E-Learning Platform: Developing an Evaluation Strategy in a Real Case

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Abstract - The ACTIVE project funded by the EU Commission aimed at improving the possibility for disabled people to become more active citizens through the use of suitable educational technologies. Very often disabled people have fewer opportunities than other citizens to take part in open distance learning and also have worse access to computer equipment. This is a threat to their active citizenship, since Information and Communications Technology (ICT) has an ever greater role in today’s society. The specific goal of the project was to investigate how people with learning disabilities could get, keep and develop their contacts with society through distance education. The target group of the ACTIVE project was composed of people affected by aphasia (aphasia is a loss or impairment of the ability to produce or comprehend language, due to brain damage). In this paper, we show and discuss the strategy that led us to select the constructivist pedagogical methodology and to implement it by means of a problem solving and game oriented approach for the design and implementation of learning contents within the ACTIVE framework. We also show how the same approach can be used for selecting e-learning platforms to utilize so as to guarantee, in the case of this particular target group, the key benefits of e-learning.

Index Terms – Active Citizenship, Distance Education E-Learning Environment, ICT and Disabled People, Life Long Learning

1. INTRODUCTION

Recent research in educational technology has identified several factors to determine the efficiency exhibited by students in acquiring new skills and knowledge. This research points out that the adoption of e-learning can greatly improve the quoted efficiency when compared with traditional approaches. Consequently, the application of such technologies to “special” target groups can be of particular interest. In this scenario a very important task is the selection of the e-learning platform to use in order to achieve the maximum effectiveness level when considering a very specific target group of disabled people. Namely, we need a platform which is able to resolve the problem of the lack of awareness and knowledge regarding how to e-learn. Concerns relate to comfort level with technology and the feasibility of independent or self learning. In particular the mix of the e-learning platform and of the utilized contents should guarantee the key benefits of e-learning:

- To allow the user to take the initiative of his/her own training and development, and providing him/her with personalized learning/training roadmaps and easy access to on-line application.
- To allow the user to connect and obtain information globally.
- To promote the concept of life-long learning by encouraging the user to continuously develop and increase learning.

Various different features should be taken into account when evaluating e-learning platforms, starting from the function and usability of the overall learning system in the context of the human, social and cultural organization where it is to be used. Obviously, the analysis of the features of a system is not sufficient: it is also important to understand how they are integrated to facilitate learning and training and what principles are applied to guide the way the system is used. In order to evaluate them fully, both pedagogical and technological aspects must be carefully evaluated. In the following paragraphs we will show the evaluation strategy used in the ACTIVE project [1] in order to select the best E-Learning platform.

2. DEVELOPING AN EVALUATION STRATEGY

Any E-learning platform and provision should give opportunities to improve the quality and the variety of teaching and learning which would not otherwise be achieved through traditional methods. This is a general claim for e-learning platforms [2]. In our special context, the requirement was also the capacity to offer additional services and tools suitably designed for the needs of the target groups of the ACTIVE project, (i.e. people with mental disabilities), making them essential to the process of knowledge acquisition. We will begin our discussion about evaluative considerations from a pedagogical and psychological point of view. The following elements are of importance:

- students and their relationships are to be at the center of attention;
the learning scenario should be enhanced by allowing a rich variety in communication;
focus should be put on the social environment;
the individuality of learning styles should be acknowledged.

As a consequence of these fundamental elements, an effective and useful pedagogical approach could be the constructivist one [3]. This is derived from a theory of cognitive growth and learning that centers on the individual and creates learning experiences including tools for facilitation. New technologies are ever more considered optimal media for applying these ideas to learning. In the following paragraphs, we are going to show technological principles that allow full implementation of the constructivist approach in E-Learning environments.

2.1 The technological principles for constructivist learning

In [4], Mamalougos et Al. note that technology “makes it possible to create learning situations that mirror what is happening in the real world […] computer simulations provide powerful methods for engaging students in complex reasoning and problem-solving in authentic learning situations [...].” Using these key issues as our starting point, our attempt has been devoted to providing a framework for applying a constructivist approach to the evaluation of e-learning environments. Let us start by showing how the platform used within the ACTIVE project has been selected and evaluated. First of all, some main principles have been followed. The first one is that learners are creators of knowledge: namely, they actively construct their knowledge while not simply absorbing ideas presented by teachers through repeated practice. A better description of the learning process is to say that learners rather assimilate new information connecting it to pre-existing notions and modify their understanding through connecting. Educational practices must therefore include facilitation of learners’ cognitive growth by enhancing their own active learning abilities and allowing for meaningful understanding within authentic activities. So it is very important to create a learning environment in which students can construct their own ideas and enhance the development of thoughts and actions both individually and constructively. Accordingly, a constructivist system stresses the following functions and roles:

- emphasis is on knowledge construction rather than on its reproduction;
- the learning process is a student-centered one;
- teachers are facilitators of learning;
- meaningful and relevant learning is enhanced;
- educational goals that are consistent with learners’ goals are elaborated;
- learning tasks that are embedded in authentic contexts are proposed;
- collaboration is encouraged;
- meta-cognitive and reflexive activities are promoted.

