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Culturally Sensitive Computer Support for Creative Co-authorship of a Sex Education Game

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Abstract. We describe a computer-supported game authoring system for educators to co-author a game to help teaching sensitive content, specifically sex education. Our approach provides educators the ability to co-author the game to tailor it to the class based on a computer-supported interface that draws upon a large, cultural database. By targeting the game to the culture of the students, they feel their values, beliefs and vocabulary are being considered in the game, providing better comprehension of the content, leading to stronger learning engagement that is helpful for highly charged, sometimes uncomfortable and sensitive material such as sex. We studied our design in the classroom and observed that giving educators co-authorship of the game helps them adopt using online games.

Keywords: Cultural Context, Common Sense, Game, Education.

1 Introduction

Sex education often is a difficult subject to teach due to factors such as the teacher can be embarrassed about the material, the students are embarrassed, the vocabulary, generation and cultural gaps between teacher and student interfering with understanding and learning, and ensuring that the material covered is appropriate to the class dynamics and background. Games have the potential to help with this material as they can provide a fun, non-confrontational, low emotional investment environment to cover sensitive topics [5]. However, traditional games are static, thus may not be appropriate for a particular class and its cultural context, especially for topics that fluctuate socially such as attitudes and knowledge about sex. The challenge for tailoring game content though is that considerable creativity and knowledge of the people who will be engaged in the game is required. Our computer-support draws upon a very large database of cultural knowledge that contains information about the attitudes, vocabulary and knowledge associated with different demographics allowing the system to supply ideas to the educator to work into the game. Our contention is that the targeted support of educator's creativity within a well-defined type of game leads to a rich, educational experience for the students, connecting them closer to the educator.

The main contributions this paper describes include: (1) a co-authored online sex education game, called *What is it?*, that can be used effectively; (2) a generalizable

approach to integrating cultural knowledge into a computer supported game authoring interface to allow educators to be creative to adapt games to their students; and (3) evidence that educators more readily adopt online games in the classroom if they have control over the content through co-authoring it. We call the tailoring process, co-authoring, as the main game structure has been created by someone other than the teacher, however, they are adding content to the game which suggests that the final game has been co-authored. We discuss the related work in Section 2 that focuses on cultural support for games. Section 3 describes the sex education game. Section 4 discusses the evaluation of this game in the classroom. We then conclude the paper and provide future work directions in Section 6.

2 What is it?

We are using common sense statements as cultural knowledge to give cultural context to the sex education game the educators develop. Common sense is the knowledge shared by most people in a particular culture [1]. As complexity of computer applications grows, one way to make them more helpful and capable of avoiding unwise mistakes and unnecessary misunderstandings is to make use of common sense knowledge in their development [5]. For our sex education game, we want to extract the knowledge appropriate for the students who will be playing the game so that the teacher can use it effectively.

We use the OMCS-Br project (Open Mind Common Sense – Brazil) to collect common sense of the Brazilian general public. Within the OMCS-BR database are encodings of the relationships between statements generated by people of all ages about attitudes and beliefs around sex. This database provides the relationships about sex related terms that are useful for providing words and concepts to the teacher to be creative when she is tailoring the sex education game [1][3]. Using it, she can ensure the content reflects the cultural reality of the students' sexual knowledge in a fun game.

We illustrate the potential of our approach by adding cultural support to a sex education quiz game called, *What is it?* The student's interface is shown in Figure 1. *What is it?* is a web quiz game where the player sees a topic with an associated secret word. Their task is to guess the word based on a series of clues that are shown one at a time. The objective is to guess the word after seeing the least number of clues. There are ten clues that can be selected by the learners by clicking on a number. The challenge for the teacher is to make a set of secret words and clues that are related to the students' concepts and vocabulary, otherwise, they will be alienated from the concepts being described. For example, many sex education curricula are



Figure 1: Student interface to the *What Is it?* sex education game.

taught in biology classes using scientific names for everything to sterilize the content. However, this does not allow students to assimilate the knowledge in a relevant way to their current situation as they don't make the connection between the impersonal scientific vocabulary and their reality.

