



COACH BOT

“Modular e-course with virtual coach tool support”

LIFELONG LEARNING PROGRAMME
LEONARDO da VINCI

Coordinated by FOR.COM

EDEN 2010
Media Inspirations for Learning
“What makes the impact”

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Elaborated by	Mikail Feituri FOR.COM.
Conference Name	EDEN 2010 Media Inspirations for Learning "What makes the impact"
Date	June 9 – 12, 2010

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Conference Objectives

Introduction

The volume of information we get is enormous and there is a revolutionary change in the ways we use media. New social media culture is extending human capacity, reshaping identity and community.

The awareness of the many forms of digital media is increasing and so are the skills that allow better intellectual and emotional understanding.

The diffusion of digital creative content and the multiplication of online and mobile platforms, the changeable, participatory, rapidly re-created information generate unprecedented opportunities for the world of learning. Teachers' and learners' abilities to make informed and diversified choices for media now make up a significant part of their skills portfolio.

The many economic, social and technology drivers are changing the nature and methods of education and training. In particular, the informal learning field is being transformed and re-positioned. All this represents huge challenges for the professional development of teachers, tutors and instructors. A quest for new structural and institutional models is emerging within the learning society.

In Europe, content industries create added value by exploiting and networking European cultural diversity, with innovation being part of the Lisbon strategy beyond 2010. The EU i2010 initiative aims to boost competitiveness in the ICT sector and create a single European information space.

New Criteria for New Media in Learning

The opportunity offered by digital media and virtual reality leads to the development of new organic learning environments. A major challenge is how to turn these environments into instrumental knowledge. New elements include development of mobile, ubiquitous and contextual computing, microlearning, functional networking, direct access to databases, with which to build

up integrated knowledge bases. Within the new distribution channels, trends in the media habits of learners show significant changes.

The related questions to be addressed at the EDEN Valencia 2010 Conference are:

- Where do new media take us as educators?
 - What in the end is their suitability for education?
- For teachers and learners, what is the value of being active in new media?
 - Having a presence on Twitter?
 - Being an active blogger?
- What is the validity of knowledge in Web 2.0
 - How can we measure recognition and achievement?
- How do media portray the changing open and distance learning practice?
- How can we control the potential of media to ensure that they work for all?
- How all is this affecting the modes of knowledge organisation?
- With the convergence of media, how are the major issues of learning mirrored in the “traditional” media channels, in TV, newspapers and journals?

Openness Emerges

Organically linked to these developments are the further changes in form and function, representing the greater and greater potential of open collaboration and information sharing. Globalization, information technology and the flow of information are transforming our economies and communities. The evolving new openness is unlocking the potential effectiveness in implementing open ICT ecosystems and enabling innovation and growth.

Collaborative creativity, connectivity, access and transparency, are revolutionizing how we communicate, learn, connect and compete. Openness reshapes ICT ecosystems, and makes it possible to rewrite business models and deliver customized services to citizens. Increasing these capacities helps to create flexible, service-oriented ICT applications in the world of learning. This has also profound implications for the publishing industry, leading to a kind of new knowledge and media economy.

Conference date and venue

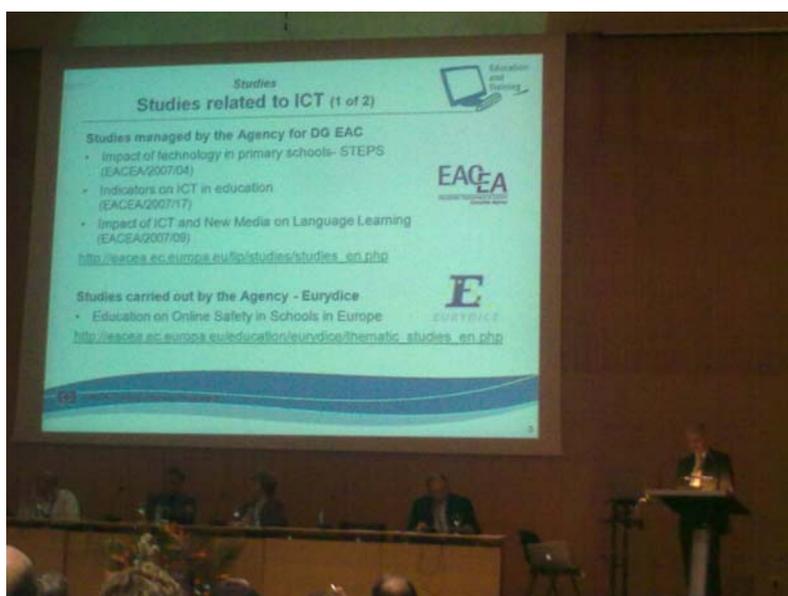
6-12 June 2010, Valencia (Spain)

