigate effects on students' language learning. The TTS technique is a kind of speech synthesis software that is used to generate a "read-aloud" or spoken version of typed text from a variety of document types such as emails, e-books, and web pages and documents. According to Rughooputh and Santally (2009), the process of instructionally incorporating text-to-speech (TTS) in universities is a new pedagogical method that can be seen to help schools to deal with current challenges. The purpose of this study was to explore the effects of the multimedia teaching material incorporated with TTS on college students' English learning. The research question was addressed as follows:

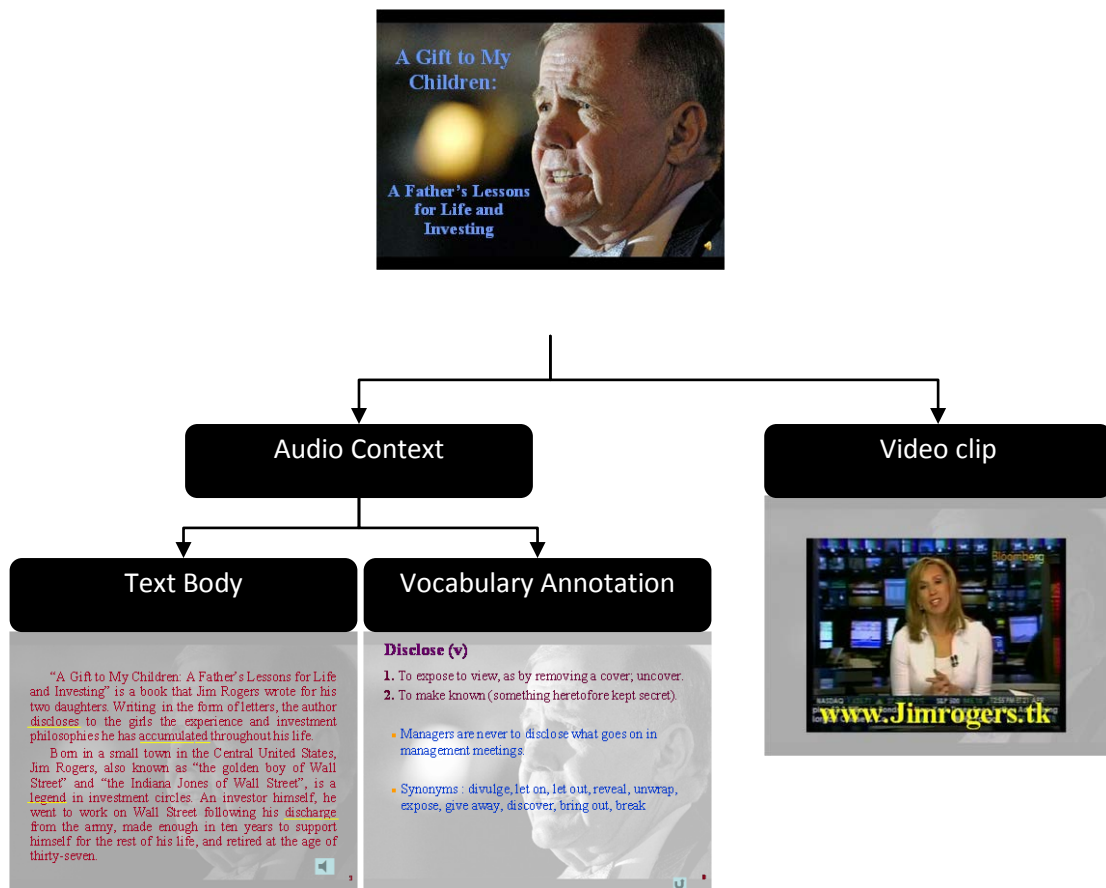
- How do students perceive the multimedia teaching material on their English learning?

