Impact on the learning process b-learning, learning virtual objects based on agents and support tools in 3d for explanation of processes and procedures

Incidencia en el proceso de aprendizaje b-learning, de objetos virtuales de aprendizaje basados en agentes y herramientas 3d para apoyo en la explicación de procesos y procedimientos

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Abstract

During the course of this project, we attempted to verify the impact of using Agents Technologies, or virtual assistants, in the learning process.

This analysis drew upon the information gathered from the course Operating Systems 1 in the Information Technology program at Pascual Bravo University.

In order to utilize the methods that would best allow for the fulfillment of our objective, we utilized computer assisted designs to better present the concepts relating to the process of learning. We combined that with pedagogical resources from the class lectures, multi-media resources and interactive resources found online.

Using the resources above, the student was given the possibility to create a comparison between the form of the objects and abstract reasoning. As a result, we sought to give to the student the necessary means to make the process of learning more profound and meaningful. We gave the students a practical guide to assist him/her through the process of outlining, proceeding, experimenting, verifying results and constant feedback from the virtual tutor.

We analyzed the outcomes of this project through a questionnaire in which the students discussed the cognitive processes they encountered during the project.

Keywords: e-Learning; b-Learning; Agents; CAD and education.

Resumen

Durante el desarrollo de este proyecto de grado, se buscó verificar el impacto que tiene el uso de tecnologías de agentes o asistente virtuales en el proceso de enseñanza-aprendizaje.

Este análisis contempló los datos obtenidos en el curso Sistemas Operativos I, del programa Tecnología Informática, que se dicta en el Instituto Universitario Pascual Bravo.

Para contar con el desarrollo de una táctica coherente que permitiera el cumplimiento del objetivo propuesto en este trabajo, se utilizó el diseño asistido por computador para mejorar la presentación de los conceptos en el proceso de enseñanza, combinando este con recursos pedagógicos en las clases magistrales y recursos multimedia e interactivos ofrecidos en línea.

Los mecanismos anteriores, le brindaron al estudiante la posibilidad de crear un símil entre la forma de los objetos y su razonamiento abstracto. Con esto, se buscó el desarrollo de las competencias necesarias para que el estudiante pudiese enriquecer por sí mismo su proceso de aprendizaje con el uso de prácticas que guiaban los procesos de esquemas y procedimientos, la experimentación, verificación de sus resultados y la constante retroalimentación del tutor.

En análisis de este proyecto se realizó después de que una muestra de los estudiantes, entregaran por medio de una encuesta sus apreciaciones con este proceso cognitivo.

1 Introduction

This work was performed in order to attempted to verify the impact of using of Agents Technologies and Software Computer Aided Design (3D) in a context of the form of b-Learning, to support teaching activities in class.

In the professional field such as engineers and teachers, the interest is based on knowing the different kinds of technologies that are still in development and implementation methodologies that makes easier the creation of educational tools and resources to improve the teaching-learning process.

In order to utilize the interviews were conducted with students in the course of Operating Systems I, in Information Technology program at University Pascual Bravo 2012-2 and 2013-1 academic semesters.

During the development of this paper the relevant factors identified in the use of agents and Computer Aided Design, programming tools, methodologies and "best practices" for implementing such technologies were investigated but this always be focused to give greater educational value to objects in the teaching-learning process.

1.1 Motivation

This analysis is a new source of information for the teaching community, which can be defined, the impact of e-learning method among the student community. Having a first look at the thoughts that students have regarding the use of Agent and Computer Aided Design, will begin to build a solid foundation to invite directives and other members of the academic community, concerned about the development of materials where prime virtual pedagogy supported with technology teaching tools to strengthen the characteristics of the University Pascual Bravo, with respect to teaching processes and procedures. This analysis may be considered within the university senate as the first piece of consultation for those wishing to propose strategies that promote virtual options and enrich the teaching and learning in the University; also in this first document statistical data relevant to the teaching activities.