Conference topics and structure

The conference was structured in plenary sessions, presentation sessions, workshops and poster sessions.

The conference covered the following topics:

- Learning Theories and Policies
- The Open University UK – Institutional Policy and Development
- E-Learning Methodology – Concept and Practice
- E-learning Methodology – Learners' Needs and Styles
- Games Based Learning
- Networked Learning and Web 2.0 Studies
- Mobile Learning
- Improving Efficiency by Organization of Learning and Knowledge
- Reconciling E-learning with Corporate Requirements
- Large Scale National E-learning Case Studies
- International E-learning Initiatives: Strategy and Practice
- Faculty Development for E-learning
- E-learning and Languages
- Socio-Cultural Viewpoints on E-learning
- E-learning Practice in Schools
- Institutional Case Studies
- Papers presented in Spanish

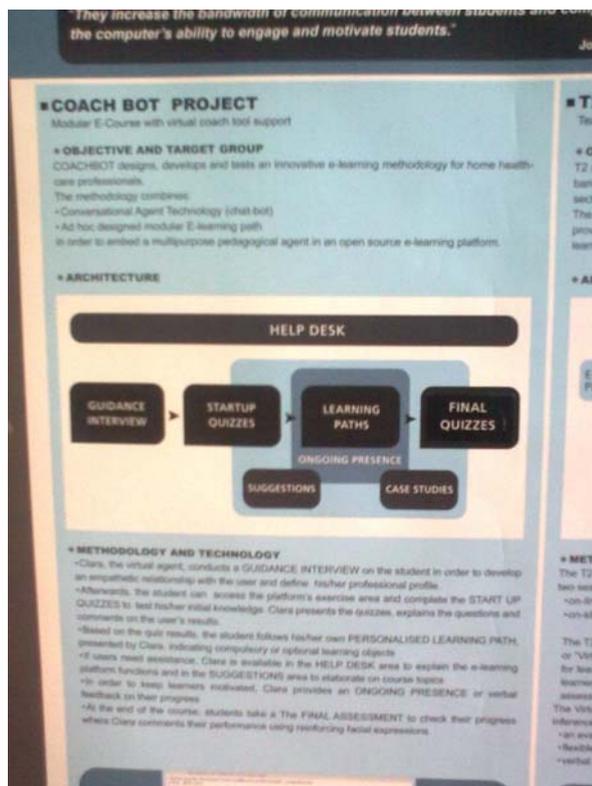
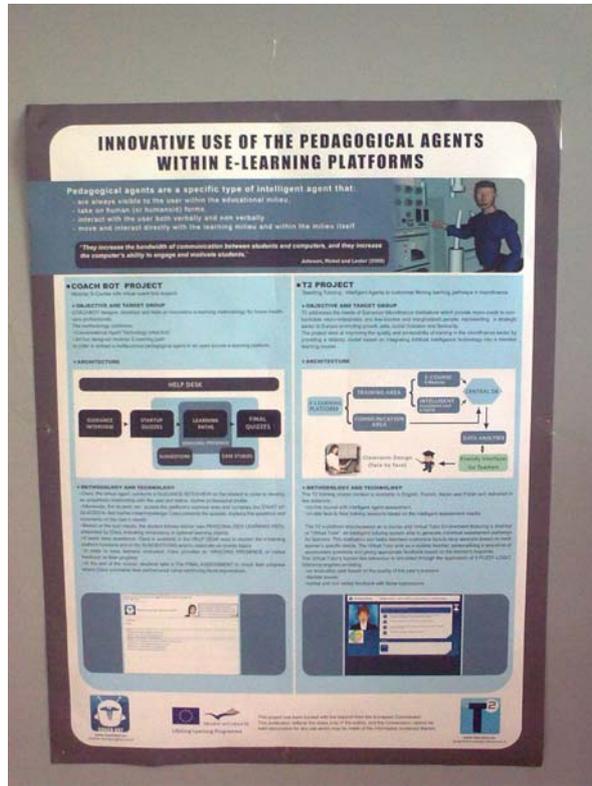


