DEVELOPMENT OF TOOLS FOR FOREIGN LANGUAGE TEACHING AND LEARNING IN THE VIRTUAL EDUCATION SPACE

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Abstract. This article presents the idea of development and use of tools for foreign language learning in the Virtual Education Space (VES). The paper describes the implementation of the test system of DeLC (Distributed eLearning Center) for self-practice in English as well as a project for development of an intelligent system called SYTE (System for teaching English) to assists English language education at the Faculty of Mathematics and Informatics.

Keywords: foreign language teaching and learning, e-education, e-testing, intelligent agents, DeLC, VES

1. Introduction

The Virtual Education Space (VES) is an evolution of the Distributed eLearning Centre (DeLC) that is implemented at the Faculty of Mathematics and Informatics [1, 2]. VES is an intelligent, context-aware, scenario-oriented and controlled infrastructure maintained by various assistants which are implemented as intelligent agents [3, 4]. Three types of assistants are supported in the space: personal assistants, specialized assistants and guards [5].

One of the main objectives in VES is to develop tools for language learning. This article makes a brief overview of the use of the test system in DeLC [6] for self-practice in English of students at the Faculty of Mathematics and Informatics (FMI). In addition, it describes the development of a specialized assistant called SYTE [7, 8].

1. Using self-practice electronic tests to enhance the educational achievement of students

Self-testing is considered to be one of the most efficient methods of study [9]. Long-term memory is increased when some of the learning period is devoted to retrieving the information that needs to be remembered, which is known as the testing effect. At the Faculty of Mathematics and Informatics e-tests are used in the education in English to consolidate the course content and practice the students' foreign language skills. These online tests are created by the teacher on the basis of the study material covered during the seminars in English. These tests are administered every week as self-study practice in a place and time convenient to each individual student.

When constructing self-practice tests one of the most essential questions to consider is their content. In an attempt to make self-practice tests more efficient, five criteria for evaluating the learning outcomes were developed on the basis of Bloom's taxonomy [10]. For each criterion several types of test questions were proposed with varying degrees of difficulty.

The criteria for evaluating the learning outcomes are the following:

1. Reproduction of information.
2. Understanding the meaning of a word, expression or a phraseological unit and finding a match.
3. Detection and correction of errors in various contexts.
4. Analysis of the use of words or expressions and selection of an appropriate grammatical form of verbs in a context.
5. Text creation.

The format of all self-practice e-tests is the same – they include open and closed types of questions with equivalent maximum total scores. To ensure higher reliability of e-tests, the DeLC environment can impose some restrictions on test-takers, for example test validity and a time limit. All questions are graded automatically, except for long-answer open ones, which are evaluated manually by the teacher. As soon as the students have submitted their tests, they can see their current scores, and the points from the essay-type questions are subsequently added to their final grades.

Self-practise e-tests are administered every week in the students' own place and time. To do them, learners only need a device connected to the Internet. Students are allowed to complete each test as many times as they wish within the week of its administration in case they are not satisfied with their scores. As only the highest

obtained grades are taken into consideration, learners feel motivated to spend more time on e-tests and achieve better results.

Moreover, self-practice e-tests can be used both for formative assessment – to assign grades to students for their performance, and for summative assessment – to adapt teaching in order to realize certain educational purposes. Test statistics allow teachers to evaluate their own work as well as the learners' progress.

2. Functionality and architecture of SYTE

The main objective of the intelligent system SYTE is to support English language teaching at FMI by providing a means for students to consolidate their knowledge and skills on a given topic. The teacher's task is to create a set of closed test questions and make them available to students online. The core functionality of SYTE is to use a data base of questions devised by the teacher and send them to the student one by one at irregular intervals of time to his/her mobile device or to their DeLC account. The student chooses whether to answer the received question immediately or not. In case the learner answers the test question, their response is recorded in the data base. If he or she does not answer it, the test question remains on their device until they select a response, decline to do the test or the test/question time limit is over.

SYTE represents an intelligent software agent which is located in the digital library of the Virtual Education Space [11]. The agent has sensors and effectors by which it studies the environment and reacts to it respectively. The agent's environment is a digital library in VES where it awaits messages from the teacher's or the student's personal assistants, or the manager of the library (StudentAsisstant, TeacherAsisstant, DigLibAsisstant). Depending on the message received, SYTE reacts accordingly, and its local management is responsible for the exact way it behaves. Figure 1 presents the communication between the different agents and SYTE. All the messages that the agents exchange are asynchronous.