This analysis may be considered to improve decentralized education, which takes its force a few years ago with the expansion of network and internet usage, changes its form of "in a distance learning" to "e-learning", which brings benefits like, support online tutor, who solves and guidance in the process of student learning. However, coverage promises e-learning with total availability, must be accompanied by a time management of the tutor, who must explain again and again the same points to their students; Because of this, comes the concern pose a support process that the tutor by digitizing your knowledge with technological options to guide the student without he feels alone. Moreover, the development of virtual objects with a dynamic interactive learning approach improves the understanding of the process alluded to, Loading more adjusted to reality the processes and procedures dimensional representations.

Developing learning objects for courses must be accompanied by a technical work in the development of graphics, programming, engineering, expert systems and platform compatibility, plus the educational component in its instructional design, content selection, thematic experts and finding a teaching strategy.

2 Background

CAD tools and graphical programming.

To use Computer Aided Design tools (CAD), is useful in the areas of civil engineering, mechanical engineering, electrical engineering, software development, automotive design, including aircraft design, since it allows to evaluate models and prototyping without investing in physical development.

Its use can be given not only for assessment but also for interaction and virtual "manipulation" of the different models and training of assembly and disassembly without risking expensive equipment or subject to transport, without suffering the depreciation on assets or incurring shop for each student.

These three-dimensional models can be used by applications using graphical programming to create a total interaction with that geometry, generating realistic as physical condition, lighting and other conditions that represent a virtual world.

Similarly technologies have been developed to facilitate this same interaction through web oriented and allow visually represent a computational model applications.

Older technologies such as VRML - (VR + HTML) Language Tags for Virtual Reality via this website - JAVA 3D, Unity, WebGL and many others have attempted to supply this need. These technologies have been available since the late 80's and still made attempts to incorporate into our daily navigation to different interfaces.

Current technology like WebGL, whose main feature is to allow compatibility with different platforms (operating systems) and different devices (desktop computers, mobile devices, tablets).

Pedagogy and Computer Aided Design

The role of technology in education is given which allows performance capabilities of abstract reasoning and spatial relations. Improved coordination and psychomotor skills synchronization, and using the constructivist model's ability to interact and experience through the error has an apprenticeship.

Using Artificial Intelligence

The advantages having an artificial assistant are just to fix the errors and flaws inherent in human beings. It is entirely feasible to observe the start using this technology as a support for virtual education, especially when we know that no virtual tutor is the possibility of attending students resolve concerns or correct online errors or inconvenience this student, and no virtual tutor, will be available at any time of day, every day of the week online.

On the other hand, artificial intelligence, another developing area, is being applied to generate the users feel that there is something or someone on the other side with a certain degree of intelligence, this perception, and we play 3D games and other example, everybody remembers, how in May 1997, Deep Blue defeated Kasparov.

Different areas related agents, expert systems, genetic algorithms, artificial neural networks, all with the same goal, Search simulate in a computer program, a degree similar to that of its creator intelligence, real applicability used by some of us come without noticing. Automated planning applications, optical character recognition scanners (OCR), speech recognition (in mobile and PC), pattern recognition, strategy games like chess among other games.

Actually there exists programs called chatbots, which can hold a conversation with human beings without them realize they talk to a machine, however, is not intended to subject the Turing test this development, just that I acted as support to teaching accompanying the learning process based on a collection of information which gives feed back correctly the student in the process.

In this area we have studied the possibility of incorporating sensations and feelings agents that interact with the aim of you can motivate and encourage students to continue with the process or evaluation, even if not for good results.

The concept of AI is more complex and you prefer to work with agents to explaining processes and tasks targeted for the program before the student behaves similarly to someone who takes a training support in a given area.

Pedagogy and the use of agents

Through the use of agents and other techniques to simulate artificial intelligence constructivist and constructionist pedagogical models, in which the student with skills in handling computers and basic

navigation through the web, is able to be used the proposed activities on the platform that will facilitate the process of new learning through scenarios where interaction and by the method of "trial and error" allows enhancing the knowledge is facilitated. With the support of intelligent agents feedback that guides the student to avoid ambiguous generating knowledge and helping to generate findings and recommendations is provided to the process. It is feasible to use diagrams and concept maps that help to better interpret the cycle or process, all linked to the correct orientation of the agent.

