

# Designing a website for creative learning

Andrés Monroy-Hernández  
MIT Media Laboratory  
andresmh@media.mit.edu

## 1. SCRATCH ONLINE COMMUNITY

The Scratch Online Community is a website (Figure 1) that allows kids from around the world to share their own interactive media. In less than two years, more than 50,000 people have uploaded close to 350,000 Scratch projects ranging from video games to animated stories to science simulations to dance projects. Continuous iterations in the design and moderation of the site have been guided by observations of the participation patterns that have emerged in the community around issues such as remixing, moral judgment and group formation. The Scratch website hopes to be an example of how web technologies can foster young people's involvement in the participatory culture to develop 21<sup>st</sup> century skills [1].



Figure 1: Front page of Scratch website

## 2. IMAGINE, PROGRAM, SHARE

Scratch is a visual programming (Figure 2) language that allows children and novices easily create their own personally meaningful interactive content [2]. The Scratch Online Community lets people share their own creations to get feedback, collaborate and spark other people's imagination to create their own projects [3].



Figure 2: Scratch Blocks

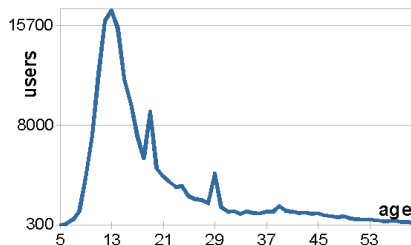


Figure 3: User's age distribution (self-reported)

The Scratch website turns programming into a fun, creative and social activity for young people. Since its release, more than 200,000 people have registered, the majority between ages 8 to 17 years old with a peak at 13 (Figure 3), of those 30% are female. The site is quite active, recently receiving more than 1,500 projects a day (Figure 4).

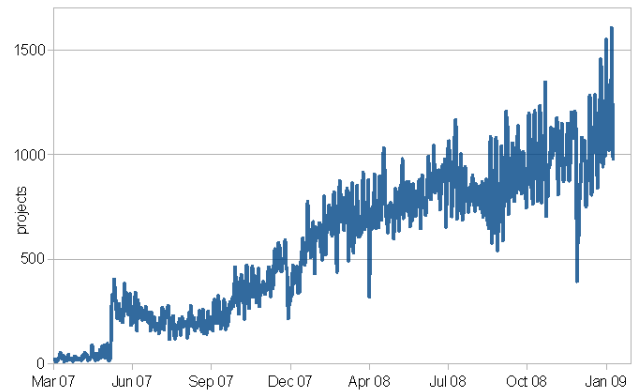


Figure 4: Projects uploaded per day

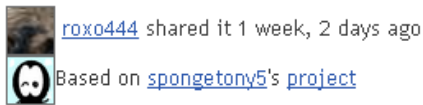
## 3. REMIXING

Defined as the “the ability to to meaningfully sample and remix media content”, Appropriation, is one of the 21<sup>st</sup> century skills promoted by advocates of new media literacy [1]. Learning from and a building on other people's work also the way most professional software is developed. For these and other reasons, from the very beginning, remixing, has been one of the core ideas behind the Scratch website. All projects can be downloaded and remixed by anyone under a Creative Commons Attribution-ShareAlike license [4].

The website tries to foster remixing as a way of scaffolding learning and social creativity. However, soon after the website was officially released, a number of children were very upset because others were “stealing” their work. In fact, one of the first discussions on the Scratch forums was started by a young participant who posted the following comment: “I created a game called 'Pong 2.1' and a week later, a user called 'mina' redid the background, and called 'her creation' and I am really annoyed with her for taking credit for MY game, I just want to know if it is a Scratch rule if you can slightly alter a game and call it yours.”

This led to the first design decision related to remixing: automatic identification of derivative work. The first implementation focused on displaying the proper attribution under each remix, e.g. “Based on john's project” and then link to all the derivative work a project could have (e.g. “90 total remixes”). The total number of remixes was displayed next to other statistical information about a project that typically give good reputation to a project such as number of views, love its, etc (Figure 5).

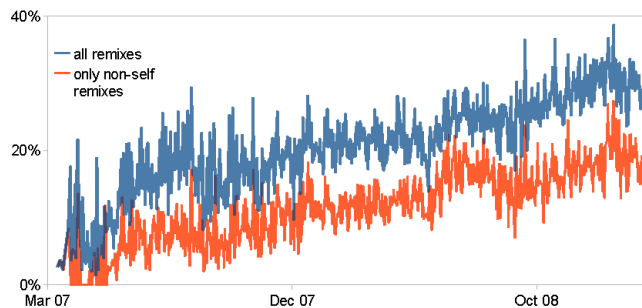
This was not enough to stop the complains, and perhaps it even exacerbated some of them since now users were easily able find the derivative projects. In response to this, a second design decision was made to frame remixing more positively in the Scratch culture.



