Artificial intelligence techniques in an e-learning environment for IT engineering projects

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Abstract- The design of an e-learning environment for user training in the execution of engineering projects on information technologies is presented here. Several research works claim that one of the reasons why projects fail is the lack of training of the people taking part in them. The design of the proposed e -learning environment integrates two techniques of artificial intelligence, i.e.: Intelligent tutoring systems and case-based reasoning. The results showed significant advantages when including these two techniques, specifically in the cognitive followup of the users.

Keywords- artificial intelligence, e-learning, engineering projects, information and communication technologies.

I. Introduction

The training of users (also known as stakeholders or students) in the execution of engineering projects is a difficult task. This is mainly due to that fact that people involved in such projects are not the most suitable [1]. A series of issues are derived from the previous claim; for instance, lack of an established methodology, lack of defined project's goals, weak planning or lack of it, weak control, poorly motivated work teams, inappropriate risk management, bad communication, lack of control on changes and inadequate estimation sources, among others[2]. E-learning environments allow to offer training regardless of variables such as time and distance [3]. The implementation of artificial intelligence in education allows to transform teaching and learning environments, since it often keeps and updates the information of every single action performed by students in order to make assertive decisions [4].

I. Work

This work's scope allows to integrate two artificial intelligence techniques into an e-learning environment. These techniques are Intelligent tutoring Systems (ITS) and Case-based Reasoning (CBR). The fields of knowledge the authors of this paper worked on are engineering projects in IT. This work intends to close the existing gaps in users' education when facing the execution of projects.

II. Results

To validate the proposed design, an e-learning environment called Edupymes was developed and implemented, which integrates the ITS techniques into those of the CBR. The knowledge field is the IT engineering projects. Nowadays, Edupymes holds 2,400 students. Figures shows an example of an educational activity found in the case chosen by the CBR technique. The goal is to have the students performing a set of activities so that they manage to pass the evaluation previously failed.

References

[1] Ciocoiu, L., Henshaw, M. J. D. C., & Hubbard, E. M. (2012). A systems-of-systems approach to the development of flexible, cost-effective training environments. In System of Systems Engineering (SoSE), 2012 7th International Conference on (pp. 531-536). IEEE.

[2] Vahos, L., Pastor, D. & Jiménez, J. (2013). Método para la formación de stakeholders en proyectos de ingeniería usando la metodología PMI y técnicas de inteligencia artificial. Revista Ingenierías Universidad de Medellín, 12(23).

[3] Saowapakpongchai, K. (2010). The development of elearning model for higher education in Thailand. Educational and Network Technology (ICENT), 2010 International Conference on pp.16,19, 25-27.

[4] Zhou, P.; Yin, W.; Zhao, J. (2012). Research on case retention strategy for industrial case-based reasoning (CBR) system: A practical case study. International Conference on Computer Science and Information Processing (CSIP), 2012. Page(s): 376 – 380. IEEE Conference Publications.