A multimedia application for self-access learning: the MISSILE software package

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1. Introduction

Under the terms of the agreement with the Italian Ministry of Defence the aim of the MISSILE Project was to produce a software package that would enable learners to acquire a basic knowledge of the English language and/or improve their existing knowledge and become familiar with military terminology for communicating with military personnel in special operations abroad.

The initial idea at CILTA was to create a number of multimedia units with different types of activities for learners to practise and develop the necessary skills in an enjoyable way using the computer, not as a frightening test of learners' ability. From a technical point of view the MISSILE Project derives directly from the ten years' experience of CILTA staff in the design of multimedia courseware. In particular the similarities with the DIAPASON project (Poppi, 1997; Tamburini, 1999; Bromwich, 1999) led us to design a self-access course taking advantage of the long experience acquired during the monitoring phase of the DIAPASON laboratories.

Let us introduce the MISSILE project by comparing it with the DIAPASON project. Table 1 shows a direct comparison of the main features of each projects.

The main element that differentiates the two projects is the difference between the type of students involved. The DIAPASON project was devised for university students from scientific faculties, students with a high level of schooling, advanced reading skills and experience in computer use. The MISSILE project was designed for military servicemen. We could not presume any particular level of schooling or computer skills and, moreover, we had to consider a low level of motivation and interest. For these reasons, while for the DIAPASON students we devised "complex materials", for the MISSILE students we had to produce simple and stimulating activities with short multimedia learning materials.

Table 1: DIAPASON project VS MISSILE project.

	DIAPASON Project	**MiSSILE Project**
Main project characteristics	• English as a foreign Language • Pre-intermediate to upper-intermediate level • Need to pass university exams • Need to read articles and books and to write thesis or articles and letters in English	• English as a foreign Language • Beginner to intermediate level • Need to acquire basic communication skills
Student types	• University students from scientific faculties • High school level • Advanced reading skills • Capable of using computers	• Military servicemen • Low schooling • Coming from depressed areas • Lack of computer skills • Lack of keyboard skills
Methods	• Multimedia courseware • "Complex materials" consisting mainly of written texts	• Multimedia courseware • Simple materials • High quantity of multimedia materials and fewer written texts • High degree of interactivity with the software • Materials taken from everyday situations (music, sports, free time,...) • User-friendly approach: limited use of keyboard

A large quantity of multimedia materials were developed, setting simple tasks designed to maintain a high level of attention on the part of the learners and to allow them to use the multimedia courseware easily.

The use of the computer keyboard is limited: every operation can be performed using the mouse, except filling in the crossword exercise; this enables learners who are not able to use a keyboard to make effective use of the course.

2. Related work and design considerations

There are numerous examples of computer courseware in the literature, designed to teach different subjects, such as mathematics (Harding *et al*., 1995) computer science in higher education (Steeples *et al.*, 1996), philosophy and religion (Ess, 1991), and so on.

Many commercial products for language teaching are currently available, but in our opinion none of these met our requirements satisfactorily. As stated in Watts (1997), good courseware has to focus only on the students' needs, and has to be designed in a clear and well organised way in order to achieve its learning goal. The available software packages are often too rich in multimedia features designed to impress, but lacking on the learning material side. Hemard (1997) underlines that a well designed learning environment and interface, as well as careful consideration of the learners' needs (Watts,1997), are important matters to consider in the early stages of the design process.

The MISSILE software tries to concentrate on communicative features, without making excessive use of images and multimedia features, but focusing mainly on the learning process. Although multimedia considerably improves the acquisition and comprehension of a foreign language (Brett, 1997; Chun, 1996) we have to carefully consider the quantity, quality and the learning purpose of every item used in the course.

