Assessment Framework for the Scratch 2.0 Project

Prepared by the MIT Scratch Team in support of NSF CreativeIT proposal 1002713
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In response to our CreativeIT proposal *Scratch 2.0: Cultivating Creativity and Collaboration in the Cloud*, the CreativeIT Program Director asked us to develop a "stronger assessment component" for the proposal, examining how Scratch 2.0 "might promote creative design more strongly or support new activities or elements of creative design and collaboration."

In this document, we present a framework for assessing Scratch 2.0. Our framework is based upon a sociocultural conception of creativity (Csikszentmihalyi, 1996; Sawyer, 2006), assessing creativity within the context of the Scratch online community. We focus not only on the novelty of ideas but how those ideas are viewed and valued by members of the Scratch online community and by the creators themselves.

Design Experiments

At the core of the assessment is a series of "design experiments" in which we will release new features to the Scratch community, study (both qualitatively and quantitatively) how these new features promote creativity within the community, then iteratively revise the features based on results of the studies. We will study the impact of the following features of Scratch 2.0:

- Programming with social media
- Access to online data sources
- Use of persistent data via "shariables"
- Sharing at multiple granularities (sprites as well as projects)
- Support for collaboration in teams

Core Research Questions

Collaboration. We expect collaboration and remixing will be central to creativity in Scratch 2.0. As Sawyer (2007) writes: "When we collaborate, creativity unfolds across people" (p. 7).

- Do the new features of Scratch 2.0 encourage more collaboration?
- What new forms and styles of collaboration are enabled by Scratch 2.0?
- How do new ideas and practices spread through the Scratch online community?

Interests. We expect members of the Scratch community will be most creative when they work on personally-meaningful projects, based on their own interests (Papert, 1980; Fischer & Giaccardi, 2006).

- What motivates community members to use new Scratch 2.0 features?
- Do community members with different interests use new features differently?
- What is the relationship between personal interest and community interest?

Diversity. The current version of Scratch has already succeeded in attracting a more diverse community than other programming environments (e.g., Malan & Leitner, 2007). We expect that Scratch 2.0 will foster even broader participation across ages, interests, and learning styles – and this diversity will foster greater creativity (Turkle & Papert, 1990; Margolis & Fisher, 2002).

- Does the Scratch community become more diverse (with respect to age, gender, interests)?
- Which Scratch 2.0 features appeal to which sub-groups within the community?

- Do collaborations between people of different backgrounds foster the development of more creative projects – and how do those projects differ from projects of the individual creators?

Learning. We expect Scratch 2.0 features will engage community members in working on more complex projects and developing a deeper understanding of important computational concepts.
- What learning trajectories and patterns of participation emerge for different individuals?
- Do community members work on more complex projects as they learn Scratch 2.0 features?
- How and what do members learn from others in the community?
- What computational ideas do members learn as they create projects with Scratch 2.0 features?

Metadesign. We expect community members will use Scratch 2.0 not only to design but to metadesign – that is, to reflect on design, suggest revisions to design, and create tools and structures that help others to design (Fisher, 2008).
- What new features and changes do Scratch community members suggest?
- What types of design tools do members create for others in the community to use?
- What skills do members display when they engage in meta-design – and which aspects of the Scratch 2.0 environment support the development of these skills?

Data Collection and Analysis

We will adopt a three-level approach for collecting and analyzing data:

Analysis of community-wide statistics. More than 100,000 people have created Scratch projects and shared them on the Scratch website. We expect this number to grow substantially with Scratch 2.0. For each of the new Scratch 2.0 features, we will analyze community-wide statistics to examine the aggregate impact of the new features.

Detailed analysis of individual Scratch projects. We will select 100 active members of the Scratch community (members who have shared at least 10 projects over the past year), and we will analyze all of their Scratch projects in detail to examine how they make use of the new Scratch 2.0 features. Through this analysis, we will explore how the practices of individual community members change over time, as Scratch 2.0 features become available.

In-depth interviews with individual community members. We will select 12 active members for more in-depth study. We will interview each of these members every six months, to get a deeper understanding of their use of Scratch 2.0 – and to analyze how new Scratch 2.0 features influence the ways Scratch community members design and collaborate on projects.

References

Csikszentmihalyi, M. (1996). *Creativity: Flow and the Psychology of Discovery and Invention*. HarperCollins Publishers.

Fischer, G. (2008). Rethinking software design in participation cultures. *Automated Software Engineering, 15*, 365-377.

Fischer, G., & Giaccardi, E. (2006). Meta-Design: A Framework for the Future of End User Development. In H. Lieberman, F. Paternò, & V. Wulf (Eds.), *End User Development: Empowering People to Flexibly Employ Advanced Information and Communication Technology,* Kluwer Academic Publishers, pp. 427-457.

Malan, D. and Leitner, H. (2007). Scratch for budding computer scientists. *ACM SIGCSE Bulletin 39*, 1, 223-227.

Margolis, J., & Fisher, A. (2002). *Unlocking the clubhouse: Women in computing*. MIT Press.

Papert, S. (1980). *Mindstorms: Children, Computers, and Powerful Ideas*. Basic Books.

Sawyer, K. (2006). *Explaining Creativity: The Science of Human Innovation*. Oxford University.

Sawyer, K. (2007). *Group Genius: The Creative Power of Collaboration*. Basic Books.

Turkle, S., & Papert, S. (1990). Epistemological Pluralism. *Signs*, vol. 16, no. 1.