Language Learning/Teaching through Information Technology

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Abstract: Information and Communications Technology is common in education throughout the world. It is not certain what is its most effective role in the teaching-learning process generally as well as specifically in the case of languages, of foreign languages respectively.

This paper surveys current and likely future developments in the use of educational technology also in modern language training. Particular attention is given to the use of computational linguistics in English. The conclusion emphasises the primacy of the teacher´s role and the need for both practical research into software development and for theoretical research into second language learning theory, particularly in computer-based context.

This paper deals with the necessity of using technology in a language environment. First, in the introductory part, the definition of Information Technology is given, then its impact on people is mentioned, after that the possibilities for students are presented and finally, the potential of interactive multimedia is questioned.

- What is the potential of using multimedia programs in an English as a Foreign Language setting, specifically in technically oriented (electrical engineering) classrooms in the Czech Republic?

- Is there a significant difference between the use of multimedia programs as a self-access tool and traditional teaching or a combination of both in aiming at an improvement in language skills and subject matter?

- If so, to what extent can innovative teaching/learning help to improve the four skills (and also retention and interpretative skills)?

- How will multimedia programs improve communicative competence and student interaction?

- What kind of tasks can make multimedia programs the most effective tool?

- Is there a significant correlation between the improvement of language skills, particularly listening and reading, and knowledge of the subject matter?

- What type of didactic principles are implied by the use of multimedia teaching approaches?

- How do didactic principles affect the target situation?

- What kind of limitations will multimedia approaches determine in the classroom?

Keywords: ICT, computational linguistics, technical English

1. Introduction

People have entered teaching at a time of many innovative, exciting and challenging ways of teaching/learning.
The attitude to learning has changed with a shift from teaching to learning, and educational technology has been part of that process. Some people make the mistake of defining information technology (IT), ICT Information and Communications Technology to be more precise, too narrowly as being just about computers; in my opinion, it is wider than that, it is about tape recorders, cameras, videos, CDs, photocopiers, fax machines and electronic mail…

IT should help us to extend the spectrum of our minds in order to think better, to access more quality information quickly, to communicate better and with more people, to control and improve the elements of everyday life.

New skills have to be acquired, and students should be given the opportunities and the ''freedom'' to use IT in real situations. Students are then surrounded by possibilities that are more stimulating and empowering. They can also share the sense of excitement and adventure. By means of recent advances in communications, students can now use information sources across the world and through using multimedia they can present their information in new and different ways. For example, graphs and animation can be used to make difficult concepts more accessible. Students are encouraged to experiment with ideas and take risks that are a good way of preparing them for the future everyday real situations. In this way, it is argued, they learn to become more responsible, adventurous, easily adaptable to unknown situations to solve problems, and explore. As teachers, we should give students an understanding of the impact that IT has made on society and vice versa.

L a n g u a g e learning through technology requires further research and development. This can be viewed from a number of different perspectives. One of the tasks is to explore the *methodological possibilities* and *technological potential* of the multimedia environment.

To create a *natural* learning environment has always been a dream of many foreign language teachers and methodologists. Advances in technology seem promising as a means of achieving this goal, and there is much hope that some of the language learning/teaching problems might be solved.

With the technological resources available, teachers are now facing a number of *questions*: **a,** how to utilise and exploit them effectively **b,** how to integrate meaningfully the unique features of particular media   **c,** what applications should be used to demonstrate the more effective results of the multimedia approach over the single media approach and **d,** how to make multimedia manageable.

In *my opinion*, multimedia has the potential to create a very rich learning environment which reflects the environment of the target language together with its culture. The exposure through authentic documents (printed text, audio, video and electronic text) seems to be an essential factor in foreign language learning and teaching. Research has shown that the speed of second language acquisition is directly proportionate to the number of meaningful interactions in and outside the classroom. Creative teachers bearing in mind the specific needs of their students and local context can show their (teachers´) aspirations and potential through a variety of tasks and activities engaging the communicative skills of listening, writing, reading and speaking as well as skill transfer and thus help the learner develop the skills and competence needed for communicating outside the classroom in the target language. Multimedia strongly stimulates the natural process of language acquisition. Many years ago Comenius - a Czech scholar who is considered to be the founder of modern language learning theory advocated the advantages of acquiring the language through *as many senses as possible* and multimedia is one of the examples. We retain 70% of what we see, hear and do, and **90%** *of what we say and do at the same time*.

Multimedia resource centres have two main modes:

1   Classroom mode
2   *Self-access* mode (project/workshop)

 In a multimedia centre as a self-access resource, students work on their own, and make decisions throughout the learning process. They have access to a variety of materials designed for foreign language self instruction and self-development. This does not mean that the students are not encouraged to work cooperatively on tasks and projects engaging them in group work. These joint activities extend and supplement classroom work or run into full-scale projects.

