USING CONTEXTUALIZED NARRATIVE GAME TO IMPROVE STUDENTS AND TEACHERS COMMUNICATION

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Abstract: Nowadays, school faces several educational challenges to teach children some skills, like ways to express themselves in an appropriate way in their community and how to collaboratively work in group. However, it is still very difficult for educator to find tools that are appropriate and in accordance to their pedagogical planning to stimuli students on those skills. Computers can potentially be a useful tool to promote expression, communication and collaboration, but the available tools are not yet so user friendly for school context of teaching and learning. Considering such reality, this game allows educators being co-authors on creating the story context taking into account their goals, pedagogical approach and the student's cultural reality. Then, teachers can adopt values, metaphors, cause and consequence relations or even a common vocabulary before and during the narrative game and, consequently, enabling students to feel identified in that story context being considered and get interested and engaged in collaborating with the teacher and other students to develop the story. In order to observe the use of this game in an educational environment and collect the target group opinion, a study case was performed at school with teachers and children, and is described in this paper.

1 INTRODUCTION

Games and storytelling serve an important role in children's development (Piaget, 1999). Computers are increasingly present in the children's world (Weib *et al.,* 2008). Therefore, why not to use them to support children in educational context?

Educational environment is very important to the children's quality of life, because this environment influences intellectual and socio-cultural growth so that they can expand their social, interpersonal, cognitive and linguistic skills.

The quality of relationships established at school, especially at the elementary school, can affect their learning and development. Because of that, the relationship among students and between students and teachers is very important. According to Benford *et al.* (2000), collaboration is also other important skill for young children to learn. These skills should be learned during childhood. In Brazil and in other emergent countries teaching those skills at school is still a challenge. Another skill that is important in education is to know how to live and to communicate with different people because each person has his own culture, values and socio-cultural reality (Bittencourt *et al.,* 2003).

On the other hand, activities to promote work in group can rarely occur spontaneously (Diaz-Aguado, 2003) so that teachers and students need to have activities and tools to support this new way of studying. Because of that, an educational computer narrative game to help teachers to work collaboratively with their students through a cultural sensitive storytelling environment is presented here.

This game was developed to children from 8 to 12 years old. According to Piaget (1999) in this phase the children are in the stage called Operational Concrete Thought. In this stage child has great interest in games and finds new ways to play and to work collaboratively. They also have facilities to build and to maintain friendships using computers; they usually interact with one another virtually.

2 CONTEXTELLER

Contexteller is a narrative game inspired in Role-Playing Game – RPG (Bittencourt *et al.,* 2003). In this type of game there are participants and the master, who usually is the most experienced player and his task is to present the story to the group, with characters, their characteristics, scenarios and situations that require choices by other participants,

who are the players. These players are not just spectators; they contribute actively in the story, through their characters that choose paths and take own decisions, and most of the time not foreseen by the master contributing to the spontaneous and unexpected development of the story. In the context work the master is the teacher who introduces the story and intervenes collaboratively with the players. The players are the students, the co-authors of the narrative.

Figure 1 shows the interface available for players. This interface allows the players to see their card (I), their dice (II), and the text area (III), which allows the master to read all the messages sent to students and master during the composition of the collaborative story. In area (IV), the card, with another color and size, represents the master of the game, and area (V) shows to other characters´ card (Silva *et al*., 2009).

Figure 1: Contexteller interface.

Contexteller also intends to help children to notice familiarity with the characters, their characteristics and plot of the story. Therefore, this gives the teacher computer support through contextualized information so that he/she can create and tell stories. This support is provided by common sense that represents cultural aspects of the students´ community.

The common sense knowledge is obtained by the Open Mind Common Sense in Brazil Project (OMCS-Br). This project has been collected common sense of a general public through a web site (Silva *et al*., 2009).

Students can identify themselves with the story when they observe that it is closer to their reality, i.e., what happens in the story is or can be similar to their way of living. Explain better, through stories, which consider the culture, the values, the beliefs, in short, the players´ common sense, can allow the players to identify themselves with the story language, characters and scenarios. Because of this allows them to identify mean in the story, then they can have greater interest in participating in it.

Because of this, Contexteller supports teachers on defining the initial context and the content of the game design considering the community's knowledge where students live. The initial context represents the scenario setup with objects, scripts, characters, their characteristics, actions and abilities that are going to compose the stories initially. The content of the story has been built collaboratively by the players and master.

In order to observe the use of this game in an educational environment and also collect the views of students and teachers about the game, a case study was realized, described in next section.

3 CASE STUDY

Case Study was adopted because in this strategy there are the necessary tools to conduct research in order to observe in a real-life context, in this case, in the classroom. According to Yin (2002), Case Study is a type of empirical research that investigates a phenomenon embedded in a context of real life (Dias, 2009).

