Learning and Collaboration across Generations in a Community

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Abstract. We report on the activities and outcomes of two workshops in which middle school students and senior citizens explored, designed, and constructed visual simulations related to community issues. The workshops are part of a larger project, in which we are studying the effects of community-related programming projects and discussion on residents' computer literacy and community involvement. We describe the interactions among participants of varying age, and the simulations that they designed and built. We also discuss the influence of age on participants' reactions to the workshop activities, and consider what implications these findings have for our goal of building and maintaining a cross-generation learning community.

Introduction

The increasing pervasiveness of community networks creates new opportunities for interaction and synergy within towns and cities (Carroll & Rosson; 2001; 2003; Cohill & Kavanaugh, 1997). Instead of attending a town council meeting, residents email questions or comments to town officials (Cohill & Kavanaugh, 1997). Elders who remember key historical events or perspectives share these in simple online forums (Carroll et al., 1999). Teachers who have traditionally worked autonomously within their own classrooms share their resources and strategies with other teachers using online tools (Kim et al., 2002). In this paper, we discuss another opportunity created by community networking—informal and collaborative learning among diverse segments of a local population.

Our interest is in community members at two ends of the age spectrum: children and senior citizens. As Putnam (2002) has argued, a community's elders are a valuable resource, with the time, motivation, and wisdom to contribute to many community endeavors. In contrast, school children are energetic, curious, and comfortable with computing technology (Brown & Cole, 1997; Druin, 2002; Mayer et al., 1997; Lewis et al., 1997; Gilmore et al., 1995), but have little experience with community activities. For two years, we have conducted a community outreach project—COMMUNITYSIMS—under the premise that the assets and energies of the young and old can be synergized in a cross-generation learning community where members participate in a complementary fashion.

The goals of COMMUNITYSIMS are two-fold. First, we seek to engage members of our community in a shared learning and discussion process that enhances appreciation of community issues. Second, we hope to empower residents with new computing technology that they can use in raising and discussing these concerns (see also Arias et al., 2000). We are pursuing these goals by inviting young and elderly community members to build visual simulations that address community-related topics (e.g., noise pollution, bullying at school). The resulting simulations are shared and discussed more broadly in a community Web site.

Building a Cross-Generation Learning Community

Although our vision of a cross-generation learning community is attractive, pursuit of such a vision entrains many challenges. School children may interact with community elders as mentors on school projects (Gibson, et al., 1999; Oneill & Gomez, 1998), but they have no reason to seek their guidance outside of these teacher-guided school settings. Senior citizens are often highly motivated and active online constituencies in community networks (Carroll & Rosson, 1996; Carroll et al., 1999; Ellis & Bruckman, 2001), but sending email or visiting a web page is qualitatively different from designing or building visual simulations.

Studies of learning communities emphasize the role of authenticity in learning, where the concepts and processes of the learning situation are linked to those of the real world (Brown & Campione, 1994; Brown, Collins & Duguid, 1989; Lave & Wenger, 1991). Thus one aspect of the COMMUNITYSIMS vision is to link residents' learning and use of computing technology to the issues they face and address in their day-to-day lives. Researchers have also pointed to the benefits of diversity within a learning community—diversity may promote socio-cognitive conflict and discussion of alternative solutions (Foot et al., 1990); more knowledgeable individuals can serve as role models and guides (Bandura, 1977; 1986) while simultaneously reinforcing their own understandings (Lave & Wenger, 1991). However, if COMMUNITYSIMS is to form and nurture a cross-age learning community, we must first understand the varying motivations and learning potential of the young and the elderly community residents.

Our strategy thus far has been to combine detailed studies of children and elders as they learn to build visual simulations, with simulation workshops that explore residents' interest and success in cross-generation design and discussion. The first year of the project focused on the learning problems of different populations (Lewis et al., 2002; Rosson & Seals, 2001; Rosson et al., 2002; Seals et al., 2002; Wissman, 2002). The results of these studies have guided the design of self-paced tutorials customized for different age groups; these tutorials are now available for other community members wishing to participate in the project.

The current paper reports the result of two exploratory one-day workshops where children and elders worked together on simulation programming projects. One practical goal for the two workshops was to acquaint some of the children and elders we had been studying in the training sessions; we hoped that by facilitating this initial interaction between these two age groups we might seed longer term relationships. More importantly, we wanted to study the nature of the cross-generation collaborations that emerged, so that we could try to facilitate such interaction more broadly within the community.

In the balance of the paper, we first provide an overview of the workshops and participants. We next summarize the workshop activities, focusing on the interaction between the children and elders, and on their differing reactions to the the simulation projects. We conclude with reflections on the prospects for expanding these preliminary efforts to the community at large.

Workshop Overview

We wanted the workshops to be a friendly and supportive environment in which children and elders could meet and learn about one another, and collaborate on programming projects. Our research team was available to coach and answer questions as needed, so that participants did not feel that they were being "tested"; instead we encouraged them to have fun with a starting set of simulations and tools, and to explore and build their own ideas for community simulations.

