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Using Place as Provocation: *In Situ* Collaborative Narrative Construction

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Abstract

This paper describes a unique model for mobile, collaborative learning embodied in the use of a new software tool called PlaceMark©. The model is overtly intended to help learners reflect on their relationship to particular places, and the relationship between their own experience and other people's experiences of those spaces. PlaceMark does this not by telling people what a place is, but by instead asking them, as they reflect and write about their own experiences of place. This paper describes how PlaceMark facilitates distributed control in coordinated classroom activities. We believe that the stance to knowledge embodied in the system encourages student responsibility within the learning process and helps teach about multiplicity of perspective in a visceral way. Additionally, as cell phones and other technologies become part of ordinary life, it is increasingly important that children (and all of us) come to have a deeper consciousness of place. This work reports on a pilot study of the software conducted with middle school students, and provides an analysis of the study activity.

Using Place as Provocation: *In Situ* Collaborative Narrative Construction

There is an increasing push among researchers to explore the possibilities of ubiquitous, mobile computing within the domain of education and learning. This trend stems from two directions. One is the increasing use of interactive learning devices in the classroom, especially Classroom Response Systems (c.f. Penuel, Abrahamson & Roschelle, 2006) which provide the teacher with formative information that may be used to gauge student understanding and guide instruction. Other systems, moreover, foster more complex forms of interaction that garner active student participation in a rich social-learning context (as in Kaput & Hegedus, 2002; Repenning & Ioannidou, 2005; Tatar, Roschelle, Vahey, & Penuel, 2003; Vahey, Tatar, & Roschelle, 2004, 2007; Wilensky & Stroup, 1999, 2000).

The second direction utilizes the flexibility and portability of handheld, wireless systems and phones to engage students with location. In several efforts that attempt to promote location-based learning, mobile and location-aware technologies augment students' experience of a place by using the location as a key for accessing mediated digital content. This has most often been used in relationship to museums,

outdoor recreational areas, or historic areas (Cheverst, Davies, Mitchell, Friday, & Efstraiou, 2000; Ciolfi, 2004; Holloran et al., 2006; Hornecker & Stifter, 2006).

These location-based systems support several of the main tenets of ubiquitous computing within education as described by van 't Hooft, Swan, Lin, and Cook (2007) (e.g., continuous access to information, situated learning, multimedia, one-to-one student access to technology, portability and integration). This paper, however, describes work based on somewhat different priorities.

We present an alternative model for the use of location-aware technology in mobile learning scenarios. This model uses location itself as a catalyst or mechanism to spur student interaction, discussion, questioning, and creativity. Rather than pre-defining particular places and thereby designating them as noteworthy, we focus students on the questions “Is anything around here a place to you?” and “What makes this a place to you?” Students are led to convey their experiences of spaces as places through a reflective practice of creating narratives *in situ* using mobile technology and sharing them in the course of the experience. The theory is that, through the process of private noticing followed by sharing and responding to other people’s perceptions (doing and undergoing, in Dewey’s terms (1938)), students will reflect on their own perceptions and the relationship between their own perceptions and those of others. They will be able to build on their similarities and differences to develop rich collaborative narratives of place. As opposed to work that is collaborative from the beginning, we believe that requiring students to make their own decisions about place and descriptions of it *in order to collaborate* will lead to a greater feeling of responsibility and commitment to the claims (Vahey, Tatar, & Roschelle, 2006), while still retaining the benefits of collaboration. We have developed a system that is, among other things, an example of *provocative coordination*--using computers to help in coordination and development, but deliberately designing gaps or areas of “roughness” to provoke thought.

In our case, the learning model is distributed between the activity structure provided by the instructor, and a multi-user, mobile software tool called PlaceMark. This tool allows the creation and sharing of textual notes and narratives while mobile. These can be shared between students, providing the means for creating an interweaving of different perspectives and insights, for “riffing” off of other people’s ideas to generate new ones, for proposing different ways in which to look at the entirety of the group enterprise, and, ultimately, for collaborating in narrative construction. To facilitate a learning environment in which creativity and sharing ideas are important but manageable, the software is designed to grant the students a sufficient degree of structure while maximizing their control over the technology.

