“You cannot use my broom! I’m the witch, you’re the prince”: Collaboration in a Virtual Dramatic Game

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Abstract. In this paper we discuss how collaboration issues are addressed in the context of *Teatrix*, a virtual environment aiming at providing the children with the means for collaboratively creating a story on a virtual stage. The children create stories using a set of pre-defined scenes and *dramatis personae* - characters that have specific roles in the play, which they control to a certain extent). Each child expects the story to evolve in reaction to her/his character’s actions and the overall story emerges from the collaboration of different children. Based on this premise we conducted some evaluation experiences, in order to assess to what extent *Teatrix* promoted collaboration and what types of collaboration were particularly elicited by the application.

1 Introduction

Children as young as three engage in the art of make-believe, exploring the boundaries between reality and fantasy. The transition from the make-believe play of the preschooler to more structured theatricals is evident in children’s efforts to set up little plays [9]. One of the most important aspects of drama is that it provides a collaborative type of activity where children engage in a play actively, with several senses. Aristotle refers to this as “enactment”: which means to act rather to read [5]. However, due to its physical grounding, acting is often seen as an activity done independently from the creation of stories and the writing processes. In fact, creating stories is often regarded as an individual activity and collaboration plays little role in it.

Merging acting, reading and writing into a single collaborative virtual environment, and supporting it, was one of the main goals of the research here presented.

The product of such research is a virtual environment for story creation, *Teatrix*, which aims at giving effective support for young children (7-9 years old) to develop:

1. their notions of narrative, through the dramatization of several situations;
2. their ability to take a second and third person perspective across the experience of a wide range of situations.

This paper is organised as follows: first we describe some of our findings concerning collaboration in dramatic games. Then, we give a summary of *Teatrix*, describing how it provides support for collaborative story creation, and we present some results of the evaluations conducted with *Teatrix*. Finally, we discuss some pending issues and propose some future work.

2 Collaboration in Dramatic Games

Our research was grounded on a set of experiences run in the school "O Nosso Sonho". During the experiences we observed children of several ages performing fairy tales in two different settings: theatre and puppet scenarios. The school follows an educational approach where different types of activities are done in different rooms. Every day, each child has the possibility to choose his/her daily activities by choosing the room to go to. Drama is one of these activities and one of the most chosen ones (drama is done in the "*Dramatic Room*"). Children enjoy the dressing up, the make-up to become someone else, the acting, the singing, and even to be in the audience.

So, in order to better understand and influence the creation of a virtual theatre we collected 14 performances done in the "Dramatic Room" (each performance with young actors with ages between 4 to 8) and observed the interactions between children and with the teacher. This analysis was not trivial as interactions in a dramatic game may occur at different levels, in parallel and between different participants.

In the dramatic games, we were able to distinguish two types of interactions:

1. "*performance level interactions*": children interact through their characters by their actions and sentences, and;
2. "*co-ordination interactions*": children may provide signals to the others, give orders, make demands or simply inform the others about something. Further, children's actions are often dictated by their common goal, and co-ordination actions may appear, like for example, in the middle of one performance when one child not involved in that particular scene, steps out of the stage to find a "little basket" to give to the *Red Riding Hood*.

Being collaborative in nature, and as with many other collaborative activities (see [4] for an overview of collaborative learning), we can find that dramatic games are influenced by several different factors. In particular:

