

Online Storytelling in IS Research

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Abstract

The Information Systems (IS) and the related Computer-Supported Cooperative Work (CSCW) research communities have generated a lot of interest in individual, group and organisational phenomena in computer-based environments and the impact and effects of collaborative technologies. Among the mechanisms fuelling this interest, storytelling seems to stand out as one of the important ingredients, without which organisational culture and creativity is hardly imaginable (Cohen & Prusak 2001).

Whilst the role of storytelling in support of organisational identity and communication is well recognised (Czarniawska 1997, Denning 2001) and it is well established as a form of entertainment, there are relatively few empirical studies of the use of storytelling in IS research. The use of storytelling is an evolving area, particularly in the online group work arena. Where storytelling has been used, it has shown strength in capturing tacit knowledge (Marshall et al. 2002a), contextual understanding (Nitsche et al. 2002), active communication (Kanjo and Astheimer 2002a) and capturing lived experience (Freidus and Hlubinka 2002).

Key Words

Online facilitation, group facilitation, online relationship development, group effectiveness, online groups, story, storytelling.

Introduction

While storytelling can be a useful tool for groups and organisations it can have its challenges also. Stories can raise complex issues with respect to online groups and to the design of the systems that support their use (Karasti et al. 2002) and those most valuable for re-contextualisation are the possibly the most problematic to preserve (Lutters 2002).

The current focus of my literature review is on exploring storytelling as a theme of inquiry and research within IS and CSCW. It has been interesting to see two predominant themes that have arisen. One theme has a strong focus on the computing tool itself. The second theme focuses on the impact of stories on people using a system in terms of learning, reflection in practice

and the wider social impacts that occur. This paper describes some of the storytelling projects researched in IS and CSCW and aims to describe the relevance of storytelling for an IS audience.

Online storytelling, sometimes referred to as virtual storytelling or digital storytelling, describes an emerging field of research which combines several disciplines ranging from non computer-based areas like theatre and literature to human-computer interfaces, information systems, entertainment and computer supported cooperative work.

Storytelling Tools

Digital storytelling is defined by the Centre for Digital Storytelling (CDS) in Berkley, California as the capture and presentation of a story in a digital format (Freidus and Hlubinka 2002). Digital storytelling encourages participants to communicate meaning on multiple levels. In voice, point, emotional content, tension and story cycle. Through the digital storytelling process, individuals learn to tell a story, and in doing so, become more effective actors in collaborative work

environments. This computer-supported process of creation allows storytellers to take fresh perspective on their experiences or work and create meaning for their intended audience. The meaning is given form and can be shared electronically.

Outlined further are some examples of how computing has been used to support the creation and the process of storytelling with a strong focus on the tool.

The coloured farm

Kanjo and Astheimer (2002a) looked at combining physical and digital environments for children. They explored the use of a physical human-computer interface, combining tracking technology and narrative control in an interactive environment for children's play. Or in other words the combination of computing with toys and visualisation.

Kanjo and Astheimer wished to explore a growing trend in children's desire for more technology in their toys (Shwe & Francetic 1999; Yelland 2000). They aimed to marry the tangible sense of the physical playset/toys with the power of the computer and visual technology. To do this they created *The Coloured Farm Environment* (Kanjo & Astheimer 2002b), an interactive child's farm that stimulates imagination by responding to an on-screen narrator, actions with animations, and sound to transform itself into a story world.

To design the system they conducted initial usability tests on both children and adults while playing with ordinary playsets. They were observed by researchers and designers through one-way glass. Usability testing of a prototype system was later conducted with children. Surprisingly they found that the children were mostly fascinated with how the system could work out where they had placed the young farmer. The narration enriched the children's knowledge and the system provided for more involvement in active communication in their play.

Mobile cinematographic narratives

In another example Correia and Proenca (2002) combined mobile networks with positioning techniques in order to create

cinematographic narratives that are navigable in space. They created a system architecture comprising of a mobile information system, co-ordination and management components, a personalisation sub-system and combined with mobile phone and PDA interfaces held by the system's end users.

