# Automated Exercises & Software Development Data

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1st Workshop on Modern Software Engineering Education (WMSEE 23)

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# An Automated Introduction

**Prof. CI: Similar in concept to the "Extreme Startup" Exercise [Cha2011]**

- Alternative to Ruby on Rails Guide self-study
- **Goal:** Use (& install) **actual dev tools** on your machine
  - IDE, CLI tools & test frameworks, Git(Hub)

[Cha2011]
http://chatley.com/posts/05-27-2011/extreme-startup/

# An Automated Introduction

## As simple as possible using GitHub Actions to make everything go

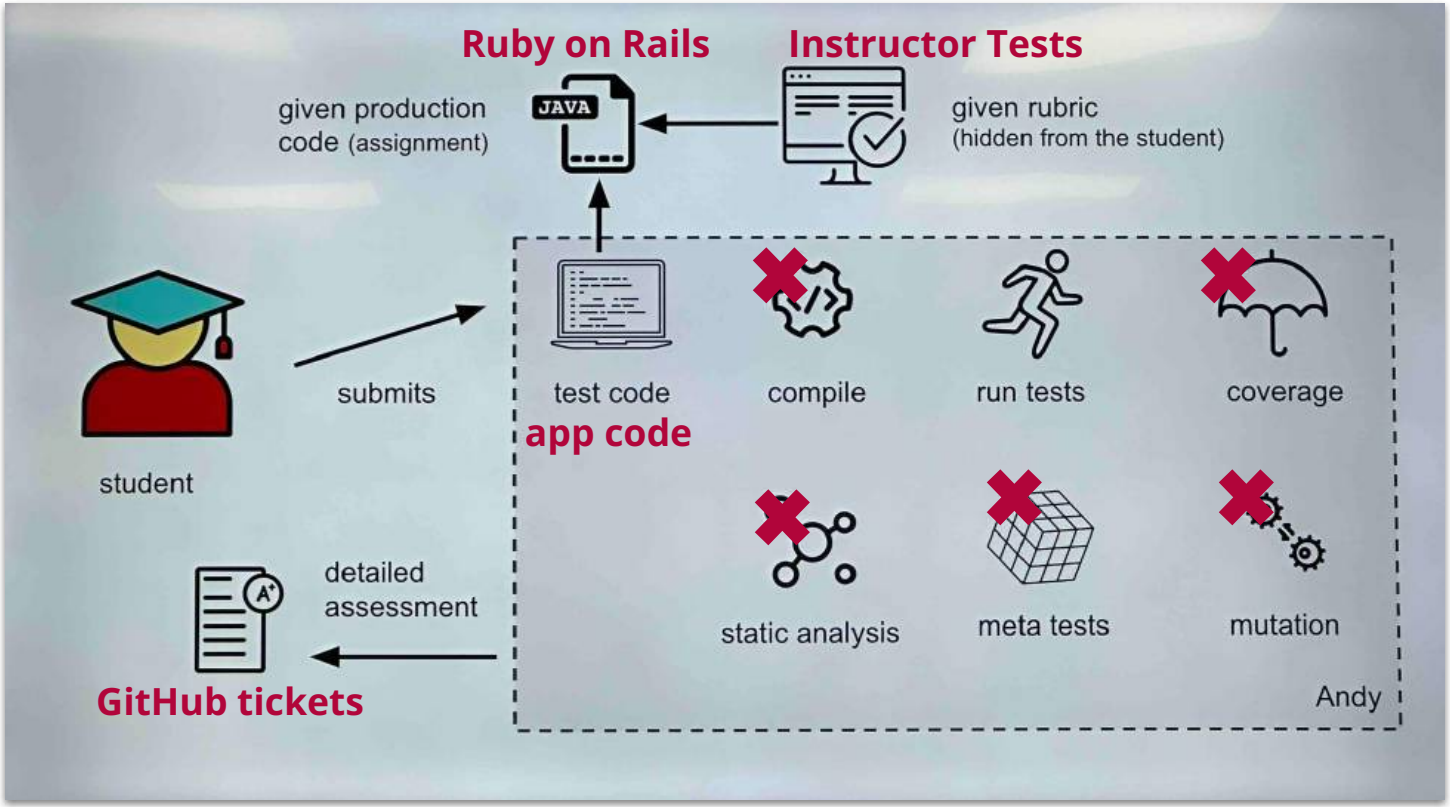
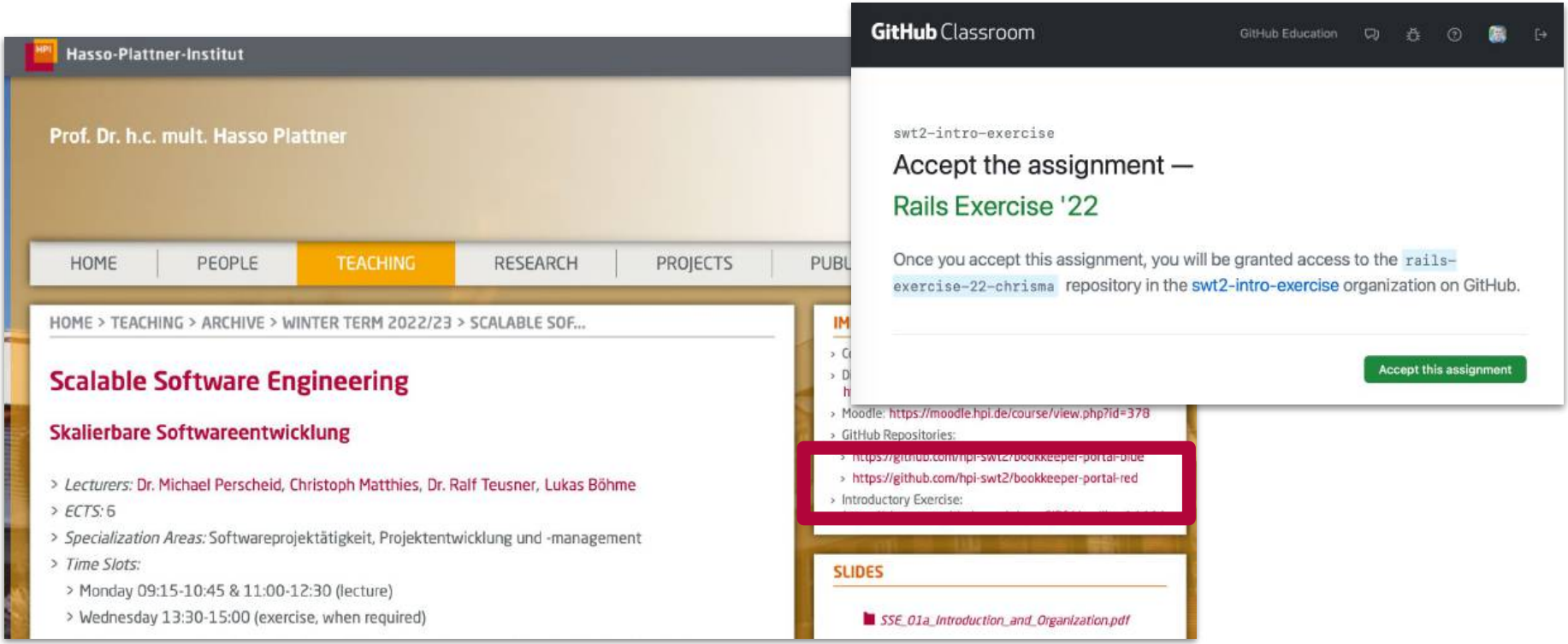



Image source:

