ABSTRACT
Organizations frequently need to recall past events that, for some reason, were not documented when they occurred. This knowledge is hard to capture structure and manipulate, yet it is valuable for the organization, and may serve as a basis for organizational learning. The successful reconstitution of past events depends on several variables, such as how long ago the event occurred, and whether key people are still available to tell what they know. Although it is sometimes difficult to completely capture all past events, an adequate recall process can provide good results. In this paper we describe a knowledge recall approach based on group storytelling. We present the results from our experiences using the approach as a means to capture knowledge from a group of people, and evaluate its benefits and drawbacks.

Author Keywords
Group storytelling, collective intelligence, tacit knowledge

ACM Classification Keywords
H5.3. Information interfaces and presentation (e.g., HCI): Group and Organization Interfaces: Computer-supported cooperative work.

INTRODUCTION
Knowledge is the most valuable asset in an organization [9]. Appropriate management of knowledge can make a big difference to most organizations [1]. People and organizations frequently need to recall past episodes that, for whatever reason, were not adequately documented when they occurred. Recalling relevant knowledge is dependent on multiple people who witnessed or participated in the events. To that end, organizations have an important asset in their employees, who detain knowledge about these past events and how they relate to the business of the organization. However, recalling knowledge is not a straightforward task. Memory lapses and the lack of key facts are commonplace in the recall process and frequently lead to incomplete information. Interviews, an often used method has also many drawbacks, including a biased view of the interviewer.

Stories are a powerful communication mechanism. They can be used for numerous purposes, such as entertainment, teaching or knowledge transfer. A good story combines the objective with the subjective, the rational with the emotional. Details depend on the person who is narrating the facts, but a story can also be told by a group of people: the group constructs the story collaboratively piece by piece, where each piece helps participants remember facts and feelings, and stimulates further contribution. Organizations in general have employees working on collective activities. In order to propagate the experiences of a team that worked on some activity, we could ask that team to tell a story of what happened.

To address the problem of knowledge recall, we have adopted a group storytelling approach. Using appropriate tools, participants may contribute synchronously or asynchronously, at the same place or remotely, to construct the stories. Each person contributes with a part of the story that he or she considers relevant. Our storytelling process is based on journalistic narrative and is supported by a computational system.

We have found that storytelling is a good way to elicit tacit knowledge. Contributors send in story parts and weave them together into a tapestry of events. Snippets are connected through qualified relations, such as “caused” or “contradicts”. Participants may contribute freely, which means there will be different perspectives on the same story and also that some parts of the story may not be covered. However, it is important to separate actual events from fiction. Due to the nature of storytelling, people sometimes make conjectures; speculating reasons and outcomes. That is when the collective process can also help. In the following sections, we present our approach and our experience with storytelling as a means to elicit information from the user.

STORYTELLING
A story can be defined as “a narrative of an event chain told or written in prose or verse”, (the word narrative comes from the Latin narrare that means “to pass knowledge” [13]). Telling stories is an old tradition that is present in many cultures, one that has been used as an important technique of knowledge propagation. Stories are a part of any individuals’ daily life, as episodes or events. Most individuals are familiar with storytelling in the form of journalistic texts. The news is defined as “the report of a series of facts starting from the most important or interesting fact; and each fact starting from the most important or interesting aspect” [2]. There is a very close link between storytelling and news.
The popularity and the importance of stories have led organizations to adopt them as a knowledge management tool. Since people enjoy reading and listening to stories, the storytelling practice is attractive for members of an institution, to construct organizational memory without increasing the workload. Stories can foster communities, facilitate communication, accelerate organizational change, stimulate innovation and transmit knowledge. It is an old human ability applied to a new context: knowledge management [4].

Besides transmitting the teller's knowledge to the listener or reader, the story can convey tacit elements of its teller’s knowledge. Many times a story is a vague and disjoint description of elements or a sample of the knowledge that can be made explicit, combined with the personal expression of emotional, physical and informational aspects that the individual associates with the knowledge [10].

Stories help humanize the environment, creating a scenario for knowledge sharing and new community construction [5]. Narratives involve emotions, which in turn provokes personal commitment and stimulates externalization [10]. However, storytelling finds obstacles inside organizations. The most important is the lack of a common and acceptable language for all the members, which usually originate from different cultural backgrounds.

In spite of certain enthusiasm on the use of stories in KM, methods for developing narratives and capturing knowledge are not easily found in literature. Studies focus on how to use stories, but few deal with the reconstruction of a story based on actual events (also known as recall).

The choice of a story-based approach is justified by the simplicity and the natural incentive – everybody likes a good story – of the story telling approach [13]. By telling stories in natural language, users are able to report their knowledge in a simple and straightforward style. Without imposing rules and pre-defined formats, users are free to tell their stories in details and unconstrained by templates or time limits.

**STORYTELLING IN ORGANIZATIONS**

In this context, we introduce the group storytelling technique. Any individual or group can tell a story. In the later case, members of a team, distributed or in the same place, contribute to create a story [13]. We believe that the knowledge generated at the end of this process is a combination of the tacit knowledge from each participant. This technique is called group storytelling.

Group storytelling is a more appropriate process than individual storytelling in contexts where there are several people involved in the execution of a project. The group will build collectively a story about a work done by its members. Each participant performed a role in the project, for which the story will be “told”. Therefore, the stories written by a team will probably contain more valuable details because everybody has the opportunity to present their viewpoint of what happened during the project. In other words, we are inducing team members to expose tacit elements of their knowledge. Discussions and disagreements will certainly arise. Thus, the group needs support to express their thoughts and to solve the conflicts in order to produce an interesting and useful story.