For many learners as well as teachers, the multimedia environment may be the first step into the fast developing information technology. They may experience fear and anxieties about technical devices, but attaining general computer literacy should also be one of the educational aims.

Last but not least, a properly organised multimedia centre may help the students and their teachers to create their own materials to be further used by classmates and other teachers. The so-called ''*do it yourself*'' approach to

study materials has found many supporters in recent years. These tailor-made materials reflect their specific needs and comprise their specific and new ideas. Let us not forget that the multimedia environment also copes very successfully with mixed ability students.

The new role of the teacher as an organiser, animator, coach or facilitator has been introduced. Previous procedures used in foreign language learning did not take into consideration fully individual differences among students which flow from individual psychological features, learning styles and strategies as well as personal value systems and experience.

We should always look at learning as a *humanistic lifelong complex process* of expanding the existing spiral like structure of knowledge. *Interactivity* is strictly correlated with this approach toward learning. The *Hypertext* concept is based on interlinking and interrelating information. While using a Hypertext program, searching, browsing and exploring strategies are often employed.

There is no doubt that high quality sound, graphics, scanned images, video output, live animation, text and computer data combined in one multimedia system can be successfully applied to language learning and teaching, and thus *enhance learning by* :

- providing constant feedback
- giving a greater degree of personal autonomy to the learner
- leading to a higher level of co-operation, team work and students becoming components of the curriculum
- liberating the user from mundane tasks and freeing him or her to be more creative
- speeding up the tasks and deepening students' understanding of the task
- placing students at the centre of the task, requiring them to share responsibility for assessment
- enabling students to produce well presented products to be admired by others
- deepening the sense of worth of a task through active learning
- learning through association rather than linear presentation

As a theoretically prepared teacher of EFL (English as a Foreign Language) with ten years teaching experience I see great potential in the teacher/student prepared kind of materials. Unfortunately, a vast number of software packages have been produced neglecting the fundamental pedagogical, didactic, psychological, sociological and even philosophical features.

2. The use of novel tools and techniques in the creation of a program of second language acquisition

The primacy concern of the research activities described later in this paper is an examination of how both the established theory and novel approaches to linguistics and language learning may be combined with recent advances in information technology and improved access to telecommunication services, in order to enhance the teaching and learning process for the individual language student.

The longer term objectives of this research are directed toward the construction of a series of multimedia programs (modules) for use as a self access tool for students of FEI VŠB-TUO, the language component of which will be created as a result of the research activities described herein. However, this paper focuses on the issues which need to be examined prior to the creation of such a system, of establishing the most effective learning procedures.

The research is based upon the collection of digitised versions of written study texts in a given specialised domain (electrical engineering), and the subsequent analyses of these texts via the use of a specialised software package (WordSmith). On the basis of this analysis, various subject and language learning exercises will be formulated, with the objective of not only facilitating the learning process of a specific subject (e.g. theoretical electrotechnology), but also contributing to the improvement of the students´ English language skills.

2.1 Tools used

Among the tools used for this research is an experimental automated system enabling the tagging of words in any given text according to their "parts of speech" classification.
Publicly accessible via email, this "part-of-speech tagging" program is a linguistic procedure which attaches word class information (e.g. noun, verb, adjective, adverb) to the words in a text. This information is very useful for further detailed linguistic study, and can be used either for analysing the syntactic structure of the sentences of the

text, or to enable statistical analysis procedures to be performed on the text, for example, counting the distribution of the different word classes in text corpora.

The tagging program works stochastically, i.e., in ambiguous cases, where a given word can be attributed to any one of a number of word classes, it calculates the most **probable** word class, by not only considering the relative frequency of a word being used as an instance of given word class, within the language, but also the likelihood of an instance of this word class occuring at the specified position in the text. It is acknowledged that there is no guarantee of 100% correctness, but it is offered as a useful tool, rather than a theory of language. Similar research (computer-based texts analyses) is being done in Birmingham - Corpus Linguistics Group headed by Prof. Sinclair. A large corpus of contemporary English is being gathered from spoken and written sources, and each word is being studied for its lexical, grammatical, semantic, stylistic and pragmatic features. The information is entered into a database from which dictionaries and other publications are edited.

2.2 Interactive teaching of electrotechnology (rationale for "my program")

After the detailed preparatory consultation with the teachers from FEI-TUO (mainly the Dept. of Theoretical Electrotechnology and the Dept. of Computer Science) I have chosen to analyse these texts (Computer Science texts will be analysed later):
Author, title: *Schwarz, Steven E.*   **Electrical engineering: An Introduction**

-    chapter 1 ELECTRIC CIRCUITS
-    chapter 2 INTRODUCTION TO CIRCUIT ANALYSIS

These first two chapters were recommended because they are considered to be fundamental for the students.

