

MIT App Inventor: Empowering Youth as Producers in Media Ecologies

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ABSTRACT

In this paper, we examine the varying roles that MIT App Inventor can play in empowering youth as producers in expressive media. App Inventor enables anyone—from novice to expert programmers—to quickly make their mobile app ideas a reality. But “empowerment” is a social phenomenon, not a technical parameter, and the three projects we mention here sit at the intersection of culture and technology. We will briefly describe these projects in which youth and their mentors use MIT App Inventor to create meaningful apps relevant to themselves, their interests, and in many cases their communities. We will then propose common themes and areas for further exploration.

Author Keywords

Youth media creation; apps; meaningful apps; programming; social justice; mobile media production; CSDT; computational art; cs4hs; MIT App Inventor

ACM Classification Keywords

K.4.2 Computers and Society: Social Issues; C.5.3 Computer System Implementation: Microcomputers; D.2.6 Software Engineering: Programming Environments; J.m Computer Applications: Miscellaneous

INTRODUCTION

Apps for mobile devices are of enormous importance in the present and at least the near future of informal learning; participation in global communities of practice; and everyday life for many people. MIT App Inventor (<http://appinventor.mit.edu>) is a user-friendly, app development environment that empowers users to program their own apps for Android devices. App Inventor’s blocks-based interface is simple enough for relatively young children to start building apps, but projects can grow in sophistication, so much so that the App Inventor still has strong teaching potential at the university level.

While we are accustomed to thinking of video as a medium for youth to express their voices, and forge relations to wider communities, the idea of apps as a medium of expression is relatively new. This medium offers amazing new possibilities, but also struggles with some of the same challenges as more traditional media. In particular, low-income youth, especially from underrepresented groups, are confronted with barriers to both academic success and informal learning opportunities. High school dropout rates for Hispanic students, for example are 3 times that of white

students. While girls have lower dropout rates than boys for all ethnic groups, gender stereotypes and sexism create a barrier to join technical fields. For example, women are vastly underrepresented in computer science; the percentage of women in that field has been decreasing since the ’80s.

Thus App Inventor offers exciting opportunities to increase the interest and skill levels of underrepresented students in fields that could have a strong impact on their academic success and career choice. Unlike many approaches to diversifying STEM education—math competitions, inspirational speakers, etc.—mobile app creation can tap into children’s creative potential and their own interests. In many cases these interests are responding to community needs: App Inventor can also play a role in “democratizing” app design, a feature that may be particularly important given its potential role in developing nations.

But media production of any sort—including that of App Inventor—does not happen in a vacuum. There needs to be an institutional ecosystem—curricula, recruitment, instructors, etc.—that employs intentional means by which these new affordances can empower youth of all incomes, races, and genders to positively express themselves. The case studies that follow describe this landscape as it is negotiated by the App Inventor community.

THE PROJECTS

Around the United States and the world, scholars, volunteers, and industry professionals are taking full advantage of MIT App Inventor’s affordances to empower youth to become producers of their own media—mobile apps that range from games to pro-social tools to culturally situated, computational art pieces. The three projects mentioned below are only a small sample of the many projects taking place in which youth are finding creative ways to express themselves through app creation with App Inventor.

The Technovation Challenge

<http://iridescentlearning.org/programs/technovation-challenge/about/>

“Iridescent is a non-profit organization that brings together scientists, entrepreneurs, engineers, and teachers. We believe that children who are encouraged to be curious, daring, and driven stand the best chance at success in life. One of our core programs is Technovation Challenge, which equips girls to become technologically literate. We want girls



Figure 1. A young woman describes the app she wants to build in a video from Uplift Inc.'s Youth APPLab. See this and other related videos at <http://is.gd/IDCAppInvWorkshopSubmission>

worldwide to initiate and lead disruptive innovations. Leveraging technology is the only way to do so. Technology enables an individual to have global impact at low cost in short time frames. We are starting a movement — a movement of women creating and inventing technological solutions.” [2] The Technovation Challenge teaches high school girls entrepreneurship and programming skills in a twelve-week after-school program. The girls build mobile apps using App Inventor and then pitch their app and business plan in an international contest. The program began in Silicon Valley but has expanded to become a nationwide and now international program. Women from industry, university students, and high school teachers have all contributed as teachers, mentors, and role models

CSDT Apps

<http://www.csdtrpi.edu>; <http://cs4hs.rpi.edu/>

In this project, three high school students--two African-American male and one Caucasian female--are collaborating with a female Computer Science undergraduate on using App Inventor to create apps inspired by Culturally-Situated Design Tools (CSDTs). CSDTs are a suite of applets based on ethnocomputing: the computational and mathematical indigenous/vernacular algorithms and principles to simulate knowledge embedded in cultural designs such as cornrow hairstyles, Native American beadwork, Latino percussion rhythms, and urban graffiti. CSDTs allow students to use the original cultural designs, create new designs of their own invention, and engage in mixed media arts and performance activities which translate between cultural and scientific knowledge systems. In addition to using App Inventor programming environment to port CSDTs to mobile devices, the CSDT scripting interface can prepare students for using App Inventor.

