ECUTE: DIFFERENCE IS GOOD!

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ABSTRACT

This paper provides an overview of ongoing research on cultural and emotional learning, thereby utilizing engaging role-play with synthetic characters. The paper explains the underlying learning objectives and provides an overview of how we intend to achieve them. This includes a technical framework integrating affective AI characters and innovative interaction technologies. The framework will be used to realize a virtual learning environment hosting the synthetic characters. Finally a brief description of an evaluation approach for the anticipated learning objectives is given.

KEYWORDS

Cultural Learning, Virtual Learning Environments, Synthetic Characters, Trans-media Evaluation

1. INTRODUCTION

eCute (Education in Cultural Understanding, Technology Enhanced) is an EU FP7 project which aims at developing new approaches to train users in cultural understanding by using theories from educational, cultural and social psychology. In analogy to real life role-play we want the user to interact with artificially intelligent characters, simulating cultural dependent behavior.

In this paper we focus on one - of two - such application called MIXER (Moderating Interactions for Cross-Cultural Empathic Relationships). MIXER is focused on children of age 9-11years. We give an overview of the research done so far by describing the learning approach and the technology involved. Finally the integrated trans-media evaluation approach we intend to use for evaluation will be outlined.

2. LEARNING IN ECUTE

Learning in the context of culture poses great challenges for people who are to interact with cultural groups that not only differ in their overt verbal and nonverbal communication styles, but also live adhering to foreign rules and customs. eCute adopts a cultural learning approach (see Ward, 2004) which treats learning in the context of culture as all other forms of learning. According to this approach, intercultural interactions closely resemble any other type of social interactions in the sense that they can be easily disrupted when the parties engaged fail to regulate the interaction appropriately. Learning then focuses on the social processes taking place between people new to a given culture and members of that culture.

2.1 Learning Aims and Objectives

Independent of the specific learning goals, a basic aim of intercultural learning within eCute is to accept people belonging to a given out-group into one's own "*moral circle*" (Hofstede, 2009). Given that moral circles have boundaries that delineate those who belong from all others, intercultural learning points to the

extension of this circle. Another fundamental learning aim relates to *conflict competence* in dealing with emotional frustrations and conflict interaction struggles that naturally arise from cultural or ethnic group differences (Ting-Toomey, 2009). Learning how to deal with conflict situations is then of immediate importance, particularly in scenarios which depict a cultural conflict such as in MIXER.

2.2 eCute Learning Framework

The framework by eCute focuses on three dimensions of intercultural learning: cognition, emotion, and behavior. Although they are strongly intertwined, an attempt is made to instigate learning in each domain. As such, learners undergo a *cognitive* change, recognizing the impact that their own culture has on their interactions with members of different cultures, and gather as much information as possible about those cultures. In addition, *emotional* development of the learners enables them to adopt changes in affective reactions to people of unfamiliar cultural background. Last, learners' *behavioral* repertoire should be expanded to include skills that facilitate effective communication with people from another culture (Gudykunst, Guzley, & Hammer, 1996).

Cognitive aspects of intercultural learning are linked to the concept of *intercultural awareness* which refers particularly to the recognition of how culture affects one's patterns of thinking and how it is expressed in one's behavior. Most importantly, this realization must be followed by understanding of cultural conventions as well as cultural differences, which often are a source of confusion. This, in turn, is likely to lead to a more adequate interpretation of other people's behavior in intercultural environments. Furthermore, awareness enables learners to seek information about cultures different than their own and to gather useful knowledge about it. Its development is therefore considered to be a critical component of training (Cushner & Brislin, 1997), and is also treated as the foundation for the development of intercultural sensitivity.

The notion of *intercultural sensitivity* encompasses the affective and motivational dimensions of culture-related learning. Achievement of change in this area requires learners to understand the importance of being able to manage anxiety elicited by unfamiliar cultural settings and to actually begin to deal with their uncertainties and fears (Gudykunst, Guzley & Hammer, 1996). As their attitudes towards "the others" change, learners should be willing to welcome and accept cultural differences, and to treat people who are different from them with respect (Chen, 1997). In addition to changing their attitudes towards members of foreign cultures, learners have to be capable of being empathic. Cultural empathy is an ability to understand another individual's experience as it is embedded in their culture (Mullavey-O'Byrne, 1997). It is also a capability of communicating this understanding in a way that will be meaningful for the other person, with concern for and attention to their feelings and reactions (Davis, 1983), which may later facilitate intercultural communication.

The behavioral dimension of intercultural learning is referred to as *intercultural communication and interaction competence*. The acquisition of skills that allow people to efficiently communicate with members of a different culture is considered to be the ultimate aim of intercultural learning. Specifically, learners are expected to be able to alter both verbal and non-verbal behaviors that are deemed functional in their own culture in order to engage in behaviors that are more appropriate in a foreign culture (Cushner & Brislin, 1997). Furthermore, involvement in interaction includes being responsive, perceptive, and attentive (Cegala, 1981), which finally helps in engaging into appropriate and effective communication.

3. THE MIXER SCENARIO

By having the target audience play through the MIXER scenario, we expect to create a positive change in their cognitive, emotional and behavioral reaction to 'strange' manners of children from different moral circles (Hofstede, 2009). In specific, successful users should be able to cope with the pitfalls of negative stereotyping, which can happen when someone is not fully accepted into one's own moral circle. Please note that two groups of children might have the same cultural background, but belong to different moral circles. The influence of culture can be seen especially in whether people get accepted into or excluded from a moral circle.