1. *The age of the children*: we found that 5 to 6 year old children did not manage to stay in character easily and needed a significant help from the teacher in order to "act". Differently, the 7 to 8 year old were much more at ease with their characters. This result may stress the importance that perspective taking plays in collaborative activities and the lack of ability not to center on their own perspective found in the younger groups.
2. *The group heterogeneity/homogeneity:* since the groups performing were quite large (from 4 children to 8) the influence of heterogeneity was not seen as very significant. However, we noticed that our groups with both genders tended to produce better plays than with only male actors (we didn't have the opportunity to have a female only play). Also, larger groups are more difficult to control, and thus the play tends to be weaker in terms of narrative result.
3. *Teacher intervention:* in our dramatic room the teachers play two essential roles: 1) the stage director, deciding where each child should go, and signal them to start or finish; 2) the narrator: it is often the teacher that sets up the story ("One day, a family that lived…"). Although both roles can be performed by children (in fact, some children do like to take a lead in coordinating the whole performance), these two activities are usually done by the teacher. We found that, if the teacher is not very active in the directives given to the young actors (in two of the performances the teacher had a minimal role in it), the play may turn into something completely different from what had been agreed upon. For example, we had a group performing *Hansel and Gretel* where half of the group decided they wanted to be wolves and attack the two children in the forest. Another group decided they just wanted to pretend that they were riding motorbikes. Also, interaction between the children, both at the *co-ordination* and at the *performance* level, becomes weaker and conflicts tend not to be solved.
4. *Story/Task*: the type/genre of the story to be performed may also influence the collaboration established, as some stories do foster interaction and coordination more than others. Since our experiments were all conducted with fairy tales (*Red Riding Hood, The Three Little Pigs, Hansel and Gretel*, and *Cinderella*) we did not achieve any results on the influence of the story in the collaboration of the children during the dramatic games.
5. *The audience*: we did performances both with and without an audience and the interactions between the actors were slightly different in each case. The audience introduces both a critic element in the performance and at the same time a disturbing one. We found that the performances without an audience lead to a much better control of the characters, but children were not as enthusiastic about it as with an audience. In our case, the audience was sometimes too disturbing, and often children

from the audience would step in the stage interfering with the whole performance (note that the *Dramatic Room* is a classroom and not a theatre).

3 Overview of *Teatrix*

Based on the above findings and taking into account the dramatic games activity of the school we designed *Teatrix* as a game for story creation (see [6] [7]). Following a theatrical metaphor, the environment is divided in three modules strongly related with the theatrical performances.

The first module (*Backstage*) offers the children the possibility to prepare the scenes, props and characters for each story (in relation with what happens in the backstage of a theatre during the preparation of a play).

Fig. 1. *Teatrix*: Backstage Module.

The second module (*On Stage*) provides the children with the possibility to initiate one story, based on a previous preparation, and to start the acting (on stage performance). The performance is done in a collaborative 3D world. The story creation only evolves if the children work together to achieve a common goal: their story. From the story creation process a "*film*"-like object is created. This '*film*'-like object offers the children with a product, which they can analyze and even to reconstruct in future performances.

The third module (*The Audience*) is based on the artifact produced from the story creation process. In this module, children can be the audience of their own performances and have the opportunity to write about their work. With this module we wanted to provide

the children with the means for watching and discussing what they've produced. By supporting the discussion of the story we aimed to promote a better understanding of the characters interactions, and to encourage the children to reflect on the emotional and intellectual parts of the story [3].

4 Collaboration in *Teatrix*

Teatrix runs in a networked classroom where each child (or group of children) uses a computer to access to the *Teatrix* environment. *Teatrix* was implemented using a distributed architecture, and since it is a cooperative environment several children can work on the same story simultaneously. *Teatrix* can support collaboration in two of the three modules of the environment: *Backstage* and *On Stage*. Although one can imagine the collaborative writing to be done in the *Audience* module, *Teatrix* does not support it at the moment.

Fig. 2. *Teatrix*: On Stage Module.

In the *Backstage*

The most important activity children have to do collaboratively with the *Backstage* is to choose the actors and roles for the play. Children can choose the roles they play in the story, according to a taxonomy of roles proposed by Propp [8]. The roles are:

- ***Villain*** - the role of the villain is to disturb the peace of the happy family, to cause misfortune, damage or harm. The villain may be a dragon, a devil, a witch, a stepmother, or even a little boy or a girl.
- ***Hero***/***Heroine*** - Propp presents two types of heroes: the seekers, which go in search of a loved/needed element; and the victimized heroes, whom are themselves the victims of the villainy.
- ***Magician*** - has special functions in the story and can be represented in many forms. The magician provides the hero with a certain magic object needed to complete the quest, and usually tests him first with a simple task. Plays the role of *Donor* in Propp's definition.
- ***Beloved one and Family*** - Usually described in the initial situation, and it is often subject to harm by the villain. The family is many times the requester of the heroes' quest.
- ***Helper*** - Helps the hero on his/her quest. Gives relevant information, rescues him/her from a misfortune situation or directly help the hero, side by side, in the defeat of the villain.