COACH BOT presentation

The COACH BOT project was presented as a poster. Nevertheless the chairman asked the author to present the project to the audience in about 15 minutes.

The presentation of the COACH BOT project was focused on the description of project background and objectives, the course methodology. In detail, the presentation included the description of the course delivering procedure as well as the description of all interactions between the Virtual Agent

“Clara” and the users within the e-learning platform such as Guidance interview, Start up quizzes, Customized learning path, Final assessment, Help Desk, Suggestions, Ongoing presence, Case studies. The author stressed more on the methodological aspect of the project because of the nature of the EDEN conference which is dedicated to methodologies for E-Learning.



COACH BOT dissemination activity

During the COACH BOT project presentation the project brochures were handed out.

Annexes

1. Paper submitted and presented during the Conference

INNOVATIVE USE OF THE PEDAGOGICAL AGENTS WITHIN THE E-LEARNING PLATFORMS

Mikail Feituri, FOR.COM., Paolo Degaspero, FOR.COM., Susanna Correnti, FOR.COM., Italy

1 – Intelligent Agents as Pedagogical agents

The Pedagogical Agents are autonomous software systems, realized with AI (Artificial Intelligence). Many AI researchers have created domain-oriented chatbots or Intelligent Agents, able to understand and speak about a specific knowledge domain with realistic, multi-purpose initiatives and human-like behaviour. The IA methods can operate in the training environment as tutors who adaptively assist users in performing training tasks¹, intervene in case of suboptimal performance, demonstrate skills, provide explanations and answers to questions, and play the role of team members in multi-person tasks.

Most web-based settings do not provide learners with ongoing assistance and feedback that can cause them to feel isolated during their learning process which can lead to a loss of motivation. Online learners, therefore, need effective and continuous feedback in order to alleviate feelings of detachment. Having a teacher or a tutor available online and involved can help solve this issue by providing a sense of “online presence”. The sense of “presence” is a critical element to enhance distance learning that can also have a direct effect on establishing interpersonal relationships and trust during online communication.

Experiments have shown that Pedagogical Agents can increase the motivation of a student or a user interacting with the system. Lester et al. ². They are therefore virtual facilitators gifted with great reactive, intuitive and interpretative skills. Thanks to them, learning is based upon a knowledge transfer where the student is followed “step by step” by his/her own agent/trainer, enjoying a new learning methodology that is highly experiential which allows real time testing of what has been learned and at the same time, corrects possible mistakes in the intervention. The methodology of Intelligent Agents as virtual professors/facilitators interacting with the student activates a strong emotional response on one side, and a real know how capability on the other. In the first case, it is important to underline the fact that training has a major impact if the person involved in the process is stimulated, not only by the cognitive-rational component, but also through the emotional component.

Follow the description of two projects – COACH BOT and T2 – financed by the European Commission within the framework of the Lifelong Learning Programme, FOR.COM. consortium are developing.

2 – COACH BOT project

2.1 – Project description

An effective online teaching and support produces many benefits in the students learning. The on line courses need to provide learners feedback and motivation to make learning efficacious. Often learners in web-based settings may feel isolated which again may lead to a loss of motivation. Feeling that “someone” is present is fundamental. This sense of presence triggers an effect on the establishing of interpersonal relationships and

¹ CRAIG, S.D.; GHOLSON, B.; DRISCOLL, D. (2000). *Animated Pedagogical Agents in Multimedia Educational Environments: Effects of Agent Properties, Picture Features, and Redundancy*. In *Journal of Educational Psychology*, Vol. 94 (pp. 95-102).

