

# The Hospital Classrooms Environments Challenge

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This poster describes a challenging application field for EDM, in the context of collaborative learning open learner model frameworks. An open and challenging field arises from the situation lived by children suffering a serious illness. The responsibility of the government continuing their schooling process is harder to achieve, since different communities (family, school teachers, hospital teachers, medical doctors, psychologists...) have to be coordinated. An appropriate educational solution, designed for this situation should solve the specific issues that arise in the described situation: Motivation, Isolation, Heterogeneity, Spatial Dispersion, Dynamicity, etc. This poster tries to explain the reasons that makes this context specially interesting for EDM; It proposes a framework to support learning in the cited environment based on the use of Multi-user virtual environments (MUVes); And it points out some Data Mining fields specially appropriate for the problem of analysis of educational data and interactions among students for the construction of an Open Learner Model (OLM), suitable to for decision support.

Key Words and Phrases: Open Learner Model, CSCL, MUVes

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## 1. INTRODUCTION

There are still some application fields where the use of EDM is specially promising and challenging, but still few efforts have been reported. This is the case of educational support of children suffering serious illnesses. These students are frequently provided with computers and with access to the Internet. However, there is still a lack of intelligent systems to support their education, adapted to their special circumstances.

The particular variables that arise in the mentioned context are mainly: **Motivation:** It is frequently shown that these children are hardly interested on any topic related with their educational process. This comprehensible attitude may be changed with the appropriated tools, designed with special attention to the user appealing. **Isolation:** Isolation may be mitigated integrating the educational process in a framework of collaborative learning, making available tools and techniques that make possible and necessary the interaction with other students. **Heterogeneity:** The heterogeneity makes it more difficult to teachers to give the proper educational response to the particular circumstances of each student. **Spatial Dispersion:** It cannot be assumed that students are located at the same room at any time of the schooling process. There is not either direct contact with other students and teachers. **Dynamicity:** Finally, all the circumstances around the student may change in short periods of time. Their mood, needs, and skills may be affected severely, and consequently, the systems they interact with should detect changes and adapt themselves immediately to the new circumstances.

All the described issues makes this context at the same time, challenging, since most of the developed approaches does not seem to fit appropriately to this environment, difficult because accurate self-adapting systems should be created, and especially suited for application of EDM, since there is a large amount and diversity of data to be analyzed.

This research has been done in the framework of the SAVEH Project (Gonzalez2011), dealing with the development and integration of ICT tools and electronic contents for young students who suffer serious illnesses.

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## 2. EDUCATIONAL SUPPORT FRAMEWORK AND EDM CHALLENGES

Based on the analysis previously made of the context of hospital classrooms, it has been designed an educational support framework. The design has been done with special attention to very diverse issues: The importance of the social component of learning, to create the new tools, new learning materials and applications (Gaudioso2009); The necessity of adapting systems to each student particular needs, using Open Learner Models (OLM) from multiple students (Ahmad2009) and allowing its inspection and the review of the learning process by the students themselves; The convenience of providing effective mechanisms of communication to increase the knowledge about student behavior and incorporating this new knowledge to the OLM for further analysis of students and influence of other roles as hospital teacher, school teacher, classmates, family, nurses, etc.; The power of educational games to improve the results of ITS (Eagle2010), engaging and motivating students in learning (González2008).

Consequently, we have proposed in SAVEH the development of a MUVE videogame with collaborative activities, intended also as an interface for an ITS using OLM. The videogame is connected with a Social Network, and an Educational Platform.

Based on the proposed educational support framework, mentioned above, there have been noticed among others some challenging problems: The detection of the influence of educational social games on student emotional state, may receive special attention. There should be designed techniques to extract and predict student emotions (motivation, isolation, etc.) in relation with the proposed collaborative activities in the framework; The detection of changes in the interests or skills of students that may be originated by their disease evolution; The extraction of models such as: Model of the reasoning process for the solutions of problems, based on social interactions among users in the collaborative activities, Model of influence of the social interactions in the learning process, Model of the emotional state of student in the MUVES, Model of the social role of each person within a group. To achieve these goals, a wide range of DM techniques are to be applied, including classification, MDP modelling and solving, concept drift analysis, frequent pattern extraction, graph analysis, structured prediction, SNA, etc.

## 4. CONCLUSIONS

It has been pointed out the main issues affecting the educational process in the context of Hospital Classrooms. It has been stated the major features for the design of educational tools for it and the reasons why it is especially challenging from an EDM perspective.

## REFERENCES

- Ahmad, N. & Bull, S. (2009). Learner Trust in Learner Model Externalisations. In V. Dimitrova, R. Mizoguchi, B. du Boulay & A. Graesser (eds.) *Artificial Intelligence in Education*, IOS Press, Amsterdam, 617-619
- Gaudioso, E., Montero, M., Talavera, L. & Hernandez-del-Olmo, F. (2009). Supporting Teachers in Collaborative Student modeling: A Framework and Implementation, *Expert Systems with Applications* 36(2), 2260-2265.
- González, C., Toledo, P., Alayón, S., Muñoz, V., & Meneses, D. (2011). Using Information and Communication Technologies in Hospital Classrooms: SAVEH Project. *Knowledge Management & E-Learning: An International Journal*, Vol.3, N°1.
- González C.S. & Blanco F. (2008). Integrating an educational 3D game in Moodle. *Simulation & Gaming*. Vol. 39 No. 3, September 2008 399-413. DOI: 10.1177/1046878108319585.
- Eagle M. & Barnes T. (2010). Intelligent Tutoring Systems, Educational Data Mining, and the Design and Evaluation of Video Games. *Intelligent Tutoring Systems Lecture Notes in Computer Science*, 2010, Volume 6095/2010, 215-217, DOI: 10.1007/978-3-642-13437-1\_23.