

Once upon a time

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Abstract

Education and learning have witnessed some important changes in the past few years. The appearance and success of the information society may well be one of the main factors for such change. Indeed, children are increasingly more and more at ease with the use of computers and technology. So, capitalising on this advantage, our research aims at exploring and enriching current and new classroom activities with the use of technology. In particular, we are focusing in areas such as story telling and dramatic games for children aged 4 to 8. Our goal is to provide an integrated computer environment for collaborative story creation and acting. With such environment we intend to provide effective support for children developing:

- their notions of narrative, through the dramatisation of several situations, and;
- their ability to take a 2nd and 3rd person perspective across the experience of a wide range of situations.

Children will create their own stories using sets of predefined scenarios and characters. By negotiation, they choose their “adopted” characters and act in a play-like situation. Children will be connected through a networked environment, and use fairly intuitive interfaces (use of LCD-tablets and light-pens, touch sensitive board and finger print recognition devices will be used). This project is part of the NIMIS project, a I3-ESE, EU funded initiative under the ESPRIT program.

Narrative and Story Creation

The concept of narrative is presented to pupils at an early stage of their development through stories, fairy tales, films, tv, or through their understanding of life experiences. From Plowman’s point of view (Plowman 1996), the role of narrative is not simply aesthetic, but it is central to our cognition since earliest childhood. Documentation from Psychology suggests that stories can be very important in human cognition because they can register each one’s personal experience and can also be a vehicle to exchange experience

with others (Dautenhahn & Nehaniv 1998). Furthermore, teachers make use of narrative structures during their learning sessions in order to engage learners in a more motivational way. The learners, themselves, also use narrative structures to exchange and communicate their own experiences with each other (usually when telling the other about some situation that happened). Narrative structure was thoroughly studied and investigated by Russian Structuralists, and specially by Vladimir Propp (Propp 1968), who analysed one hundred of Russian fairy tales and established a set of 31 functions that compose the structure of a story. This definition makes it possible to study a story by means of the functions performed by the characters. These functions can be understood as both the actions of the characters and the consequences of these actions in the story. Moreover, and in Berger’s opinion (Berger 1997), the structure established by Propp can be applied to modern narratives (of all genres) as well.

Designing an Interactive Environment for Collaborative Story Creation

By exploring the potential value of narrative, we aim at building a collaborative story creation environment. Such environment will allow children to create and act in stories. Moreover, we expect to use such characters in a mixed-control situation whereby children can control the characters, or the characters themselves act autonomously in the story. Indeed, we expect that such environment will deal with the pedagogical goals of the acquisition of notions of narrative and the ability to take 2nd and 3rd person perspectives.

A Story Creation Experience

The first step in the development of such environment was to experience and to gather information from story creation situations in real classrooms, with children of these targeted ages. We wanted to ground our research in the current activities and practices happening in

schools. In this experience, we analysed what happened during the story creation process to answer the following questions:

1. How does the theme for the story arise?
2. How do children choose their characters?
3. What happens before the beginning of the acting-“telling”?
4. What do children do to act “in character”?
5. How much scaffolding do children need to create a story?
6. What is the role of the teacher during acting?
7. What are the differences/particularities encountered throughout the age range (from 4 to 8 years old)?

To obtain some answers to these questions, we performed some experiences in a Portuguese school. The school is located in a suburban area of Lisbon, covering an extremely poor neighborhood. The school follows a pedagogical approach that allows children to explore daily different thematic rooms: the intellectual room, the dramatic room and the artistic room. The experiences took place in the “dramatic room”, which main activity is the dramatisation of different situations/stories. Two experiences were performed over two groups of children: 4 to 5 years old; and 7 to 8 years old. The first experience occurred in a theatrical setting, the other was based on a puppet’s performance. The experiences were filmed to better retain its aspects and details.

The Story Creation Experience Results

After the experiences, we analysed the videos to get some of the answers to our initial questions. Children behaved very freely and spontaneously during the acting of the story, even as they were filmed on tape.

• The choice of the story theme

Before starting to act, children sat around the teacher and discussed which story they wanted to perform. During this choice, the teacher acted as a moderator. From the teacher testimony, they usually choose from a known set of fairy tales, from books they read together, or from situations of daily life (example: a shopping trip - note that children live in a city area).

• The choice of the characters

The task of choosing each character was done collaboratively between all children, although the teacher’s

mediation was often needed (especially when the younger ones became upset and cried when they could not be the heroes of the story). Besides choosing his/her characters, children also dressed up (in the theatrical stage only) to better incarnate the characters’ personalities.

