

The Design of a Synchronized Multimedia-based English Self-Study System for Elementary Students

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Abstract: In this paper, we describe the development of a Synchronized Multimedia-based English Self-Study (SMESS) system for elementary students in Taiwan. Three major functions for fundamental English learning are designed in the SMESS system: (1) synchronized multimedia reading guidance, (2) online dictionary and (3) four types of self-assessment tools- sentence translations, fill in the blank questions, grammar error corrections and spelling exercises. Lessons covered in the current system include a total of 85 essays in two levels (primary (40 essays) and intermediate (45 essays)). In order to increase the flexibility of content, we also developed a content management component for providing an easy-to-use interface to manage all related materials.

Keywords: Synchronized multimedia, English learning, self-study, self-assessment, content management

Introduction

Second language (L2) acquisition is generally thought to be enhanced a great deal by information technology and multimedia networking for their functions that provide practice, interaction, and feedback in learning [1, 4, 6]. Web-based writing programs have been developed to provide instructors and students with writing instruction and assessment of English essays [5, 7]. Due to the constraints of EFL learning environment in Taiwan, English learning has conventionally been taught through lecture-based drills and paper-based practice. Some foundation and important issues such as vocabulary retention, grammatical cognition and reading comprehension are highly related to learning effectiveness of other subjects in particular to the stage of college or looking for jobs. However, these issues are usually lack of practice in the classroom due to the limitation of class time. Thus most of Taiwanese students have to spend much time and money to hire tutors or go to cram school after class. Therefore, in this paper, we describe the development of a Synchronized Multimedia-based English Self-Study (SMESS) system for elementary students, which is helpful to learn fundamentals of English. Three major functions are designed in the SMESS system: (1) synchronized multimedia reading guidance, (2) online dictionary and (3) four types of self-assessment tools- sentence translations, fill in the blank questions, grammar error corrections and spelling exercises. Lessons covered in the current system include a total of 85 essays in two levels (primary (40 essays) and intermediate (45 essays)). To increase the flexibility and extensibility of

content, we also developed a content management component to manage all related materials by an easy-to-use interface. The system has been served free online for a while (<http://mlab.cs.pu.edu.tw/boyo>) and promoted by a charity, Boyo Social Welfare Foundation, which is a famous organization on its free remedial programs for under-achievers in Taiwan.



Figure 1. Reading guidance of SMESS

Table 1. Four types of exercise	
Types	Examples
Translation	(1) What do you do after school? 放學後你都做什麼? 你放學後都做什麼?
Fill in the blank	(1) 他沒有一台電腦。 He <u>doesn't</u> <u>has</u> a computer. (1) 他沒有一台電腦。 He <u>doesn't</u> <u>have</u> a computer.
Correction	(1) What does Ben <u>doing</u> now? <u>do</u> <u>does</u> → is
Spelling	(1) 新的 _ew new ✓ (2) 刺激的 e _ i _ _ exciting

Note: Each type of exercise except translation practice has an automatically answering check mechanism. The red texts in the above examples show the automatic checking results.

1. Overview of SMESS

1.1 Synchronized Multimedia-based Presentation for Learners

Figure 1 shows the functions provided in our system for learners. The reading guidance includes a short essay and its corresponding oral reading recording by a native speaker. When oral reading plays, the sentence corresponding to its audio clip will be highlighted. That will help learners to concentrate on text accompany with playing of the sound. Learners can randomly access oral reading clips by clicking any sentence. All vocabularies appeared in the essay will be parsed automatically and displayed by red color. Moreover, online dictionary is a useful tool when learners are reading. Each lesson consists of four types of self-assessment, as Table 1 shows. Each type of exercise except translation practice has an automatically answering check mechanism. For elementary students, the designed functions or tools will be helpful for their pronunciation, intonation, vocabulary retention, grammatical cognition and reading comprehension.

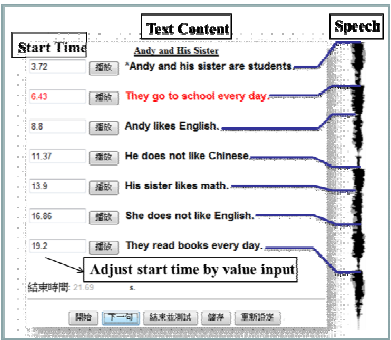


Figure 2. Speech-Text alignment

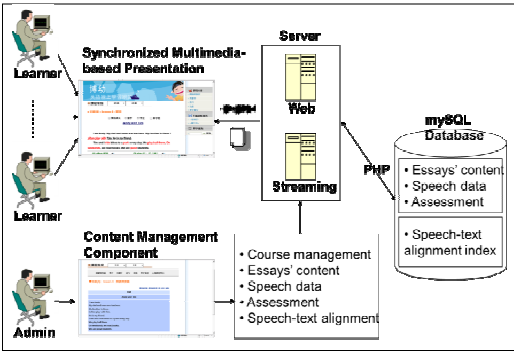


Figure 3. SMESS system architecture

1.2 Easy-to-Use Content Management Component for Instructors

Content management is not a new concept for web-based applications. The design of our system keeps this feature to manage all materials represented to learners. An instructor can use this tool to create a new lesson, use pre-defined characters to format a short essay, edit self-assessment exercises and determine the timestamp between each sentence and its corresponding oral reading clip. Figure 2 shows an example of operations for determining the timestamp of each sentence. When starting to play oral reading, the instructor can click a button to retrieve the current playing time and set it as the starting time of a sentence. After completing this process, he/she can test the alignment results and adjust the timestamp value for each sentence. This process provides important clues for synchronized presentation of reading guidance and random access.

2. System Architecture

Figure 3 shows the architecture of SMESS system. It consists of two major parts: (1) synchronized multimedia-based presentation mechanism and (2) content management component. The former applies the multimedia synchronization concept used for web-based language learning system which proposed on [2] and [3]. The latter provides variety of editing tools for learning content management. All related data will be stored on a MySQL database. In this architecture, server plays an import role to provide web and streaming services. Network streaming facilitates the access of oral reading or pronunciation of vocabulary speech data which usually has larger file sizes.

3. Conclusion and Future Work

In this paper, we proposed the SMESS system for fundamental English learning on pronunciation, intonation, vocabulary retention, grammatical cognition and reading comprehension. Learners can access all of online lessons through Internet for their self-studies. We believe that the use of our system will enhance learners' English ability in some degree. Therefore in the future, we will invite students who are studying in an elementary school to use this system for empirical study and evaluating the performance and effectiveness on English learning.

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