Student Play: a didactic tool to educate in values

Antoniet Kuz[1], Roxana Giandini[1,2,3]
[1]GIDAS, Universidad Tecnológica Nacional, Facultad Regional La Plata,
La Plata, Buenos Aires, Argentina.
akuz@frlp.utn.edu.ar
[2] LIFIA, Facultad de Informática, Universidad Nacional de La Plata.
La Plata, Buenos Aires, Argentina.
giandini@info.unlp.edu.ar
[3]CIC, Comisión de Investigación Científica y Tecnologica, La Plata, Buenos Aires,
Argentina

Abstract. This article describes the creation, development and practical application of a prototype version of a web tool called Student Play, an educational module of Agent SocialMetric, whose main objective is to establish interactive games with students to educate in values, through different conversational interface software agents

Keywords: Games; Education in Values; Intelligent Agents; Educational Environment; ICTs.

1 Introduction

The great development of new Information and Communication Technologies (ICTs) in all spheres of society in general, has facilitated the penetration of these in education. This has provoked and provokes important changes in the educational community, offering advantages for all its members, which has even changed traditional models of teaching. In education, especially in schools, the use of ICTs is essential. For a proper incorporation of ICT in the classroom, several factors linked to the context given by interactions between students and teachers should be analyzed. In this sense, taking into account technological advances, educational software is a nexus within the teaching-learning process [6].

According to Seymour Papert [20], "the best learning will not derive from finding better forms of instruction, but from providing the learner with better opportunities to build." The educational software is characterized by being interactive, using multimedia resources such as sounds, exercises and games that support the functions of evaluation and diagnosis.

There is currently a consensus among the different actors involved in education about the need to educate in values [5]. Technological innovations allow us to focus on education in values as an imperative necessity. Values are the result of a relationship between the objective reality of the individual, institutional components that are expressed through human activity (attitudes and behaviors) in guides and

principles that support the teaching-learning process, therefore giving a constant process of development and personal construction of the values of the students.

The objective of this research is to describe the creation of a Student Play module as part of the software development tool, called Agent SocialMetric [12] (which is one of the first tools of its kind). On the one hand, in Agent SocialMetric combines and incorporates the SNA along with the creation and development of an intelligent agent called Albert, whose goal is to become the means that allows the teacher to anticipate how to act in the classroom to anticipate their behavior towards the students [12]. On the other hand, Student Play [16] is an attached module that is responsible for establishing interactive games with students to educate in values, through various agents of conversational interface software.

The rest of the article is structured as follows: in section 2 we introduce the Agent SocialMetric tool and its state of art. In section 3, we detail the Student Play module. In subsection 3.1 we detail the methodology and design of the module. In subsection 3.2 the modeling of values. In section 4 show the results obtained. Finally, section 5 presents the conclusions and future work.

2 Encourage through Agent SocialMetric

According to Gonzales Isabella [10], "the classroom is a world, particular, specific, everyday, and characterized as a unique space within which the teaching and learning situation takes place in a given time. From the beginning, pedagogical work has been concerned with finding means or resources to improve teaching, which is why, when referring to didactic resources, they are considered as pedagogical support from which reinforces the act of the teacher and optimizes the learning process, providing an interactive tool to the teacher. It is precisely from this perspective that the didactic resources become tools of supports, aids, strategies, ways, didactic actions to be carried out this teaching-learning, involving in this way motivational aspects in the processes of attention for the efficient management of information. Therefore, the quality of education requires the introduction of this type of resources in a justified and adequate way in order to make the classroom more receptive, participatory, practical and enjoyable in the educational process.

Through several investigations and as a result of the development of the TICs [14], we have developed a web tool called Agent SocialMetric, whose main objective is the assistance to the teachers, based on concepts that link the social networks and the SNA together with the Embodied Conversational Agents (ECAs)**.** Attendance to the teacher is based on the fact that the agent will provide the current state of the classroom, the prevailing social climate in the classroom along with positive relationships and the affective bonds found there.

We have translated into Agent SocialMetric, through the development of an online integrating system that unveils students' perceptions of interpersonal relationships in a classroom, allows the analysis of the existing interaction between students and the teacher within the classroom the thematic framework, making it possible for the teacher to make decisions. It is essential to apply it in the classroom, because that is where students not only learn new knowledge but also incorporate and

become familiar with rules of conduct and various ways of coping with the endless situations that arise. In the tool the agent called Albert, takes an active role in the conversation, being part of his abilities to recognize and respond to inputs by the user as well as generate the corresponding outputs and perform conversational functions.