3.1 Planning of the Case Study

Place: The Case Study was performed in a school that is a partner of educational projects in the Research Laboratory where the Contexteller Game was developed, in the state of Sao Paulo – Brazil with about fifty thousand people.

Ways of Collecting Data: To collect data the Case Study some sources of evidence were used, such as:

- Questionnaires: Two types of questionnaires were used:

Pre-section was distributed to the participants before the interaction with the Contexteller Game. In this questionnaire, the data were collected according to the participant's backgrounds, the familiarity with computers, computer games, their satisfaction to hear and tell stories.

Post-section was given to the participants after interacting with the Contexteller Game to collect not only information about the experience but also the facilities and difficulties perceived during the Game.

- Video recording and screen capture:

All interactions were also recorded using software, called Camtasia, which can record the screen, the participant's face and his voice. These records (audio users - thinking aloud, user's interaction record and user's expression image) very important and valid to demonstrate the levels of attention and interest of individuals, consider some quantitative criteria (Yin, 2002).

Infrastructure: One of the initial concerns was to identify if the school had Internet access and the amount of available computers. It was found that the school had access to broadband Internet and three networked computers. To realize case study, it would take six computers, five for students and one for the teacher. Therefore, for the case study could be realized, was a improvised with five laptops and two desktop computers provided by the laboratory from UFSCar, with external mouse, headphones with microphone and installed software to capture user interaction.

Method: This case study has divided the Case Study in three steps, each one with a distinct goal, which will be described as to following:

- *First Step:* to explain the process and purpose of the Case Study for the school coordinator;
- *Second Step:* to show and use the Contexteller Game with the teacher so that she could know the Game;
- *Third Step:* to use the Contexteller Game in educational environment with teachers and students interacting.

3.1.1 First Step

The proposal of the first step was presented to the coordinator of the school whole steps of the case study, the Contexteller and explained ways of collecting data.

Presenting Contexteller to Coordinator: An instance of the narrative Contexteller Game was created in order to explain to the coordinator all user interfaces which the teacher and the students would have access during their interaction with the Game. The coordinator reaction seemed positive during all the presentation, because she kept her attention on the presented questions and gave some tips related to other ways to use Contexteller, as:

"While I'm listening the presentation, many possibilities comes to my mind. Did you imagine that this Game can be used in many ways? An idea that came to my mind is that I can use the Game during the History classes. For example, I can choose some Brazilian History characters and define that each student will be one of them and through these character the students can learn not only the History, but they will experience it too. " "There are lot of possibilities with this Game. The possibility to retrieve common sense suggestions is very important." Another important factor addressed in this first step was the teachers choose.

The coordinator said that she had thought in a set of possible teachers to participate of the case study, but after the Game presentation she decided to choose a teacher that is more communicative and

that likes to interact with people in a happy and spontaneous way. Including, this teacher works nowadays in a municipal school, but she worked during few years in the school which the case study was conducted. Thus, the coordinator invited this teacher to attend the study case and she accepted.

3.1.2 Second Step

Besides the teacher chosen by the coordinator, other teachers showed interest in participating of this step. In total, there were three teachers. This step started with the presentation of the study case's liable people and with the Pre-section questionnaires delivery. Through the Pre-section questionnaire, it was possible to identify the teacher profile and some information related to her familiarity to the stories, games and computers. Teachers have utilized internet more than 2 years, some activities, which they usually do, are represented on Figure 2. This questionnaire also shown that teachers like to tell and to listen stories and they often do these activities with students in their classes.
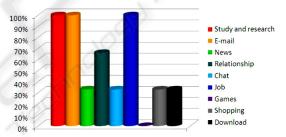

Figure 2: Some activities that teachers usually do on the Internet.

Presenting Contexteller to the Teachers: During the Contexteller presentation, some subjects were addressed, like: the Game objective and why the choice of a computational narrative Game. In this step, a Contexteller Game instance was also created in order to show all the user interfaces that the teacher and students would have access.

During the presentation, the teachers pointed out two positive aspects: the common sense and the co-authoring possibility. Teachers said that common sense stimulates creativity; expands the possibilities and the repertory. They also found relevant the possibility to create a game instance according to their needs, i.e., the possibility to be co-authors.

The teachers reported that many times they searched on the Web in order to find learning materials to use in class, but they said that it is too difficult to find a learning material that fits the target audience needs. Teacher 3 reported: *"We know what we want, but we can't find it"*. Teacher 1: *"That is right "*.

Then, Teacher 2 reported one of her experience with learning material edition: *"Most of the time I need to print the material founded in the Web, scan it and change the material according to what I want... I do this because I can't change the site, but maybe I don't know how to use it properly, but I think that the site doesn't have this feature at all"*.