STAGECAST CREATOR

COMMUNITYSIMS projects are built in STAGECAST CREATOR, a visual programming environment designed to allow children and other nonprogrammers to build simulations by example (Smith & Cypher, 1999). Users program simulations by creating a "stage" (a rectangular grid) of animated characters. Users create one or more visual appearances for each character, along with a set of rules that enable the characters to move, change appearance, create or delete other characters, and so on. Thus the effects of a simulation are experienced as visual animations in which characters appear, move, encounter one another, change shape or color, and so on.

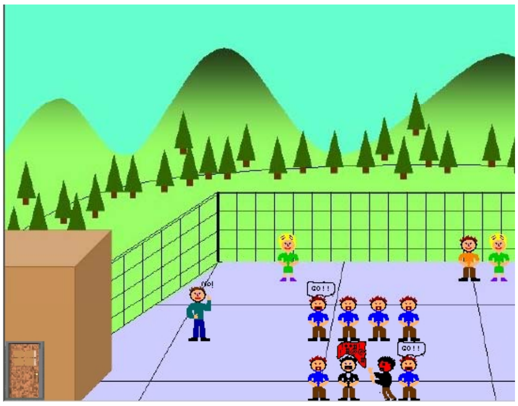

Figure 1. A schoolyard fight simulation built in STAGECAST CREATOR.

Figure 1 displays the stage of a COMMUNITYSIMS project—a schoolyard fight. The students and the teacher are characters, as is the door. The visual before-after rule in Figure 2 illustrates the basic visual programming paradigm: if the starting condition for a rule is met, the actions are performed. The starting condition specifies a visual context (the two boys next to each other, facing forward), though it may also specify values for variables defined globally or for each character. A key challenge in Creator programming is the mapping of simulation objects and behaviors onto visual effects (Seals et al., 2002; Smith & Cypher, 1999). For instance, in the schoolyard fight, changes in the "tension" variable cause the boys to begin pushing and hitting each other.

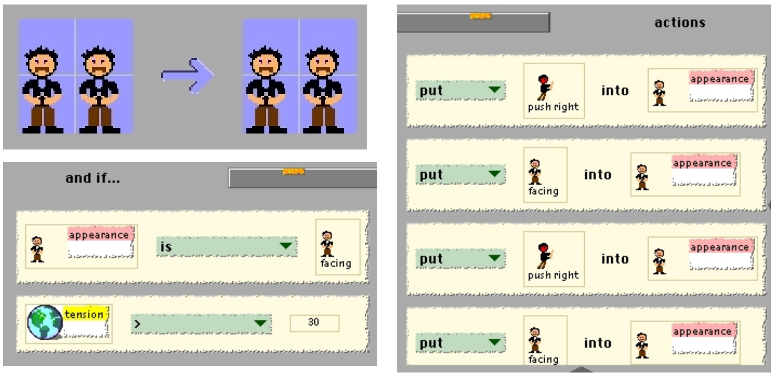

Figure 2. A rule specifying the when the pushing is to begin.

Workshop Participants

We recruited children and elders who had already received training in CREATOR programming, so that they could focus on the use and creation of simulations rather than introductory learning. The elders had received their training as part of an experiment comparing the efficacy of two different tutorials (Wissman, 2002). Because this earlier work had suggested that older women find visual programming in CREATOR more interesting than older men, we decided to recruit only women for these first two workshops.

The children were middle school students who had been introduced to CREATOR during a formative evaluation of a minimalist tutorial (Seals et al., 2002). In order to minimize social awkwardness and distraction among the student participants, we decided to recruit only boys for the first workshop and only girls for the second. Three women and four boys came to the first workshop; one woman and three girls came to the second[1]. The participants were recruited through email messages or phone calls; each individual was offered a small stipend ($30) as a thank-you for coming to the one-day event.

As we expected, the boys and girls had more experience with computing than the women (Table 1): the students reported more years of computer use, and described a greater variety of computer-based activities, than the women. An important difference is the relative experience with “programming” activities, for example, the creation of spreadsheets or Web pages. The students had experience with graphics or drawing tools while none of the women had used such tools.

Background question	**Women (N=4)**	**Boys (N=4)**	**Girls (N=3)**
Years of computing?	5.25	7.50	9.00
Regular use of word processor?	3 of 4	4 of 4	3 of 3
Use of spreadsheets?	1 of 4	4 of 4	3 of 3
Use of drawing or graphics editors?	0 of 4	4 of 4	3 of 3
Experience building Web pages?	0 of 4	3 of 4	2 of 3

Table 1: Participant Background

Workshop Activities and Data Collection

The two workshops followed the same schedule and provided participants with the same materials and activities:

- Introduction to COMMUNITYSIMS; brief statements of personal interests and background with computing.
- Walkthrough of COMMUNITYSIMS Web site; practice logging on, opening, running, and commenting on existing simulations.
- Subjective reactions to sample simulations and simulation features.

[1] Two additional women were scheduled to participate in the second workshop, but last-minute personal problems prevented them from attending.

- Refresher tutorial on CREATOR; basic skills and advanced techniques.
- Group formation, each woman joined one or more students; due to absent participants, two girls were paired with researchers.
- Collaborative work extending 1-2 simulations.
- Collaborative generation of ideas for 1-2 new simulations.
- Collaborative construction of a new simulation.
- Survey of general reflections and project goals.