We chose sex education as our target since in Brazil, teachers must cover the transversal themes defined by Fundamental Education Secretary/Minister of Education (SEF/MEC). These themes aim to promote citizenship upbringing in school. The themes are: Ethics, Health Care, Environment, Sexual education, Cultural diversity, Work and consumers [4]. However, teachers often find they are not provided adequate training to teach the sex educational components and often are very uncomfortable covering the material. Thus, the main objective of this game is to make possible the use of cultural knowledge in web educational games, stimulating the introduction, reinforcement and the knowledge's construction in the learning process to allow teachers to more effectively cover these areas.

3.1 Culturally Sensitive Authoring of the Sex Education Game

We provided a computer-supported teacher interface to allow the teacher to define the set of secret words and the clues that would be associated with them. There are 10 clues needed for each secret word which becomes quite a creative challenging to come up with good clues and secret words. It is here where the OMCS-Br cultural knowledge can help support this creative process. The clues for the game are defined using the support of the OMCS-Br cultural knowledge base that helps the teacher adopt a common vocabulary to the students and clarify myths, beliefs and taboos culturally inherited.

There are seven steps to support a teacher to create a quiz: **(1)** the teacher first selects the profile of the learner, age range and region of the country to identify what group of learners the configuration is more appropriate; **(2)** the teacher defines the game's main theme, such as sex education or health, that is used to constrain the cultural knowledge base search; **(3)** some of the related topics to the main theme are shown in the teacher interface (shown in Figure 2) so that the teacher can decide which topics he wants to explore in the game; **(4)** a list of possible secret words is shown based on the search results allowing the teacher to choose one or create one of his own; **(5)** a list similar words is shown based on the secret word in the previous step. The teacher can also insert synonyms for secret word selected; **(6)** the teacher defines 10 clues; clue suggestions come from the cultural knowledge base that he can select from or he can edit it, or ignore it and create his own. The suggestions are intended to trigger creative ideas for the clues as well as provide some choices that might be useful. The selected clues are shown in region II of the interface shown in Figure 2; and **(7)** Once complete, the teacher sees all clues and the secret word for final editing and confirmation.

In a separate view, the teacher highlights the relevance of the cultural knowledge as a factor that interferes in student's learning process. This approach brings discussions about what was previously described, like myths, beliefs, misunderstandings into the classroom so these ideas won't be understood as facts by the students.

The teacher repeats all seven steps for each secret word that they want to include in the game. Once complete, the students can then go to the website to begin playing the game to guess the secret words from the clues. Notice that the teacher can include misconceptions that student may have that have appeared in the database as these typically are captured. For example, if the secret word is HIV/AIDS, one clue could be, “You can’t get it from a public toilet.” as the contrary may have been in the database. Interactions with the game are logged so that the teacher can see where students are having trouble for further focus on those concepts. In the end, teachers can consider and use the cultural knowledge as needed from the computer support in their pedagogical activities aiming at helping the learners to associate the content being taught to their personal experiences and knowledge [1].

We studied this web-based sex education game in a school as described in the next section. Of particular interest are two main design issues: (1) how teachers responded to having a role to play in co-authoring the game; and (2) whether the cultural knowledge used in the computer supported co-authoring stimulated their creativity and/or was useful in some way.

4 Evaluation

We used a case study approach to evaluate this game because we wanted to evaluate the game in a real-life context, in this case, the classroom. According to Yin [6], case study is an effective type of empirical research that investigates a phenomenon embedded in a context of real life. For each classroom we studied, we used the following data collection techniques: questionnaires pre-section and post-section based on QUIS [2], video recording and screen capture and direct observation with four researchers. We evaluated *What is it?* in two classrooms. The researchers selected six teachers and nine students. In the first classroom, there were four students in the age range of 11 years old and they played the sexual education theme. In the second classroom, there were five students in the age range of 12 until 15 years old and they played the health care theme. Teachers were asked to create a new instance of a game, choosing any of the themes and topics. They used the system for approximately 40 minutes to set up a new instance of the game with twenty clues and two secret word; the themes used in these settings were: environment (3 times), healthcare (twice) and sexual education (once). After this step, the students were asked to play the instances. Each player used the game for about 50 minutes, playing an average of 7 times different instances of the same theme.