² LESTER, J. C.; CONVERSE, S. A.; STONE, B. A.; KAHLER, S. E.; BARLOW, S. T. (1997). *Animated pedagogical agents and problem-solving effectiveness: A large-scale empirical evaluation*. *Proceedings of the Eighth World Conference on Artificial Intelligence in Education* (pp. 23-30), IOS Press.

LESTER, J. C.; CONVERSE, S. A.; KAHLER, S. E.; BARLOW, S. T.; STONE, B. A.; BHOGAL, R. S. (1997). *The persona effect: Affective impact of animated pedagogical agents*. In *Proceedings of CHI '97* (pp. 359-366).

trust among online communication partners. Besides, it is important to focus on adults specific needs. They haven't any time and need to find a solution that combine their work and life with the training activity. A modular training path can answer to these needs.

In order to tackle the over mentioned weaknesses of the e-learning methodologies and with the purpose to answer to adults trainers specific needs, the COACH BOT project aims to develop a new e-learning methodology for adults that combines the Conversational Agent Technology (chatbot) with a modular learning path.

This methodology will be tested through a pilot course addressed to home healthcare professionals (nurses, social and care workers, physiotherapists, etc.). The health care sector is a complicated system where each position requires a broad skills base and elaborate training encompassing a wide range of functions. The current training system is inefficient to cope with these needs³. An IT based learning solution can help solve these problems by providing learners a flexible learning environment. The COACH BOT project attempts to work around these aspects providing home healthcare workers a modular e-learning course supported by a virtual assistance throughout the training path duration.

2.2 – Methodology

The project methodology is based on the use of a natural language interface, a Virtual Assistant called Clara, created with the Intelligent/Conversation Agents technology and able to build the students' personalized training path, to support, motivate them throughout the e-course. It has human features like an avatar and is always present in the e-learning interface to offer emotional support to users and providing them a set of services as follow.

Clara interacts with the user for the first time through the GUIDANCE INTERVIEW. The student begins to be familiar with the virtual agent who starts a friendly conversation to create a sort of empathetic relationship with final aim is to define a professional profile of the user and then a learning path that best fits each student. In this case, the virtual agent behaves as a mentor who tries to understand the user's emotional aspects.

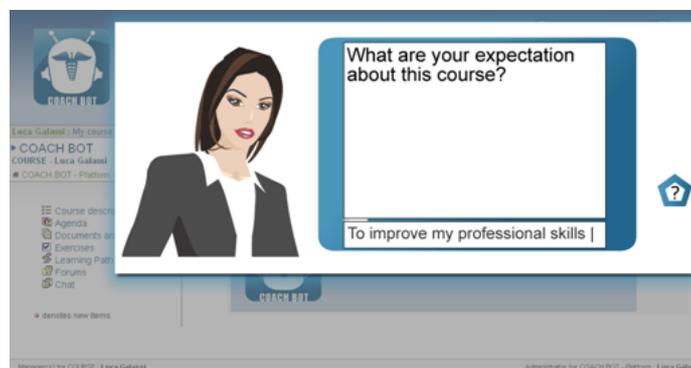


Figure 1 Clara first contact with the student (GUIDANCE INTERVIEW)

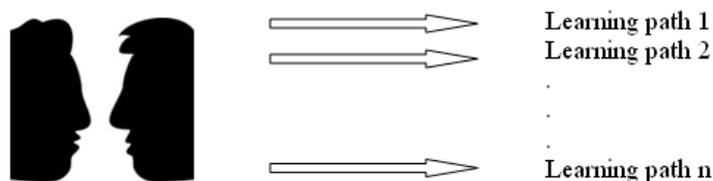


Figure 2 Student profiling

³ RECHEL, B.; DUBOIS, C. A. ; MCKEE, M. (Ed.) (2006). *The health care workforce in Europe. Learning from experience. European Observatory on Health Systems and Policies.*
DONALD C., Epic (2006). *Health care and e-learning.*