The following describes PlaceMark tool, and a pilot study conducted with the software system in a middle school club context. Still in very early stages, our research is driven by the following questions: how can the design of educational software facilitate creativity in the moment? To what degree and how can the design of software influence student control over learning and classroom responsibility? and, how can educational technology serve as a means to coordinate social knowledge building and activities in which insights and ideas are shared, and understandings are deepened?

PlaceMark

To explore these issues of control and collaborative student knowledge building in the context of ubiquitous computing, we are using a multi-user, mobile software tool called PlaceMark. The technical capabilities of this software are simple but, we believe, powerful. The primary feature of this application provides for the creation of anonymous textual entries (comments, notes, or other written work) while mobile (Figure 1). These entries are displayed in a common linear listing (Figure 2). As shown in Figure 3, different people can proceed at their own rates and develop different kinds and sizes of entries.

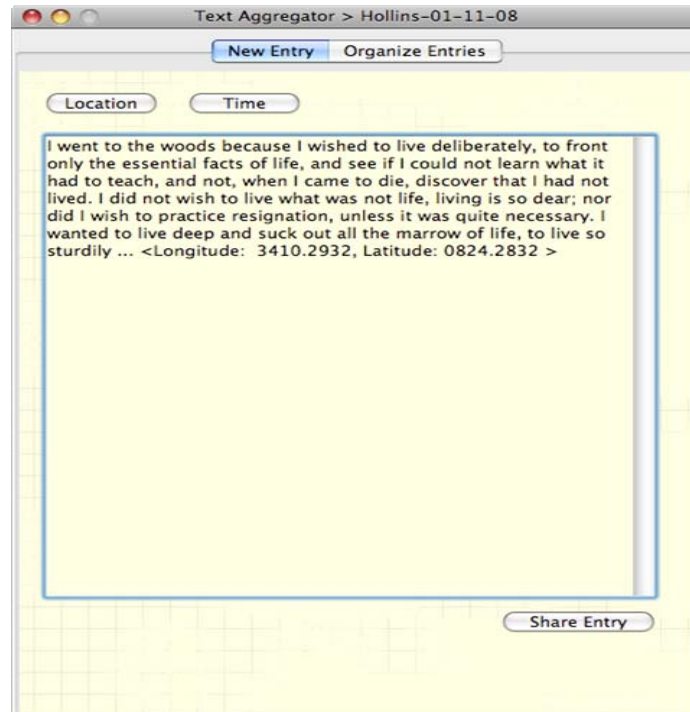


Figure 1: The new entry screen where users create their narrative contribution.

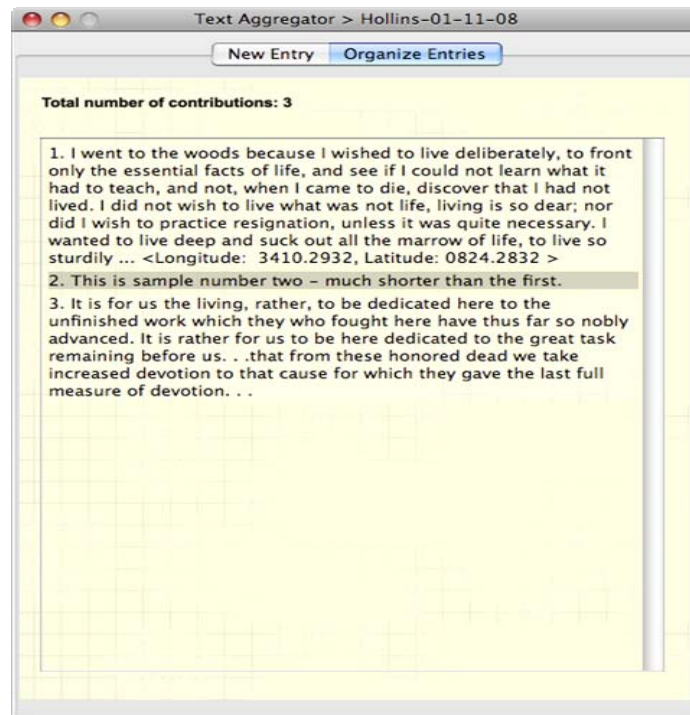


Figure 2: The "Organize Entries" screen where the entries can be viewed and reordered.