The interface is focused around a soccer game where users contribute to a story and collaborate to pass the ball between players. Small video clips, images text and 3d images are combined with positional mechanisms.

From their work Correia and Proenca found that "the personalisation aspects needed refinement and to be explored in richer ways" (Correia and Proenca 2002), and that further user studies are required to direct their continuing development from a user perspective.

The virtual storyteller

Theune et al. (2002) developed a multi-agent framework for dynamic story creation as part of development on virtual environments inhabited by autonomous embodied agents. Called the Virtual Storyteller (Faas 2002), it is a sub-component of a larger Virtual Music Centre (VMC) project that provides a replica of a theatre where users meet embodied agents that provide information and entertainment. The system is aimed at generating very simple fairy tales.

Now unlike many text-based story generation systems, the Virtual Storyteller includes the integration of narrative and presentation levels rather than simply focusing on the level of plot. The narrative level turns the plot into a textual narrative by translating the system's states and events into natural language sentences. These sentences are then sent to the presentation agent that uses speech synthesis and text balloons to present the narrative to the end user. An animated Microsoft wizard is used to present the story.

The capture of complex problem-solving

Pekkola (2002) looked at problem-solving and the generation of stories and describes

design issues to consider when designing computer-support for storytelling. He looked at the maintenance and complex problem solving activities needed in the period after construction of large paper manufacturing machines. The types of problems encountered vary from broken or poorly functioning components to poor or inconsistent quality of paper. Problems can lie in the machine itself, the software settings, the automation or in one of the preceding processes of stock preparation, pulp making or bleaching systems.

The problem solving process requires involvement and feedback from dozens of experts who need an overview of the situation and the ability to consult and collaborate with each other.

The capture of the problem solving process, which can involve meetings, emails, telephone conversations, international flights, resulted in the problem solved and a general entry in a database. Much of the problem solving process, experience and details were not captured within the database system should the problem reoccur at a later date or with other paper manufacturing machines.

Pekkola found that the challenges for capturing the problem and its solution lied in the global distribution of participants and urgency in completing the task. While utilising email, telephone and document databases have their own benefits and failings (Hollan and Stornetta 1992) other document distribution and management applications (Ackerman 1994; Bently et al. 1997) and internet enabled communication tools (Pekkola 2003) are insufficient for capturing a full picture of the problem and it's solution as a conceptual story that can be retold.

“One can compose a partial story from one source, but that is merely an incomplete tale. It must be possible to combine information from multiple sources with tacit knowledge gained through consulting other people.” Pekkola (2002)

Pekkola's recommendations for design are to capture the story of everything relating to the problem and its solution in-vivo or 'live' as it is occurring within one shared system.

Kuchinesky et al. (2002) describe the use of narrative structure as a conceptual framework for developing and representing the story of biological processes. They focused on the synthesis task of biomedical researchers. They created a software system based on a storytelling metaphor. “We have built software tools to support the hypothesis formulation activities of molecular biologists, in particular the activities of organising, retrieving, using, sharing and reusing diverse biological information.” (p. 4).

Through investigations they had discovered that most bioinformatics software tools support the *analysis* task of biological research and not the *synthesis* task involving the tracking of pieces of information, organising the information for hypothesis creation, and sharing information with colleagues. They found that research into human memory and knowledge representation showed that people use *story structure* as a primary way of organising and remembering information (Schanck 1990; Middleton & Edwards 1990; Thorndyke 1977). This led them to develop a software system based on a metaphor of *biological storytelling*, wherein narrative structure is used as a framework within which biologists could organise, use, share diverse information, as well as build up hypotheses and alternative explanations of biological phenomena.

Tool focus

These projects, the coloured farm, cinematographic narratives, the virtual storyteller, and the capture of complex problem-solving are focused predominantly around the tool or the design of the tool itself. They have a strong feature and system function focus. An interesting point here is that these above attempts at combining the power of computing and story seem to completely miss any description, illustration or understanding of the storytelling process. In particular the relationship between the storyteller and audience. This relationship is developed through the techniques that storytellers use and movements between storyteller and audience that influence both the story itself and its creative production. If IS designers are to utilise the power of a storytelling approach within systems design

and use a better description and understanding of the storyteller process and audience relationship may be needed.