Throughout the day, the research team assisted attendees and took notes. We also recorded the discussion among participants. In the following three sections, we present observations and analyses based on several sources of data: the workshop transcripts, comments and changes to existing simulations, the new simulation projects, our informal notes, and responses from the two surveys. We first summarize the use of the Web site and the CREATOR tutorial; we then discuss cross-age collaboration and participants' reactions to the workshop.

Learning and Use of CREATOR

In the first part of the workshop, participants worked individually, first interacting with the COMMUNITYSIMS web site, then the STAGECAST CREATOR tool.

Exploring the COMMUNITYSMS Website

In the first year, our research project focused on creation of sample simulations and tutorial materials suitable for residents of differing ages (Wissman, 2002). We are now shifting our emphasis to sharing and discussion of the simulations, that is, to the building of an online community around the simulation projects. Thus one goal of the workshops was to introduce participants to our prototype Web site, so that they could explore the materials and tools it contained.

Figure 3 displays a screenshot of the welcome page the users encountered when first logging in (guests can also visit, but are unable to upload or download projects). The workshop participants spent approximately 30 minutes experimenting with seven example simulations (Table 2).

The women and students explored the website quite differently. The women were cautious in their navigation, bothered by problems such as system response delays and confusing controls for using the CREATOR simulations. In contrast, the students were quick to follow links and try things out, even without explicit guidance. If one simulation was too slow or seemed not to be working right, they simply moved on to another. As a result the students opened and explored more of the sample simulations than the women: all of the students contributed at least one comment to a simulation (one of the girls commented on five of the seven), whereas only two of the four women did so. Nonetheless, all participants successfully accessed and used at least two of the sample simulations.

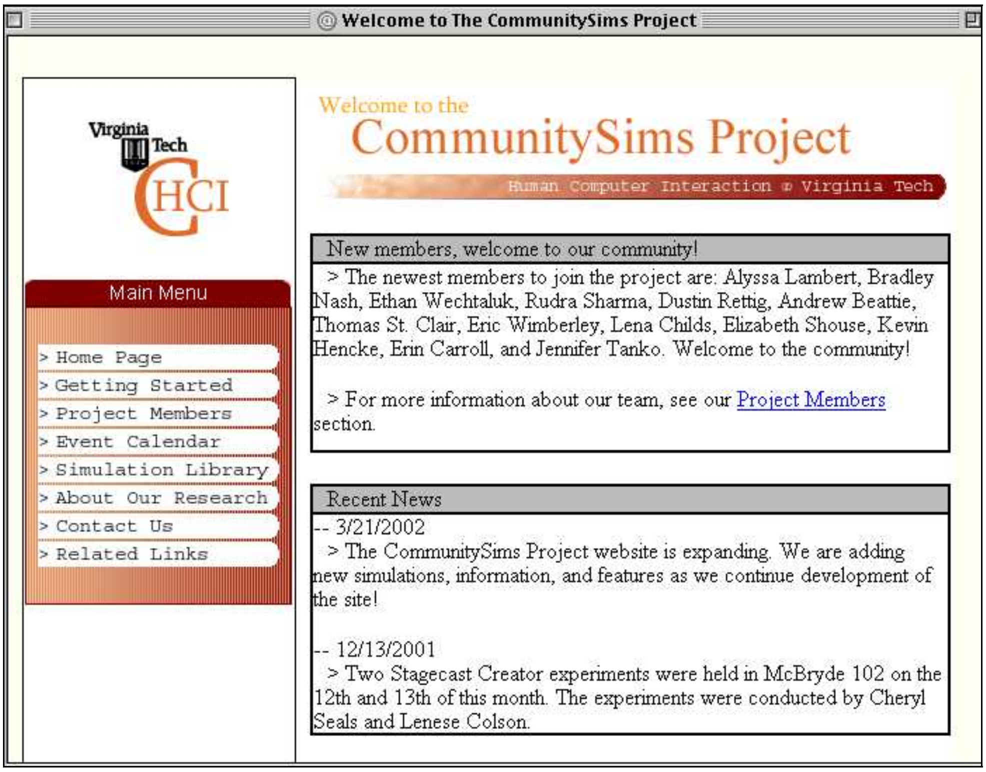

Figure 3: COMMUNITYSIMS home page.

Simulation	**Description**
Smoking Kids	Two kids smoke at school, get sick, collapse
Schoolyard Fight	Two kids argue, yell, eventually push and hurt each other; a teacher comes out and stops fight
Flirting or Hurting	A cute guy is rebuffed by one girl, but tries to force his attentions on another
Noise Pollution	Young people have a party with loud music; older resident comes out to complain, police arrive
Smart Road	Cars drive on road while weather conditions change from good to bad
Cliques	Kids on school playground form groups based on their “coolness” or “sports” interests
Classroom Bully	Bad kid picks on others in class; a teacher punishes him and gives him detention

Table 2: Sample simulations provided for exploration and comment.

CREATOR Refresher Tutorial

During the refresher tutorial, we again observed that the women had trouble keeping up with the pace set by the students. The boys and girls often jumped ahead and did extra experimentation on their own. As a result the “walkthrough” became a bit chaotic, with different users attempting different actions at different times. The women tried to follow the step-by-step guide we had prepared, but became confused when the questions being asked or answered did not relate to what they were trying to do. In several cases, a member of the research team sat down with an older woman to offer additional assistance during these exercises.

