

From Tools to Communities: Designs to Support Online Creative Collaboration in Scratch

Ricarose Roque
MIT Media Lab
75 Amherst Street
Cambridge, MA 02142
1-617-253-4408
ria@media.mit.edu

Yasmin Kafai
University of Pennsylvania
3700 Walnut Street
Philadelphia, PA 19104
1-215-746-3468
kafai@gse.upenn.edu

Deborah Fields
University of Pennsylvania
3700 Walnut Street
Philadelphia, PA 19104
1-215-573-8146
defields@upenn.edu

ABSTRACT

In this paper, we investigate the support of online creative collaborations among young programmers in Scratch. We designed and implemented two online collaboration events, the Collab Challenge and Collab Camp, implemented in January 2011 and in August 2011, respectively, in which members of the Scratch community were invited to work together on programming projects. This paper explores what we learned from iteratively designing and implementing the second event Collab Camp. In our analyses, we reflect on how the changes in context of collaboration (context), the opportunities for finding collaborators (connection), and the engagement of members in constructive feedback (critique) emerged as critical spaces supportive of online collaboration. We discuss how these spaces can serve as guiding principles for online communities that support young designers in creating expressive and personally meaningful projects together.

Categories and Subject Descriptors

K.3.1 [Computers and Education]: Computer Uses in Education – Collaborative learning.

General Terms

Design, Human Factors

Keywords

Scratch, creative collaboration, iterative design, online communities

1. INTRODUCTION AND BACKGROUND

Many efforts have focused on helping young programmers to become more fluent and expressive with new technologies by developing novice programming tools to simplify the mechanics of learning to program [8]. In particular, the design of computational construction kits for children has provided rich insights into how to think about making programming accessible for beginners and supporting many styles and interests [11].

While the design of such programming tools continues to be an important and fruitful endeavor, social and cultural barriers are

often “harder to address than mechanical ones because they are harder to identify and some cannot be addressed through programming systems” [8] alone. In this paper, we turn our attention to social aspects present in programming communities for young designers and examine what it would mean to make programming accessible and supportive of styles and interests for young designers online. In recent years, many examples of such technical production communities can be found online [2] but relatively few youth venture into these communities even though millions of youth of all ages participate in social networking sites, virtual worlds, and gaming communities [5].

In this paper, we consider the Scratch programming environment and an online community for youth to create and share stories, games, and animations [12]. Launched in 2007, Scratch is a vibrant online community with over two million projects and over one million registered users, primarily between the ages of 8 and 16. Inspired by Seymour Papert’s samba schools [10], the Scratch online community was designed to engage people from many backgrounds, interests, and styles, creating, collaborating, and supporting one another in their learning.

Our goal was to design events to initiate and support creative collaborative efforts among Scratch members. While the Scratch online community already features a number of collaborative groups formed by young designers themselves [1, 13], the analyses focus on our iterative design of two collaboration events, called the Collab Challenge and the Collab Camp, which we initiated respectively in January and August 2011 in the Scratch online community. We asked members to form their own teams, or *collabs*, to create an interactive project together and then share it with the Scratch online community. Our analyses draw on observations of online activities and project designs in addition to online questions we asked participating Scratch members. This paper is about what we learned from designing and implementing the second online collaboration event Collab Camp, which was influenced by challenges we encountered in the Collab Challenge. By comparing the two events and reviewing our conjectures about our design changes, we identified three critical spaces – context, connection, and critique – to support creative collaboration. We report on what we learned about the design of these spaces to encourage a greater diversity of participation in collaboration and reflect in the discussion on design principles for supporting creative collaborative activities for novice programming communities.

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2. RESEARCH DESIGN

2.1 Online Creative Collaboration Events

To better understand how to initiate and support online creative collaboration between Scratch members, we examined our experiences in designing and implementing two online collaboration events following a design-based approach [4]. The Collab Challenge (<http://info.scratch.mit.edu/collabchallenge>) ran from January to early March 2011. Open to the entire community, the Collab Challenge had three requirements: (1) teams needed a minimum of two participants; (2) teams had to upload an initial draft midway through the Collab Challenge to receive feedback from the Scratch Team before submitting a final project three weeks later; and (3) teams had to integrate three unique, pre-selected images into their projects (for more detail, see [7]). Teams who creatively integrated these three disparate images had their projects featured on the Scratch homepage, a highly visible page in Scratch online community.

The next iteration of the event, called Collab Camp took place in August 2011. Open to the entire community, the Collab Camp (<http://info.scratch.mit.edu/collabcamp2011>) also had three requirements: (1) teams needed a minimum of two participants; (2) teams had to upload an initial draft midway through Collab Camp to receive feedback from the Scratch Team, and, for this iteration, from online community, before submitting a final project three weeks later. However, this time we asked teams (3) to work on an interactive story. We also continued to feature a subset of exemplary projects on the Scratch website homepage.