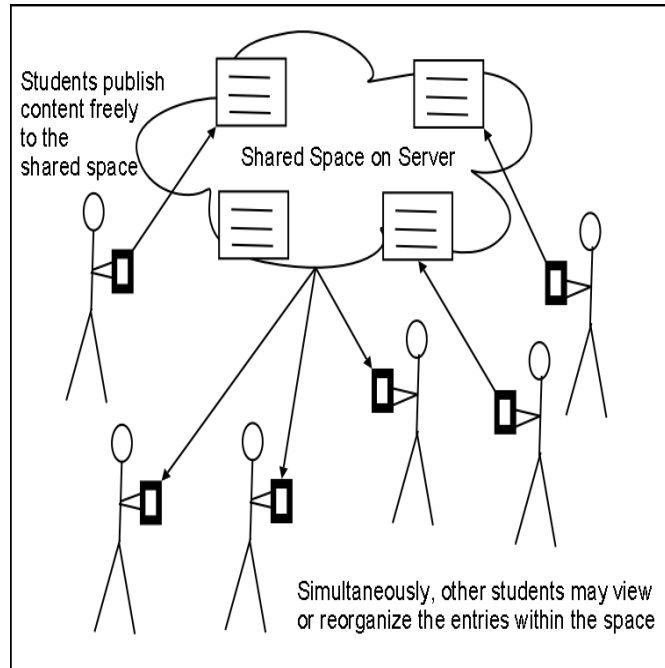


Figure 3: PlaceMark model of entry creation

As shown in Figure 4, these entries can be shared while mobile at any time. Thus, one student might discuss entries with others before submitting them, while another might work in a more solitary way. Even within a more solitary approach, one student might create a number of entries, sending each one out into the shared space as s/he finished them, while another might choose to look at the shared space between creating two entries, or after creating every entry.

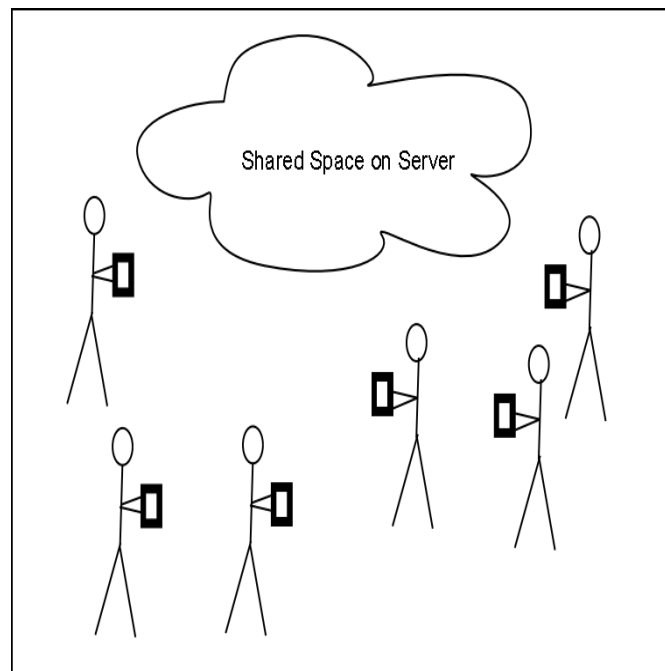


Figure 4: The Text Aggregator model of entry sharing and observation coordination.

While, to ensure attention to the act of publishing and its effects on others, the entries themselves cannot be removed or edited, the order of entries in this list can be modified from its initial temporal sequence by any student at any time. This reordering will potentially be part of discussion, processing, and reinterpretation by the group of the entries and reinterpretation of their experiences. By providing the means to collect and sort textual entries, PlaceMark serves as an instant forum for sharing ideas and insights. These entries, in their original or reordered sequence, may constitute shared narratives by themselves, or generate fodder for further development and reflection.