These differences in learning style emphasize the different needs of these two age groups. The students thrived in this interactive group setting, calling back and forth to one another with ideas and tips, and so on. In contrast, the older women sought a controlled, self-paced interaction with the new ideas and skills (Wissman, 2002).

We also noticed differences between the boys and the girls and older women: in one exercise that involved addition of a new object to an existing simulation, all of the boys added characters that made the project more game-like, but in doing so often lost the “community message” of the simulation. In one extreme case, B1 deleted all of the students in the Cliques simulation, replacing them with a flock of bomb-dropping birds; B3 and B4 added alien characters; B2 constructed a very detailed animation of a girl-eating cat. The boys clearly enjoyed themselves as they attempted and accomplished quite sophisticated programming, but they seemed to ignore the community-oriented goals of the simulations. In contrast, the women and girls made simple enhancements that did not diminish the community-related content (e.g., a cloud moving across the sky).

Cross-Age Collaboration

Although every attendee worked on a collaborative project during the workshop, two of the girls worked only with members of the research group (the two women they were to have worked with were unable to attend). In cases where a researcher formed part of a team, we made a concerted effort to let the “real participant” generate the ideas and act as the driving force behind the simulation projects. Thus the discussion of cross-age collaboration is based largely on the experiences of Team1-Team4 from the first workshop and Team5 from the second (Table 3).

Extensions to Existing Simulations

The first collaborative project involved the enhancement of an existing simulation. Three of the cross-generational groups (Team2, Team3, Team5) cooperated in this, although they varied somewhat in the relative contributions made by the students and the women. Team2 began with a conversation initiated by B2, who queried W2 “What are your ideas?”. When W2 responded, “I don’t know what we are going to do”, the boy quickly proposed to expand one of the schoolyard simulations to include basketball teams and a game (Table 4). W2 agreed, but seemed to then adopt a relatively passive role, “This is going to be amazing how you are going to do it.”

Group	Participants
Team1	Workshop 1: Initially B1 and W1, but later disbanded
Team2	Workshop 1: B2, W2
Team3	Workshop 1: B3, B4, W3
Team4	Workshop 1 (formed after Team1 disbanded): W1, R1
Team5	Workshop 2: G1, W4
Team6	Workshop 2: G2, R1
Team7	Workshop 2: G3, R2

Table 3: Team Composition

Team3 and Team5 were similar to Team2 in that the groups assumed from the beginning that the students would do the programming, with help from the women. However, the women in these groups were more active in choosing what to do. The two boys in Team3 wanted to enhance the Smart Road project, because they felt it didn’t “do” enough. Their initial proposal was to cause the cars to slide off the road and crash when the rain came down; W2 gently suggested instead that they “improve” the road rather than making it worse, so the group worked together to make the car and raindrop animations more realistic (Table 4).

Team1: In Cliques, birds drop bombs that cause other birds to explode on contact
Team2: Sports-oriented students in Cliques get basket-shooting behaviors
Team3: Smart Road improved to look more realistic in its animation of rain
(Team4: This team had not been formed at the time this activity took place)
Team5: In Noise Pollution, participants given a more elaborate interaction
Team6: Classroom Bully extended to pull out a straw and throw spit wads.
Team7: Kid hassled by Classroom Bully pushes back to defend himself

Table 4: Simulation Extensions

Team5 reflected a more balanced contribution of ideas from the student and the woman. Although G1 tended to take the lead in proposing ideas, W4 often helped to extend or refine the ideas. For instance, G1 suggested they that they could add more police cars to the Noise Pollution project, and W4 expanded this to consider an implication, “We probably need to get our people off the road before they get run over”. This illustrates the general interaction pattern for Team5: G1 would propose an idea or modification, W4 would react and suggest refinements. Like Team2 and Team3, this team focused on making an existing simulation more realistic (Table 4)

One of the cross-generation groups (Team1) was unable to establish a collaborative working style. B1 was extremely interested and experienced with computer-based activities, particularly gaming. As in the other teams, he acted as the programmer; but unlike the other students, this boy was so absorbed by his own ideas that he never consulted or tried to interact with his partner. B1’s game-oriented extensions did not appeal to W1 (birds dropping bombs), so there was little for her to contribute. After we made several failed attempts to “repair” this collaboration (e.g., asking B1 to consult W1, to consider more ideas), we disbanded Team1 and established a new collaboration between W1 and R1, so that W1 could work on creating a new simulation.

Two teams comprised a girl and a researcher. In these cases, the researchers made an effort to extract ideas from the students so that the projects “belonged” to them. The girls did the programming; the researchers served as coaches. Both of these girls chose to enhance the Classroom Bully simulation, making it more interesting or fun from their own points of view (Table 4).

One important consequence of the simulation extension activity was that each team established a general collaboration style: breakdown (Team1); student-driven interaction with occasional mentor-like input (Team3); relatively balanced interaction of proposal and refinement (Team5); and “student-teaching”, wherein the student explained CREATOR programming (Team2).