To recall a past episode, which has been witnessed by a group of people, we count on the group’s testimonies to try to reconstitute the episode. However, it is usually the case that no individual participant is able to tell the full story because s(he) knows only part of the complete event. Only when put together do the events make sense. This organization is achieved through knowledge exchange and combination. Although this is not enough to guarantee the full reconstitution of the episode, as some events may not have been witnessed or some witnesses may not be available, we have noticed that the product of a collective knowledge recall process is usually more complete than individual recall reports.

The basic concept in Group Storytelling is that a group of people can recall portions of knowledge from the past and describe them in their own words. It provides a natural way for users to report their experiences with process activities. Unconfined by the limitations of a formal language, users can express themselves freely and analysts can use these reports to extend their knowledge about processes. As stories are built collaboratively, they do not display a single view of the process. Instead, they correspond to the collective knowledge of the process.

In our method and supporting software, a description of an episode is defined as a set of events and their relationships. It is therefore, a hyper-story: story elements linked together by relations. An episode description falls into one of three categories (shown in Figure 1): the true version, the known version and the reported version. Between the Known version and the Reported version there might be a large gap, depending on the technique used to recall the episodes. With our approach we intend to approximate the Reported version to the Known version, while avoiding conjectures, at least at this stage of the recalling process.

![Figure 1: The different versions of a story](image)

The reported version is generated when participants externalize knowledge about the events they have witnessed. This process is called externalization because participants transform their tacit knowledge into formal knowledge [7]. However, during this process they can forget or disregard events they think are not relevant,
making the reported version different from the known version. Faulty memory, subjective perception, partial or erroneous knowledge may also distort the report [11]. The goal of the tuning/recalling process is to approximate the reported version to the known version: the closer the two versions, the better the recall process. The true version consists of all events that formed the episode organized in a coherent way. In real situations, the true version does not usually exist, because of missing information, such as events, motives and emotions. To generate a true version from an incomplete known version, one must add conjecture, speculating about missing information. The conjecture process, though very relevant, has thus far not been studied by us.

While reaching the true version depends on external facts, such as the set of known events and the proper establishment of the relationships, we believe that the difference between the reported and known version depends on the recall process of a group of cooperative participants. The more people there are to contribute, the higher the likelihood of completeness and accuracy, i.e., the closer the reported version will be to the known version. On the other hand, the more people there are, the greater the potential for controversy.

TESTING THE GROUP STORYTELLING APPROACH

The goal of our method is to reconstruct the story as closely as possible to the collectively known story. The main difficulty in performing tests with our approach is finding good stories to be told. In a number of preliminary experiments, we observed that reading and commenting on other participants’ narratives activates recall, increasing people’s ability to recount what they have witnessed.

An initial test was performed with a group of project members who participated in an undocumented project [8]. They used the approach and the Tellstory tool (a storytelling tool developed by us [8]) to recall the important events of the project. A second experiment was having TellStory used by a group of firefighters recalling the story of a fire in a supermarket in Rio. Although both groups liked the experience and judged it beneficial to the organization, we couldn’t evaluate how close they got to the known version of the story.

For the next iteration, we decided to carry out a controlled experiment: one in which we know the story and know what each participant knows in order to evaluate the gap between the known and reported version. We decided to use movies with a good underlying story.

The experiments were setup as follows: first, we selected the storytellers. In most of experiments they were students. There is a lot a criticism in using students for testing software and methods, but in this case it doesn’t make any difference, as they were witnesses of an event like anyone else can be.

Second, we selected a movie with a good story, not too simple (wouldn’t have the complexity required to create curiosity and engagement), and shouldn’t have been watched by any of the participants.

We split the movie into several episodes and selected which episodes to show to each participant as illustrated in Figure 2. We should note that three situations are possible: a) episodes not shown to any of the participants; b) episodes shown to one participant; c) episodes shown to two or more participants. We should also note when we show the same episode to two different participants they might have a different interpretation, depending on what other episodes they had watched.

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and drawbacks, comparing face-to-face with distributed interaction. As a teaching tool the results have been very valuable and we have been able to improve the TellStory software through these courses.

We have also applied the technique in organizational settings. In one case, we applied our method to the recall of a project development process that took place in an organization in Rio de Janeiro, again supported by the TellStory tool [8]. We compared the official report generated at the time of the project with the story generated by all but one participant two years later, and results were very good, i.e. the collective story contained valuable information that had been omitted in the official report.

In another project, we applied the technique and used TellStory with a group of firefighters who had participated in the combat of a fire in a supermarket in Rio de Janeiro [2]. Again, the knowledge captured by our process was not reported in official documents generated after the event. The information contained in the story was so valuable that it has since been used by the command to instruct inexperienced members of the fire brigade.

We have also used variations of the TellStory software in other domains. Laporti et al. [5] applied the group storytelling approach to capture requirements for a new system based on the stories reported by users of the old system. Santoro et al. [11] used group storytelling to capture knowledge about business processes using the stories told by people responsible by process activities.

All these applications demonstrate the potential for the group storytelling approach for collective knowledge recall. They also served to demonstrate its limitations, most related to the general drawbacks of groupware, particularly in asynchronous mode. The importance of awareness and coordination functionality was pointed out by most participants.

Another limitation that crept up was the relationship between story fragments. The default association is simple one. It depends on the existence of an organizational knowledge management culture and of a collaborative culture, and appropriate technological support, issues we are also looking at in this research.

Furthermore, the approach might not work so well when blame is to be assigned for some undesirable event: individuals might not want to point their fingers at their colleagues. This is another social issue that will need to be overcome by these types of systems.

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