It is currently a challenge to have a software tool aimed at facilitating the atmosphere of public living (see Figure 1). The focus of our proposal is the integration of the SNA with ECAs for relationship evaluation, which allows teachers to envision pedagogical indicators [3] and contribute to strengthen the teaching-learning process [23]. Bearing in mind all of the above, a software platform was built as an educational resource in which the two lines of research are applied and integrated, using a development framework by (based on THALES [18]) framed in an Agile [9] and systemic work methodology [11], considering a global system feedback [4], which is given between students and the system, given that the system is nurtured by student interactions; between the agent of conversational interface and the teacher (feedback of particular form through an interactive dialogue) [1] and finally between the teacher and the students being able to apply the concepts given by the agent in the face-to-face classroom context.

The scenario is considered mixed, since the teacher in his role of tutor, will accompany in person, the students putting their ability to practice, and then lead to more empathic links. Through the development and practical implementation of the tool we have worked in different cases of study and tests analyzing the prevention of situations or problems such as repetition [15], conflicts [13], classroom climate [12], absenteeism, risk disruptive behavior and other situations among students about the resulting information provided by the system.

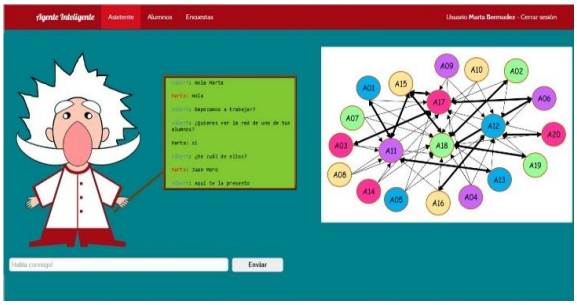

Fig 1. Agent Interface SocialMetric

3 Student play, an educational and didactic module of Agent SocialMetric

At present disciplinary fields are more often intertwined, giving rise to new disciplines such as Educational Informatics. With the incorporation of new technologies in the education sector, there is a greater offer of resources to support the teaching of different areas of knowledge. In our case we have developed an

educational software module as a didactic resource. Our tool will incorporate on the one hand the technologies of software agents like ECAs in the educational domain [14], through the creation, facilitation, or enrichment of situations, which trigger learning mechanisms and, on the other hand, educational games based on values, since through play emotional and social skills can be developed, and values emerge as a result of a relationship expressed through attitudes, behaviors, and behaviors [23].

It is also important to take into account the context and learning environment under which the tool is applied. It is for this reason that we specify Table 1 which details the knowledge of the population or group of students in relation to their characteristics that allow a greater knowledge and understanding of diversity, is of utmost importance for the specific treatment of each individual.

Table 1. Population for Student Play application

Grupo	Socio-economic	Average academic performance	Average Age
Preschool	medium-low	Medium-Good	5-6 years

3.1 Methodologies and design model

The methodological support Agent SocialMetric is mounted on a web application (in prototype version) and seeks to achieve an analysis of the behavior and evolution of a social network in the classroom, which together with Albert allows to obtain a flexible tool with a totally friendly and intuitive [16].

There are several methodologies for the development of educational software such as those developed by Marquis Graells [8], [19], Galvis [6], Madueño [18], Sánchez [22], Polo [21] and Benigni [2] , each depend on the type of project and the construction of the software it wants to be carried out being crucial to the success or failure of the resulting system. Trying to comply with this premise we used the THALES methodology [18] but it has been adapted, which implies that it is used as a support methodology, cyclical and hybrid working each stage from an agile vision iterating at each stage and protecting integrity of the system design.

In Figure 2 we see the design model of the architecture of the Student Play tool coupled to Agent SocialMetric. Below, we detail the two pillars on which the tool is based [16].