Development of New Simulations

In earlier project work, we have observed that residents are most engaged by simulation problems that make a personal connection to their own lives and community-related interests (Rosson et al., 2002). As a result, we encouraged workshop participants to brainstorm about their own community interests that might be the topics of a CREATOR simulation. For the women, typical ideas related to their hobbies or their community activities, for example a sewing club, managing the library bookmobile, or participation in the annual downtown festival. Similarly, the students’ ideas seemed to express their own sense of “community”, for instance getting lost on the first day of school, town rules for using skateboards downtown, or reactions to substitute teachers.

Team1 (minus W1): Robber comes from hide-out and holds up convenience store; if policeman sees theft, robber is shot
Team2: Cars travel through a comprehensive grid, turning right, left, or going straight on.
Team3: Cars (and other odd creatures, a dragon, ants) travel past a storefront designed to model downtown Blacksburg
Team4: Optional activities offered in retirement community (a banjo concert, a card game); residents prefer the music
Team5: Cars arrive at a downtown intersection from multiple directions at once, and crash into each other
Team6: Stray cat eats food set out near a house and multiplies into two cats; two cats fall in love and produce more cats
Team7: Kids are walking around in the hall at school; when a pretty girl comes through the door, a cute boy falls in love with her

Table 5: New Simulation Projects

Given the rather diverse personal contexts and interests of the different age groups, we found it interesting that all three cross-generational groups chose to build new simulations involving some aspect of traffic management (see Table 5): Team2 worked on a traffic grid, Team3 on a model of downtown traffic congestion, and Team5 simulated an accident at a downtown intersection. We speculate that traveling around one's town in a vehicle is a salient and pervasive community behavior that all residents share, enabling contributions by all members of the team. Driving is also a very concrete problem domain, making it easy to visualize cars engaging in stereotypical "traffic scenarios" (e.g., busy streets, speeding cars, accidents). Driving is governed by familiar laws and conventions; this may make it an especially evocative context for surfacing and discussing community values. Finally, the public nature of traffic laws may cause the underlying values to seem uncontroversial, with the result that traffic issues are a "safe" topic for collaboration by dissimilar individuals.

The four other simulation topics were determined instead by participants' individual interests (recall that the researchers participated only as coaches in these groups): Team1 built a cops-and-robbers game where on some occasions the robber got away, but on others he was caught; Team4 explored the differential "attractiveness" of musical performances versus card game activities at a retirement center; Team6 simulated the effects of feeding stray cats around one's home; and Team7 built a project exploring high school romances.

Within the cross-generational groups, we observed the same styles of interaction during creation of new simulations that we had seen during the extension activity: Team2 was characterized by B2's programming efforts, accompanied by explanations for W2's benefit; in Team3, most of the ideas and programming was done by B3 and B4, with occasional refinements by W2; in Team5 a relatively balanced interaction of suggestion and elaboration took place.

We also examined in more detail the content of the questions or suggestions offered by the women to their student partners. Our original expectation was that older residents would provide a sort of "community conscience", bringing up issues that emphasized concerns or details specific to the local community. We saw some evidence of this during simulation programming, although this input was at a fairly low level of abstraction. For example, during Team5's work on traffic accidents, W4 provided a real world setting:

W4: "Do you want the cars to have an accident?"
G1: "Yeah…where's there an intersection in Blacksburg where they could have an accident?"
W4: "Alright, Tom's Creek" [a busy intersection near the university]

Similarly, Team3 was working on an idea related to the traffic congestion the town experiences when Virginia Tech students arrive back in the fall. They first wanted to create an appropriate background for their road and cars. B3 and B4 were quickly able to open and begin using a paint program to draw storefronts:

B4: "We're just gonna write down 'building' on a little square."
B3: "Yes, like, there are signs that tell you what the shop is. We can call it a 'shop building'.
W3: "Are you going to call it 'building'? Oh, come on, you could call it something creative, like Kroger's"!
B3: "This is downtown though. We just choose a random spot to do it…the place by Rocket Music and Souvlaki's, where the old middle school is."
B4: "Souvlaki and Dairy Queen, where there's always concerts, the pizza place."

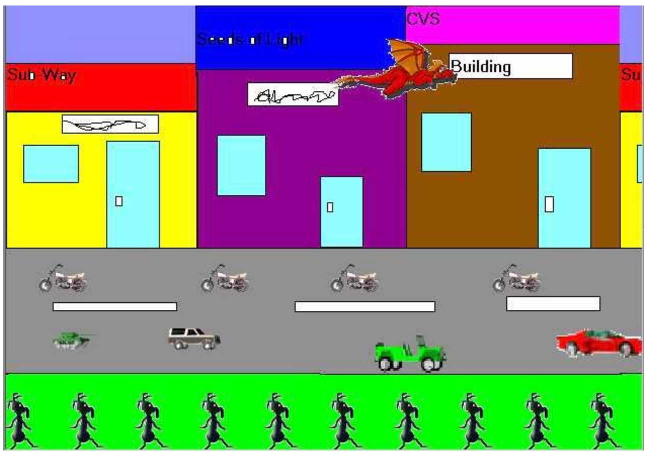

Figure 4. Downtown traffic congestion simulated by Team3.