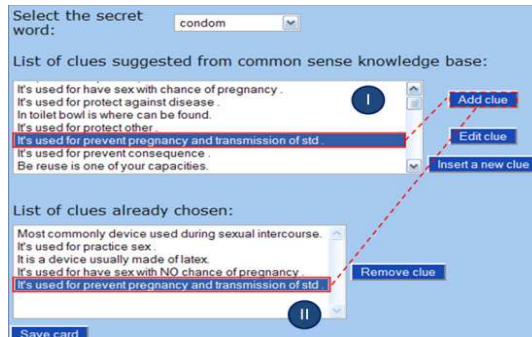


Figure 2: Clues suggested from cultural knowledge base for the ‘What is it?’ game.

4.2 Results and Discussion

After the teachers created the instance of the game, they received a post-session questionnaire. Each point represents an alternative which shows the teacher's opinion. For example, in the first question, "What did you think about the game creation process?" the alternatives were: I have no opinion, Very hard, Hard, Indifferent, Easy, Very easy from zero to six. For this particular question, just one teacher said that this support was unhelpful or irrelevant, in which she commented, "I thought it was very unproductive to have to read a huge list of clues with many phrases" and "It is hard to find a clue that fits well to the secret word". However, for the others, the game process of co-authoring was simple; all these teachers had a good experience to create their own game. Table 1 shows three post-session questions with the teachers' answers.

Table 1: Teachers' Post-session questionnaire answer about the creating of the game.
(Translated from Portuguese, 5 is strongly liked.)

Questions	Teacher 1	Teacher 2	Teacher 3	Teacher 4	Teacher 5
What did you think about the creating game process?	easy	hard	easy	easy	easy
What did you think about the game, created by you, to work the themes with students?	very inadequate	appropriate	appropriate	very appropriate	appropriate
What did you think about the quiz game strategy, i.e., guess secret word taking into consideration the clues, created by you?	very inadequate	indifferent	appropriate	very appropriate	appropriate

We also asked the students if the language of the game was familiar to them, which they agreed with. Of course this does not mean that it was only due to the common sense knowledge support, however, as this support was used by the teachers, we believe that our approach helps to achieve this goal. We noticed that the students did understand that material as well. For example, there was a question "Did you get to understand the clues?" for which one student said "always", five said "sometimes", one said "indifferent", two said "rarely".

The results confirm that the "What is it?" environment provides extra benefits beyond a simple educational game. The teacher's ability to be the co-author of the game content is considered beneficial by most of the teachers allowing the game to be tailored to different students with different issues. In order to support the teachers during this process, the software uses the common sense knowledge base to provide some suggestions of clues for each card, which were generally accepted by the teachers. Almost all teachers used part of these suggestions in order to create their own clues.

Our experiment shows that, except for one teacher, the common sense knowledge base helped with creating the game content. The criticism made by the one teacher may be interpreted in two different ways: (1) since the common sense knowledge base content is created by any person who accesses the project site, there are many concepts that do not make sense or that are scientifically wrong and do not provide meaningful options when presented as a choice. It is the teachers' decision how they could work with this information; (2) the process to create the clue has some

problems and can be improved in order to create better sentences. We are addressing the second interpretation by working with a natural language processing research group to improve the sentences suggested to the teacher. Nonetheless, the suggestions allow the teachers to successfully create clues for the secret words.

5 Conclusions and Future Works

We created a new web-based sex education game to illustrate that cultural knowledge can be included in computer games to support the creative process of co-authoring the game in an educational context. Our approach is general and can be applied to many games where the interface needs to be authored to take into account the cultural context of the players. Through our deployment our main observations suggest the following: (1) the ability to co-author the game through the tailoring system we built empowered the teachers and was very successful. Teachers felt that this made the game useful in their setting and would use it again because of that; and (2) the cultural knowledge component was found to be useful, but it is still premature to determine whether it will be accepted as part of the methodology for creating culturally sensitive games.

Thus, the ability to co-author the games was a helpful element that made the game successful. The fact that teachers indicated they would like to continue using it because of that and that they would explore the potential of the computer-support system more as they created more games suggests that there will be an important role for our approach. We are continuing to explore this promising direction.

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