Children’s collaborative storytelling with linear and nonlinear approaches

Chen-Chung Liu\textsuperscript{a}, Kuo-Ping Liu\textsuperscript{a} *, Gwo-Dong Chen\textsuperscript{a}, Baw-Jhiune Liu\textsuperscript{b}

\textsuperscript{a}National Central University, No.300, Jhongda Rd., Jhongli City, Taoyuan County 32001, Taiwan
\textsuperscript{b}Yuan Ze University, No.135, Yuan-Tung Rd., Jhongli City, Taoyuan County 32003, Taiwan

Received November 8, 2009; revised December 9, 2009; accepted January 20, 2010

Abstract

Collaborative storytelling is an imperative and innovative pathway to children’s learning. Collaborative storytelling can be developed in linear and nonlinear approaches. Linear stories contain exactly one begin, one middle and one end. All children collaborate on a shared story in the form of relay and no branches can be developed. Children deeply rely on evaluating the relationship, continuality and coherence of story path before sequentially participating in building up the story. By contrast, nonlinear stories enable children to link and orchestrate different ideas. Children can thus integrate other’s episodes to develop different branches of stories. Since the linear and nonlinear approaches facilitate children to develop stories in different manners, children’s perception towards linear and nonlinear approaches may be different, which may affect their motivation and ultimate success in collaborative storytelling. However, research which has empirically documented the children’s perception of linear and nonlinear approaches is scant. In order to explore whether children’s perception and learning behaviors about linear and nonlinear collaborative storytelling approaches are different, a Web2.0 storytelling platform featuring animated picture books is designed for the study. The platform implements multimedia elements such as texts, pictures, images, music and narration to increase children’s engagement and collaboration. More specifically, children are facilitated to collaboratively sketch pictures, create animations and share comments of works. The study involved a four-week empirical study, comprised of a questionnaire concerning four factors: derivation, remix, ownership and positive interdependence. Two intact classes of 57 participants, the 3rd graders were randomly assigned and treated as linear group and nonlinear group. The quantitative analysis of the questionnaires was conducted through an independent t-test to analyze and compare children’s perception between the two approaches. Children’s onscreen activity and collaboration process were also logged and screen videoed for further analysis. Results showed children in nonlinear group performed superior to those of linear group in all four factors. To conclude, this study may be of importance in providing a deep understanding of how children’s perception about linear and nonlinear approaches in collaborative storytelling activities.

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Keywords: Collaborative Storytelling; social media.

* Kuo-Ping Liu. Tel.: 882-3-4396654
E-mail address: domi.liu330@gmail.com
1. Introduction

Collaborative storytelling is imperative and innovative pathway to social learning. Collaborative storytelling prompt children to communicate ideas, transfer knowledge, and make decisions (Wang, Moore, Wedman, et al., 2003) since story tellers have to organize, evaluate and transform life experience in their own voices (Pirrie, 1999). Therefore, as collaborative storytelling brings people together to experience a common perspective, it helps to stretch people’s capacity to empathize with others and share experiences (Denning, 2001) which is essential to social learning (Bandura, 1977). During collaborative storytelling, tellers bring different ideas and coordinate with each other trying to create a coherent story. Such social interaction is the core process of social creativity to form new insights, new ideas, and new artifacts (Fischer et al., 2005). However, to harmoniously collect all participants’ contribution and create a coherent story is difficult (De Silva and Skaf-Molli, 2006), as remixing and deriving among the works of each other frequently take place in the social creativity activity (Cheliotis and Yew, 2009). It is thus critical to understand how technologies could facilitate the remix and derivation of participant’s works during collaborative storytelling in order to advance group creation.

The term Web 2.0, coined by Tim O’Reilly in 2005, which are considered to be new technology that explores the continuum between the personal and the social, and tools that are endowed with a certain flexibility and modularity which enables collaborative remixiability (Rettberg, 2005; Alexander and Levine, 2008). “Web 2.0 is the network as platform; Web 2.0 applications are those that make the most of the intrinsic advantages of that platform: delivering software as a continually-updated service that gets better the more people use it, consuming and remixing data from multiple sources, including individual users, while providing their own data and services in a form that allows remixing by others, creating network effects through an architecture of participation” (Reilly, 2005). Therefore, storytelling Web 2.0 platforms, the platforms of telling stories using Web 2.0 tools, technologies, and strategies, may broaden social creativity to connected worldwide community (Alexander and Levine, 2008).