In addition to the features described above, PlaceMark works in conjunction with wireless GPS devices. This allows students to place location stamps (currently, geographical coordinates) into their entries as they type. These may be placed within the text at any point, thus serving a narrative function as well as a location-oriented one. Indeed, the student may choose to place several markers within a single entry, perhaps to identify placial boundaries. This location-oriented ability, combined with the similar ability to stamp the current time into the entries, is critical in the model of inquiry for which PlaceMark was constructed.

Relative to PlaceMark, the preceding systems are feature-rich, and mostly designed for complex forms of user interaction. The power of PlaceMark, on the other hand, is its simplicity of use and flexibility in application. In the same vein as the Group Scribbles program, which provided a flexible framework in which coordinated classroom activities could be enacted through the simple sharing of "Scribble Sheets" (DiGiano, Tatar & Kireyev, 2006; Roschelle et al., 2007), the software is designed to provide a very simple set of operations on flexible data units (i.e., free form text). In both Group Scribbles and PlaceMark, students are primarily responsible for generating the information which is exchanged through these respective systems.

The Study Activity

The following sections describe a one-day pilot study using PlaceMark with middle school students. The purpose of the pilot study was three-fold: first, we wanted to test the technology in the field to identify any major issues prior to deploying the software in higher stakes circumstances; second, we wanted to get a sense of how young students would respond to the software and the associated tasks; and third, we wanted to know whether the software was enjoyable in circumstances that were more likely to produce untrammelled answers than working with the classes of one of the professors on the project. Would they enjoy using it? What difficulties would they encounter? What features would they use heavily, and which would they ignore? Finally, how would they interpret the activity as a whole? We wanted to get a sense for the kinds of entries they would generate, and the novel behaviors they would exhibit within the context of the activity.

Study participants came from an after-school game club at a K-8 school in southwest Virginia. The 8 participants consisted of 3 females and 5 males. Participant ages ranged from 11-13 years old, and all were in grades 6-8. Three children did not come to the game club that day, either because they had other things to do, or because they did not wish to participate. One participant had to leave half-way through her annotation session.

Conducted during the club's normal meeting time, the study progressed in the following manner. First, the students were introduced to PlaceMark by one of the investigators using a simple handout; this handout consisted of three pictures of the PlaceMark interface with short, simple, textual descriptions of each of the important buttons and interface elements of the program.

The students then received verbal instructions for their task: they were asked to walk around the playground and to use PlaceMark to mark and write about the different places they found. To provide more direction, the students were asked to address questions such as "What makes you think of this area

as a place?", "What happens there?", or "Does the *place* have a name?" They were encouraged to use the software to look at the entries made by their fellow students and to talk with one another while out in the yard, but were told that their writing should be their own.

Following these instructions, the students were separated into two groups of four. Each group spent approximately twenty minutes outdoors performing the exercise. They carried laptops running PlaceMark software. Laptops, while cumbersome to carry, offered greater ease in writing textual entries compared to typical handheld devices. During this time, the investigators observed the students, videotaped their locations throughout the yard, and assisted with any technical difficulties they encountered. After finishing the activity, each participant completed a short questionnaire regarding their experience.

Last, after both groups had finished the exercise, the participants took part in a short discussion led by one of the investigators. This discussion addressed students' reactions to the activity, and the entries they generated. During this discussion, the investigator prompted the students with questions like, "Do you see any places in the entries that you didn't notice while you were outside?" or "Where do you appear to agree about the places you marked?" Unfortunately, this discussion was somewhat curtailed by the arrival of parents eager to take their children home.