Here, a modest “correction” by W3 prompted the boys to remember and share specific downtown experiences, and to position their simulation at a familiar downtown spot. This made the simulation project more concrete and tied to the team’s shared understanding of “downtown” and helped in coming up with more details concerning the look and behavior of the simulated world. Nonetheless, as can be seen in Figure 4, this project ended up as an interesting mix between the “realism” that one might expect of an adult simulation developer (e.g., actual store names) and the “fantasy” that seems to be engaging to boys of this age (marching ants, a tank driving down the street, a flying dragon).

These conversation snippets reflect the community mentoring we expected from elders. Additional examples come from the comments about the sample simulations: where women’s comments tended to relate to the community issue the simulation had been built to raise. For instance, W2 reacted to Noise Pollution: “I agree that courtesy demands speaking to the neighbors first before calling police. Also, where is a responsible adult?” In contrast, the students tended to focus on simulation usability or realism problems (e.g., “OK…I don’t see what is happening here. This one is too short to understand.”). We speculate that the women took the simulations (and our COMMUNITYSIMS project goals in general) more seriously, such that they made a more concerted effort to initiate community-oriented discussion.

Our expectation that the students would be eager and able to take on the task of CREATOR programming was also confirmed. An interesting side effect of students taking on this role was seen in the Team2 interaction, where the student became the “mentor”. In this case, both B2 and W2 were sociable and articulate individuals, but B2 had a better understanding of how to use CREATOR. He adopted the habit of narrating what he was doing; W2 often asked questions to learn even more about how CREATOR works as the programming took place. This suggests a novel community collaboration wherein young people serve as mentors in raising the computer literacy of older residents.

Reactions to Workshop Activities

A second goal of the workshops was to explore participants’ interest in community simulations. Our vision is one of informal education, which means that project involvement will be voluntary and thus very influenced by participants’ intrinsic motivation. We gathered preliminary information about these issues by asking workshop participants to react to a) the example simulations; b) a set of hypothetical simulation features; c) working in cross-age teams; and d) the overall project goals.

Reactions to the Example Simulations

In the first year of the research project, we developed a number of example simulations to use in training and to convey the essential vision of "community-oriented simulations"; several of these were developed in a participatory fashion with other community members (Rosson et al., 2002). These example projects (recall Table 1) were posted on the web site and provided for exploration during the early phases of the workshop.

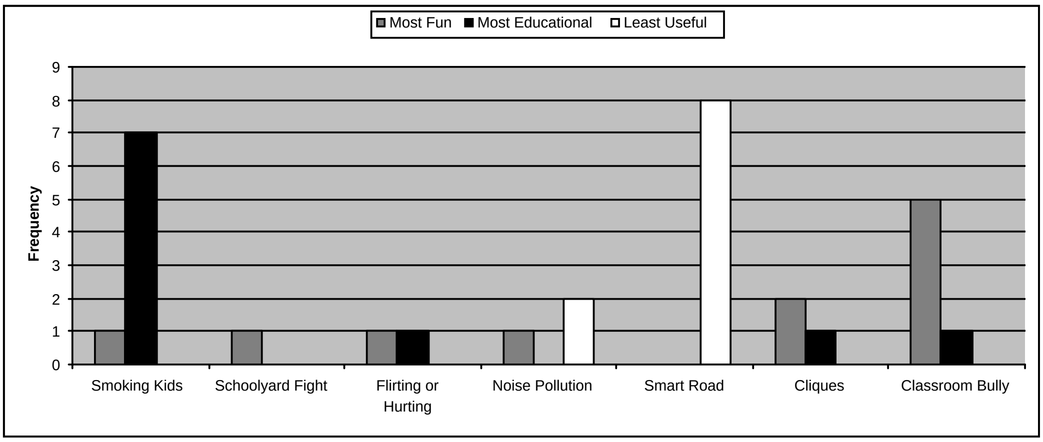

Figure 5: Simulations identified as most fun, most educational, and least useful.

During web site exploration, participants left a total of 26 comments about the example simulations. 22 comments were contributed by the students, and most of these had a negative tone, for example complaining that "nothing happens", or that a simulation was "boring". As mentioned earlier, only the women commented on the community issues the simulations were intended to raise. Although the reactions of the students were disappointing, they are consistent with our general impression that they viewed the simulation effort as more of a game than a community-related activity. We speculate that to engage these young people, we must make the topics more exciting, or investiage ways to engage the youth in elder-led discussions.

After trying out the simulations posted on the web site, participants were asked to choose the example simulation that they thought was most *fun* to use, most *educational,* and *least useful*. As suggested in Figure 5, there was considerable agreement about what was most educational (Smoking Kids, 7/11) and least useful (Smart Road, 8/11). There was less agreement about what was most fun, although 4/7 students chose Classroom Bully because "it was funny".

In general, participants said that they preferred simulations with a clear message, or that "did" something. It is difficult to visualize the impact of a smart road (it measures changes in a car's movements) or a noisy neighborhood party, whereas it is very obvious that a bully has hit someone, or that a kid has collapsed after smoking for a while (of course the bully and smoking topics are also more personally relevant to middle school students). As we work with community members on simulations of their own design, we will encourage them to include very visible and obvious outcomes as part of their programs.