1.1 The TTS technique

The multimedia teaching material consisted of the use of TTS software to generate the complete lectures prepared in sound format, video, and vocabulary acquisition. The material used in multimedia teaching material included:

- Microsoft PowerPoint
- Nature Reader Software
- Next Up Technologies Text-Aloud (trial version)
- Bytescout PPT to Video Scout Software (trial version)
- Available lecture notes, textual explanations and learning activities

Figure 1 demonstrated how the course material that included text, audio, video, graphics and pictures synchronized with TTS in the power point presentation. As Figure 1 showed, the vocabularies in the text can be clickable to elaborate their definition and usage. The power point presentation provided the printed text, definition of vocabulary, usage, synonyms and antonyms. The course instructor also inserted the visual and audio aids related to the topic of the course presentation that is likely to be available online into PPT slides to provide students more background knowledge. As Figure 1 presented, a video available on www.Jimrogers.tk was inserted into the course PPT to make students understand more about Jim Rogers.



Technical Support

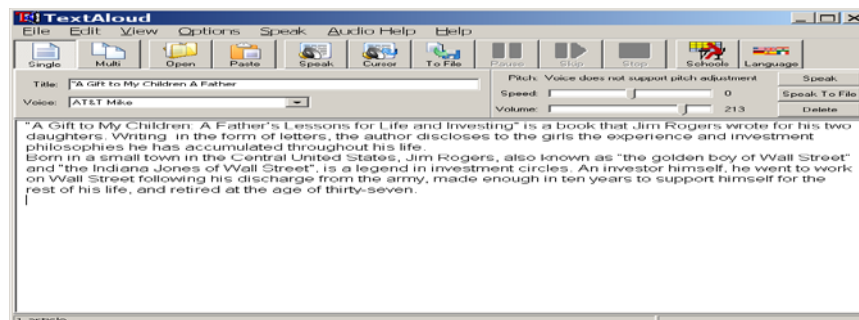


Illustration of the TTS approach: TTS conversion

Figure 1. Incorporating Text-to-Speech into Multimedia Material Flow Diagram

2. Method

2.1 Participants

44 sophomore participants, including 34 female and 10 male, enrolled in the course “English Reading” were selected as volunteers at one selected university in Taiwan. The instructor totally presented 20 lessons in the course presentation. The course was 18 weeks long and consisted in 2 hours a week of face-to-face class. The research process lasted one academic year, two semesters.

2.2 Data Collection

The techniques of data collection in this study included (a) questionnaire, (b) open-ended questions, and (c) pre-test and post-test of vocabulary tests. In reporting the findings, all participants were given a pseudonym to assure their anonymity.

2.3 Data Analysis

All quantitative data regarding the multimedia teaching material were analyzed using Statistical Package for Social Science (SPSS). The mean and deviation were calculated for all the scores. T-tests for vocabulary learning were also run to observe proficiency achievements from pre-test to the post-test. Significance level was set at .05.

The answers to the set of open-ended questions were initially compiled into main categories reflecting their perceptions of multimedia teaching material. For the sake of consistency, whenever appropriate, answers were further categorized into themes included in the research questions.

3. Results

As the results showed, the utilization of this multimedia teaching material appeared four effects on students’ English learning. This study found that the multimedia teaching material (a) enhanced students’ vocabulary learning, (b) facilitated students’ pronunciation and listening, (c) constructed knowledge, and (d) raised learning motivation.

3.1 Enhanced students’ vocabulary learning

The results showed that the multimedia teaching material incorporated with TTS software helped students’ English vocabulary learning from open-ended questions, questionnaires and pre-post test results. The analysis of open-ended questions found that students perceived the multimedia teaching material contributed to their vocabulary learning, increased vocabulary size and satisfied the PPT presentation. Clearly, the results in this study corresponded to the five steps of vocabulary acquisition (Brown & Payne, 1995): (a) having sources for encountering new words; (b) getting a clear image, either visual or auditory or both, of the forms of the new words; (c) learning the meaning of the words; (d) making a strong memory connection between the forms and the meanings of the words; and (e) using the words. The results showed that students are likely to build connections between visual text and graphics representations through the application of TTS.

In addition, for Level 1000 words, there was no statistically significant increase in vocabulary test scores from pre-test ($M = 87.77$, $SD = 11.99$) to post-test ($M = 85.07$, $SD = 6.43$), $t(43) = 1.241$, $p > .05$. The result also implied that students’ vocabulary size ranged around level 1000 words. The findings indicated that the multimedia teaching material had positively affected students’ vocabulary size, especially for level 2000 words. Namely, when visual text is presented with spoken text in PPT, students may be motivated to success and achievement in vocabulary learning. The results supported that conclusion that students performed better on vocabulary test when they were allowed to use a combination of visual text, graphics and spoken assistance (Kost et al., 1999).