There is a taxonomy for agents within the educational context:

Pedagogical Conversational Agent

Teaching Intelligent Virtual Agent

Intelligent Virtual Agent Chains

Conversational Agent Personified

Animated Pedagogical Agent

Embodied Conversational Agent Pedagogic

Teachable Agent

Pedagogic Agent as Learner Companion

The role agent can be adjusted according to the level of the student, it can become a motivator within the course to encourage feedback with keeping his attention or be able to learn from the student.

In any process of virtual learning is the use of definitive elements to facilitate rapprochement between teacher and student. In discussing these elements and explain from the macro part is essential to explain what the LMS or Knowledge Management System (Learning Management System - LMS), which is a platform through which learning activities are organized and knowledge, both by students and teachers.

This platform allows the integration of different software alternatives in the process of virtual training, always thinking it benefit the learning process of the students and the constant use of New Technologies of Information and Communication - TIC.

In the LMS, you can use a types of software and protruding including Moodle, a platform for easy access, open source software and intuitive navigation. This platform is well known in the world of e-learning because many universities, institutions and companies use it (about 95 % of universities worldwide have a moodle platform).

In Moodle, the teaching-learning strategies are easy to establish the extent that this platform contains different tools that integrate the student, it is observed in areas such as communication in chat rooms and forums and various assessment tools to which the teacher has access.

However, a platform for easy access and usability as Moodle does not ensure the success of the virtual process for doing so is essential to have a good learning object that allows the mainstreaming of knowledge and the logical order of the same and bring the student for a safe way in which it closes its gaps ignorance.

The OVA (Learning Virtual Object) should consist of different theoretical basis and practical elements involving the student and allow you to interact with faculty and peers, overcoming challenges of knowledge with him to learn, learn, learn the knowledge seen.

It is important to establish that the Virtual Learning Objects must adapt to the needs of the students and not the other. This is because the student who has unique learning characteristics and the teacher's responsibility to know, use appropriate methods in the process and provide options to facilitate the assimilation of concepts.

This " understanding of the teacher " can be facilitated by the use of shareable content packages - SCO - as these can be used on different platforms and different people LMS also be governed by the SCORM standard, which leads to a rapid and appropriate classification for storage and use.

Some developments used in virtual reality, precisely because of their visual, conceptual and strength in the teaching wealth, are called simulators that allow using "trial and error" learning process perform without causing further damage or loss costs or procedure inaccurate. The student may face real situations, without this leading to a financial or personal risk, testing foreground and performing feedback of learning.

Artificial intelligence is characterized by the course developer and knowledge managers, teachers implemented databases, with the basic rules of procedures and processes required for the course, then by specific algorithms are extracted at the right time for the agent to act and react to the student's actions, generating feedback for the different probabilities of occurrence of each case.

Pedagogical component

Within the framework of learning platforms has dominated the social constructionist pedagogy through different tools we have as forums, chats and wikis. In these spaces each student brings discusses and compares learning with their classmates and teachers who guide the course tutor also called in a collaborative learning environment based on activities and promoting critical reflection. Platforms are flexible to allow different methodologies and work -based learning based on competencies like self-training and research problems, development and training.

In the development of digital content with learning objects promote meaningful learning, the development of higher psychological functions and multiple intelligences.

The concept of social constructionist pedagogy is based on current pedagogical constructivism, constructionism, social constructionism.

Technology as a Component

3D technology and computer aided design have been initially used in video games with immediate success, it is entirely feasible to use these technologies in order to more successfully capture the attention of the target audience and achieve generate a learning environment, and training around this, to be supplemented with learning and master explanations inside and outside the classroom.

Another technology is used agents or virtual assistant, which motivate students to continue with the activities planned and takes feedback in the proposed learning activities, supporting the work of teachers in customizing the teaching-learning process.

Computer as a Component TIC

Resource usage of Web 2.0, has also been part of this work, through the use of tools such as chat, wikis, blogs, social networks and YouTube channel videos as support topics covered in the course Operating Systems I, all within the context of the moodle learning platform, which unifies the convergence of these technologies and record keeping ensures the activities of the student for evaluation, monitoring and support of the educational work of the teacher.

2.1 Method

The methodology used for this research was mixed. At first quantitative analysis, we developed a survey for which results were tabulated and analyzed. Secondly learning activities performed showed good results according to online assessments.