Reactions to Hypothetical Simulation Features

Also after exploring the example projects, participants completed 21 scales rating the extent to which a hypothetical feature could make a simulation more “fun”. In this case, we wished to explore a wide range of characteristics, to see what sorts of simulation behavior might be appealing, and whether this would vary for the two age groups. We created the list of features by reviewing the simulations we had built or viewed, as well as by brainstorming characteristics we felt might be attractive. We tried to include features we thought would appeal to middle school students (e.g., cute, silly), but also to include more “serious” concepts we that might appeal to older adults (e.g., educational, matches the real world).[2]

In general, the students (particularly the boys) gave more positive ratings to all of the features, perhaps because they had more fun overall with the projects, or because they were more comfortable with computing technology. The women and the students also showed a fair amount of agreement on several of the features, for example agreeing that having more “action” and “artistic detail” would make a simulation more fun. They also seemed to agree that some features were less likely to increase the fun of using a simulation, for example both age groups gave relatively low ratings to the features “educational” and “moral lesson”.

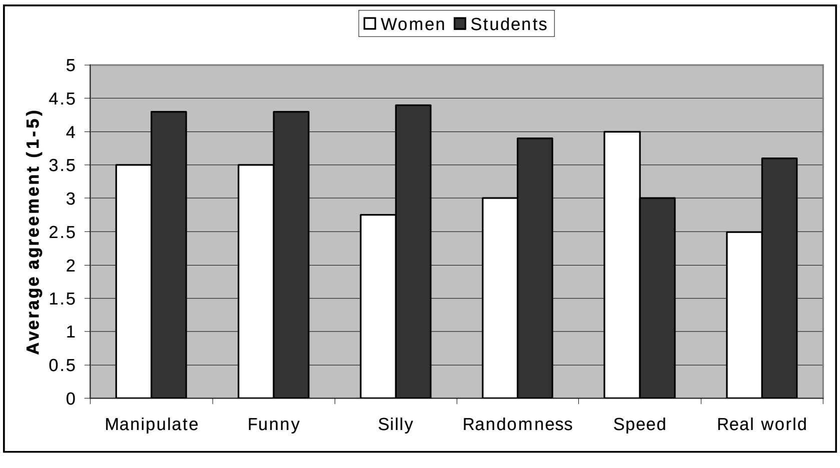

Figure 6: Average ratings of six hypothetical simulation features, for women (N=4) and students (N=7).

[2] We have limited our report of these ratings to descriptive statistics due to the small sample size and the exploratory nature of the “funness” rating scales.

However, we also observed differential reactions to features. Figure 6 contrasts the ratings of the women and the students for the six scales with the largest cross-age differences. The largest difference is for "silliness", and the second largest for "real world". Some of these differential ratings can be explained by the students' desire for more game-like simulations; again, this was particularly apparent in the boys' ratings, who rated features like "randomness" and "manipulate" much higher than the women and girls. In fact, one unexpected finding was that the pattern of the girls' ratings was more similar to the womens' ($r = 0.39$) than to the boys' ($r = 0.03$), leading us to wonder whether gender will be as important (perhaps even more important) as residents' age in predicting reactions to the topic or style of a community simulation.

Reactions to Cross-Age Collaborations

At the end of the workshop, participants completed a survey questioning how easy it had been to work with their partners on simulation projects, and what might be done to facilitate collaborative projects in the future. The group was moderately positive about their overall collaboration experience (averaging 3.73 on a 5-point scale). However, several participants voiced concerns about the difference in ages:

W2: "I was overwhelmed and could not keep up with teenagers".

W3: "The young folks are so aggressive with the computer."

G1: "Just make sure that your partner is someone of around the same age so you will agree on more things."

These comments—in conjunction with the learning style differences reported earlier—lead us to conclude that real-time collaborative programming may not be the most effective way to establish cross-generation interaction. We need to search for alternative mechanisms for bringing these groups together, for example an asynchronous collaboration in which elders suggest topics or comment on students' projects. Another possibility is to make an explicit shift in the "direction" of the collaboration and help, for instance asking students to mentor elderly residents in the construction and use of visual simulations (recall Team2).

General Reactions

At the end of the workshop, participants provided comments about their experiences, and rated their interest in working with simulation activities in the future. Figure 7 contrasts the responses of women and students on four items: whether Creator simulations can help to build community; whether participants want to build or to extend simulations; and how well they understand Creator. Whereas the students were moderately positive in these final ratings, the women's ratings suggest some uncertainty about future activities. Notably, the average student rating of Creator knowledge was 4.0 whereas the women's average was

2.5. However, the women seem to have accepted our community education goals more than the students; the women's agreement that Creator simulations can help to build community was 3.25, compared to a rating of 2.71 for the students.