Each role has a set of *functions* associated with, this set of *functions* characterises the character's behaviour and goals in the story, and the combination of the role with the actor originates the concept of a "*character*" (*dramatis personae* [7]) that the child will have to control. The interesting aspect of this is that children in *Teatrix* do not mind being witches and villains as much as in a "real dramatic game".

The mechanism for choosing the roles is simple: one child is the responsible for creating the settings and selecting the actors involved in the story. It is usually that child that then initiates the story performance in the 3D stage. To do that, s/he invites the others to select their own characters to control (and thus their role in the story). Once a character is chosen by one of the children, the others cannot choose it. Children see this part as a game and there is normally no negotiation involved. They just want to be involved in it.

In the Virtual Stage

In the virtual stage, as in a real stage, collaboration is necessary in order to attain the objective that is "the performed story". Children control their characters using actions from the set of possible actions associated with the character being controlled. The choice of the actions is done from a control window they can choose *walk*, *pick* an object (which the character will keep in the bag – see **Fig. 2**) or even *talk* to other characters. Amongst the possible actions to choose from, there are some that involve the *use* of an object (which they have to collect and keep). Using certain objects may implicate other characters and the result may be something happening to those characters. For example, a little boy may use a stick to hit and harm the witch. With the use of actions provided in the control window, the child can control the actions his/her character will perform, even if these are

against the goals established by its role (a child controlling a villain may not want it to harm anyone).

Further, at the *performance* level, the interaction between the children is achieved from both the actions that involve other characters, but also though the t*alk* action that allow children to make their characters communicate through speech with the others. These actions performed by the characters constitute the fundamental ingredients of the play and consequent movie. Thus, children collaborate with the others to make their "collaborative story" an entertaining story (to be watched in the audience module).

However, interactions may also occur with system-controlled characters, which are characters that exist in the story and that are not controlled by any child. Such characters have their behaviours and goals as a result of the role they play in the story (see [7] for more details on the system controlled agents).

5 Results

Teatrix is already installed in a Portuguese school "O Nosso Sonho" and we have been testing it since March 2000. Children work together in a distributed environment (see [6] and [7] for more details on the distribution mechanism and NIMIS environment) each one controlling his/her own character. Each child is using his/her own computer/working place (in the NIMIS classroom they have a LCD tablet embedded in the table which is used as the interface with pen based input). Also, as they are all in the same room, they can talk to each other in particular for coordinating their actions in the 3D worlds.

First experiences with *Teatrix*

We did the first tests and evaluations of *Teatrix* during 2000 and at the beginning of 2001. From the first experiences we realized that the roles of the characters were well understood, as well as the whole creation metaphor. In general, children liked to play with it (they see it as another game they can play together).

However, the first evaluations also showed that:

1. children were a bit disappointed with the control they had over the characters since it did not provide them with the means to develop their character's performances or to fully express their creativity. The problem of controlling characters at different levels has already been addressed by [1] and recently by [10]. Similarly, and to overcome our particular problem, we designed another type of control (the "Hot Seating") that can be seen as a kind of mental control of the character. The "Hot Seating" tool is based on research by Dorothy Heathcote [2] on acting in classroom drama. The idea is that a child is seated on the "Hot Seating", and s/he is asked to freeze her/his character's actions. S/he should step out of the character's behaviour

and justify why the character is acting in that way. S/he can also inspect the emotional state of the character and its goals, and change the behaviour accordingly (more details on the control of the characters and the "Hot Seating" can be found in [11]).

2. children did most of the coordinating type of interactions by talking (shouting!) to each other over the tables. For example, "I'm following your witch", or "you cannot use my broom". This fact justifies that in the future we will be working on the creation of a clear and explicit support for *co-ordination* level interactions.

Recent experiences with *Teatrix*

More recently we have been developing a systematic work that has lasted for about three months with a group of six children (8-11 eleven years old), in the school *"O Nosso Sonho*". This study was conducted in three phases:

Phase 1. We began our work by introducing *Teatrix* to the children, a few of them had already some experience from the past year but the majority of the group was at *beginner* level. First we let them try the system on their own (with little guidance from us). They worked in groups of two or three. Our goal was to allow children to explore the story creation process in *Teatrix* only with the experience they got from the stories they performed in the *Dramatic Room*.

