Approaches to Diversifying the Programmer Community -- The Case of the Girls Coding Day

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Higher gender diversity is beneficial for software development teams

Vasilescu et al. 2015, Catolino et al. 2020
There are female adults who want to try out programming

Coding camps that last for weeks

Pre-college

Professional

We need

A short-term event
Project-based learning
Mentoring support

Short-term events with project-based learning formats

Emphasize more on the competitive climate

Warner et al, 2017
Girls Coding Day - a one-day coding workshop that allows participants to try out programming

- Announce projects
- Assign participants to mentoring groups
- Distribute handouts
- Create Wechat group - encourage participants to read the handout and discuss online

One week

- Participants work on individual projects
- Mentors answer questions regarding programming concepts
- Mentors try to solve technical problems and debug
We wanted to study if the format of Girls Coding Day is effective

RQ1. What were the participants’ motivations for participating in GCD?

RQ2. How was the design of the GCD related to the participants’ intention to continue learning about programming?

RQ3. How was the design of the GCD related to the participants’ perception about their own coding ability?
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We organized several Girls Coding Day workshops on
different topics

2017-2018

12 workshops

489 participants

2018-2019

17 workshops

940 participants
We designed a multi-case study

First survey (distributed after each event)

Identified components that can be measured

Handouts
Mentoring experience
Kick-off event
Learning satisfaction

Second survey (distributed in 2019)

Correlation analysis
Thematic analysis

Learning satisfaction
Answering RQ3: participants’ perception about their own coding ability?

Participants still have low perceived coding ability

**Participants' level of comfort using the following technologies after GCD**

| Technology          | Very comfortable | Comfortable | Neither comfortable not uncomfortable | Uncomfortable | Very uncomfortable |
|---------------------|-------------------|-------------|---------------------------------------|---------------|-------------------|
| comfort with HTML   | 0.60              | 0.20        | 0.10                                  | 0.15          | 0.05              |
| comfort with CSS    | 0.55              | 0.20        | 0.10                                  | 0.15          | 0.05              |
| comfort with Python | 0.35              | 0.30        | 0.10                                  | 0.15          | 0.05              |
| comfort with GitHub | 0.30              | 0.30        | 0.10                                  | 0.15          | 0.05              |

Mean = 3.25 2.92 2.66 3.02
Answering RQ3: participants’ perception about their own coding ability?

Satisfaction with the handout correlates with higher perceived coding ability

| Handout satisfaction | Coding capability |
|----------------------|-------------------|
|                      | 0.60***           |

Benefits

- It was newbie-friendly because it starts with the basics (PP2-12, PP2-15, HP2-11).
- It helped the participants prepare for the event (PP2-17, HP2-12, HP2-4).

Unsatisfying aspects

- It needs to be more readable (HP2-14).
- Make it more comprehensible for “who don’t know about programming” (HP2-21).
Answering RQ3: participants’ perception about their own coding ability?

Mentoring experience was perceived to be the most useful by the participants

Benefits

• Increased learning effectiveness (HP2-7, PP2-28, PP2-3, PP2-32).

• Expanded participants’ social circles (HP2-4, PP2-31, PP2-15, PP2-6).

Unsatisfying aspects

• Group assignment was arbitrary (PP2-23).

• Mentors’ professionalism was unequal (PP2-29).
Answering RQ3: participants’ perception about their own coding ability?

Kick-off event makes the workshop more effective

The kick-off event “avoided a large number of installation environment problems” by installing and configuring environment in advance (PP1-105).
Answering RQ3: participants’ perception about their own coding ability?
Learning satisfaction correlates with higher perceived coding ability

| Coding capability | Learning satisfaction | Outcome satisfaction |
|-------------------|-----------------------|----------------------|
|                   | 0.74***               | 0.66***              |

Mean=3.53, SD=0.79
Mean=3.49, SD=0.89

High correlation
Low means
Implications: We found pros and cons of short-duration workshops

Pros:

• It was sufficient to get them interested in computer programming
• It helped them started learning programming (“brought to the gate to a new world”)
• Provide handouts before the event to allow participants to preview the materials.

Con:

• “it was haste”
• Could not cover materials in more details
• Could not cover more materials
• Lacks follow-up curriculums
Girls Coding Day – a case study for diversifying the programmer community

Girls Coding Day - a one-day coding workshop allows participants to try out programming

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Survey instructions: https://github.com/sophieball/GirlsCodingDay