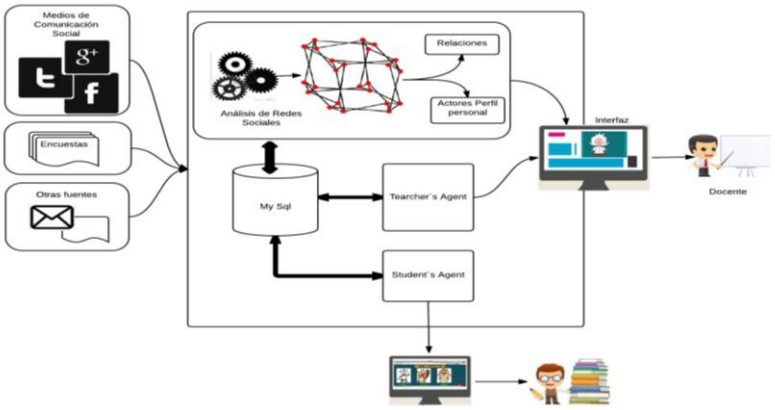

Fig 2. Design model tool of Student Play integrated to Agent SocialMetric

3.2 Value modeling

Values shape our consciousness and behavior. The formation of values is of paramount importance at this time, because at the global level it is a concern the loss of values that can be seen today in all nations. Many researchers [17] agree that it is essential to attend to the formation and strengthening of moral values in man, and especially in younger generations. If values are learned, it is important to have the means to facilitate the moments in which this may be possible, determining valuation learning. The formation of values is a pedagogical task that must be taken by the family and the school. Research has been developed and continues to be developed on the issue of values [17]. Values are not taught; are learned. To educate in values is not to model attitudes. Attitudes do not presuppose the internalization of a value. Good manners do not make a person educated; in the same way as simply belonging to solidarity organizations do not make it solidarity. Solidarity, or respect for others, must be something that we carry within us and that conditions our actions, which causes us to enter into value conflict whenever we must make a decision that affects our human behavior.

The research of this work combines games framed and based on the formation of values. In order to analyze and framing the values in the tool we have considered a "System of indicators of the degree of development of students' habits and values" [7]. The indicators we have selected refer to four types of habits and values:

1. Indicators referring to habits and values that facilitate coexistence and school life.
2. Indicators referring to habits and values that facilitate work and study.
3. Indicators referring to habits and values that favor personal and family well-being.
4. Indicators referring to habits and values that favor the commitment to people and society.

In the database are articulated through a system of rubrics that describe the different levels of development of each aspect included in the indicator. Each indicator is composed of a statement of the aspect included in it, a definition or conceptual approach and the sequencing or gradient of the achievement of that aspect. For the latter, a five-level scale is used that is called: minimum level, low level, medium level, medium high level and high-optimal level.

3.3 Results

Play and play activities are part of the human species, in different cultures and is a universal activity. The game is being introduced into the school as more than an entertainment or a fun, given that the educational potential is important.

In Student Play to be guided in games the tool makes use of ECAs, as shown in Figure 3. Once the agent is selected through the different personifications is allowed to interact with the student holding a conversation and a dialogue, through which it is guided by the different interactive games. Essentially, the agent acts as personification in a virtual learning environment, and activated by natural language input (which can be in the form of text and they provide conversational output in response. Personification is an animal (see Figure 3) that has anthropomorphic characteristics that allow the verbal communication between the agent and the student, in order to motivate the student, to capture their attention and to facilitate the understanding of concepts, thus achieving compliance of educational objectives. In this way the common characteristic of these agents is the exercise of the action; an agent acts and produces an effect. Also the tool integrates didactic games as shown in Figure 3, based on the categorization of values, mentioned above.

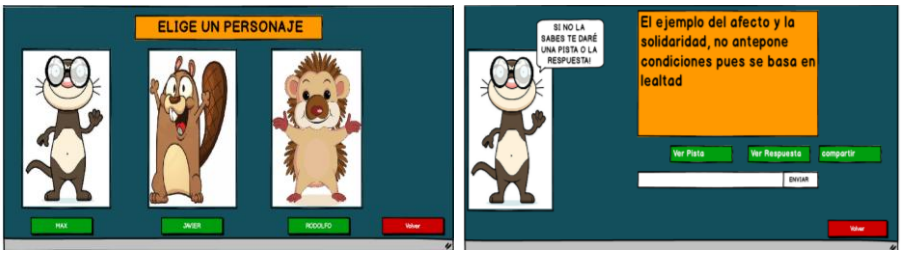

Fig 3. Screen of selection of the interactive personage that corresponds to a conversational agent, Max Javier or Rodolfo and screen showing a guessing game with Max on values

Children construct their own knowledge through the interactions with the agent. In this sense the conversational agents, allow introducing new experiences of use through verbal communication with the user, and their presence will influence learning positively in various ways. Agents are assumed to have a positive effect on users' perception of the learning experience; this is accomplished by adding the social dimension to providing a fluid communication cues and building a positive relationship, which in turn might lead to more effective learning. In a pilot experience of the use of ECAs in our project we observed as preliminary advantage, reduce digital barriers because: they can achieve a natural communication experience

with the user, the anthropomorphization of the agents improves the communication process and as a result and other aspects of usability, such as satisfaction and learning capacity, they diminish the rejection of the user to the system, since they manage to give sufficiently satisfactory answers, and also we can expand the interact in natural language form voice. Also with this proposal, the school environment is incorporated into the game as a playful experience of a socializing nature, understanding it as an element that favors the development of values, and learning. This type of software according to the opinion expressed and relieved of the teachers contributes to the enrichment of the educational process since it allows them to explore the methodological possibilities of working with students.