What does all this imply for an evaluating approach? A constructivist e-learning platform is an environment where learners collaborate and support each other using a variety of tools and resources. It is an environment where knowledge is constructed and learners assume a central role in the cognitive process. The E-Learning platform must manage and create flexible and context-based learning sequences: content cannot be pre-specified since learners are encouraged to seek out new sources of knowledge in order to deepen a topic. Learners are also provided with opportunities to reflect on how and what they are learning and how it fits into what they already know. The basic idea ruling the e-learning platform is the pluralistic approach to education, the multiplicity of perspectives and strategies, and the variety of learning styles. It offers specific services and tools in order to meet the plurality of learning situations and satisfy students’ educational goals. These guiding considerations form the basis for evaluating the e-learning situations and satisfy students’ educational goals. These guiding considerations form the basis for evaluating the e-learning platform used in the ACTIVE project. Two questions are regarded as essential: is the platform able to satisfy these considerations? To what extent does it fulfil these expectations? An important aspect in this evaluation concerns motivation: motivation is a really important factor, a driving force in the cognitive process, as it influences how and why one learns. Motivation (together with interest) fosters thinking and attention. Human beings cannot effectively think about an issue or learn something that is considered boring or useless. Motivation plays an even more significant role when learning is delivered through platforms and involves students with developmental problems and/or attention disabilities. Our plan is to focus on whether or not the platform offers tools capable of facilitating motivation and stirring up interest in students, thus promoting learning.

2.2 Evaluating how the platform promotes collaborative learning strategies

This question will be answered by evaluating along the criteria from constructivist thinking [3][5][6]: Learning is particularly effective:

- When students work together towards a common goal
- When students are engaged in real argumentative situations
- When they are part of negotiations to achieve a shared solution
- When they can exchange ideas and opinions actively the level of interest and participation is raised
- Learners can perform at higher intellectual levels when they work collaboratively
- Learners win by the application of the diversity of knowledge and competences among them
- Cooperative learning methods can enhance problem-solving strategies
- A peer support system plays an important role in helping students to internalise external knowledge

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As a step in evaluation this refers to assessing platform functions and how they optimise and support the learner and manage to engage him in dialogues and constructive discussions.

2.3 Evaluating the learning process supervision offered by the ACTIVE platform

It is of utmost importance that students do not feel disoriented or confused, which is often the case in e-learning environments. The platform has to see to the development of the learner’s sense of competence. So it could be important to use feedback types to affirm competences. In fact students need to be provided with consistent feedback concerning their progress in learning. Obviously, corrective procedures for a diversity of problems must be implemented. Learners also need acknowledgment for completion and success; this makes them more interested and enthusiastic in their studies. On the other hand the growing competence of self-evaluation helps students to become more responsible in facing problems and solving them. Self-evaluation helps learners to think more independently and act resourcefully. Evaluating these aspects asks for an analysis of the qualities of feedback provisions and of strategies for working with recognition for accomplishments and self-evaluation.

2.4 Evaluating the integration of sensorial perception

A sensory-enriched environment enhances positive attitudes and behaviour, above all in the case of disabled learning. Students exposed to enriched environments can perform tasks significantly better than those exposed to less stimulating environments. An enriched environment has a certain number of characteristics able to promote the development of a broad range of skills and interests that are mental, physical, social and emotional. Any E-Learning platform used by students with learning difficulties has to also stimulate the senses. A learning atmosphere must be created to reduce pressure and stress by blending work with enjoyment, positive emotional support and promotion of exploration and the fun of learning.

2.5 Evaluating the interactive quality of the e-learning system

The participants could be able to work at a distance in synchronous and/or asynchronous ways. They could explore content and make use of the inherent potentials of hypermedia tools. Participants could develop a play-like attitude through appropriate options. Play could serve as a real benchmark for evaluating e-learning platforms for students with special needs: it can stimulate their interest, optimism, affection and confidence and can encourage them to express feelings, explore relationships, describe experiences, and disclose wishes and ideas for self-fulfilment. When the play aspect of learning and making use of real games is intensified, the platform may also promote features like challenge, curiosity and fantasy. With games a platform can eventually make complex goals clear and can help to adapt the different levels of difficulties through play and thus keep the challenge of the task optimal.