Social storytelling

Storytelling can provide an opportunity to capture of an individual or a group's appreciation of the experiences they encounter. For example, in the context of online cooperation, storytelling may currently provide many untapped opportunities for collaborative virtual environments and offer new methods for computer-supported cooperative work. Stories can capture the implicit and explicit aspects of culture and social structures within individuals, groups and organisations. Story has been used successfully as a metaphor for work activities, to foster learning and discussion, to promote reflective practice and an example that highlights the difficulty of capturing some forms of experience through story.

Story as a metaphor for group activity

Fuchs (2002) explored story as a metaphor for Boeing's Team Space system. The Team Space system is an environment which uses a story approach for displaying temporal flow activities. Fuchs believes that collaborative systems could benefit greatly if they offer users a story-like way to see the work environment in terms of actions performed by others over time. Fuchs believes that this kind of story approach improves user willingness to adopt technology and their effectiveness.

"A [collaborative] work environment shouldn't be just a large information store in which we spend our time searching and trying to remember but instead it should be a place where we are being told what has happened...If the system allows users to see the shared information space in terms of stories it can offer new and potentially powerful ways to interact in the environment". (Fuchs 2002, p. 16).

Boeing's Team Space system that Fuchs studied is a web-based collaboration environment described as "an integrated synchronous and asynchronous team information repository" (Geyer et al. 2001). The system brings together project

management, meetings support, document sharing and facilities for cross-relating information. Activities are captured as a sequence of events that are linked to the video, audio and documents used during the group process. The system benefits from a viewer component that allows users to browse through captured meeting events. This activity visualisation offers a comprehensive overview of the important things that went on during a meeting and allows the user to review what was covered and is a useful indexing tool. "For meetings it is clear what belongs to the story and what doesn't" (Fuchs 2002).

Fuchs found that the temporal display of related activities incorporated by the story approach provided a useful tool to explore a shared information space and make sense of what went on. He also found that users could detect interesting coincidences within meetings that they would not have otherwise discovered.

Learning about Narrative

Marshall et al. (2002a) present a system, the PUPPET virtual theatre (Marshall et al. 2002b), which provides autonomous agents for playful interaction and a dialogue recording and editing facility to foster learning and discussion between children. Aspects of children's behaviour in a virtual environment were recorded by the system to aid them in objectifying their activity, support reflective thought and discussion. Pairs of 7-8 year-old children first passively watched the interaction between autonomous agents, then played in the world as avatars, then recorded dialogue for the three characters while engaged in the world, and finally edited their recorded dialogue off-line away from the virtual world, before re-entering the world again as avatars. The study concluded that the PUPPET environment provided great potential for reflective learning about narrative. It offered an engaging world for children to play in, and at the same time gave them the opportunity to make concrete their understanding of different aspects of that world. "This is not always possible in improvisational narrative play, where representations of activity are typically short-lived." (p. 15)

Freidus and Hlubinka (2002) present two case studies on digital storytelling which

have been used to promote reflective practice in communities of learners. They found that when participants produced a story in digital form they became into a new relationship with the story. As a production, the story gave fresh perspective to the author.

The first case study was with the North End Outreach Network (NEON), a public health initiative in Springfield, Massachusetts. At a workshop, focused around digital video production, community health advocates chose an issue that they have witnessed in their work and created a story based on their own experience confronting that issue. These stories ranged from teenage pregnancy gang involvement, and domestic violence. In producing their stories “They listened and critiqued multiple drafts of each other’s stories, borrowing ideas, exchanging photos and sharing music with one another.” (p. 24)

The community health advocates then held screenings in community centres, health clinics and with their clients. They found that the “audience related closely to the themes and struggles portrayed in the stories. Beyond building community among the participants of the workshop, community health advocates found that their stories connected them closely with neighbourhood residence, thus leading to more effective advocacy.” (p. 25)

The second case was with the Intel Computer Clubhouse, who provides an after-school learning environment where young people from underserved communities work with adult mentors to explore their own ideas, develop skills, and build confidence in themselves through the use of technology (Resnick et al. 1998). The production of digital stories by members was aimed at creating stories about the Computer Clubhouse. The stories were to show visitors a ‘tour’ of the clubhouse community and to enhance the interaction and influence between clubhouse locations. It was expected that digital storytelling would provide Clubhouse members and mentors with a richer experience and deeper connection to their work and to one another. Members were encouraged to post their work to a shared intranet.

