

Lessons Learned in China: Using AppInventor to Teach Computer Science to K-12 Students

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Most schools in China still do not offer computer science classes. Despite a strong influence from Western culture in education, schools in Asia are constrained by limited capacity in the teachers and cultural emphasis on exams.

Since May 2013, our school have taught computer science courses over 200 students in 25 different schools in China, using App Inventor specifically. When choosing programming language and platform, we were convinced by the fact that many major cities in Asia have over 100% penetration rate of cell phones (more than 1 cell phone per person). We in particular liked the fact that AppInventor can bring their programming creation to the students' daily lives (mobile phones).

With the learn to code movement swipes, there are growing interest from parents and teachers. Being able to link to a device they interact with everyday, AppInventor helps kids link their real life with coding. Seeing mobile apps on their screen is the important turning point of transforming them from consumers to creators in technology. Soon we realize that not only does teaching coding infuses technical knowhow, it also helps instill in students a mindset of a creator.

This talk shares with the larger MIT App Inventor instructors community 3 lessons learned along the way.

1) Age groups. While originally we focused high school students, we discovered students as young as 8 years old can pick up App Inventor and concepts like Lists. The focus on these younger students then shifted from grasping difficult ideas to developing a habit of creating through technology. Students create apps around pre-set themes such as family, music and geography.

How it came about

Originally we have set the age group at 12-15. An Asian syndrome is that the parents would like their kids to participate something a year or two earlier than the stated age. Soon we launched a program for 8 year olds only.

2) Guidance versus free style creativity. In the beginning when we first launched the program, we encouraged students to dream up an app to make as a final project. However soon we realized that students perform a lot better in brainstorming with certain constraints and guidance.

3) Mindset of a maker. Chinese culture emphasize on saving face. That creates a fear of failure and an aversion from venturing away from the familiar and safe. In addition, the competitive nature of education (playgroups start at 6 months) pressure parents and students to expect perfect scores in each homework and tests.

Part of our emphasis in teaching coding is also a mindset of the maker. **“Done is better than Perfect”** - a motto we found on Facebook’s Menlo Park headquarter - helps students move the mindset of a perfectionist to a “shipping” mindset. Each lesson, students are invited to present their apps even work in progress.

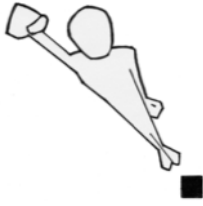
The second class motto is **“Move Fast and Break Things”**. Also found from Facebook’s headquarter wall, this slogan reminds students that the beauty of software is that it does not have to work and it is a cost-free canvas that can frequently be wiped and started from scratch again. This mindset can encourage them despite in a rigid and competitive environment and a reserved culture.

In addition, we combined teaching **Design Thinking and App Inventor**. One of our course advisors is an alumnus of the Stanford d.school. We incorporated Design Thinking with our semester program, and discovered that they grasp the concepts effectively after a mere 3 hour session.

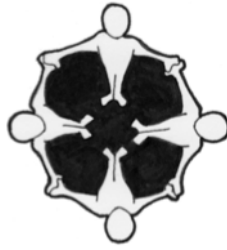
Even with a young students, they were able to complete in the user empathy session with their partners giving interesting insights. They also demonstrated divergent thinking skills in the ideation phase.

The most powerful thing is that students were not only able to incorporate and think creatively using Design Thinking, but can create the solution they dream up and test a working prototype using App Inventor.

The values on design thinking are also central to adding to our two class mottos, especially on bias toward action and collaborate across boundaries.



bias toward action



collaborate across boundaries



focus on human values



be mindful of process



prototype toward a solution



show don't tell