**Figure 5: Automatic attribution and links to remixes**

There are different ways in which people's work gets recognized by the community. For starters, the front page is a collection of, mainly user-driven recognition sections like "Top Viewed" and "Top Loved". Having one's project on the front page is received with great appreciation as this note on a project illustrates: "OMG OMG! it got featured, this is so great, press the luv it button, please! I am so happy, this is the greatest day of my life!".

Remixing was added as a new section of the front page that displayed the Top Remixed projects. The percentage of projects that are remixes of others increased significantly (Figure 6). In the most recent weeks (early 2009), up to 30% of the total number of projects are remixes and 20% without counting self-remixes (used sometimes to increase the chances of getting to the front page or simply as a way to have different versions of the same project). These changes also created new phenomenon: "chain projects". These are generally simple projects that ask people to add something to a project, remix it and pass it along. For example, a project with an initial animated character falling from the sky that invites others to remix to add their own characters. After a few rounds, the project has tens of characters added each one added by someone who remixes the project.



**Figure 6: Percentage of projects that are remixes**

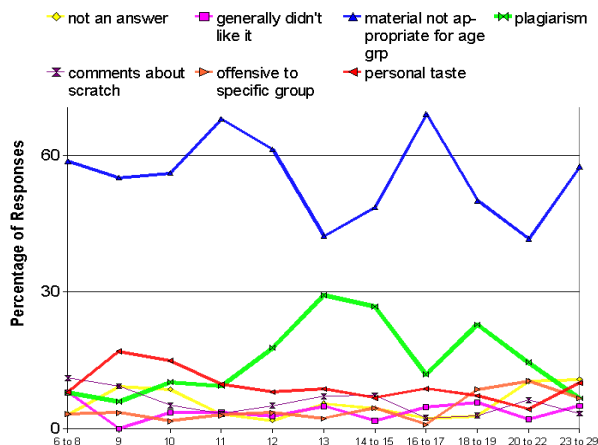
There is still ongoing discussions in the community about the nature of remixing. Some kids argue that remixing has become shallow and others often argue that the automatic attribution not enough. Additionally, the Scratch case has opened a new area of exploration for research on intellectual property. There is a lot of discussion in the media about young people illegally remixing professionally made music or movies, however, not often the discussion is centered on kids perceptions of intellectual property when it comes to their own creative work. More work is needed to better understand this phenomenon and the ways to promote the acceptance of remixing.

## 4. CHILDREN'S MORAL EVALUATIONS

In order to deal with with inappropriate content, the Scratch website uses a combination of automated filtering, decentralized monitoring and centralized decision making. The website relies heavily on the community to help monitor the site. This is not only a pragmatic and scalable solution but it also helps engage young people in thinking about their own moral reasoning as they have to explain why a project is inappropriate when they flag it. In the early days of Scratch, no system for flagging was in place, then when it was created, the system did not require an explanation for flagging which resulted in a lot of false positives and wasted effort. Now, when a project is flagged the following can happen:

1. The project gets automatically censored if it gets flagged by certain number of people (currently four). When this happens, the account of the creator is blocked for about an hour to prevent for repetitive uploads of inappropriate projects. The administrators of the site are notified and they review the project to decide if they leave the project censored or restore it.
2. The administrators of the site get notified even if the project does not get enough flags for it to be automatically censored. The administrators review the project and make a decision to either: censor the project, mark it as "for everyone" so that even if it gets flagged a lot it does not get censored or mark it as "not for everyone" when the project is acceptable but would rather not be on the front page ever.

Flagging of comments and other types of simpler content go through a similar but faster process of monitoring where people do not have to explain the reasons for flagging.



**Figure 7: Categories of reasons for flagging projects**

The type of complains users send when flagging projects vary a lot. For example, some raise complains about violent projects: "this is too violent for little kids. it is also implying that humans can be cruel to animals" while others about political sensibilities: "i think that this should be flagged because some people think that Bush doesnt suck i an not saying that i think he does or doesnt i just think that should not be posted". After collecting more than 2,000 flags they were all coded in one of 25 different categories

by two people. For this report, categories were collapsed into 7 super categories. The analysis showed that the most common complain, accounting for 53.3% of all, were about age inappropriateness (swearing, violence, adult material), in second place was plagiarism at 16.6%. e see that 13 and 14 year olds tended to complain more about plagiarism (Figure 7). When looking at gender differences, females tended to complain more about age inappropriateness and males about plagiarism, however the results were not significant (Figure 8).