They found that the development of digital stories were not just important in that they created a product - the story, but also in the process of reflective practice (Schön 1983) as they were being produced. Through reflective practice, individuals and groups gave their work conscious attention, thereby examining their positions as leaders and learners in their communities. Freidus and Hlubinka conclude by saying that “digital storytelling for reflective practice is a valuable, transformative tool for personal, professional, organizational, and community development. As stories are shared, the sense of community itself is strengthened. Once complete, the stories serve as objects which mediate relationships.” (p. 25)

Narrative and expressive space

Nitsche et al. (2002) explored the construction of a narrative expressive space with the contribution of dramatisation and cinematic mediation within the *Haven* research project. They believe that the dramatisation of place and events through cinematic mediation contribute to what they call narrative expressive space in real-time 3D virtual environments.

The role and nature of narrative in real-time 3D virtual environments is relatively well covered. Generally there are two predominant approaches. One approach is drama based on intelligent characters (agents) (Bates 1992; Hayes-Roth et al. 1996; Seger 1990) the other is driven by a virtual narrator (Laurel 1986). What Nitsche et al. (2002) have introduced is the idea that both the agent and narrator-based approaches can benefit by “...being imaginatively related to the spatial dynamic structure of the environment [place] where they are located” Nitsche et al. (2002). They bring place into the relationship of drama, characters and action.

In virtual environments place can be perceived as a space for action. Emotional attachment, perceived visual affordances (Gibson 1996) and each individual’s memories and experience of place all become invisible elements contributing to our subjective understanding of virtual environments. “Previous knowledge and experience, familiarity with cultural connotations and underlying archetypes contribute to our experience of place”

Nitsche et al. (2002). So meaning given to narrative, characters and drama cannot really be separated from meaning given to the space within which they interact.

Much effort has been put in to understand strategies and techniques to support effective navigation and interaction, as well as design processes in real-time 3D virtual environments. Learnings from the Haven project suggest that drama and narrative benefit from engagement with a virtual environment understood as a *place*. There is an emergence of the tying together of story and technology as an enabler in these situations.

Challenges for organisational storytelling

Lutters (2002) discusses challenges in the design of computer-based collaborative storytelling support and argues that stories most valuable for re-contextualisation are the most problematic to preserve. Lutters sees storytelling as a critical component in successful organisational memory systems. He tells us that it is an intensely personal form of communication. In the telling it reveals a person's experience, personality, biases and interpretive views. He believes that valuable personal interchanges need to be held in a higher confidence due to the personal nature involved. This is particularly so when the central story line comes closer to sensitive topics and that any capture may comprise a legal or organisational audit trail. "Thus efforts to formally capture and represent workplace storytelling via computer support can fundamentally change the character of the story; promoting the mundane, broadcasting the private, personalising the general, or de-contextualizing the relevant." (p. 22) Lutters concludes by offering this challenge as an area for further research.

Relevance of storytelling for an IS audience

Although Storytelling is a relatively new and emerging area within IS it does provide some indicators for the design and development of systems from a story perspective.

Storytelling within a system can enrich communication and involvement, is useful for approaching synthesis tasks, and in promoting reflective practice. Opportunities lie in capturing more aspects of group interaction than are currently captured to help solve complex problems. Further benefits lie in re-presenting these aspects in a structured story means that shows what has happened, and what is related over time.

For the design and development of cooperative environments a stronger understanding of the storytelling process would be useful and is an area for further research. Particularly better understanding of the relationship between the storyteller and audience. Understanding place as part of the story and the dramatisation of virtual place and events may offer greater engagement for online environments and give people a sense of place.

While there are some challenges in using story within systems, the relevance of storytelling for an IS audience is that it offers a fresh perspective for the design of tools that include narrative, environment and the presentation of information over time.

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