• The story acting

Each child knew his/her role and acted accordingly with it. They used voice, accentuated movements and gestures to stay “in character”. The story emerged from the children interactions and reactions to the situations, according to their feelings (indirectly the feelings of the characters). In some parts of the story they decided (collaboratively) to sing an appropriate song for a particular moment of the play.

• Teacher’s role

Although the children knew their characters’ role (the two fairy tales: used were “the three little pigs” and “sleeping beauty”), sometimes the teacher had to intervene in order to ensure that the story was heading to an end. Such scaffolding was much more intense for the younger ones (age 5 and 6). This need arose from the fact that our actors got carried away by small things (such as a friend in the audience) and so enthusiastic with the situation that “forgot” that they were acting in a story.

Interactive Story Creation Environment

Taking the above findings into consideration we designed, and are now implementing, the first prototype of the interactive environment for collaborative story creation. The architecture of this environment is composed by several components, which will simulate the several steps taken in classroom story acting (see figure 1).

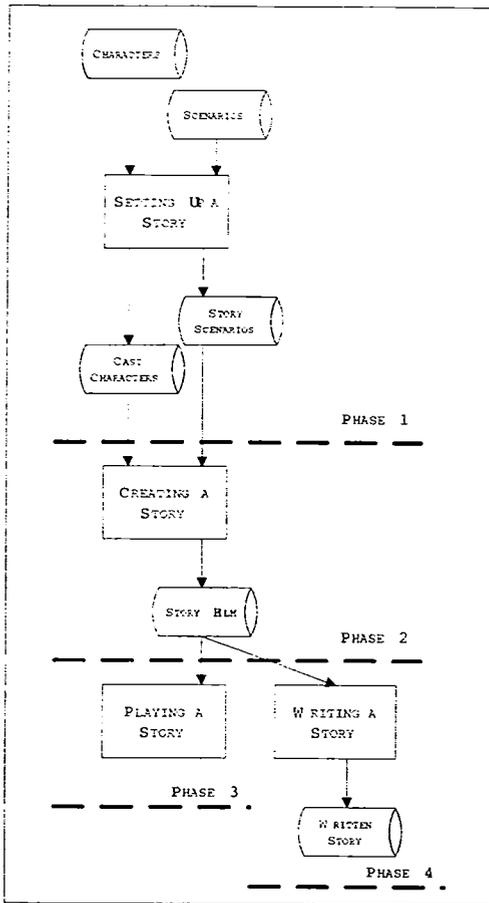


Figure 1: Story Creation Environment Architecture

The steps considered are: setting up the story; creating the story; playing the story and writing the story.

Setting-up a Story

In this phase every component of the story (that is, the cast characters and the scenarios) must be chosen. To perform this choice, children and teacher decide which characters should be selected for that particular story and also which are the appropriate scenarios. The story setting is only completed when each child chooses the character he/she wants to “adopt” during the story creation. At the end of this phase the story scenarios are chosen and the characters cast defined. The choices are made with the support of a mediating agent (the real teacher or an artificial mediator).

Creating a Story

The creation of the story can be done in two different ways:

- **Improvisation Mode.** During this phase, children interact with each other in order to create a new

story. Each child has a character to direct during the story. The interaction with the other children is performed, indirectly, by means of their characters. Therefore, we do have a computer to mediate the story creation and also to mediate the social interactions between the children.

Children command their characters by selecting the actions they can perform (in a game-like manner). Besides selecting the characters’ actions, children can also induce some changes in their characters’ emotional state. These changes in the character’s emotional state will reflect the result of the inter-character interactions.

The story creation evolves from the characters’ actions. To guarantee the accomplishment of a meaningful story in the end of the interaction, a narrative guidance mechanism will be applied (for further details see section *Story narrative structure*). This phase produces a “film” with the story created by children.

- **Scripted Mode.** The scripted mode is performed similarly to the improvisation mode but also allows children to add scenes, go back, edit some created parts, etc. It does not rely on a script language as such due to the early age of the children.

Playing a Story

After creating the story, children are able to watch it, whenever they want since the story is recorded as a “film”. These “films” are visualised with a tool, which provides the necessary commands for film manipulation. With this “film” we want to provide the children with the opportunity of watching and discussing what they’ve produced.

By encouraging a discussion on the story, we aim at promoting a better understanding of the characters interactions, and maybe encouraging the reflection of the children about the emotional and intellectual parts of the story (Bettelheim 1978).

Writing a Story

After discussing the story between them, children are motivated to describe and re-tell, through writing, the story that they have created. This task can be done collaboratively or individually. To help the story writing, some key sentences (Example: the witch bewitched the boy) are generated during the story creation phase and allow children to elaborate on them.