In recent years, more and more storytelling Web 2.0 platforms such as CBC4Kids (Antle, 2003), FaTe2 (Garzotto and Forfori, 2006) and LinkMap (Désilets, Paquet and Vinson, 2005) are characterized by supporting children’s collaborative storytelling in linear approach. More specifically, stories development in linear platforms contained exactly one begin, one middle and one end. All participating children collaborate on a unique story path in relay style (Cao, Klamma and Martini, 2008) and no other story branches can be developed. Children thus deeply rely on evaluating the relationship, continuity and coherence of story path before sequentially participating in building up the story (Rettberg, 2005).

By contrast, nonlinear stories enable children to link and orchestrate different ideas. Children can integrate other’s episodes to develop different branches of stories. Since stories can be developed in different manners, children’s perception and interaction of linear and nonlinear approach may be different, which may affect their motivation and ultimate success in collaborative storytelling. As an increasing number of technologies employ non-traditional, non-linear environments, work in this area is important and timely (Boltman and Druin, 2001). Thus, it is imperative to understand and articulate the impact these technologies have on young children. However, research which has empirically documented the children’s perception of linear and nonlinear approaches is scant (Désilets and Paquet, 2005). In order to explore whether children’s perception and learning behaviors about linear and nonlinear collaborative storytelling approaches are different, a storytelling Web2.0 platform is designed for the study. By gathering the data from 57 elementary students of two intact classes in Taiwan, this empirical study tried to answer the following research questions based on the interaction analysis in the storytelling Web 2.0 platform:

- Does the nonlinear approach improve children’s perception of mutual support in collaborative storytelling?
- Does the nonlinear approach improve children’s perceptions of collaborative storytelling experience?

2. Pedagogy and System Design

2.1. Pedagogy

Schneiderman and Robin provide extensive discussions in the creativity framework that can be applied in the design of storytelling Web 2.0 platform. Based on Schneiderman et al. (2002) and Robin (2005), a four-step approach to facilitate children’s collaborative storytelling is proposed: 1) collect, 2) orchestrate, 3) narrate and 4) publish and evaluate. A storytelling Web 2.0 platform incorporated with the pedagogy.
Collect: According to Schneiderman and Robin, a shared preparation space for children to collect should better benefit children’s collaborative storytelling. Hence, a shard pool is incorporated in this system to support children to contribute and their ideas and retrieve ideas from others. Children can refine or elaborate elements contributed by others with personal ideas. In addition, a shared pool of versatile elements may also inspire children’s fresh ideas of storytelling.

Orchestrate: Children retrieve and organize the selected elements from a shared pool and individually orchestrate those elements by linking to form a story path. Children combine assorted contributions to create a personal story version. Thus, multiple story versions can be emergent and they can also derived by others for modification. Remix happens through combining participant’s creations.

Narrate: Children integrate vocal or written narratives to elaborate a story consisted of orchestrated elements. A story can be multiply interpreted with different voices and tones. Remix thus takes place in the form of adding personal interpretations to the story.

Publish and evaluate: After the finalized story is published, children receive other viewer’s comments. The feedback facilitates children to reflect on their story. Children can then modify published story based on comments for advancement. That is, remix occurs while children providing and adopting comments.

2.2. System design

In this study, a storytelling Web 2.0 platform is designed to support children’s remix in the form of animated picture books. The platform enables children to sketch pictures (Figure 1) and create animations (Figure 2) collaboratively either in nonlinear or linear approach. The purposes of applying multimedia elements in storytelling are: 1) increase children’s engagement, emotion, and motivation (Druin and Solomon, 1996); 2) encourage children to remix different specialties. A child who is good at writing may tend to collaborate with others who are good at painting, narration and animation respectively. A story can be composed of recourses contributed by multiple people’s capabilities. This platform aims to assist children to remix other’s specialties in the whole process of collaborative storytelling.