Results

Across the two 20-minute exercises, the 8 students produced a total of 72 entries. The first group generated 45 entries, while the second created 27. On average, each student created 9 entries. Within these 72 entries, the students marked 59 of them with a location stamp, and 3 with time stamps. There were two exceptions to report. In the second group, one of the students had to quit the exercise part-way through because her ride arrived to pick her up from school. Also in the second group, one of the students appears to have spent the entire period working on a single entry, but never published it to the others; thus, the investigators do not have access to this data.

Conceptions of Place

The entries revealed several ways in which students conceived of "place" within their school yard. Not surprisingly, the students demonstrated a wide range of sophistication and creativity when generating them. A large majority of the entries described places in terms of physical or geographical characteristics, and the activities that they and others students regularly perform in those places. Some salient examples of this include the following (spelling and grammar uncorrected):

"i'm next to a tree!"

"The place that I am sitting in right now is in a hill shape. Behind me there is a circular sandbox filled with white, soft sand. In front of me there is a grassy plain. Straight in front of me there is a tree with no leaves that is still growing"

"Now I am in a place where baby pine trees are growing. Baby grass has also been planted and behind me a big tree stands tall. Behind me is where the elementary schoolers play games that they have made up."

"i'm at the place where the teachers sit during snack time for the elementary school."

"this is the little kid bridge they build bridges accross the river bottom so that they can safely cross"

Harrison (Harrison & Dourish, 1996; Harrison & Tatar, 2008) argues that place consists of a space imbued with meaning by a semantic tangle of persons, events, and the pre-existing meaning of the space. Thus, it is not surprising that many entries reflect the notion of place as a landmark or partitioned

area in or around which certain behaviors regularly occur.

While many of the entries followed this pattern, others were more novel in their interpretation of place. A few entries identified a place based on its name:

"This is the new [school name] Fairy town this is ehere the little kids play a lot"

"I'm in the outdoor classroom."

Other entries described a location based on who else was there. These are all rather transitory places whose event-ness is defined by nothing more than the presence of another:

"this is josh he is writeing about me"

"this is where ben is temporarily standing while i write this."

One student identified an area based on rules of behavior:

"This is where mounds of grass are that you are forbidden to go on during recess."

Comparing Perspectives Within a Location

To better understand how the students conceived of place within the context of this exercise, we looked not only at what the students wrote, but where they wrote. Based on the video captured by one of the investigators, we attempted to determine the approximate "locations" which the students deemed worthy to visit and write about. We considered a visit to a location only if the student stopped in that location and appeared to be writing on the laptop. Individually, we noted from the video at least 56 instances where students stopped to write. Within these, we attempted to group the instances based loosely on location. (Our groupings were arbitrary, and based largely on proximity and uniformity of physical and geographical characteristics of the locations, e.g., in or next to the sand box). This analysis yielded 27 groupings around locations. We then attempted to determine which entries were made within each of these groupings. While the entries from many of the groups were simplistic, a few provide interesting examples of the multiplicity of perspectives on places.

In the first example, the entries were written under or near a large wooden structure (the so-called outdoor classroom) which spanned over a brick patio near the school building. Each of the following entries was created by a different student. They reflect the slight differences in which students perceived the same location on the playground.

"IN front of me stands the [school] building. A wooden outdoor classroom surrounds me and a wooden roof hovers over top of me. I am sitting on a pile of cement blocks an d behing me is a pile of mud. In the mud plants are growing."

"this is the outdoor class room. it is made of stone with a wooden cealing and supports. we also use it for pictures."

"This is the outdoor classroom. Many people play on it. We have had a few classes out here. It is made of large and small bricces. There is are two ramps leading up two it. the boundries are where the bricks end."

"the location that i pressed the button on the mac of is about 8 feet from the ground. It is a wooden structure that you can see from the place with the view."

The first entry is very much a physical description of the author's immediate environment in the present tense. The second entry continues in describing the physical environment, but also adds a name for the place (outdoor classroom) and includes an activity which takes place at that location (taking pictures). The third entry, like the first and second, is also comprised of physical description; however its author adds a new element to place description – boundaries. Moving in a very different direction, the fourth entry is a novel take on the question regarding the nature of place. In the video recording, the fourth author placed the laptop on top of the wooden structure before stamping the entry with location information. This author also references another place, "the place with the view," while discussing the current place.