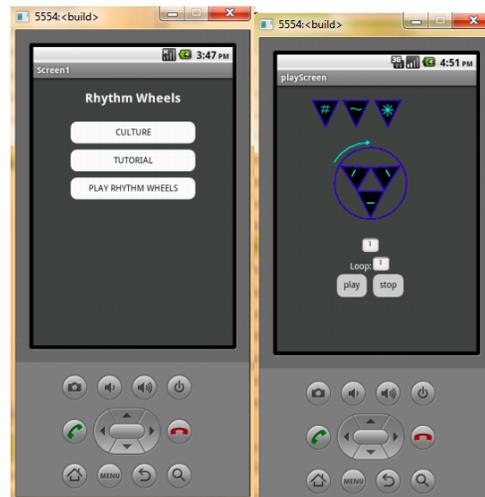


Figure 2. Two Screens from the Rhythm Wheels CSDT App

Uplift Inc.'s Youth APPLab

<http://www.youthapplab.com>; <http://www.upliftdc.org>

Youth APPLab is an opportunity to create, offered to elementary, middle, and high school students (African-American males and females) by Uplift, Inc., a nonprofit in Washington DC. It uses MIT App Inventor to introduce students to mobile app development. To date, students have designed, created, and/or published (via Google Play) 50+ apps. App ideas come from concepts relevant to students, their peers, their communities, and often their family members (young and old). Design ideas, critique, and implementation enable students to share their interests, express opinions, and to explore more about particular topics, from the various wars the US military is involved in; to the grammar of regional slang; to health issues and how to better teach younger kids how to care for their bodies.

DISCUSSION

When you listen to a recent podcast [3] from Youth Radio (an organization that has also used App Inventor with youth to create locally relevant apps), one Oakland, California youth says this about computer coding: “I would assume it’s something that’s only taught in private schools where they have funding to do something like that.” This young man has made the assumption that programming is something that others do. Sadly for many underrepresented youth, this assumption often holds true.

The three programs described above are evidence that does not have to be the case. As has been widely documented, girls and women are dramatically underrepresented in computing. Technovation gives girls positive experiences with technology and programming, via App Inventor, in a way that the organization posits will lead to social change: “We want girls worldwide to initiate and lead disruptive innovations. Leveraging technology is the only way to do so. Technology enables an individual to have global impact at low cost in short time frames.” [2]

Similarly, CSDT apps are created with the intention of helping marginalized youth tap into the computational potential of artistic practices from their own cultural heritage: translating the algorithms in native bead work, African American cornrows and other knowledge systems from their original context to digital media—and back again in new material forms. Meanwhile, Uplift Inc.’s Youth APPLab provides a creative environment in which youth from some of the most challenging neighborhoods in Washington, D.C. can design and build apps that hold meaning for the youth, their families, their peers, and others in the area.

If the skills youth learn in these kinds of media production programs include computational thinking, math, and deep forms of technological literacy, this can have a dramatic benefit for the youth involved, and thereby for their communities and society. Personal identities are not static; they are dynamically evolving works-in-progress. This is true for adults, but especially so for youth. Anthropologists such as John Ogbu and Signithia Fordham have documented the ways in which low-income and minority youth can form an “oppositional identity” in which academic success becomes a form of “selling out.” Media production that is linked to computing and math skills can have the opposite

effect, positively linking self-expression to academic disciplines. These links between self-expression and media production can be particularly profound in the case of mobile apps, which offer real-time interaction with the external world.

Our implicit assumption is that we will have a better society if there is more equality, i.e. less sexism and racism, more economic parity, etc. The curricula for the projects described above share the theme that they are designed with that thought in mind.

For example, there is solid literature showing that girls will become more interested in technology if it is associated with “helping people” – thus in the case of the Technovation Challenge, “For the 2013 challenge, girls develop an app that solves a problem in their local community. This could be a health problem that affects their community, a social problem, or even a lack of a resource.” [2] This statement addresses not only the issue of social benefit to communities, but also a learning theory question – how can we increase girls’ interest in tech careers?

At the upcoming workshop we seek to continue to explore the ecosystems that need to arise around technologies such as MIT App Inventor. What curriculum delivery and instructional approaches (content, concepts stressed, instructor roles, pedagogy, etc.) need to be combined with media technologies to democratize media creation and empower youth in a variety of ways (from increased self-efficacy in programming to the confidence to help increase awareness about a particular issue in their communities). Our lens for this is the creation of mobile apps, but we feel that it can be generalized to other youth media creation.

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