2.2 Data Collection

For both the Collab Challenge and Camp events, we collected information about participants' experiences on the online community and self-reported gender, age, and location. We also collected multiple versions of projects, comments written about the projects, relevant discussions in the online forum, and statistics about the projects that included number of views, "love-its" (a count of how much people like the project), and remixes. When participants submitted initial drafts half-way through each activity, we asked questions about their team formation and collaborative process such as "How did you put the project together?" and "How did you form your collab?" At the end of the Camp, we asked questions about how they put their final project together such as "Did you find the comments from Scratchers and Scratch Team members on your initial project helpful? If so, how were these comments helpful to you?"

3. PATTERNS OF PARTICIPATION

Table 1 provides an overview of participation across the Collab Challenge and Collab Camp. While the number of collabs, who participated in either the Challenge or the Camp, remained the same ($n=52$) with a median of two members per collab, the number of actual participants increased from 139 to 153. We also saw an increase in the number of final projects submitted, rising from 25 in the Collab Challenge to 36 in the Collab Camp. Participation also increased among both experienced (Scratch accounts created more than 6 months before event) and newcomers (Scratch accounts created less than 6 months before event). Participation by newcomers especially increased in Collab Camp from 62 to 94 new members. In addition, the participation by young women programmers increased from 27% to 39%.

Table 1. Participation across the two collaboration events

	Challenge	Camp
Number of Collabs Who Submitted an Initial Draft	52	52
Largest Collab	6	15
Median Collab Size	2	2
Number of Final Drafts	25	36
Total Num of Participants	139	153
Number of Participants with Scratch account	125	147
Number of Participants with Scratch account > 6 months	63	53
Number of Participants with Scratch account < 6 months	62	94
Female Participants	34	59
Age (Median)	15	13

4. ITERATIVE DESIGN OF COLLABORATION EVENTS

Our design decisions for Collab Camp were informed by several observations and challenges from the Collab Challenge: (1) the low number of female Scratch members participating in the Collab Challenge; (2) the difficulties that many Scratch members experienced in finding and working with collaborators; and (3) negative comments from community members on projects, particularly projects that were less sophisticated than others. When designing the next iteration, we were inspired from prior research supporting creative collaboration in local classroom programming activities [3]. We not only wanted to focus on artifacts and the website features, but also to encourage more intangible components of the environment, such as youth social interactions and individual or shared understandings of design activities. In this iterative design and analysis, we reflect on how the changes in context of collaboration (context), the opportunities for finding collaborators (connection), and the engagement of members in constructive feedback (critique) emerged as critical spaces supportive of online collaboration.

4.1 Context

The naming of these collaboration events reflected an important design decision in how to think about the *context* for collaboration. We considered multiple options among them arranging competitions emulating a format popular with robotics or game design activities. Instead, in the Collab Challenge, we decided on developing a broader format of a design challenge issued to the community. We also gave design constraints to stimulate creativity: we asked members to incorporate three unique images and create any kind of Scratch project from games to stories. However, while over 50 collabs participated in the Challenge, submitting a diversity of projects, we found a lack of diversity across gender with only 24% of the participants being young women. Overall, the Scratch online community consists of 36% women.

To attract more young women to participate in the next iteration, we decided to change the context to create a more supportive tone by naming the collaborative design event Collab Camp. We wanted to emphasize a more collective experience as could be found in summer camps, but still leave room for a variety of approaches and interests. We decided to use the genre of stories rather than using three pre-selected images for members to integrate in their project's mechanics. Previous research has shown that narrative can be an attractive context for young women to engage with computing [9]. In addition, to encourage Scratch members to engage more deeply with programming, we required that stories be interactive. We defined an interactive story as “projects that not only told a story, but allowed readers to interact with the plot and/or characters.”

We observed that Collab Camp attracted a larger number of young women, making up 39% of the Camp participants, but it is unclear which of the design changes, i.e., renaming of collaboration event or type of collaborative task, were responsible for this increase. We also noted that our decision to promote interactive stories was met with some negative reaction from community members, mostly male members, who preferred to exclusively create games.

4.2 Connections

In designing *connections* for online creative collaboration, we knew that Scratch members already used a variety of ways to connect with each other such as project comments, designated “galleries” (where collections of projects are gathered) and website discussion forums. In the Collab Challenge, we created a forum for members to discuss the design activity, ask questions, and find partners; many members used this forum for these purposes. However, we also found that many Scratch members had difficulty finding collaborators, especially those who were unfamiliar with the discussion forum.

Because of these challenges, in Collab Camp we introduced a space, called the *Connect Gallery*, that was created in the main Scratch website and separate from the website discussion forums. When Collab Camp began, we directed members to the Connect Gallery to find partners. To encourage members to go beyond declaring that they needed a partner to providing information about their ideas and their interests, we prompted them to share a project that described these details.