Phase 2. After the first period of exploring, we have introduced *Teatrix* in a tutorial session. To promote a collaborative situation, we gave the group the responsibility to develop a specific task where they would build a story all together, to perform afterwards in *Teatrix*. All these sessions were observed and recorded in video format**.**

Phase 3. In the final phase, we created an initial setting (prepared in the *Backstage*). The story set up, named "witches, wizards and witchcrafts…" had two characters: Pedro (a boy) and Inês (a girl). The two characters played antagonist roles, so one was a *villain* and the other a *hero*. Each group of 3 children had to choose their character to control and the group had the flexibility to assign the roles of the two characters. To give extra motivation for this story an initial situation was presented to the group: "*The summer holidays ended and Pedro and Inês are coming back to the Dark Raven school for another school year. To decide who will be the leader of the year, every student has to go into the haunted forest and find the enchanted magical wand. Pedro starts to harass Inês by telling that he is the one that is going to win and he bets a jewellery bag with her. Throughout this journey, the teachers challenge the apprentices of wizards and witches, and in each moment there is a new quest…*".

The collaboration was analyzed by considering the interaction performed through the characters by their actions in the virtual world and by the direct interaction between children in the classroom. After the experiment we interviewed the children about what

they had done, and how they had understood their role and the objective of the story creation process.

First, we asked the children for their opinion about *Teatrix*, in order to understand the representations that they had about the characters, roles, scenes and props. The results showed that children liked *Teatrix*, and they understood the characters' roles, the scenes, etc. While we were interviewing the children about what they liked most about this experiment with *Teatrix*, one child told us that he liked it when they found the villain in a scene and the villain moved towards his character and hit him with a stick. This and similar statements show that children realise the importance of interactions between characters for the story to evolve and also that the role of the characters changes the way the interaction flows. As expected, we identified two levels of collaboration between students using *Teatrix*: (1) *co-ordination* interactions and (2) *performance* level interactions as described below:

1. a) the children working in a group discuss their ideas and the decisions they made: what objects to pick and what to do with them. We observed that those children always had the need to discuss what to do with their mates. We were able to observe one particular moment, where children were very excited because they were almost reaching the magic wand, they knew it had to be in the current scene because they had looked everywhere else. They all wanted to direct the character and make him walk; they were standing up and shouting. One child took the control and started to ask everyone what they thought would be the best way of searching and reaching for the wand. Quite naturally, all children started talking to each other, listening and deciding according to all opinions.

1. b) the two groups worked together to build the story by sharing ideas, theories and experimenting through collaborative activities towards a common goal which they successfully achieved. Sometimes, besides controlling different characters, the decisions about one character were established between all children of both groups. They stood up and cross over the tables pointing up to the other monitor. They seemed to understand the task as something to be performed by everyone. It was clear that making stories involved more than just playing with the characters in the virtual world. It involved the real context and the use of the computer and to go back and forward from the virtual world into a deep social involvement.

2. Concerning *performance* level, occurring in the virtual world, children constantly looked for the other character, exchanging objects, performing actions and trying to communicate with him. We could clearly identify the climax of the moment when they finally met the other character. They become so excited, standing up and couldn't stop looking at the monitor.

Children were highly motivated to work with *Teatrix*, and although the system had some problems during its use, children interpreted them as magical phenomena of the program itself. For example, two girls were walking with their character towards a door, trying to

go to another scene, but (as the system crashed) they ended facing a “blue wall”. Later, during the interview, they explained it was something that had happened to prevent them to go where they wanted, so to them it became part of the game, part of that story.

6 Conclusions

In this paper we show how a story creation environment can trigger and promote certain types of collaborative activities. We started by briefly describing *Teatrix* and the factors that influenced its design. Then we analysed the types of collaborative activities one can find in *Teatrix*. We believe that the work here presented allows us to understand to some extent how we can support the *co-ordination type of interactions* and *collaboration*, and more importantly if we do really need to support them through a virtual environment.

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