There is another problem that affects commercial products: they usually span a wide range of student levels and the courseware is not tailored to any specific language field. In having to cover this huge range of tasks, it is difficult or even impossible to obtain in-depth language analysis and sufficient training exercises for each teaching topic. We preferred to concentrate our attention on a limited range of levels and to analyse the lexical items derived from a specific

language field. In doing so, it was possible to analyse the language topics in detail and to produce many exercises and drills.

3. Design and development of the MISSILE courseware

Accordin; to Davis *et al.* (1998)

> Multimedia ....describes a computer's ability to deliver interactively and simultaneously on the same screen - a mixture of "media" or "data types", principally text, graphics, animation, photographic quality stills, moving video and sound.

Multimedia is nowadays one of the best means for developing educational tools; all the best technologies, hardware and software are now available to develop powerful multimedia applications that integrate graphical user interface, attractive features, traditional and new media. In the literature many advantages of multimedia have been underlined: individualised teaching, feedback on progress, enhanced cognition and visualisation, increased learning, reduction of learning time and non-linear access to information (Gazzaniga *et al.,* 1997; Brett, 1998; Borchardt, 1998).

The approaches employed in the design of interactive multimedia tend to fall into two groups: the former is technology-driven and the other is more learner-based; in the design of the MISSSILE courseware both approaches were used, starting from the latter.

Past experience at CILTA in developing multimedia linguistic applications allowed us to quickly put together a team of linguistic and computer experts.

> Every designer wants to build a high quality interactive system, but appreciation comes from inherent quality features that are achieved by thoughtful planning, sensitivity to user needs, careful attention to detail in design and development, and diligent testing. (Shneiderman, 1987).

The first thing to do was to decide the general requirements of the application and its user interface. After a detailed analysis and discussions with the linguistic experts we focused the general requirements of the MISSILE English course, we defined the general metaphor, the structure and the navigation of the application. Helander (1991) has stressed the importance of selecting an interface metaphor which is well-suited to the user's viewpoint or experiences with existing systems.

For the MISSILE application we adopted the metaphor of a cartoon that is the nearest to the learner's everyday experience and navigation is through an index and arrows to move from one page to the next one.

Then we defined some interactive templates to perform various exercises with different contents but similar interaction modes. After this the linguistic experts selected and structured the learning material according to the chosen templates and the user interface. The following step, performed by the computer experts, was the selection of programming tools for the development and the implementation of the templates, the unit framework and the navigation.

Tool Book Instructor was the authoring tool chosen because it is a powerful tool, suitable for a quick production cycle and for complex applications that use multiple data types for existing multimedia items, and allows quick prototyping.

After this it was necessary to produce and digitalise all the audio-visual material (images, audio, videos) and put it into the application. This step was performed by linguistic experts as far as production is concerned and by computer experts for digitalisation. The last two phases were integrating the multimedia objects in the unit framework and the unit testing. These phases were performed by all the developers and linguistic experts of the application with the so called "in-house testing" to avoid mistakes or major problems. The last testing stage was an alpha version distributed to selected people outside the department who helped the developers to find and fix further bugs.

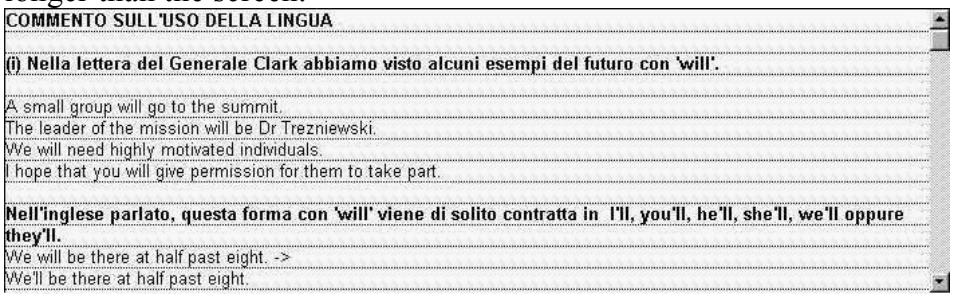
4. General application contents

The MISSILE application consists of two different English courses: the elementary and the intermediate level. Each course is made up of lessons and pages. In each page there is an activity with many objects (buttons, input fields and hotwords) to let the learner interact with the application and many multimedia materials (text, graphic, audio and video) to focus on the language.