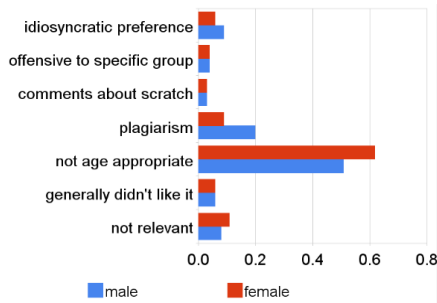


Figure 8: Gender distribution when flagging projects

## 5. COLLABORATION

One of the first examples of collaboration was the creation of the game Tetris by a number of kids in the community, each of whom contributed in one way or another. However, it took a few months for the very first organized and sustained collaborative group to be formed. Most of the groups use a section of the website called “Galleries” which allow people to create clusters of projects. Galleries were originally intended just to gather a group of projects with a similar topic. Galleries also have a section to post comments which are often used in collaborative efforts as the main way of communicating with peers. The creation of these groups (a lot of kids call them “companies”) is now very common. Some of these companies fail to produce any finished project but engage participants in some of their first on-line collaborations. Other groups are quite successful at developing multiple complex projects and create intricate social rules to assign each participant a role in the organization. These groups are often formed by a diverse group of kids from distinct cultural, geographical and age settings.

One of the most prolific “companies” was started by a group of three kids ages 8, 13 and 15, later more than 18 members joined. Most of the members are in different countries. This company now has six finished projects and continues to be one of the most active ones. When looking at how projects in this gallery have evolved, we can see that the number of scripts (i.e. code) and sprites (i.e. characters in a story or game) has increased with time (Figure 9). This suggest that the group as a whole has become

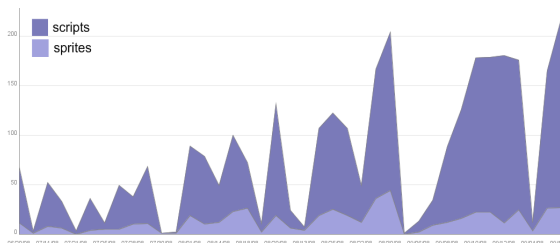


Figure 9: Complexity of projects in a company across time

more advanced building collective skills and experience. It is also possible to observe periods of zero productivity that presumably corresponds to periods of brainstorming and decision making.

## 6. WEB-SUPPORTED LEARNING

In 1971, Illich called for the use of advanced technologies to support “learning webs” [5]. His idea, based on educational resources, is particularly relevant today as the technology is already mainstream. Some of the resources Illich talks about are:

1. Reference services to “educational objects”.
2. Skill exchange network so people can tell others what skills they are willing to teach.
3. Peer-matching networks for people to find others interested in learning the same.

One could think of search engines and digital libraries playing the role of a reference of “educational objects”. Also, one could imagine social networks playing the roles of skill exchange and peer-matching networks. However, the potential of the Web to support learning is still in its infancy. Most of the efforts in using Web technologies in education have been focused almost primarily on content dissemination and very little in using it as a platform to support peer-learning, collaborative building and skill exchange. The Scratch website tries to support some of these activities but more work is needed to really create an effective “learning web”.

## 7. CONCLUSIONS

The Scratch website shows the use of a Web platform to support learning by building things with others. Its design and moderation hint at the fact that building a successful online community for collaborative learning requires continuous social and technical interventions. Additionally, the Scratch community presents itself as a research platform to explore new ideas and opportunities for engaging youth in the participatory culture.

## 8. ACKNOWLEDGEMENTS

I would like to thank the Lifelong Kindergarten Group at the MIT Media Laboratory for their support and the members of the Scratch community for participating in this adventure.

## 9. REFERENCES

- [1] H. Jenkins, K. Clinton, R. Purushotma, A. Robinson, and M. Weigel, *Confronting the Challenges of Participatory Culture: Media Education for the 21st Century*, Chicago, Illinois, USA: 2006.
- [2] J. Maloney, L. Burd, Y. Kafai, N. Rusk, B. Silverman, and M. Resnick, “Scratch: A Sneak Preview,” *Proceedings of the Second International Conference on Creating, Connecting and Collaborating through Computing*, IEEE Computer Society, 2004, pp. 104-109.
- [3] A. Monroy-Hernández and M. Resnick, “Empowering kids to create and share programmable media,” *interactions*, vol. 15, 2008, pp. 50-53.
- [4] “Creative Commons Attribution-Share Alike 2.5 Generic.”. <http://creativecommons.org/licenses/by-sa/2.5/>
- [5] I. Illich, *Deschooling Society*, New York: Harper & Row, 1971.