The Mixer scenario features two groups of characters visiting a summer camp. While at the camp they participate in different activities, one of them being the Mafia party game. The user plays an invisible friend

to one of the characters present in the game[1]. Our aim is for the user to create an empathic relationship with this character. The scenario starts with the friend-character playing the game with his group (host group). After playing the game the player's friend moves on to the other group (guest group) and plays with them. Throughout the process the user communicates with the character to help him to reflect on the character's experience or to give advice on how the character should cope with certain situations, such as adapting to new behavior in the guest group. The aim of the MIXER scenario is to encourage learners to deal with conflicts in an effective and appropriate way. As such, learners should discover that the other group has different rules from their own (alias the friend-character's one). This will support learners to become open-minded by perceiving new and different practices in a safe environment.

3.1 The Technology

The technology part in eCute focuses on providing virtual learning environments which can be used for the education of social phenomena and to fulfill the learning goals as described in the sections before. This is done by having the user interact with artificially intelligent virtual characters. These virtual characters become actors in a in a role-play scenario. In order for the user to have an immersive, interesting and educational experience, it is very important for the virtual characters to have believable emotional and social behavior. It is also very important that the user has a meaningful interaction with these virtual characters, and that interaction has some influence in the overall role-play scenario.

3.1.1 eCute Software Architecture

The main software component that drives the characters' behavior is an extended version of FAtiMA (Dias & Paiva 2005), an agent architecture based on the OCC appraisal theory (Ortony et al., 1988). FAtiMA agents are able to create plans for their goals in a particular situation and to perceive and react to environmental events (in the form of affective emotional reactions).

Apart from the agent architecture, the virtual learning environments consist of other components such as: (1) the graphics component which in this case is provided using Unity3D[2] game engine and (2) the interaction modality with the graphical environment and the characters. In MIXER we will support more intuitive input utilizing an iPad's touch screen instead of relying on keyboard and mouse only. (3) As the agents behavior is emergent the smoothness of the produced narrative may be supported by a story facilitator. All these and other necessary software components are synchronized and connected through an integration framework called ION (Vala et. al, 2009). A schema of the architecture is shown in Figure 1.
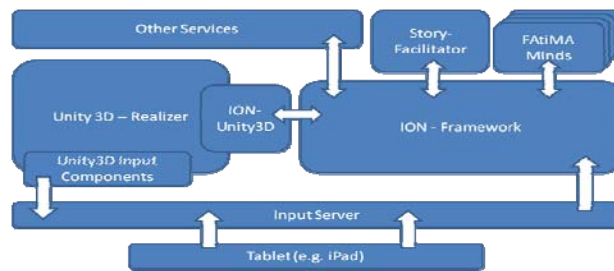

Figure 1. The Software Integration Architecture

3.1.2 Interaction with the User

There is great potential in using virtual characters for culture-related learning scenarios. Advantages, such as the repeatability of training sessions or simply to save the costs for human training partners support that idea. In comparison to simply watching videos tutorials of culture-specific behaviors, virtual characters can be reactive to the learner's actions. An important task for the purpose of culture-related learning through interaction is to come up with interfaces that are intuitive, in order to not distract from the actual learning goals.

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[1] http://en.wikipedia.org/wiki/Mafia_(party_game)
[2] http://unity3d.com

For the MIXER scenario, we had to come up with an interaction type that is appropriate for school children in the age of 9-11 years. In our earlier work, desktop-based systems and hand held devices have been proven to be very suitable for interactive learning scenarios with school children (Aylett, 2007). In addition, they also support easy logistics and are able to provide intuitive experience at the same time.

To overcome the language barrier across cultures and the limitations of typed text input, we decided to focus on an emotion based sign language for interaction with the MIXER scenario. In that manner, actions or feelings can be selected by the user using representative icons. Such a toy language has been shown to be well suited for storytelling approaches (Crawford, 2011). For interaction with character in a virtual environment, we think it is an equally promising approach.

4. EVALUATION APPROACH

The eCute concept of trans-media evaluation is to embed evaluation within an activity so that users are unaware of the evaluation task. The approach taken in the early stage evaluation of MIXER, involved two separate activities. Firstly, we evaluated the MIXER scenario with users to ensure that the scenario was appropriate, understandable and enjoyable for the age group of 9-11 year olds. Using a low-tech solution, children and teachers were asked to comment on a version of MIXER provided through storyboarding software (on the screen, but passive). From this point we were able to refine identified episodes and interaction points in the MIXER scenario.

The evaluation artefact was presented in the form of a children's comic book annual. The MIXER scenario was presented as a comic strip and bound along with other activity pages that would be typically found in a comic book annual i.e. word searches, spot the difference etc. The seamless embedding of the evaluation task within a comic book annual aimed to ensure that the user remained in role, as a Comic Annual reader, throughout their experience with MIXER. During the MIXER evaluation event the group of children were split into groups, one received the comic book annual and the other received standard, black and white versions of the evaluation documents. There was a notable difference between the groups. The children who were given the comic book annual answered all questions and provided more detailed answers to the questions than the group who were given standard documents.

5. CONCLUSION

In eCute we argue that having artificially intelligent characters play out role-play scenarios in interactive virtual learning environments can be an effective way of educating users in cultural sensitivity and other such social phenomenon. By using affective models of synthetic characters which also include cultural cues, and physical interaction devices in graphical environment, we intend to provide the user with an engaging, and challenging experience. And finally we use seamless, trans-media techniques to evaluate the resulting learning environments and the learning outcomes.

Currently, we are working on the story board for the Mixer Scenario. Also prototypes are being developed for the scenarios. The prototypes will be developed iteratively with continuous evaluation built into the design. The work involves improvement in the agent models to make them more adaptive to cultural parameters and also to improve the dialogues between the characters and the user.

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