Each learner has to be registered the first time he accesses the program, writing his name and choosing a password, to maintain a bookmark of the pages visited and to record the scores of the entry and achievement tests.

In order to achieve a high degree of consistency in the application, great attention was paid to the location and the use of different objects. For this reason the navigation buttons are always placed at the bottom of each page using an intuitive icon (an arrow) to go backward or forward.

All the texts are presented in text scrolling fields to show also texts longer than the screen.



All the activities with audio have an audio bar to control the playing and the volume. All the videos are shown inside a box to control the playing of the video itself.

In every activity that needs instructions or translation the buttons "Instructions" and "Translation" are shown, and by clicking on them a modal text field shows the written information. Moreover, every activity allows the learner to correct his work with an appropriate button.

The objectives of the package of materials which are currently being developed are fourfold: firstly, they are intended to contribute to comprehension, then to develop vocabulary, listening and repeating and limited vocabulary writing skills. According to these different objectives, different activities were developed through different exercise templates:

- Fill-In (the user has to put the appropriate word or expression in the right space in the text);

- True or False (the user has to decide whether a sentence is true or false by clicking on the appropriate button);
- Reorder (the user has to put some sentences or the lines of a dialogue in the right order with drag & drop);
- Matching balloons (the user has to put the right phrase inside the correct balloon deciding which sentence is uttered by each speaker in a dialogue);
- Listen and repeat (the user has to listen to a short utterance, and then has to record his voice);
- Answer the question (the user has to listen to a question and then try to formulate and record the answer);
- Vocabulary (the user has to drag a list of words next to the correct pictures);
- Category (the user has to divide a list of words into two groups according to a particular linguistic criterion; this is mainly used for exercises concerning pronunciation);
- Language notes (the user has to read and study some grammatical notes);
- Right Order (the user has to put the words of a sentence in the correct order);
- Crossword (the user has to rite some words according to the definitions given).

5. Conclusions

The MISSILE multimedia course is now in use with military personnel from various Italian regions and the feedback gathered is very positive and encouraging. After three months a second version was released with some changes made to meet specific military needs.

In developing this CD a considerable effort was made by the courseware designers to create a clear interface, an intuitive metaphor, and a reusable and optimised code. The wealth of experience acquired in developing this application will undoubtedly be used time and again for creating other similar materials.

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Abstract

This paper describes the design and development of the MISSILE English courseware performed by a team of linguistic and computer experts at CILTA, the Bologna University language centre, for the Italian Defence Ministry.

The experience derived from the DIAPASON project, a multimedia courseware developed for university students, was essential for the design of the software package and multimedia materials that form the MISSILE courseware. Special consideration was given in the design of the courseware to the particular student type, with a low level of educational achievement and motivation and typically not able to use a computer. A quick tour through the applications shows the main characteristics of the software package.

Abstract

Questo articolo presenta il software multimediale per l'auto-apprendimento della lingua inglese MISSILE, realizzato da un gruppo di linguisti ed informatici presso il Centro linguistico dell'Università di Bologna, CILTA, per il Ministero della Difesa. L'esperienza derivata dal DIAPASON, un analogo progetto sviluppato per studenti universitari, si è rivelata essenziale durante la fase di sviluppo e di elaborazione dei contenuti del software MISSILE. Una cura particolare è stata dedicata alla interfaccia grafica e alla presentazione dei materiali del corso per questo tipo di utenti, caratterizzati da una bassa scolarizzazione, motivazione e talvolta da scarsa abilità nell'uso del computer. Una rapida panoramica all'interno dell'applicazione mostra le caratteristiche salienti del software.