Furthermore, the analysis of the questionnaire showed that added value and motivation dimensions have higher mean scores ($M=3.88$, $SD=0.65$; $M=3.87$, $SD= 0.72$). The two dimensions with higher mean scores revealed that students realized the images, sounds and animations presented

in the multimedia teaching material improved their vocabulary learning. The realization of the evaluation on the multimedia teaching material was measured through the statements in the added value dimension: “item 6: *The images in this learning material help me to learn*”(M=3.94, SD=0.63), “item 7: *The sounds in this learning material help me to learn*” (M=3.98, SD=0.64) and “item 8 “*The animations in this learning material help me to learn.*” (M=3.90, SD=0.60).

In the motivation dimension, students gave high ratings for the statement: “ item 10 : *I try to achieve as high a score as I can in this learning material*” (M=4.06, SD=0.72). On the other hand, although the applicability dimension didn’t reach a higher mean score, the item 2 “*I feel that this learning material will help me to do better in the test*” had a higher mean score(M=3.98, SD=0.54). The data from item 10 and item 2 showed that the multimedia teaching material encouraged students to achieve higher score. This led to cautiously conclude that the finding supported the multimedia teaching material was designed to allow a learner possibility to decide where and when to proceed.

The findings of this study suggested the way of using visual media supported vocabulary acquisition and helped increase achievement scores. When the multimedia teaching material in the study was examined to foster their vocabulary learning, meaningful learning occurred when students engaged in cognitive processes. To summarize, the results of the open-ended questions analysis corroborate in most aspects what was observed in the quantitatively analysis: the multimedia teaching material enhanced their vocabulary learning.

3.2 Facilitated students’ pronunciation and listening

Forty-four students in open-ended questions agreed that the multimedia teaching material by using TTS facilitated their pronunciation and listening. The open-ended description in Table 7 illustrated the participants’ views of the multimedia teaching material on English pronunciation and listening.

At the same time, some of the responses reflected other benefits of the use of TTS of the multimedia teaching material, which were often perceived as tools that provide immediate feedback, improve English pronunciation and speaking, and imitate the accent of native-speakers of English. The responses clarified the statement that speech recognition provides an optimal solution to pronunciation learning (Neri et al., 2001).The results in this study also suggested that the use of authentic audio-visual texts can teach the spoken and provide students with authentic language input that is rich enough to promote language acquisition (Klassen & Milton, 1999)

The analysis of open-ended questions showed the audio function in PPT allowed the course instructor play and replay the sound any number of times so that students had more chances to practice their listening. In addition, 34 out of 44 students from questionnaire agreed that the audio function in the multimedia teaching material improved their listening. The results found that students are more likely to notice their problems or differences on English pronunciation while listening to the simulating voice of native speaker of English. At the same time, they would try to pronounce the sounds of that person like a native speaker of English does. When they practiced more by imitating or hearing the simulating voice in TTS, they tended to acquire new vocabularies and subject knowledge. This learning approach contributed to students’ English learning. The results corresponded to the findings of Weyers (1999) that the multimedia teaching material can be seen as a valuable source of authentic target language usage that has positive effects on students’ listening comprehension and communicative skills.

3.3 Constructed knowledge

The analysis of the open-ended questions presented that the information obtained from the multimedia teaching material helped them to increase knowledge. Specially, students were impressed by the video presented in the multimedia teaching material.

This learning process suggested that the multimedia teaching tool enabled students to have awareness of their own knowledge and ability to understand control and manipulate individual learning processes. The results in this study corresponded to the statement that computer-based technologies helped further by making it easy for learners to construct, recall, and modify visual representations and kept them for a long period of time (Jonassen, 2000; Novak & Canas, 2008). This can be explained that visual methods helped externalize and elicit the abstract structure of knowledge and human brains have rapid processing capabilities to acquire and retain visual images (Jacobson & Archodiou, 2000; Paige & Simon, 1966).