Through the use of Learning Management System (LMS) Moodle, we can also obtain information traceability of each student with regard to content and assessments.

Using activities which involves Learning Virtual Objects, Experts Systems and CAD, the student was enabled to identify the structure of PC Hardware, assembling and disassembling its parts. This was evaluated with a physical activity, with real Hardware parts.

2.2 Population

The sample size is the students of two semesters at the University Pascual Bravo in the subject Operating Systems I.

2.3 Data collection

Use of paper surveys, which was applied anonymously, without pressure or questions to the interviewee in order to obtain the highest degree of honesty in the responses of the sample was made. On the other hand using the results of traceability provided was made by the platform Moodle learning for the semester 2013-I, which helped in the verification and credibility to collect and analyze information, then reaching the goals outlined in this research.

2.4 Statical Inferences

The hybrid methodology was accepted due to classroom support teachers and the extracurricular work platform supported by the Intelligent Custom Agent, the student strengthens and develops skills in self-study, discipline and commitment, changing their conception of this methodology teaching.

In satisfaction survey developed at the end of the semester the survey was conducted for both technologies, which were well received.

The survey can be seen in Annex 5 and the data in graphs 6 and 7.

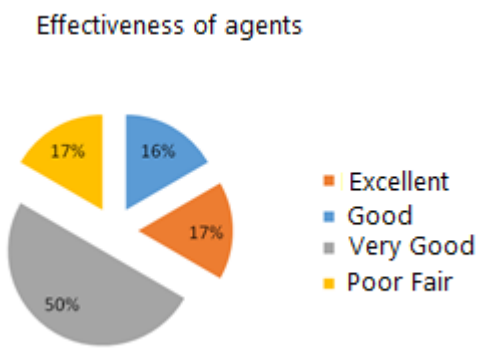

Fig 1: Effectiveness of agents.

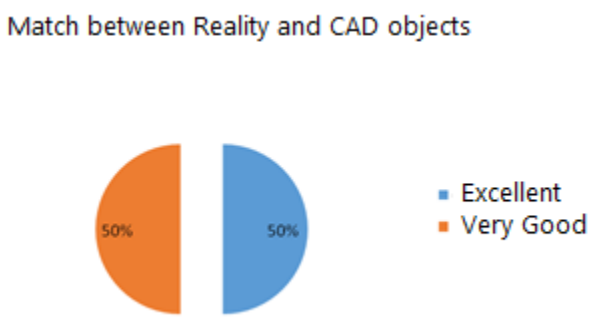

Fig 2: Match between Reality and CAD objects.

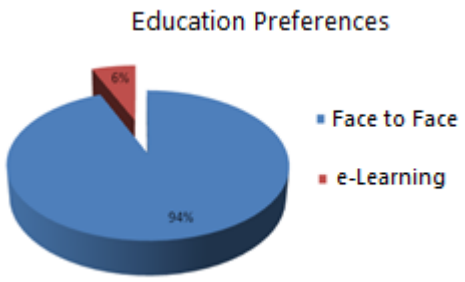

Fig 3: Preference education

3 Conclusion

Through the evaluation of the applications that are used to create virtual objects serving to support the course, variables such as reduced costs, reduced development time of OVA and easy creation of objects under SCORM methodology identified, like creating activities where students could consolidate the knowledge raised.

Acceptance and performance obtained by students in the methodology b -Learning has continued in 2012-2 and 2013-1 semesters.

In the development of learning objects according to studies by Edward Lester and Peter Chapman, the use of characters or character and is determinant but not speak or not interact, motivate the learning process.

However, in this study we found that its use is completely re- potentiated when technical components and more complex as agents, expert systems and neural networks not only provide feedback about the status of good or bad response are added but also information much more important to the process reinforcing concepts and using other methodologies that teachers use. Similarly to incorporate three-dimensional elements facilitates graphical representation of computing devices and the student creates a relationship between the real world and the virtual world where this interaction through new knowledge that promotes the learning process is created.

The development of these agents OAI and Computer Aided Design, increased the motivational factor in the activities and improved dropout perception having students about online courses.

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