Mauricio Aniche, WMSEE'23

# An Automated Introduction

## Getting Started using GitHub Classroom [SSE23]

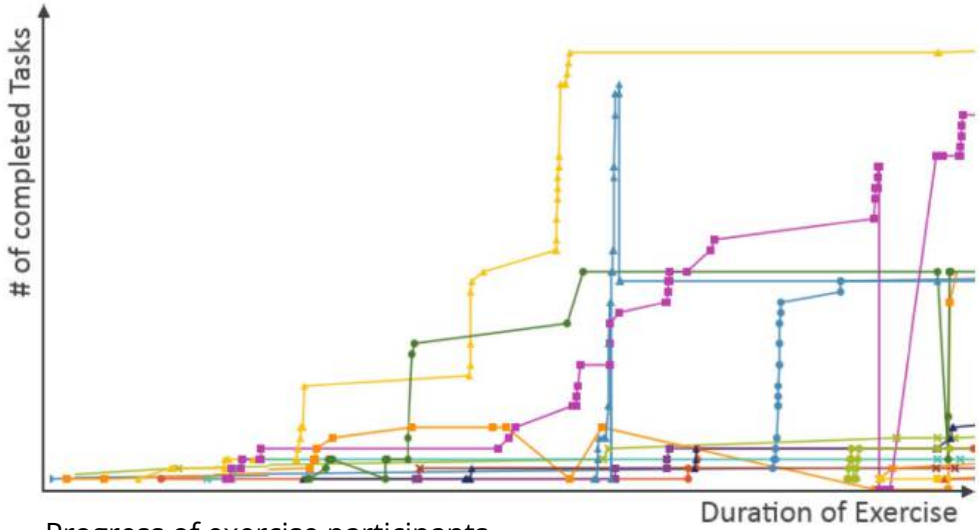



[SSE23] https://hpi.de/plattner/teaching/archive/winter-term-2022-23/scalable-software-engineering.html

# Detailed Development Data

**Providing data to counter the curse of knowledge [MTU17]**

- **2nd goal:** Understand **struggles**, improve instruction




Progress of exercise participants.
Every line represents the amount of completed tasks.

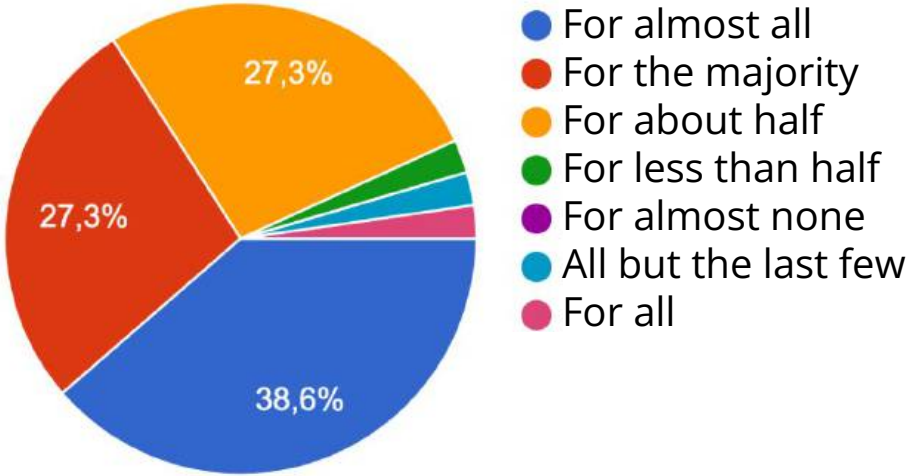
| Student | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0.0 | 0.2 | 0.2 | 0.2 | 0.5 | | 0.2 | 0.5 | 0.1 | | 0.1 | 0.1 | | 0.1 |
| 2 | 0.0 | 0.8 | 0.1 | 0.4 | 0.8 | 0.4 | | 0.7 | 0.2 | 0.3 | 0.1 | 0.4 | 1.9 | 0.1 |
| 3 | 0.8 | 0.7 | 0.1 | 0.9 | 0.2 | 0.2 | 0.4 | 1.2 | 0.8 | 0.5 | | 0.3 | | 0.3 |
| 4 | 0.0 | 0.2 | 2.3 | 0.1 | 0.5 | 2.3 | | 0.4 | 0.2 | | | 0.2 | | 0.4 |
| 5 | 0.0 | 0.7 | 0.1 | 0.1 | 0.3 | 1.0 | 0.5 | 0.5 | 0.6 | 0.2 | 0.2 | 0.1 | | 0.2 |
| 6 | 0.2 | 1.0 | 0.6 | 0.1 | 0.2 | 0.2 | | | 0.2 | 1.1 | | 0.2 | 0.4 | 0.6 |
| 7 | 0.0 | 0.9 | 1.5 | 0.1 | 0.7 | 0.7 | | | | 0.3 | 0.2 | 0.3 | | 0.1 |
| 8 | 0.2 | 0.3 | 0.1 | 0.4 | 0.2 | 0.2 | 0.7 | 1.8 | 0.0 | 0.4 | | 0.4 | 0.2 | 0.1 |
| 9 | 0.8 | 0.2 | 0.3 | 0.7 | 0.2 | 0.6 | 0.3 | 0.4 | 0.1 | | 0.2 | 0.4 | 0.1 | 0.1 |
| 10 | 0.8 | | 0.2 | 0.1 | 1.2 | | | 0.8 | | | | | | 0.1 |
| Avg | 0.5 | 0.4 | 0.6 | 0.4 | 0.3 | 0.4 | 0.1 | 0.6 | 0.2 | 0.3 | 0.0 | 0.4 | 0.2 | 0.2 |