In the following example, the entries were created in and around a large sandbox in the middle of the yard. Again, each of these entries was created by a different student.

"now I'm at the sandbox."

"I am at the sand boxes where the elementary school kids play and build with the sand to make sand castles and sculptures."

"This is the sand box. This is a very popular spot to play. There are some ideas to dig deep holes and hide in them. Some little kids build castles with trenches around them. The sand is very pure. There are many foot prints and there are two sand boxes on different layers."

"The place that I am sitting in right now is in a hill shape. Behind me there is a circular sandbox filled with white, soft sand. In front of me there is a grassy plain. Straight in front of me there is a tree with no leaves that is still growing"

In this second set of entries we again see students extracting very different characteristics from the same location. Each author conceives his or her physical location in terms of the sandbox. The last three offer a physical description of the box, while entries two and three also mention activities and who performs them. The fourth author understands the current place in terms of a larger set of physical proximities than the first three.

Log Data and Survey

Based on the rough estimates gathered by software logging, the majority of students did not spend much time working on each entry. The average time spent on each entry is approximately 1:08 minutes (N=71, one entry composition time was not logged correctly). Out of the 72 entries, only 9 of them were written over a period longer than 1:40 minutes. Of those 9, 7 entries were written by only two students. Based on the short amount of time spent on writing the entries, it is not surprising to find that the entries contained an average of only 18 words (N=72). Later, we discuss why these numbers might be low.

In a post-test survey, the participants were asked how much they enjoyed using PlaceMark. On a seven-point Likert scale (1=Disliked as much as possible, 7=Enjoyed as much as possible), the average participant rating was 5.19 (N=8). Additionally, they were also asked how interesting they found the software. Again, on a seven-point Likert scale (1=As boring as possible, 7=As interesting as possible), the average rating was 5.13 (N=8). While positive, these results probably indicate that there was not an overwhelming student interest in participation. One possibility to consider why these numbers were not higher is that the activity took place during a normal after-school game club meeting. Participants may have been comparing their experience to games or anticipated a game-like activity.

Post-Activity Discussion

Following the activity, five of the students were able to stay to participate in discussion with the

investigators regarding their entries. Due to time constraints, this discussion had to be cut short to less than ten minutes. Given this, the students did not have much time to reflect on what others had written. Instead, the discussion was based more on their motivation for their selections of places. In response to a simple question posed by the investigator, “Why did you pick at least one place that you picked?” the students provided a variety of responses, again demonstrating a diverse set of perceptions of place. For example, one of the students chose to write about the swing set because of its social importance: “lots of people go there.” Another student chose to write at the big tree because he considered it to be a landmark and because “you can see the whole rest of the playground” from there. A different student wrote about the creek bed because it “popped into his mind” and that it was a place unlike any other in the old school yard. This student later revealed that he felt it was being “ruined” by the younger children because they were moving stones and placing wood boards across it. Another student agreed. As they augment the activity entries, these discussion comments continue to reveal differences in what constitutes place for the participants.

Discussion

Taken cumulatively (or perhaps even individually), the set of student entries can, at some level, be considered a “narrative” of their experience with the school yard environment. They represent a collective understanding and description of places within the school yard. These convey an important example of how PlaceMark can amalgamate different perspectives or interpretations from students into a single collection. However, the software was not only designed to collect these ideas, but also to expose students to each others’ ideas and to illicit new perspectives based on those entries. Although our instructions encouraged the children to work together, we emphasized that entries should be their own work. Evidently, our instructions pushed them too far towards individual work, and time constraints prevented us from encouraging a second phase of discussion and coordination.

When considering the age of the participants and the context of use, it is unrealistic to expect more elaborate or complex entries without more scaffolding. Instead of students partaking in a one-time use of the system, we envision engagement with location-based narrative and PlaceMark as an extended exercise.