The data from open-ended questions and questionnaire showed that students in this study were in a so-called ZPD (zone of proximal development, Vygotsky, 1978) because they were in the process of rising into a new level of skills and knowledge and progress depending on the understanding of some detail. Mayer (2001) also stated that knowledge should be constructed through meaningful learning, which takes place when learners deliberately seek information to relevant knowledge that he/she has already possessed. In this study, students constructed knowledge as a way of making meaning of exercises. So, the findings in this study showed that video offered a new way to deliver content and instruction to students, and further constructed knowledge.

3.3 Raised learning motivation

Motivation affected all learning and made people behave the way they do. In this study, the data from open-ended questions showed that the multimedia teaching material raised their motivation to learn English.

The reported results showed that the multimedia teaching material promoted students motivation, expectation and incentives to learn English. As Ruohotie & Nokelainen (2003) explained, the key concepts of motivation include incentives, self-regulation, expectations, attributions of failure and success, performance goals. When the multimedia teaching material led students to be goal-oriented, motivation affected their vigor. The results indicated that the multimedia teaching material raised students' motivation.

4. Discussion and Conclusion

The purpose of this study was to investigate a group of L2 learners' perceptions of and attitudes towards the use of the multimedia teaching material incorporated with TTS in a foreign language classroom. Through a survey questionnaire, pre-post tests and open-ended questions, this study investigated how language learners view the use of the multimedia teaching material incorporated with TTS and its putative effects on motivation, involvement and participation in the course, assessment, and potential learning gains. Students' statements indicated that they believed the use of the multimedia teaching material in their classes promoted vocabulary learning, facilitated students' pronunciation and listening, increased their learning motivation and participation in class, constructed knowledge and, more importantly, contributed to English learning. With regards to the research question: how do students perceive the multimedia teaching material on their English learning?, the overall results suggested that the participants view the use of the multimedia teaching material positively. The effects of multimedia teaching material found in this study can be linked to students' autonomous learning and teacher autonomy.

References

- Jacobson, M. J., & Archodidou, A. (2000). The design of hypermedia tools for learning: Fostering conceptual change and transfer of complex scientific knowledge. *The journal of the Learning Sciences*, 9 (2), 149-199.
- Jonassen, D. H. (1999). Designing constructivist learning environments. In C. M. Reigeluth (Ed.), *Instructional design theories and models: A new paradigm for instructional theory*, Mahwah, NH: Lawrence Erlbaum, 215-239.
- Klassen, J., & Milton, P. (1999). Enhancing English language skills using multimedia: Tried and tested. *Computer Assisted Language Learning*, 12, 281-294.
- Kost, C., Foss, P., & Lenzini, J. (1999). Textual and pictorial gloss: Effectiveness on incidental vocabulary growth when reading in a foreign language. *Foreign Language Annals*, 32 (1), 89-113.
- Mayer, R. & Moreno, R. (2002). Aids to computer-based multimedia learning. *Learning and Instruction*, 12, 107-119.
- Mayer, R. E. (2001). *Multimedia Learning*. Cambridge: Cambridge University Press.

- Neri A., Cucchiarini, C. and Strik H., (2001). *Effective feedback on L2 pronunciation in ASR-based CALL*. In Proc. of the workshop on Computer Assisted Language Learning, Artificial Intelligence in Education Conference, San Antonio, Texas.
- Nokelainen, P. (2006). An empirical assessment of pedagogical usability criteria for digital learning material with elementary school students. *Educational Technology*, 9 (2), 178-197.
- Novak, J. D. & A. J. Canas (2008). The Theory Underlying Concept Maps and How to Construct and Use Them. *Technical Report IHMC CmapTools 2006-01 Rev 01-2008*, Florida Institute for Human and Machine Cognition, 2008.
- Paige, J. M., & Simon, H. A. (1966). Cognitive processes in solving algebra and word problems. In B. Kleinmuntz (Ed.), *Problem solving: Research, method and theory*. New York, NY: Wiley.
- Ruohotie, P., & Nokelainen, P. (2003). Practical Considerations of Motivation and Computer-supported Collaborative Learning. In Varis, T., Utsumi, T. & Klemm, W. R. (Eds.), *Global Peace Through The Global University System*, Hämeenlinna, Finland: RCVE, 226-236.
- Vygotsky, L. S. (1978). *Mind in Society. The Development of Higher Psychological Processes*, London, England: Harvard University Press.
- Weyers, J. (1999). The effect of authentic video on communicative competence. *The Modern Language Journal*, 83, 339-349.