Only after the guidance interview the users can access to the platform's quiz area and through the START UP QUIZZES the system can test the user initial knowledge on the course topics (3 question per topic). If the user answers all questions correctly, the corresponding LO is "optional", otherwise it is "mandatory". A CUSTOMIZED LEARNING PATH is then provided, according to the student's initial knowledge: "mandatory" for the topics not well known, "optional" for the ones where the user is comfortable. Clara explains the quizzes and comments the results, acting as a teacher. In this case, Clara behaves as a teacher.

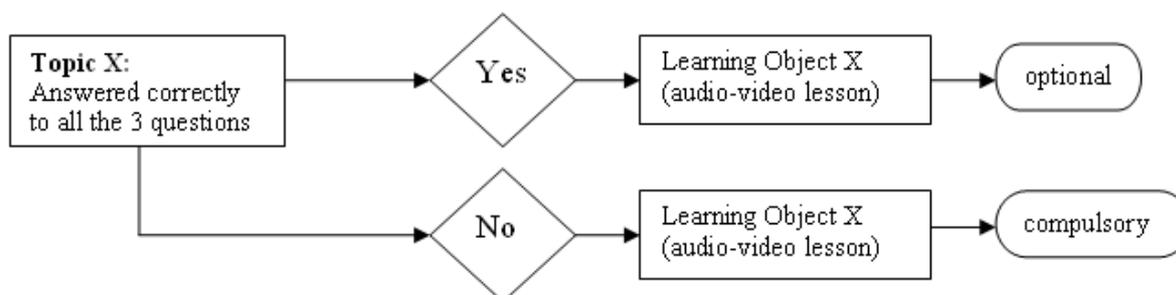


Figure 3 Definition of a learning object state

The LMS functionalities are explained by Clara when users ask for help through the HELP DESK area. Each tool is analyzed to cover the generic and specific questions that an user can do. The forum area, e.g. can be "expanded" to cover these questions. On "generic" forum usage: "Who can participate?", "What is a forum?", etc. Or "specific" questions on LMS user interface: "What is a replay?", "Where can I search a text?", etc. Here, the Clara behaves as a technical tutor. It is central to underline that the Clara isn't a normal FAQ, because it uses the natural language interface. So the user can write the question in different ways, e.g. "What is a forum?" can be expressed in these ways: What is a forum?, Tell me about the forum, Describe what a forum is, What does forum mean?, What is this? [while inside the forum page], etc. In this case, Clara behaves as a technical tutor.

Through the SUGGESTION AREA Clara provides students information on both technical issues, answering to questions such as "how can I access the forum", "how can I open a learning object", and so on, and on didactical issues, answering to questions regarding the training path such as the didactical meaning of the different learning objects, communication tools, and so on. The virtual agent's area can be seen as a interactive glossary or a "quick answer teacher" but doesn't have to substitute the main learning sources that are, and remain, the learning objects. When the user wants more information and deepening, the virtual agent will address her/him to the learning object that talks about the requested content. In this case, Clara behaves as a teacher.

In order to maintain learners motivation the Clara interacts with each learner during the entire course duration in different ways (ONGOING PRESENCE), providing ongoing verbal feedbacks on the study progress. So the learners can receive a positive feedback when he/she is proceeding well or can notice learners when for example he/she are studying too slowly or when he/she does not studying some fundamental lessons. Here, Clara behaves as a tutor.

The FINAL ASSESSMENT aims to check the user's learning progress at the e-course end with Clara support. For each learning path, the same number of final questions has been developed as the number of start up quizzes. The final quiz will be visible in the platform, if and only if, the user has answered all the questions of the corresponding start up quiz and if he/she has studied the related module "enough". Technically, studying 'enough' means that a student has to access the LOs of a module for a specific time. In this case, Clara behaves as a teacher.