A student in VES is represented by his/her personal assistant. Through it they can subscribe to the services offered by the specialized agents (Operatives) in the digital library. To subscribe to the service provided by SYTE, a request is sent to the manager of the library which forwards it to SYTE. It, in turn, records this registration and starts providing the service of English language teaching to the student.

The teacher who is presented by his/her own personal assistant in VES can create test questions that are recorded in a data base in the repository of the digital library and used by SYTE. When the data base has a sufficient number of test

questions, the teacher can compile a test or select questions which will be sent to the student within a specific period of time at irregular intervals. SYTE forwards a test question to the student's personal assistant which has to visualize the question and its possible answers. After the student has selected a response, their personal assistant sends the answer to SYTE which in turn records it in the data base with the questions.

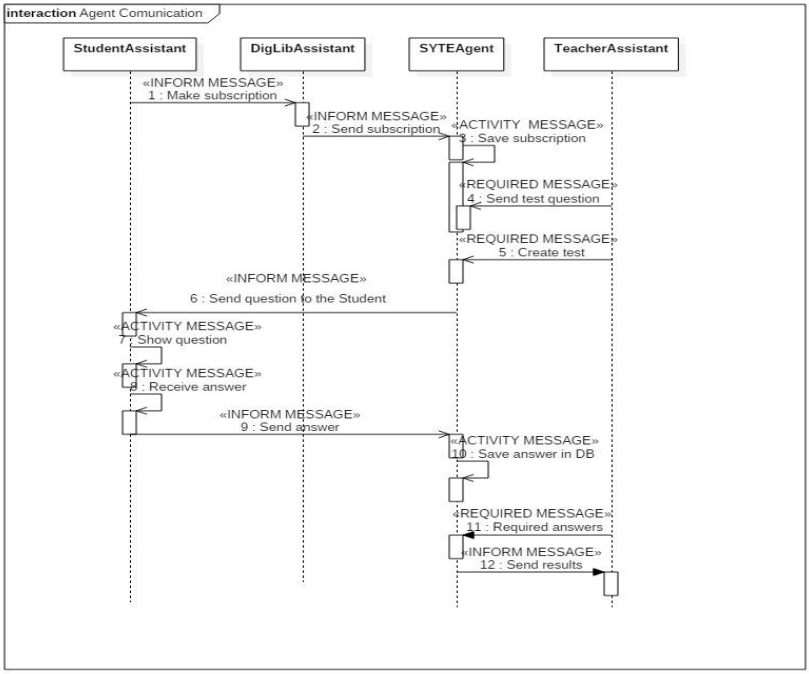

Figure 1. Communication between the agents in SYTE

The test questions will be uploaded by the English teachers in a data base located in the repository of the digital library via a graphical interface which will be realized as functionality of the teacher's assistant.

By reviewing the received responses, different conclusions can be drawn about the students' acquisition of the teaching material. The objective of the e-tests offered by SYTE is not merely to check whether students can reproduce information or understand the meaning of words, expressions or phraseological units. They are designed to evaluate various aspects of the students' skills and competences including their ability to detect errors in various contexts, analyze the use of lexis and select an appropriate grammatical tense use in a context.

3. Conclusions

One of the main objectives that have been set in the Virtual Education Environment is to develop tools for foreign language learning and teaching. This article presents two ideas which contribute towards realizing it. Currently, the test system of DeLC is successfully being used at the Faculty of Mathematics and Informatics for self-practice in English while the development of the intelligent system SYTE is under way. The future plans of the authors include incorporating game-based language learning into VES.

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РАЗРАБОТВАНЕ НА СРЕДСТВА ЗА ЧУЖДОЕЗИКОВО ОБУЧЕНИЕ ВЪВ ВОП

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Резюме. Статията представя идеята за разработване и използване на средства за чуждоезиково обучение във Виртуалното образователно пространство (ВОП). Представено е как се използва тестовата система на DeLC за самоподготовка по английски език и проект за разработване на интелигентна система SYTE (System for teaching English), която подпомага обучението по английски език.