2.6 Evaluating the role of adaptation to different developmental levels

Training paths and content must be personalized in order to be suitable for these students [7]. So a detailed student analysis is therefore required to understand his/her learning needs and attitudes. According to the Learning Orientation Theory, it is also essential to understand individuals’ emotions and intentions. It is crucial to learn how to use learning for reaching goals. It is also crucial to learn from the individual how he or she interacts with an environment and commits himself or herself to learning. The e-learning system should also provide services for developing the learner profile on the basis of his/her features. These characteristics ask for adaptive technological features, which give extra value to the whole system.

2.7 Evaluating teaching methods

Organizing students, helping them to learn, selecting from the multitude of resources and devices available are important teaching activities to make learning beneficial for learners. In the light of this, it is our aim to evaluate the methods and techniques employed within the platform for disabled learners, and to see how well the constructivist approach is employed to improve learning for disabled learners. This further manifests itself in the following key issues:

- knowledge construction;
- communication and collaboration;
- iconic and symbolic representation;
- taking initiatives;
- awareness of progress in time;
- sharing and contributing.

All these characteristics ask for technological features to give extra value to the whole system.

3. TECHNOLOGICAL FEATURES

From a technological point of view, it is important to pay attention to three main aspects in order to accurately evaluate on-line the potential of a learning platform. An efficient e-learning system must be able to integrate all three components into one comprehensive whole so that they can efficiently interact with each other:

- The Learning Management System (LMS).
- The Learning Content Management System (LCMS).
- The Virtual Environment for teaching and tools associated with it.

The Learning Management System embraces all the services for managing on-line teaching activities. It aims to offer management functionality to training platform users: system administrators, teachers, tutors and students. From the
students’ point of view, an LMS must offer services able to evaluate and record the acquired skills storing the training path followed by them. The System administrator must have the possibility of drawing up statistics on the use of platform services in order to better organize on-line learning service delivery. An LMS should give the teacher the possibility of verifying the right formulation of the various lessons and suggesting changes (in case it is semi automatically inferred from student tracking) in the learning path. Therefore, the functionalities of an LMS integrated within a distance learning platform can be categorized as:

- Student management
- Course management
- Student activity monitoring and tracking
- Activity reporting

The Learning Content Management System includes all the functions enabling creation, description, importation or exportation of contents as well as their reuse and sharing. Contents are generally organized into independent containers, called learning objects, able to satisfy one or more didactic objectives. An advanced LCMS must be able to store interactions between the user and each learning object, aiming at gathering detailed information about their utilization and efficacy. On-line training efficiency is directly related to the Virtual Environment and the tools made available by the delivery platform as well as to their usability. The services should satisfy teachers’ and students’ needs. The services must be adapted and be made further adaptable in accordance with the different users: e.g., teachers should be provided with tools enabling them to manage teaching processes for single individuals or groups. Tools should be also there to help them to work with interactions, including asynchronous discussions or live events. The teacher also needs tools for handling updated reports on learner or learner groups’ progress so as to better manage evaluation processes and facilitate activities. It is necessary to give the students themselves the possibility of synchronously and asynchronously communicating both with the teacher and other students. The following services characterize an on-line training platform from a collaborative point of view:

- Virtual classroom service;
- Audio/video conferencing service;
- Chat;
- Whiteboards;
- E-mail;
- Virtual lab.

The technological features of the e-learning platform developed and used in ACTIVE will be evaluated on the basis of the above considerations. In particular, it will be examined if the platform provides such indispensable management services such as:

- Services for including and updating user profile;
- Services for creating courses and cataloguing them;
- Services for creating tests described through a standard;
- User tracking services;
- Services for managing reports on course frequency and use;
- Services for creating, organizing and managing one’s own training contents or contents provided by other producers

In the application of these guiding criteria for evaluation the main issues are transferred into evaluating grids that name the aims and parameters for evaluation and connect them with fitting evaluation activities. General issues in the ACTIVE project are system effectiveness; Courses and service delivery: efficiency and quality, administration, user needs’ analysis, pedagogical dimensions and technological features. Each of these main issues is broken down into refined grids as can be seen in the example for user needs analysis. The user needs’ analysis is a strategic step in evaluating learning platform performance. In this project the target group is represented by students with learning disabilities. It is therefore necessary to carry out a thorough analysis of their needs and conditions.