Finally, the e-course platform provides learners three CASE STUDIES. It consists of real cases / practical examples on the course main topics, in particular related to medical issue, psychological issue and ethical issue through the Machinima technique. Machinima is the use of real-time three-dimensional (3-D) graphics

rendering engines to generate computer animation. In particular, Linden lab's Second Life will be used to create these highly engaging 3-D animations⁴.

3 – T2 Project

3.1 Project Description

The "T2 Teaching Tutoring - Intelligent Agents to customize lifelong learning pathways in the microfinance sector" project, supported by the European Commission through the Lifelong Learning Programme, addresses the needs of European Microfinance Institutions who provide micro-credit to non-bankable micro-enterprises and low-income and marginalized people.

Microfinance is a strategic sector in Europe promoting growth, jobs social inclusion and flexicurity. This rapidly growing sector employs MFI professionals who are relatively young, work under diverse national legal frameworks and adopt different intervention models. Despite growing demand, training markets neglect to target the diversified training needs of MFI professionals. Many training courses are unaffordable and inaccessible to MFI professionals due to the fact that they are generally offered only in major cities while most MFI professionals are based in rural areas. In addition, many e-learning courses targeting MFIs offer training that is too standardised and unspecialized.

Our project addresses to a target group of MFI professionals who often suffer from a lack of opportunities due to the fact that most of these professionals work in geographically scattered locations thus causing the economical cost of a face-to-face training course to be extremely high and therefore virtually impossible to implement.

The T2 project aims at improving the quality and accessibility of training in the microfinance sector by providing a didactic model based on integrating Artificial Intelligence technology into a blended learning course.

The training content is available in English, French, Italian and Polish and delivered in two sessions:

- on-line course with intelligent agent assessment
- on-site face to face training sessions designed on the intelligent assessment results

The T2 e-platform (Fig. 4) encompasses an e-course and Virtual Tutor Environment featuring a chat-bot or "Virtual Tutor", an intelligent tutoring system able to generate individual assessment pathways for learners. This evaluation tool helps teachers customize face-to-face sessions based on each learner's specific needs. The Virtual Tutor acts as a realistic teacher, personalizing a sequence of assessment questions and giving appropriate feedback based on the trainee's response.

⁴ JOHNSON, W. L.; LEWIS, W.; RICKEL J. (2000). *Animated Pedagogical Agents: Face-to-Face Interaction in Interactive Learning Environments*. In International Journal of Artificial Intelligence in Education 11 (pp. 47-78).

