Chapter 14
Using Precision Teaching Method to Improve Foreign Language and Cognitive Skills in University Students

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ABSTRACT

Learning a foreign language takes time and effort. In the last few years, too much emphasis has been placed on oral communication skills and English teachers make their students speak English without paying enough attention to grammatical accuracy. As a result, while students' ability in terms of fluency has improved, they often cannot communicate appropriately in English due to a lack of grammatical knowledge. The aim of the study was to explore the potential of Precision Teaching software developed for the improvement of English grammar rules. Two groups were compared, one having used the software and the other following a traditional textbook-based approach. The students who used the software showed significantly higher learning scores than students who did not. In addition, after using the software students show increased scores in some cognitive abilities that are related to foreign language learning.

Acquiring a linguistic competence, such as a foreign language, involves complex learning. Neural commitment to the native language interferes with foreign-language processing, causing difficulty in foreign-language speech perception in infancy and adulthood (Iverson et al., 2003). In recent years, many studies have indicated that the use of multimedia technology for foreign

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language instruction can increase learning' levels (Brandl, 2002; Chikamatsu, 2003; Meskill & Anthony, 2005).

Several advantages can be gained by incorporating computers into language learning instruction. They can facilitate oral communication, reduce anxiety, enhance student motivation, and improve writing skills (Arnold, 2002; Conti-Ramsden, Durkin, & Walker, 2010; Davis & Kim, 2001; Tsou, Wang, & Li, 2007). For these reasons, multimedia technology in learning contexts has expanded rapidly during the last few decades. Researchers have reported that innovative use of computers in language learning is characterized by greater participation and interactions, and students enrolled in computer-mediated projects demonstrated more fluent conversation and improved their communication skills (Beauvois, 1998; Lee, 2002). Moreover, the use of Internet technology (electronic mail, electronic journals, search engines, chat and video conferencing) increases confidence in speaking and writing English, and listening and reading comprehension are also helped (Ware, 2004; Xiaoqiong & Xianxing, 2008).

Several studies have demonstrated the effectiveness of multimedia instruction (Mayer, 2001; Moreno & Mayer, 2000), although it has also revealed that multimedia materials can produce negative effects on learning outcomes (Kalyuga, Chandler, & Sweller, 2000) and on spatial and verbal ability (Jonassen & Grabowski, 1993). This damaging effect could be explained by cognitive overload occurred in multimedia-based learning and by individual differences on working memory capacity (Plass, Chun, Mayer, & Leutner, 1998).

Nevertheless, using computer and educational software provides many positive effects, especially for English language learners, to improve their skills and to check their language proficiency (Wang, 2005). Unfortunately, too much emphasis has been placed on oral communication skills and English teachers make their students speak English without paying enough attention to grammatical accuracy. Consequently, while students' fluency has been improved, they often cannot communicate appropriately in English due to a lack of grammatical knowledge (Padilla, 2006).

For these reasons, various methods for teaching a foreign language have evolved in the last few years. Numerous researchers have tried to identify the most effective educational technique in different contexts. Among the different learning procedures, behavioral technology has been shown to help students in the acquisition of basic skills, as it is more effective on behavior modification which allows learning and memorization (Lindsley, 1991; West, Young, & Spooner, 1990). The learning paradigm, such as Precision Teaching method (PT), based largely on Skinner's operant conditioning (Skinner, 1938, 1968), uses continuous and precise measurement and charting of behavior frequencies to assess student progress. Moreover, the psychologist and the teacher can see immediately whether an educational or treatment program is working or not.

Precision Teaching is a type of programmed instruction that focuses heavily on the acquisition of fluent behavior - that is both accurate and fast (Binder, 1996; Pennypacker, Heckler, & Pennypacker, 1977). *Fluency* is the ability to complete a task accurately and quickly. To measure fluency, Precision Teaching utilizes a semi-logarithmic chart called Standard Celeration Chart (Pennypacker, Gutierrez, & Lindsley, 2003). This chart allows for demonstration of changes in the rate of acquisition and allows the teacher to quickly assess student's performance. By utilizing this chart, teachers are able to quickly adjust the curriculum to maximize the student's learning, stimulating the student's ability of self-monitoring and guaranteeing an adequate fluency assessment (Cavallini, 2005; Truzoli, 2004). In other words, through a direct measure of the performance, teachers and students have a graphic feedback of the course and, at the same time, fluent acquisition is promoted by a repeated exercise that requires speed in execution.