4 Conclusions and Future Work

Based on the development of Agent SocialMetric and a review of the fundamentals within innovative learning environments, the specific proposal of teaching-learning strategies for the construction of knowledge is continued, enriching the knowledge permanence phase such as the transfer phase, interactions and group organization. In this research we have shown the development of a didactic module of authorship: Student Play, coupled with Agent SocialMetric. Student Play search combine ECAs and educational games by working to educate in values, since values shape awareness and behavior [5] marking patterns of behavior, personal and accepted, but not unmovable. Our development seeks the integration of different technologies that contribute to the strengthening and innovation of tics framed within the teaching-learning process.

In future works we will try to compare this tool with others mentioned opportunely in this work to determine in a timely manner the incorporation of personality characteristics of students associated with values. Also we will attempt to analyze the prolonged use of the tool and how is its impact on the students' learning in relation to the values. We will also intend design other games that are collaborative among students, from the educational point of view, to focus on the contribution of all, seeking the incorporation of all and not the elimination of participants.

References

1. Sameera, Abdul-Kader and Woods.: Survey on chatbot design techniques in speech conversation systems. International Journal of Advanced Computer Science and Applications, 6(7) (2015).
2. G. Benigni.: Una metodología orientada a objetos para la producción de software multimedia. Revista Saber, 16:26–32 (2004).
3. José Manuel Bezanilla.: Sociometría: Un Método de Investigación Psicosocial. Chapter 7, 117–174. PEI Editorial, México D.F México (2011).
4. Zulma Cataldi.: Metodología de diseño, desarrollo y evaluación. Master's Thesis, Universidad Nacional de La Plata, Facultad de Informática (2000).

5. María Nieves Pereira de Gómez.: Educación en valores: metodología e innovación educativa (2000).
6. A. Galvis.: Ingeniería de software educativo, Colección Biblioclase. Ediciones Uniandes (2000).
7. Gobierno de Navarra.: Sistema de indicadores de hábitos y valores (2015).
8. P.M. Graells.: Software educativo: guía de uso y metodología de diseño. Estel (1995).
9. Dan X. Houston.: Agility Beyond Software Development. In Proceedings of the 2014 International Conference on Software and System Process, pp 65–69, New York, NY, USA, ACM (2014)
10. Gozales Isabella.: El recurso didáctico. Usos y recursos para el aprendizaje dentro del aula. Escritos en la Facultad, 109 (2015).
11. E. Ivala.: Proceedings of the 8th International Conference on e-Learning: ICEL 2013. Academic Conferences and Publishing Limited (2013).
12. Antonieta Kuz, Mariana Falco, and Roxana Giandini.: Understanding the teaching-learning environment through Agent SocialMetric. In Information Systems and Technologies (CISTI) 11th Iberian Conference on, pp 1–4. IEEE (2016).
13. Antonieta Kuz, Mariana Falco, and Roxana Silvia Giandini.: Estudio y valoración de conflictos en el aula a través del ARS y SociometryPro, TE & ET (2015).
14. Antonieta Kuz, Mariana Falco, Roxana Ginadini, and Leopoldo Nahuel.: Agent SocialMetric: herramienta de asistencia al docente para determinar el clima social y la estructura del aula. Informática Educativa Comunicaciones, (22) (2015).
15. Antonieta Kuz, Roxana Giandini, and Mariana Falco.: El clima social del aula entre los alumnos repetidores con sus compañeros a través de Agent SocialMetric. @tic. Revista dinnovació educativa.Servei de Formació Permanent i Innovació Educativa, (15):20–28 (2015).
16. Antonieta Kuz, Roxana Giandini and Mariana Falco.: Combining Software Agents and Gaming through Student Play, an Educational Module in Agent SocialMetric. In Conferencia Latinoamericana de Informática (CLEI) (2017).
17. Carreras Llorenc and Mir Victoria.: Cómo educar en valores: Materiales, textos, recursos y técnicas. Narcea Ediciones. ISBN 84-277-1099 (2004).
18. L. Madueño.: Desarrollo de Software Educativo bajo Plataforma Web. In Congreso Internacional EDUTEC, Gestión de las Tecnologías de la Información y la Comunicación en los Diferentes Ámbitos Educativos, Venezuela, (2003).
19. G. P. Marquès.: Modelos de Desarrollo de MDCS. La Metodología de Pere Marquès, http://www.peremarques.net/disdesa.htm (2005).
20. Seymour Papert.: Mindstorms: Children, Computers, And Powerful Ideas. Basic Books (1993).
21. M. Polo.: Aproximación a un Modelo de Diseño: ADITE. Docencia Universitaria, 1(4):67–83 (2003).
22. J. Sánchez.: Informática educativa. Nueva Técnica. Editorial Universitaria, Santiago de Chile, Chile (1993).
23. Kuz, Antonieta, and Mariana Falco.: "Herramientas sociométricas aplicadas al ambiente áulico." Congreso Nacional de Ingeniería Informática/Sistemas de Información (2013).