My idea is to use WS Tools and analyse all 7 chapters of the chosen textbook. Then concentrate on single chapters and create modules which would be presented on the Internet (MMP on a CD ?). Considering the Internet – on my own web-page, and the web-pages of tutors.

The scientific experiment (verification of my theses) will be conducted later on, during the academic year.
I will examine three groups – FEI students. *First* group (traditional – no MMP), *second* group (combination, traditional plus modern), *third* group (modern – MMP). The students will be monitored during *one semester*. A set of well structured questions will be prepared and presented to the students well in advance, so that while working on their tasks they can answer the questions. They will be asked to try to answer them before they start the semester work, and also after they finish it. They will also be asked to give feedback especially, any recommendations for the improvement of the MMP.

As for ELECTRIC CIRCUITS, the *initial hypotheses* (questions) are:

1 Is TE (technical English) easier or more difficult to learn for the students of FEI – intermediate level than GE (general English) OR the same?
2 What was the most difficult, what were the obstacles to the achievement of the required language competence? How to make it easier?
3 Which words from GE occur, have the same meaning/function in TE? What is their frequency? Can the texts be written in a "simpler" way and still have the actual informative character?
4 Which verbs are the most frequent in the text? What are "their" prepositions, patterns? Are they the KEY words OR are nouns the key words?
5 What will be better – should the MMP concentrate on practising the most difficult parts of the subject matter which require more time (self-study) for understanding, and at the same time should it be practised at school in lessons? OR should the MMP contain only self-study learning materials which can be learned without explicit explanation by the teacher?

I will examine the texts from these points of view:
- What is the frequency of "purely" technical words, are there more "pure" technical words or "pure" general words in the technical texts? What is the proportion? Does it have any significant impact on the creation of
these kinds of texts? Does it have any impact on understanding them? What are then the recommendations for the methodology of learning and comprehension?

- I will look at: **A,** the level of difficulty of the texts
                B, typical combinations of words, phrases
                C, difficult words and their spelling, formation
                D, grammar – what are the most frequent grammatical features and what are their functions

E, paragraphs

When using WS Tools for analysing the above mentioned chapters (1,2) I will compare my initial assumptions and computer-based results, when analysing chap. 1 using WS Tools I will compare WS science corpus and the above texts to see which words from electrical engineering can also be found in other sciences, later I will compare GE corpus and the above texts in order to see which words from electrical engineering occur frequently in general English. Finally, I will draw conclusions, e.g. which words need to be studied from the very beginning, focusing on them, because of their high frequency and importance.

I would like to present something "unusual" in a sense that it has not been presented before. Part of the MMP should be:

- How to study foreign languages, how to study in general, test on sensory styles
- Humour (relax)
- IT points of interest (motivation)
- Points of interest at VŠB-TUO (loyalty to Alma Mater)
- Proverbs (moral)
- Job market research (future career)
- AW (academic writing) – Paper writing
- GE (socializing phrases)
- How to prepare for the exams, how to pass them
- Internet references
- Leisure time activities
- Hygiene of working with the computer
- Information – dictionaries, publishers
- Ecological matters
- Songs
- English within the language system, differences and similarities of Englishes (especially technical English)
- …

The first chapter of the textbook "Electrical engineering" will be the basis for a **pilot** study where the effectiveness and overall quality of the program (first module) will be evaluated by:
- first year students (coming to university and/or already here)
- teachers (KJ VŠB-TUO, FEI-TUO, and outside the University)
- mature students of FEI

The PILOT program will be evaluated by a mix of people with a different level of language competence, subject knowledge, and/or view.

Students of FEI-TUO, because of their future prospects, must be taught, prepared to communicate in English, discuss the questions relevant in their specific fields of study, be able to use technical literature written in English, to follow lectures in English, be able to write common forms of written discourse, they must also be able to communicate about everyday common situations, about their interests etc. I propose to start preparing the students for these far from easy tasks from the very beginning of their university studies. And gradually prepare at least the best of them to write their doctoral dissertations/diploma work in English, which is common practice in most countries where education has a high standard.

3. Conclusion

Further research in language learning/teaching through technology will aim to raise questions, bring problems to a forum and show the way in which the field is developing.

I am aware of the fact that no "miracle method" can be found to solve various and complex problems related to language acquisition, and I am convinced that the way to success means mainly hard work. In my opinion one of the very important factors in succeeding is a good co-operative relationship between teachers and students. Among other factors are: repetition as the "Mother of wisdom"; learning by doing, experiencing and discovering; learning by enjoying; learning through a complex knowledge approach; learning by building up specific abilities and skills on top of general ones; learning through skill transfer; practising all four language skills at the same time; and the key role of a teacher in the learning process.

4. Bibliography

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