Nonetheless, the entries displayed PlaceMark’s potential for gathering student ideas. The participants generated an array of creative entries, and observation of their use provided insights into ways in which the software can be improved for future work. Some of the participants displayed noticeable enthusiasm when using the system. As an additional benefit of this study, we were able to identify some key technical and usability issues related to network and GPS connectivity.

Conclusions and Future Work

In this paper, we have introduced a learning scenario in which students create location-based annotations of space through mobile technology with the intent of ultimately constructing shared narratives. Through a multi-user application called PlaceMark, students take an active role in reflection and ideation in pursuit of the question, “what makes this place a place?” This is a different and, we think, important approach to mobile learning.

We argue that the PlaceMark system will ultimately encourage students to take a stance of responsibility towards critical reflection through an active relationship with information. Student collaboration is essential in developing nuanced and rich perceptions of the world. To facilitate this collaboration, PlaceMark provides the scaffolding for coordination between students; it allows them to share their ideas in real-time, and hopefully in an environment which facilitates their own creativity and ideation. The software was designed to support what we believe is an important aspect in educational technology – the distribution of control in coordinated activities. Through a set of features (or lack thereof), responsibility for learning is shifted toward the students. We believe this is increasingly important in educational environments which focus on social knowledge construction and negotiation.

We presented the results of a pilot study in which middle school students engaged in an outdoor activity, employing PlaceMark to explore the places within their school yard and to construct a diverse narrative of their reflections. Students were able to generate diverse thoughts and experiences about place with little prompting.

In the next phase of our work with PlaceMark, we plan on integrating the system more deeply into the middle school curriculum and introducing it into the context of an undergraduate course. In these contexts, we will be better able to further refine instructions and assess student learning. We anticipate that the software will undergo iterative development during this phase. Also, we will continue to address questions regarding the relationship between software interface design, coordination, and student control and responsibility. Furthermore, we would like to explore the ways in which the software provides support for creative and critical thinking as learners engage in writing and reflection.

Based on these questions, there are several potential interface features that require investigation. We would like to explore different means of portraying location and proximity within the software. Currently, if a student stamps an entry with location information, only the students' geographical coordinates are displayed. One contentious possibility is to embed notes into a map representation, based on their stamped location. One concern with this method is that it may undermine the narrative genre and over-emphasize the students' conception of place as simply a location on a map rather than the locus of a web of meaning. A second possible way in which location information can be portrayed to the students is by providing a graphical indicator of proximity between entries (perhaps giving entries written within close proximity to each other similar shade of color). While this method may de-emphasize abstract geographical characterizations provided by the map, it raises the question of what scale of proximity should be portrayed (i.e., should ten meters be considered "close" or is fifty meters more appropriate?). Also, even if students are writing in close proximity to one another, they may perceive completely different places. For example, when standing on a mountain side, looking up toward the peak would give one a different sense of place than looking down into the valley.

In the pilot study, students did not take the time to look at the entries created by the others. Consequently, they were unable to reference or respond to each others' work. While this may be a result of how the investigators framed the activity for the participants, it may pertain to students' interest or perceived value in participating in a collaborative narrative building process. The choices participants make in sharing or creating text entries provide valuable information in how students construct and view "narrative" in an experimental and unfamiliar setting. Further exploration is required of the conditions that influence whether participants approach the narrative component of the activity as an opportunity for individual expression (the student and the computer being the primary interaction) or as a space for community sharing (lateral sharing of entries between students). To encourage student collaboration, we would like to explore the boundaries between private and public work, including for example what happens when both are visible at the same time.

While not mentioned in this paper, we believe the Text Aggregator can be used in a multitude of learning activities. Almost any activity which includes group writing, ideation, argumentation, or knowledge sharing could potentially be an application domain for the software. One such domain in which we are actually investigating is in group or class discussion. While this is quite a different context from collaborative narrative development, some aspects (e.g. aggregation of learner contributions) remain the same.

PlaceMark is a simple, yet, we believe, powerful application. As we move into a time when mobile technologies become ubiquitous, this software highlights the potential of these systems to provide the framework and scaffolding to support learner collaboration, ideation, and creativity.

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