

Chapter 8.9

Development of a Web-Based System for Diagnosing Student Learning Problems on English Tenses¹

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ABSTRACT

In the past decades, English learning has received lots of attention all over the world, especially for those who are not native English speakers. Various English learning and testing systems have been developed on the Internet. Nevertheless, most existing English testing systems represent the learning status of a student by assigning that student with a score or grade. This approach makes the student aware of his/her learning status through

the score or grade, but the student might be unable to improve his/her learning status without further guidance. In this paper, an intelligent English tense learning and diagnostic system is proposed, which is able to identify student learning problems on English verb tenses and to provide personalized learning suggestions in accordance with each student's learning portfolio. Experimental results on hundreds of college students have depicted the superiority of the novel approach.

INTRODUCTION

The advance of computer and Internet technologies has significantly affected the style of tutoring and learning (Kuo & Chen, 2004). Many educational institutions all over the world have started to develop and deliver Web-based courses on the Internet (McCormick, 2000).

English has been the most popular language for the past decades, probably due to its systematic grammatical structure. Even though English has such positive characteristics, learning it has always been substantially difficult for ESL/EFL (English as Second/Foreign Language) students. Additionally, English tenses play an important part in explaining the temporal background of English sentences. Nevertheless, EFL learners in general often omit or misuse them. These errors can significantly alter the intended meanings, especially in higher-level communications. Moreover, EFL learners' confusion about English tenses seemed to be the most significant reason for their learning obstacles.

Experts of language education have recommended that the best way to learn English is to establish a good study environment and practice it through various approaches, thus making it a satisfying learning experience (Wang & Lin, 2004). From this viewpoint, an e-learning environment seems to be a good solution to improve a student's English learning performance.

Most existing e-learning systems for English courses evaluate and represent the learning status of a student with a score or grade, which merely makes the student aware of his/her learning status through the score or grade, but the student might be unable to improve his/her learning status without further guidance. In this article, an intelligent English tense learning and diagnostic system is proposed by employing artificial intelligence (AI) technologies, which is able to identify student learning problems on English verb tenses and to provide personalized learning suggestions in accordance with each student's learning portfo-

lio. Furthermore, some experimental results are given to demonstrate the benefits of the novel approach.

RELEVANT RESEARCH

In recent years, many researchers have attempted to make use of computers to help ESL students in learning English (Chan et al., 2001). Through implementing computer-mediated education, many advocates emphasize its positive aspects and the English learning tutoring systems, which are computer-based, that have been developed by numerous academic research groups (Wang & Lin, 2004). For example, Tsou et al. (2002) applied the ideas from computer-assisted learning (CAL) and language learning to the development of a multimedia Web-based English abstract word learning system. An experiment on thirteen commonly encountered abstract words at the elementary school level has demonstrated the benefit of applying the system. Recently, Yang et al. (2005) proposed a Web-based interactive writing environment designed for elementary school students. The environment includes several writing themes to encourage reading comprehension, creativity and problem-solving skills of students.

In addition to the examples mentioned above, there exist innumerable splendid and elaborate works devised by researchers around the world (e.g., Park & Shirai, 1998; Brett & Nash, 1999; Li, 2000; Wintergerst et al., 2003; Itakura, 2004; Ruthven et al., 2004; Coniam & Wong, 2004; McDonald, 2004). Moreover, the issue of applying information technologies to the improvement of English learning efficacy for those who are not native English speakers has attracted researchers from various fields regardless of educational circles, such as linguistics and computer science.

Meanwhile, the computer has evolved into a tool that can improve the accuracy, efficiency, interface, and feedback mechanism of online tests (Ho & Yen, 2005). Many researchers have

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