Doctoral Research Overview
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ABSTRACT
I am interested in the analysis and design of social software that empowers people and lets them learn by creating personally meaningful artifacts with others. A lot of my work focuses on the Scratch Online Community, a large website I created, where thousands of young people from around the world share their own animations and video games. My research is informed by the fields of human computer interaction, Web science and the social sciences.

Author Keywords
computer supported collaborative learning, cooperation, web science, youth and media

ACM Classification Keywords
H.5.3. Group and Organization Interfaces: Computer-supported cooperative work.

General Terms
Human Factors

BACKGROUND
Benkler and others have described how networked information technologies have lowered the barriers for participating in the creation of information, knowledge and culture. Despite this, the Web and other technologies have typically been used in formal education primarily to deliver information rather than to foster creative and collaborative learning. Vygotsky, Papert and Csikszentmihalyi have stressed the importance of the social and cultural contexts in the creative and learning processes, yet traditional uses of technology in education do not seem to leverage social computing for example. On the other hand, Jenkins and Ito have narrated how young people are using the Web as platform for informal learning by collaborating in, for example, the creation of fan fiction literature and remixing media. New technological developments such as the Semantic Web and the popularity of the social Web have the potential to open new and exciting opportunities for collaboration, discovery and creative expression among novices. However, the tools and the social environments to enable amateurs to explore these new possibilities and become fluent in these new technologies are not fully developed yet and that is one of the main motivations for my work.

Remixing and social media
I built the Scratch website inspired by the Free and Open Source Software movement where the ability to build on other people's work is essential. My collaborators and I have analyzed two interventions on the Scratch website designed to foster content reuse. We found evidence that suggests that (1) people value credit given by a person much more highly than automatic attribution generated from a system; and (2) community members' attitudes toward remixing can be influenced by positive framing in terms of community norms. We are now preparing an experiment to further test these propositions. The experiment will try to measure the effect of explicit credit giving allowing users to acknowledge other contributors. Using the analysis of attitudes towards remixing we are also experimenting with design interventions intended to increase the acceptance of remixing as a sign of cooperative behavior by simply changing the notification message of the event. Additionally, I am collaborating

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with a group of social and developmental psychologist interested in looking at children's understandings of intellectual property. Using the Scratch community as a lens to look at this issue, we have found that kids' disapproval of remixing is connected to the similarity between the original and the remix. We are now interested in seeing if other factors such as age, gender and friendship have an effect on this as well.

Co-creation: case studies of "Scratch companies"
My collaborators and I have analyzed some of the most successful groups in Scratch, often called "companies" by the kids. One of these groups, which started with only three members and grew to close to 20, has been able to build dozens of projects collaboratively. We found that in average the group created 17 versions of a project before it was considered finished and that, while distance mattered, some elements that helped break the distance barriers were: (a) loosely-coupled social spaces that support the emergence of self-organized structures and (b) space for socio-emotional interactions. We did some comparative analysis of a team of Scratch users and a group of professional scientists and we found striking similarities in the way they collaborated and the importance of the two elements mentioned above in both communities. We are now interested in looking in more detail at the qualitative and quantitative differences of collaborative and individual projects.

Explorations in cloud computing and the Web of data.
Recent developments in cloud computing and the Semantic Web open new opportunities for creative expression and co-creation. We are starting to exploring the ways in which end-user programming like Scratch can leverage the available social data that exists on the Web in new and interesting ways for amateur users. For example, one can imagine letting people create interactive widgets that make use of data from social network websites, weather information or even data about popular culture to create interactive data mashups.

Cross-cultural studies.
My collaborators and I did some the analysis of participation patterns among Scratch users in Israel. Our findings suggest that the Israeli users were divided in two non-overlapping groups: those who use the website primarily to socialize and those who use it mainly to share projects. I will utilize these international communities or sub-communities to look at cross-cultural differences to help inform the future design of localized communities. I have been involved in the creation of two sister Scratch online communities: one in Portugal and the other in the United Arab Emirates that we hope can be used to do some of this work. More recently we are exploring the partnership with collaborators in China and Mexico.

RESEARCH QUESTIONS
At this stage, I am trying to approach a couple of orthogonal research questions as exemplified by the projects listed above. I am interested in understanding how web technologies can support their social learning models such as Papert's apprenticeships and Illich's learning webs. I am interested in creating and experiment with different design interventions to foster collaboration and cooperation in real and active online communities. More specifically, I will look at how certain design choices influence activities and attitudes in the Scratch online community and how new technologies can extend the range of things people can build with each others.

My ultimate goal is to learn from existing social science research on the nature of human cooperation to understand how people use current technologies and design the next generation of Web-based environments that engage people in creative and collaborative learning experiences. I expect to encounter questions like: what do the social and natural sciences tell us about the nature of cooperation that can directly inform social software design? What socio-technical interventions and system design decisions foster collaboration and participation? What does learning research tell us about the best ways of using the technology to leverage human creativity? What do young people do on-line now and how can we imagine what they can do in the future to become full participants in society?

CONTRIBUTIONS
I expect to contribute to the CSCW literature by executing interdisciplinary research on the Scratch community. I will create a comprehensive qualitative and quantitative description of three years of interactions of this large online community that, hopefully, can lead to generalizable and operationalizable design guidelines for technology design.