<table>
<thead>
<tr>
<th>Analysis of target group’s features</th>
<th>Describing what features of the target group are analysed</th>
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<tbody>
<tr>
<td>Validity of analysis</td>
<td>Reporting whether or not the analysis provides the right data</td>
</tr>
<tr>
<td>Reliability of analysis</td>
<td>Reporting whether or not the analysis gets the same quality of results in different situations</td>
</tr>
<tr>
<td>Target group’s learning needs</td>
<td>Outlining to what extent the learning needs of the users are analysed and how they learn most efficiently</td>
</tr>
<tr>
<td>User needs and platform design</td>
<td>Describing how and to what extent the features of the target group are integrated into the platform design</td>
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**Table 1: User needs and evaluation activities**

By working in this way, starting from the guiding criteria through to their realization in the project activities and products, it is possible to evaluate in a careful and systematic way and to assist in the process of achieving the aims set.
4. EXPERIMENTAL RESULTS

The partners of the ACTIVE project have agreed to use two e-learning platforms for web course delivery, namely, the First Class particular platform, and the web learning environment uLern [8] which was brought in in order to tailor and adapt it to the specific needs of the project target groups - persons with learning impairments - according to the previously described guidelines. The platform uLern is a web-learning environment that allows easy authoring of training materials on the Internet and quick navigation during the learning or tutoring process. We selected two different platforms in order to test the advantages obtained for web course delivery using a customized platform (uLern) compared to those of a traditional one (First Class). The following five principles were applied for the development of the web courses:

- web course as a game – the game is a natural way of learning, this can be very suitable for handicapped persons
- interactivity – this kind of meaningful exchange keeps the attention and the motivation of learners high
- collaboration – the mutual co-operation or friendly competition (depending on the instructor’s management) reinforces motivation
- communication - the possibility to communicate via the Internet is a very strong motivating agent (using chat or Virtual Classroom)
- media rich – combination of text, pictures, audio/video provides more choice for learners

Obviously these web courses can still be used in a First Class platform without some features. In a second, equally essential step, the uLern software was adapted in cooperation with uLern company for users with impaired learning abilities:

- Simplification of the introductory page. Students with impaired learning ability might have problems with navigation in the standard uLern environment, so after the login, they can directly enter the Lecture Windows of web courses. On the other hand, the possibility to enter the uLern environment in the standard form for those who prefer to, is still available.
- Integration of the possibility to use a “reading window”. In view of the reading problems of students with impaired learning abilities, it made good sense to present an “Adapted course for Reading”. The “reading window” forms a suitable mask for the surrounding words, which would most probably otherwise make the comprehension more difficult for the student.

Summing up, the web courses developed intend to give persons with learning impairments several possibilities to exercise their numeracy and reading/writing skills:

- They can exercise the content of web courses individually, without Internet connection and instructor feedback.
- They can use courses within the uLern environment and send the task solutions to the instructor and get feedback.
- They can work together in a Virtual Classroom, arrange meetings.
- They can play the collaborative/competitive games on the Internet together with friends and controlled by an instructor.
- They can enjoy the rich media learning environment including audio/video streaming and thus be further animated in their motivation.

We divided the target group in two sub-groups composed of about 20 students in each one. The first group used the First Class platform while the second group used uLern. The same teachers supported both groups. At the end of the course we submitted a satisfaction questionnaire to students and teachers in order to evaluate the obtained results. The obtained remarks can be summed up in the following way:

- Students that used First Class improved their knowledge less than students that used uLern.
- Teachers through uLern were able to keep a track of the students’ performance better than by the use of First Class.
- Students said that it was very easy and amusing to use the uLern platform while First Class was very difficult to use.

In general the introduction of the uLern platform allowed the achievement of all the aims previously mentioned. In particular we demonstrated that a platform designed according the guidelines previously described allows an effective improvement of the learning process.

CONCLUSION

In this paper we have described the main parameters that characterize an E-Learning platform. In particular we have underlined the parameters that had to be evaluated in order to select a platform for disabled people, the target group for the ACTIVE project. In particular an ACTIVE e-learning platform must have the following requirements: active Learning Strategies, real interaction and collaboration, a positive emotional climate (for example, through a “play the game” approach) and an easy navigation system. In the future, we will aim to show the results of the application of our evaluation strategy on a set of e-learning platforms and the opinions of teachers and students using them.

REFERENCES

[8] uLern WebSite: www.uLern.com