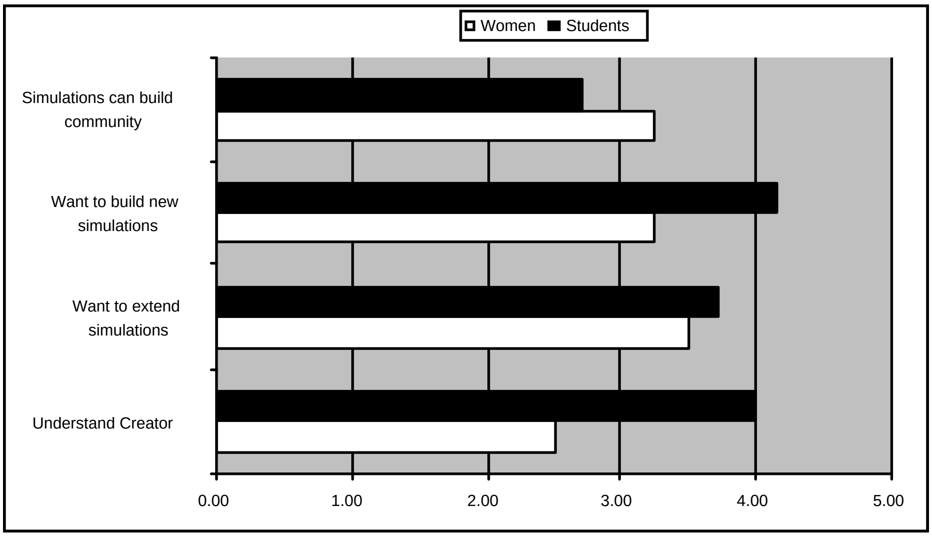

Figure 7. Average agreement (1-5) of women (N=4) and students (N=7).

Participants' comments reinforced the patterns seen in the rating data. All participants answered "yes" to a question asking if they wanted to continue to work with us in CommunitySims. But the nature of participants' future plans varied: three of the four boys tied their interest to game development (B1: "I'd like to make games out of existing sims"), whereas all four of the girls conveyed more general positive reactions (G3: "Yea, I though it was really fun when we got to make our own world and that kinda stuff"). Although the women also answered affirmatively, each was careful to qualify her future involvement (W4: "Yes, but I need to have more knowledge about creating a simulation project").

Summary and Discussion

We conducted two workshops to investigate the nature of cross-generation collaboration, and to explore features of community simulations that might make them more or less appealing to different age groups. Despite the small group size, we identified several interesting patterns in learning and collaboration style, and in reactions to the content of the community-oriented simulations.

The learning sessions were somewhat chaotic, with individuals jumping around, asking idiosyncratic questions, offering tips, and so on. The students thrived in this atmosphere, but the older women became confused and needed assistance to synchronize with the group process when they fell behind. In the future, we will rely on workshops to introduce and inspire student participants, but provide more systematic, self-paced instruction for the older residents. We were also impressed by the "student-as-mentor" interaction style of one group, and plan further investigation of this novel form of cross-age collaboration.

The cross-generation interactions varied widely—from complete failure, to a very balanced give and take of ideas. One interesting observation was the choice of traffic as a problem topic for these groups. We now wonder if there are pervasive community experiences appropriate for cross-age discussion, situations in which any community member would have an obvious stake. Until now, we have focused on *controversial* issues as a means of attracting participation, but it may be that we will have more success in "bootstrapping" interaction among diverse community members if we identify and focus on *generic* issues. Topics associated with personal values (e.g., sexual harassment, the use of drugs) may be difficult to raise and discuss among an unfamiliar and diverse group of community residents.

With respect to simulation features, the users agreed that a good simulation has characters that "do" something. However, the students—particularly boys—clearly viewed the simulation activities as more of a "game" than the older women. For example, the boys spent considerable time adding game-like features to the existing simulations and were more likely to rate hypothetical features such as manipulation, silliness, sounds, and randomness good contributors to fun—these same features would cause the simulations to be more like computer games. At the end of the day, several boys expressed an interest in turning simulation projects into games. With respect to engaging young people, a challenge for us will be to identify topics that can at once address community issues but also have a silly or game-like character (e.g., the smoking kids who "die" and then recover and start smoking again).

As expected, the elderly women seemed to better accept our vision of community education, helping to ensure that projects contained community-specific content, contributing issue-oriented comments to the example simulations, and agreeing at the end of the day that simulation development activities might provoke community discussion. Student contributions tended to be more individualistic and game-oriented, emphasizing the importance of modeling by adult community members.

Our long-term goal is to form a learning community from residents with diverse backgrounds and motivations, providing complementary skills and contributions. The combination of our earlier learning studies and the workshops described here have helped us to articulate several tactics for building such a community:

- Develop additional training materials and examples that help users to build game-like simulations while still addressing "serious" topics.
- Recruit students via lively and open-ended workshop activities, but offer to elders a 1:1 or carefully structured environment.

- Explore the role of *mutual* mentoring, where students assist elders with simulations, and elders demonstrate simulation of community topics.
- Introduce young people and elders in a real world setting, but mediate subsequent project collaboration with web-based asynchronous tools.

Community networks leverage and develop local resources through online collective endeavor. One of the most precious resources any community has is its elders. This has always been true, but today it may be even truer. Our elders have been called the civic generation because of their lifelong commitment to community issues and institutions (Putnam, 2000). COMMUNITYSIMS is only a first step, but its goal is to leverage and develop this precious resource through mutually-engaging, cross-generation collaborative learning.

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