Using Contexteller: The instance created during the Game presentation was used to play with the teachers. Each participant was one of the characters and one of the researchers was the master. This possibility to allow the teacher to play taking into consideration students´ role was a coordinator suggestion given in the first step. To her, this could help the teachers know the tool better. They showed a lot of interest and engagement. This could be observed through the video analysis in which they gave laughter when some objective was achieved and they whisper some words to the other teachers, as: "*I did it*", "*Nice*", etc.

Creating an Instance of Contexteller: After the presentation, discussion and interaction with the Game, the teachers were invited to create an instance of the Game. It was possible to observe three different ways to use common sense knowledge to create the Game instance. The Teacher 1 utilized the common sense to find some character names and characteristics according to the suspense scenario that she was developing. She said that: *"the common sense enriches"*.

Teacher 2 preferred to see all the existing characters that exist inside the common sense knowledge base, and using these options, choose some characters which she knows and have domain. Through the video analysis, it was possible to observe a comment that Teacher 2 did to the Teacher 1: *"I want to use a story that I have certainty that I know... to do the inferences. I don't want to choose characters that I don't know. I want to use one that I have some domain"*. In this case, it is perceived that the Teacher 2 was afraid to create a story which she could lose the situation's control.

Teacher 3 preferred to define the characters, their characteristics and the scenario without utilize the common sense. After, she reported: *"I stuck in the first step and I didn't use the common sense. It's interesting that I wanted to resume it and try the common sense. It's a database that is available and I didn't open the box. Did you understand? I went straight. I think that I did it because I didn't have experience with the tool"*.

After this creating process, the teachers filled pos-section questionnaires. Some questions and teachers´ answerers are in Table 1. It was possible to observe that teachers liked to use Contexteller and

thought appropriate many their functions. Only teacher 3 considered the use of common sense as indifferent because she did not use it.

Table 1: Some pos-section questions and teachers´ answers.

Questions	Answers		
	Teacher 1	Teacher 2	Teacher 3
What do you think about process of creating a Game?	stimulant	stimulant	stimulant
What do you think about the steps of the Game?	appropriate	appropriate	inappropriate
Was information on the Game´s interface clear?	clear	clear	clear
Did common sense help you to define characters?	useful	useful	indifferent
Did common sense help you to define characters´ characteristics?	useful	very useful	indifferent
Do you observe any disadvantage to use common sense?	no	no	no

3.1.3 Third Step

Three options were offered to teachers in order to investigate the use of common sense in a second contact with Contexteller:

1. Changing the instance created at the second step,
2. Creating new instance, or
3. Using an instance already created.

Teacher 2 chose the option 2, i.e., to create a new instance of the Game again. Because of this, she came to school 30 minutes before the students. This was the time teachers used to create an instance at the Second step.

It was possible to observe, analyzing videos, that the teacher used common sense cards more in this second contact with Contexteller, as illustrated in Table 2. In this table there are how many times each teacher searched and used the common sense help in first and second contact.

Table 2: Using common sense through Contexteller.

Teacher	First contact	Second contact
Teacher 1	Searched: 8 times Used: 6 times	Searched: 11 times Used: 11 times
Teacher 2	Searched: 9 times Used: 6 times	Searched: 12 times Used: 8 times
Teacher 3	Searched: 0 times Used: 0 times	Searched: 5 times Used: 2 times

Pre-Section Questionnaire – Children: Students were invited to get into the classroom to fill pre-section questionnaires while the teacher was creating an instance of the Game. Five pre-questionnaires and five pens were organized on the

desks. Through this type of questionnaire it was possible to collect some information about the students´ profile and their familiarity with stories, games and computers, as in Figure 3. There were five students: Gender – 3 Feminine and 2 Male; Age – 11 and 12 years old.

It was possible to observe that students like to use computers, as well as, listen and tell stories. On the other hand, nobody has contact with the computer in an education environment.
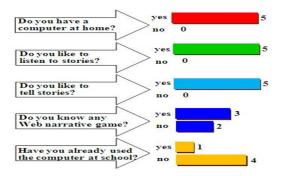

Figure 3: Some pre-section questions and students´ answers.

Using Contexteller: Figure 4 presents how the computers, two desktops and five notebooks, were distributed in the classroom. The students used notebooks; the teacher accessed the Game trough a desktop and another desktop registered the whole interaction between the teacher and the students.

Figure 4: Teacher and students using Contexteller.

Story: Teacher 2 created a scenario about a castle. The characters were: Beauty, Witch, Princess, Elf, Vampire and the Teacher. She wrote on the scenario: *"'ONCE UPON A TIME A CASTLE ON THE MOUNTAIN. THERE WAS A SIGN, ON THE CASTLE DOOR, WITH THESE WORDS: "COME ON! LET'S HAVE FUN! YOU WILL LIKE IT VERY MUCH!"*.