However, while many members came to the gallery, we still found a number of challenges. Instead of creating projects to find partners, Scratch members primarily used the gallery comments to engage with others. Only three projects were posted compared to the 77 attempts in the comments made by members to find partners. Of those attempts in the comments, 36 turned into groups that may or may have not completed their collab project. In this new space to connect, we still observed members having difficulty finding partners. Members would post a comment looking for a partner, but would not look at other comments and try to connect with others that way. We also observed that members who posted comments with detailed information about their own Scratch capabilities or their collab project idea received more replies from other members. For the three creators of the three projects in the Connect gallery, each one found collaborators and successfully completed projects together.

4.3 Critique

The last design space is *critique*. While there are over two million projects generated by over 300,000 Scratch members, there is an even larger number of comments (over 10 million) exchanged on the website. In both the Collab Challenge and Collab Camp, we

required participants to submit an initial draft half-way through the activity to receive feedback on their projects by Scratch Team members. When we featured a subset of projects at the end of the Collab Challenge, projects that were less sophisticated and primarily made by new Scratch members received a number of negative comments from the community.

We thus decided to provide increased support for members to give and receive constructive feedback from their peers by including community members in the feedback process. While Scratch Team members continued to give feedback, we asked five Scratch members, who have been respectful and helpful members of the community, to demonstrate and provide constructive feedback to Camp projects. We recognized these Scratch members by giving them the title of “Collab Counselors.” In addition, we encouraged participants to pass on the feedback by reviewing each other's initial drafts and provide feedback by prompting them with two questions: “What did they like about the project?” and “What can the creators do to improve their project?”

Out of the 153 members that participated in Camp, 22 members, who were not Collab Counselors, left a total of 74 positive or constructive comments on 26 initial project drafts. Of these, 49 were simply positive comments and 25 were constructive in some form. This means that half of the projects in the Collab Camp initial drafts received some form of positive feedback from members who were not Collab Counselors or Scratch Team members. This is a large increase from the Collab Challenge where only 16 members left a total of 25 positive or constructive comments on 15 initial project drafts (only 10 of these comments were constructive).

5. DISCUSSION

In this paper, we examined changes in the design of online collaboration events and reflected on how different aspects may have influenced creative collaborations among young programmers. We focused on three dimensions – context, connection, and critique — to consider guiding principles that help us think about the design of online learning communities in support of creative and collaborative constructions. We discuss what we have learned in the move from the design of computational construction tools to the design of events in collaborative communities that engage participants in rich activities to generate productive learning experiences. We also discuss the gaps in the design for future consideration.

The context can define the space for not only what participants can expect from the experience but also what kinds of participants the context may appeal to. Our designs of challenges and camps tried to emphasize a collective rather than a competitive dimension with the goal of reaching a broader audience. In selecting stories as a design constraint for participants, we leveraged what [9] found with Storytelling Alice, that narrative could be a compelling motivator for engaging girls in programming. While the context of interactive stories attracted members interested in narrative, it might have also excluded those not interested in this genre. One of the challenges in designing contexts for online creative collaborations will be not only to identify which aspects appeal to which groups, but also to think about ways in which we can bring together youth across different interests and provide meaningful collaborative experiences.

We found that providing explicit and central spaces such as the Connect Gallery were useful for members to find potential collaborators that may not exist within their immediate social networks or have skills and interests complementary to their own.

Such connections can promote peer-to-peer mentoring and learning. A future design should consider a more streamlined way to collect and organize the attempts members are making to find collaborators across the dimensions that can connect people such as experience, skills, and ideas. Additionally, while there are many Scratch members attempting to connect and collaborate through Collab Camp, as designers we are unaware of members who are at the periphery, observing the public interactions of their peers and not engaging in these spaces. In an earlier ethnographic study of participants in an in-person Scratch club, participants experienced some initial resistance and hesitancy in engaging with the online community, but freely and openly engaged with their fellow club members around Scratch [6]. In that study, only a few members became actively engaged in the Scratch community. Future designs of connection spaces should consider how to help bring in members from the periphery who are interested in participating, but may be uncomfortable with the public and open nature of the website.

Finally, initiating and providing constructive feedback among members was a promising way to create further engagement and community. Our goal was to examine how we could generate a culture of giving and receiving constructive feedback that would become sustainable, create a collaborative spirit, and support a sense of community. While more participants gave feedback in Collab Camp, much of the comments shared by Collab Camp members were positive but not necessarily specific or constructive (suggesting ways for creators to improve their project). While we created features to encourage members to give feedback, future work can examine the challenges that feedback-givers may experience when trying to give constructive feedback and designing ways to support them. Finally, future iterations can also consider how to bring in community members who are not participating in the collaboration event. The problems of negative or unconstructive feedback experienced by participants in the first event Collab Challenge can be found within the larger Scratch community too. By attracting the rest of the community, the practices of giving and receiving feedback can extend beyond the event experience.

In moving from programming tools to communities, we are expanding the guiding principles that have been essential in designing construction kits to include social and cultural dimensions. Tools like communities have always been artifacts that embody longstanding and meaningful practices of a culture that can be marshaled for learning purposes.

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