A story consists of episodes. One can create episodes with drawing tools and selective images in the sketchpad interface, as shown in Figure 2. As to remixing episodes, with nonlinear approach, one can construct episodes by remixing since all created episodes are shared and can be retrieved. Before editing other’s episode in the sketchpad interface, one has to copy first and then edit episodes. To directly modify original episodes is not allowed in nonlinear approach. The copy-before-derivation mechanism ensures the original episode will not be altered. Figure 3 illustrates the derivation of episodes in nonlinear interface. A~E are original episodes and arrows show the
derivation paths. When the mouse is on the episode, a derivation list pops out to show who have derived the episode. The story many have different branches with nonlinear approach. By contrast, with linear approach, one can modify other’s episodes directly without copying beforehand. Besides, there is only one story path. One can change the sequence of story by changing the sequential number, as shown in Figure 4.

3. Method

3.1. Participants and procedure

The participants in this study were 57 third graders with a mean age of 9 years attended a suburban elementary school in Taipei. Two intact classes were randomly assigned and treated as nonlinear group (28) and linear group (29). The whole process was conducted in the presence of the current school teacher who is also a researcher in the study.

Each child did not only create her/his own stories but also help peers to develop their stories. Both groups dedicated 40 minutes every week on creating and remixing their stories entitled, adventure to the moon, for consecutive eight weeks. In the first four weeks, children developed their own stories with aforementioned interface while in the following four weeks, children work with peers on other’s stories. Every student came to the computer lab and was seated in front of a computer and equipped a sketchpad and microphone for sketching and voice recording. During the eight-week activity, the children would experience different interfaces to create stories. Finally, they were asked to fill out a Likert 5-point questionnaire which elicited their perception on the collaborative creation process.

3.2. Questionnaire

An independent t test was implemented with SPSS to compare the difference between two groups. The total of 24 questions consists of four parts: derivation (6), remix (6), ownership (6) and positive interdependence (4) as described below:

- **Perception on derivation:** mainly student’s willingness to create products by modifying others’ work, e.g., ‘I like to modify classmate’s picture book story’ and acceptance of others’ modification on their products, e.g., ‘I am proud that my picture book story is modified by classmates’.
- **Perception on remix:** mainly concerns the perceived improvement of products through the combination of products, e.g., ‘the quality of story was improved by gathering others’ ideas’, and the coherence among participants, e.g., ‘participant’s ideas can be presented on a story’.
- **Perception on ownership:** children in nonlinear group personally own their product while using others’ resources. However, children in linear group share the ownership of a group product. The two different ownership mechanisms may result in different perception of ownership and may influence students’ intention to participate in collaborative learning activity. Example question is, ‘I feel that I am a co-originator during the collaboration’.
- **Perception on positive interdependence:** the children in nonlinear group implemented others’ products to fulfill personal objectives while children in linear group work together on one shared story. It may result in different degree of positive interdependence. Sample questions include ‘My classmates help me to get my story done’.

3.3. Activity log and onscreen recordings

The children in both groups may have various behaviors during the process such as derivation, combination and cementation. These behaviors were recorded by Microsoft SQL Database for later coding and analysis. Besides, to better understand how and why students performed above behaviors, every student’s onscreen activities were captured with the screen recording tool, Camtasia Studio. Unfortunately, the result and discussion of activity log and onscreen recordings are beyond the scope of this paper.
4. Result

Table 1. Results of questionnaire

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<th>t test</th>
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The results of questionnaire, as in Table 1, showed children in nonlinear group performed superior to those of linear group in all four factors. The interpretations were as follows:

- **Derivation**: children with nonlinear approach are better motivated to derive other’s episodes because they were not afraid of spoiling other’ work with the copy before modify mechanism.
- **Remix**: nonlinear interface better facilitated children to manage and remix due to the flexibility and convenience of orchestrating episodes. Children may view all episodes at one time and decide to link episodes to develop a story.
- **Ownership**: children with nonlinear approach were allowed to develop stories of their own. They feel that the stories were created by themselves. By contrast, children with linear approach show less ownership because the story was directly modified by many participants.
- **Positive independence**: children in nonlinear approach tend to improve other’s narratives and sketches while those of linear groups tend to concentrate on their own stories.

To conclude, this study may be of importance in providing a deeper understanding of how children’s perception about linear and nonlinear approaches in collaborative storytelling activities. Researchers and educators may find it of value to evaluate and assess linear and nonlinear approaches when designing platforms or activities to enhance children’s collaborative storytelling performance in similar contexts.

References


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