Children can write about some parts of the story and send them to the teacher or to colleagues. After discussing between them and with the teacher, some readjustments of the story can be made, and the final written version is accomplished.

Synthetic Characters as Believable Agents

Since characters will act on behalf of children, the environment must provide children with means to adapt their characters to the story. The types of characters were established by taking in consideration Propp's definition of the main character classes present in fairy tales. Propp defined the characters by means of their functional role in the story (see two examples of character types in tables 1 and 2).

Functions	
	<ul style="list-style-type: none"> • departure on a search • reaction to the demands of a magical empowered person • reward
Goals	
	<ul style="list-style-type: none"> • to find the desired object • to achieve the magical object • to win the reward
Example	
	Boy

Table 1: Type of Character: **Hero**

Functions	
	<ul style="list-style-type: none"> • villainy • struggle • pursuit
Goals	
	<ul style="list-style-type: none"> • to do some actions in order to injury the other characters (in particular the hero) • to enter in direct fight with the hero • to pursuit the hero
Example	
	Witch

Table 2: Type of Character: **Villain**

When "adopting" his/her character, each child has to assign a role to it. Therefore, each character has its behaviour and goals defined through the application of Propp's functions, and the child will expect that the story will evolve in reaction to his/her character's actions.

Hence, if the characters act in a believable way, the story creation environment will engage children in an entertainment experience, which can meet the child cognitive needs to interpret, understand and interact with the world in term of stories (Dautenhahn 1998).

Each synthetic character will be developed as a believable agent. The most accepted definition of a believable agent comes from the Arts and is based on the concept that: "a believable character is one that provides the illusion of life, and thus permits the audience's suspension of disbelief" (Bates 1994). Although it is a good definition, it does not provide us with any information on how to build such an agent. Literary studies may provide an answer to this question: readers are bound to characters that display positive and negative reactions that make sense when considering their perceived or assumed goals, beliefs and attitudes (Ortony, Clore, & Collins 1988).

Generalising, we can state that believable characters are the ones which behaviour is consistent with their perceived or assumed personality. Our approach to build the believable agents for our environment will be based on a methodology developed in the S3A system, which featured two synthetic dolphins (Martinho & Paiva 1999). Such methodology passes through the specification of the agent's personality (and in our case also the functions they will play in the narrative), and the definition of a set of elements based on the OCC theory of emotions.

In this research, and differently from the Oz Project (Kelso, Weyhrauch, & Bates 1992), the majority of the characters will be controlled by children (although a few characters may act autonomously). Furthermore the story will not be the one previously created by an author in a script like manner, but will emerge from the character actions and interactions, as in a dramatic improvisation game.

Following such an approach one main question arises: how can we guide the story creation to ensure the existence of a well-formed narrative structure in the end of the process?

Story narrative structure

If we want to increase the likelihood of achieving a well-structured story in the end of the creation process, we need to develop a guidance mechanism within the environment.

One of the approaches to the development of this guidance mechanism is to define a set of plot points - as "important moments" in the story (Mateas 1997). These plot points are defined from the story's initial situation. Propp defines the initial situation as the situation in which the characters are introduced.

With the information gathered from this initial situation, it is possible to set the space of all possible stories (by establishing the set of permutations of all possible plot points). Instead of defining the story by means of a set of structural constraints, we will define an evaluation function that will evaluate the story characteristics and based on this evaluation it will decide for which plot point the story should converge next.

The concept of "plot point" gives us a first approach to handle the guidance mechanism. However, it does not provide us with answers to the following questions:

- How should the plot points be defined without restraining children's creativity and improvisation?
- How should the evaluation function be defined to choose the next meaningful plot point?
- How should we induce the story to converge to the next plot point?

As a very preliminary approach on how to handle these questions, we will try to have two ways for specifying the plot points: (1) internally produced by the system; and, (2) parameterised and defined by the teachers (providing that the parameterisation can be done without any serious programming effort).

In addition to this approach, and to guarantee the story convergence to the plot points, we will give the possibility to introduce a story director or/and by keeping one of the characters under system control. However, both methods lead to the following questions:

- How should the director interact with the characters?
- How should the system-characters interact with the child-controlled characters?

Concluding Remarks

We have presented some ideas that are the basis for our work in the construction of a collaborative story creation environment. The introduction of the narrative guidance mechanism does not aim at binding the children's improvisation capacities, but at instilling the narrative concept through an interactive and innovative method.

Children will not only have the possibility to guide their characters throughout the story, but will also be

able to experience the emotional changes that arise from the characters' interaction. This research is giving its initial steps and the ideas presented in this paper are only now being implemented.

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