An Agent-based Approach to Support Formative Assessment

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Abstract

The formative assessment process and the difficulties found in online assessment overloads the educators activities. The doctoral research presented in this paper aims to reduce this overload through a formative assessment support based on interface agents.

1   Research Goals

The goal of the doctoral research presented in this paper is to propose a formative assessment support to TelEduc[1], a web based distance education environment. The TelEduc Project has been developed since 1997 by the Nucleus of Informatics Applied to Education and the Institute of Computing, both from University of Campinas [1].

The formative assessment has been used as an alternative to the traditional assessment based on exams, and allows the continuous monitoring and orientation of the learning process [2]. In distance education, the formative assessment is even more important since the online assessment has some intrinsic difficulties, such as the absence of the face-to-face interactions feedback, the lack of instructor control over the assessment and the authentication problem (who is performing the assessment?).

In this context, the instructors need to take extra steps to monitor learners' performance and comprehension, and the formative assessment helps instructors to ensure that the learners are on the right track and to detect learning problems [3]. An advantage to be explored in online formative assessment is the possibility of saving all interactions for later analysis. Formative assessment also offers some control over the authentication problem, since the instructor becomes familiar with the writing styles and the abilities of individual students, so that changes on writing styles would be an alert. So the interest on formative assessment supports research.

Nevertheless, the formative assessment has high costs, making necessary to explore the development of intelligent and automatic mechanisms to help collecting and analysing assessment relevant data and making decisions based on these data, aiming to reduce the instruct overload and consequently, the formative assessment costs.

It is not possible to predict an ideal set of assessment methods and criteria on formative assessment that supplies the pedagogical goals of any teacher in any course because they change according to the context. Thus the formative assessment demands a flexible support, that is, it should be adaptable to different contexts. This is the present doctoral research's specific goal.

2   Partial Results

Actually the formative assessment on TelEduc is supported through the monitoring of its communication tools logs (**Discussion Forums, Chat, Portfolio, Mail, Bulletin Board**) and the analysis of the data generated by the **Accesses** and **InterMap** tools. The **Accesses** tool allows the generation of reports on student access (to the course or tools), and the **InterMap** tool uses visualisation techniques to map the interactions, making easier to visualise the students' participation [4].

A recent participation on a teachers' distance preparation course based on formative assessment, using the TelEduc support, allowed us to evidence the instructor overload using this assessment approach [5].

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[1] Teleduc is an open source software, with free distribution at http://www.nied.unicamp.br

The teacher's main roles on this process are explained briefly: (1) **Tasks elaboration:** to define the learning goals and to elaborate appropriate assessment tasks that orientate learners to achieve those goals; (2) **Monitoring:** to monitor and analyse the learner behaviour, to detect problems and to generate reports based on this monitoring; (3) **Orientation:** to motivate the active participation and to incentive the collaboration through the continuous and constructive interventions on learning process; (4) **Learning quality analysis:** to collect and to analyse useful information in order to verify the learning quality during the requested tasks development.

The assessment support model that has been developed in this research aims to reduce the instructor overload. The initial proposed model explores the software agents technology, specifically, interface agents based on machine learning techniques [6], that observes and learns with the instructor, trying to provide a flexible and customised assistance to the teacher's particular necessities. The interface agents are going to explore the distance courses' interaction records and filter, search and analyse important information, according to the teacher's pedagogical goals.

Initially the model has three modules, whose functionalities are presented briefly here:

- **Monitoring Module:** (1) to monitor the learners interaction and the ongoing tasks; (2) to select and present the relevant monitoring information (based on instructor's interests); (3) to detect the possible problems on learning process (access and interaction absence, late tasks) and make decisions (for example send messages to learners, alert the instructor); (4) to generate learner monitoring reports, according to the instructor's interests;

- **Learning Quality Analysis Module:** (1) to select and present the relevant information (based on instructor's interests) in order to help the learning quality analysis, developed during the learner's task performance; (2) to assist grading, through the instructor's criteria observation;

- **Validation Module:** (1) to construct dynamic learners profiles, reflecting the actual knowledge on topics and subtopics of the course; (2) to validate the previous grades by promoting learners collaboration (for example, asking them to respond doubts posted on **Discussion Forum** tool, according to their profiles).

3 Concluding Remarks

Recently TelEduc Project's researchers have obtained promising results with the interface agent technology on chat's log adaptive filtering [7]. These results seem to indicate that this technology is appropriate to provide an effective and flexible formative assessment support.

The research presented in this paper is at initial stage and actually we are involved in the modules specification and in the viability analysis of integrating them to the TelEduc Project.

4 Acknowledgements

5 References

[1] Rocha, H. (2002) O ambiente TelEduc para Educação à Distância baseada na Web: Princípios, Funcionalidades e Perspectivas de desenvolvimento. In: Moraes, M.C. (Org). Educação à Distância: Fundamentos e Práticas. Campinas, SP:Unicamp/Nied, 2002, 197-212.

[2] Perrenoud, P. (1999) Avaliação: da excelência à regulação das aprendizagens entre duas lógicas. Porto Alegre: Artes Médicas, 1999.

[3] Thorpe, M. (1998) Assessment and 'Third Generation' Distance Education. Distance Education 19, no. 2, pp. 265-286, 1998.

[4] Romani, L. (2000) InterMap: Ferramenta para Visualização da Interação em Ambientes de Educação a Distância na Web. Master Thesis, Institute of Computing/Unicamp, December, 2000.

[5] Otsuka, J. L. (2002). Análise do processo de avaliação contínua em um curso totalmente à distância. In: Virtual Educa Conference, Valencia, Spain, 2002.

[6] Maes, P. (1994) Agents that Reduce Work and Information Overload. *Communications of the ACM*. 37 (7), 1994.

[7] Otsuka, J. L.; Lachi, R. ; Ferreira, T.; Rocha, H. V. (2002) Suporte à Avaliação Formativa no Ambiente de Educação à Distância TelEduc. In: VI Congresso Iberoamericano de Informática Educativa, Vigo, Spain, 2002.