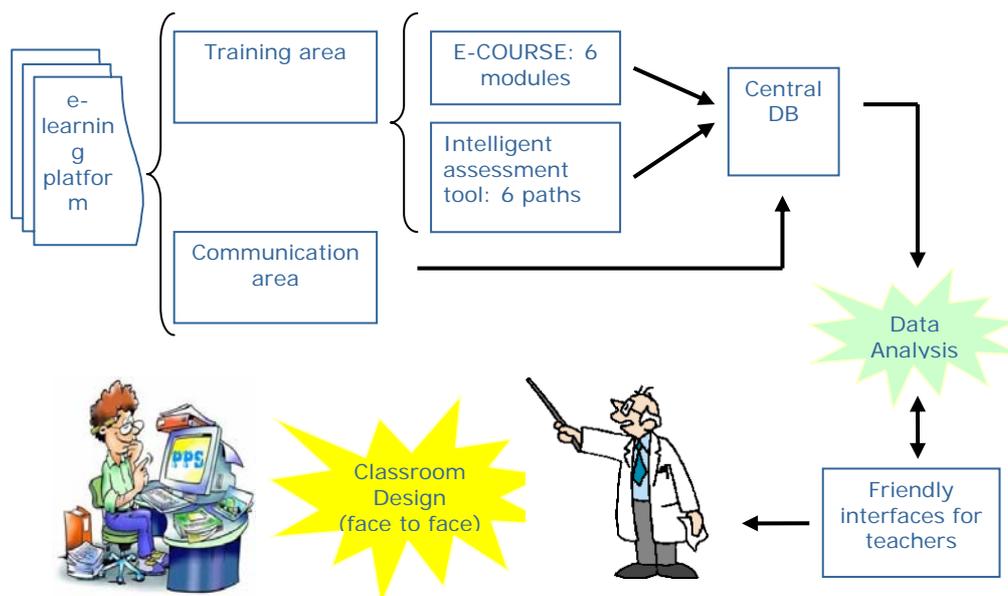


Fig. 4 Overall project architecture

3.1 – The Methodology

T2 e-course consists of two kinds of learning objects that have been developed for the microfinance field: audio-video lessons and static slides. The audio-video lessons consist of an audio explanation synchronized with a slide presentation. The audio-video lesson generally represents the core of each lesson whilst the static slides represent supportive material. Learning Objects promote learning thanks to both visual (text, images, diagrams and movies) and audio support (the teacher's recorded explanations) that facilitate personalized learning.

The learning path is assessed through an intelligent assessment tool that is composed of six intelligent evaluation paths, one for each module. The different evaluation paths are independent but have to be performed in the right sequence i.e. the second path can be followed only if the first one has been followed at least once. Intelligent Agents (IA) are autonomous software systems realized with Artificial Intelligence methods that can operate in the training environment as virtual tutors that adaptively assist users in the performance of the training tasks. They can intervene in case of suboptimal performance, demonstrate skills, provide explanations and answer questions, and play the role of team members in a multi-person task.

The didactic model is also developed based on the concept of "emotional learning", which offers students exceptionally stimulating scenarios with a strong visual stimulus impact through very detailed graphics. The pilot application starts by choosing an important question randomly from the dataset. The application begins with an important question just like in a real exam when a teacher wants to verify if the student is comfortable with the important topics. The reason why this kind of tool is considered to be more flexible and intelligent is due to the fact that 3 Fuzzy Logic inference systems are implemented to make the virtual tutor's behaviours and the entire system appear more realistic. Fuzzy logic manages reasoning that is approximate rather than precisely deduced from classical predicate logic. Fuzzy logic is used in complex systems often found in the real world. When dealing with such complex systems, human beings use approximate, but flexible reasoning. Fuzzy Logic, with its linguistic rules, simulates such human behaviours and translates human natural language syntax into an artificial language suitable for computers.

4 – Conclusion

Different experimentations suggest that the effects of agents are not universal, but depend on the specific features of the agent within a learning environment (Kim & Baylor, 2005). In accordance with this view, researchers have gone over the simple comparison between training with agents and training without, they prefer exploring which specific characteristics may contribute to advance pedagogical agents' effectiveness.

Moreover it is important to acknowledge that in order to successfully design, develop and implement one or more pedagogical intelligent agents in a learning environment ample time and a vast amount of resources, both human and

financial are required. This is especially true regarding the prototypic phase. It is therefore crucial to first conduct a cost-benefit analysis to help better evaluate if the work and efforts required to develop an intelligent agent is actually worthwhile and beneficial. It is very difficult to truly define general rules to determine the value and how useful pedagogical intelligent agents are for training organizations, considering that specific training needs and requirements can vary greatly based on different factors and situations. The best possible solution for training organizations whose training needs are not too specific that they require ad hoc development or do not have the resources needed to design and develop complex applications, could be, therefore, to purchase set applications developed by a third party.

The real innovation of the COACH BOT project is the embedding of a pedagogical agent in an open source and SCORM compliant learning management system. This project provides the premises to provide the distance learning community with a multiple purpose pedagogical agent that is easy to integrate in any open source LMS like Moodle, ILIAS, Dokeos, Atutor, etc. This is true also because the pedagogical agent has been implemented as an independent module even if the student is perceiving it as if it was completely embedded in the E-Learning platform.

An interesting future work could be to use T2 project assessment methodology in the evaluation area of the Coach Bot project. Start-up and final quizzes can be processed by means of Fuzzy logic inference engines to guarantee more flexibility in understanding student's didactic needs and performances.

5 - References

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