Teacher 2 invited each character to enter the castle; this behavior was in her planning to find out if the students would get interested in the story. Beauty was the first invited character: *"WOULD YOU LIKE TO ENTER THIS CASTLE. BELA, DO YOU WANT TO ENTER IT?"* Bela got very interested as well as the other characters, she answered: *"Oh yes, I would like to enter in so much, I think that there are many stories in this castle."* Elf: *"yes, it would be a great honor to enter in it".*

When all characters were in the castle, the teacher wrote: *"NOW, EVERYBODY IS IN THE CASTLE. WE CAN START THE STORY. OPS! I ALMOST FORGOT, I NEED TO EXPLAIN THAT WE CAN'T LEAVE THIS PLACE, WE NEED TO FIND OUT THE PASSWORD BEFORE."*

The students´ behavior showed a good collaboration to each other. The teacher sometimes sent some motivated messages, such as: "*INVITE A FRIEND TO FIND OUT THIS WITH YOU.*" At the end of the story there was a wonderful collaboration among them because they needed to find out the password together; this password was the beginning of their character's name, i.e., BWPEV (Beauty, Witch, Princess, Elf, Vampire).

During the story, the teacher has used the common sense twice. First, to know what the students know about castle, and second what there is in the castle.

Pos-section Questionnaires – Students: After the Game, which took 45 minutes, the students received the pos-section questionnaires. The answers confirmed the enthusiasm noticed through the videos. They wrote that Contexteller was very cool and funny. They also enjoyed the colors, the characters and the use of the Game was: easy.

Through this question (Who was your character? Did you like him/her? Why?), all students answered that they liked their characters chosen by the teacher with common sense help. Some of their comments: Student 5: *"I loved very much to be an Elf, I imagined that I was him"*; Student 1: *"My character was Beauty. I liked her very much, she helped a lot to find out the password"*; Student 3: *"I was a Vampire and I like it. Because of this, I enjoyed to be one".*

Most of the students considered very cool the possibility of telling stories with the teacher and friends; they also observed that everybody helped to tell the story. Students said that they did not want to stop the story; on the contrary, they wanted to play with their friends again. When they read the question about what they liked most, they answered: Student 1: *"I liked to use my imagination to find out the password"*, Student 2: *"Everything"*, Student 3:

"mystery", Student 4: *"I though that everything was real"*, Student 5: *"I liked to use the imagination".*

Pos-section Questionnaires – Teacher: The teacher considered the Game easy and she liked to tell the story with the students through the Contexteller. She liked to use a scenario that she created by herself.

"There are many common sense suggestions to support before and during the story", she said in the questionnaire. She did not see any disadvantages in using common sense. Her opinion, *"common sense is a good way to get to know the students´ culture and language. I believe that exchanging knowledge is important to learn in a collaborative way and it is a source of knowledge for everybody".*

She wrote that the Game was suitable for children to express themselves and to work collaboratively. The teacher realized that the students collaborate with each other: *"Characters were interconnected. It was important the collaboration."* She realized that the students´ motivation during the story was good: *"I noticed that the students were curious about what could happen later".*

Analyzing the videos, it was observed that the teacher was having fun with the story; she laughed and was interested in reading all the messages. This behavior demonstrated engagement and motivation. About her motivation she wrote: *"I thought that this activity was very interesting and pleasant and there were many possibilities to help and to improve students´ imagination and creativity".*

Her last comment about the Game: *"It was a pleasure to play this Game. I believe that it can be a good tool for teachers to help students to improve themselves in many development and knowledge areas".*

4 CONCLUSIONS

The results of the case study have shown that Contexteller is a good tool to achieve these objectives mentioned above. The students got involved and liked the stories. They also identified themselves with their characters and participated taking consideration the character`s characteristics defined by the teacher. They also participated actively, facing and proposing challenges; helping each other during the whole story to reach a common aim.

The use of Contexteller as tool to help collaborative work was other positive data collected through questionnaires, logs, interviews, among others. The teacher said that she could identify how students collaborate in the stories and then she could propose some challenges to stimulate students to work better in a collaborative way.

The teacher also said that Contexteller, most of the time, was an appropriate tool to allow students to express themselves. They helped to tell stories through their characters and used that moment as an opportunity to talk to participants and enjoy themselves.

The case study showed evidences that the common sense knowledge makes easier for teacher to define characters with their characteristics, themes and scenarios. For the teacher this knowledge helps to remember these pieces of information and to present what the students like. Students also described in questionnaires that all the characters (chosen with common sense help) were very cool.

Common sense also supports teachers to tell contextualized stories with characters, events, places, among others that students know. For example, in this case study the teacher has used the common sense twice. First, to know what the students know about castle, and second what there is in the castle.

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