[MTU17] C. Matthies, A. Treffer and M. Uflacker, "Prof. CI: Employing continuous integration services and Github workflows to teach test-driven development," *2017 IEEE Frontiers in Education Conference (FIE)*, Indianapolis, IN, USA, 2017, pp. 1-8, doi: 10.1109/FIE.2017.8190589.

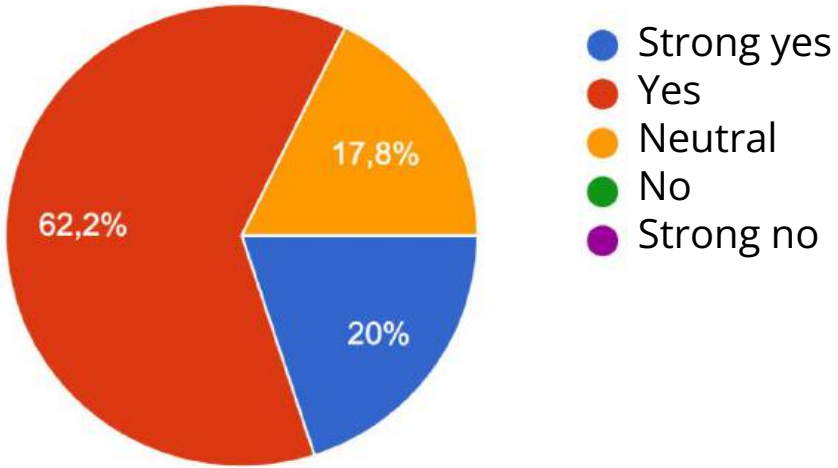
# Student Self-Assessments

**Collected via link in the last ticket (high response rate!), 2023 course data**

I wrote tests for the provided requirements (n=44)




I would recommend the exercise to others learning Ruby on Rails and TDD (n=45)



# Extract of Free-Form Feedback

**What students noted about the exercise**

> Note to myself: **Don’t install Github Copilot** beforehand. I felt I didn’t have to understand Ruby to solve issues [...]
> Maybe it’s sensible to force pushing tests before implementation? **I caught myself** writing tests afterwards...

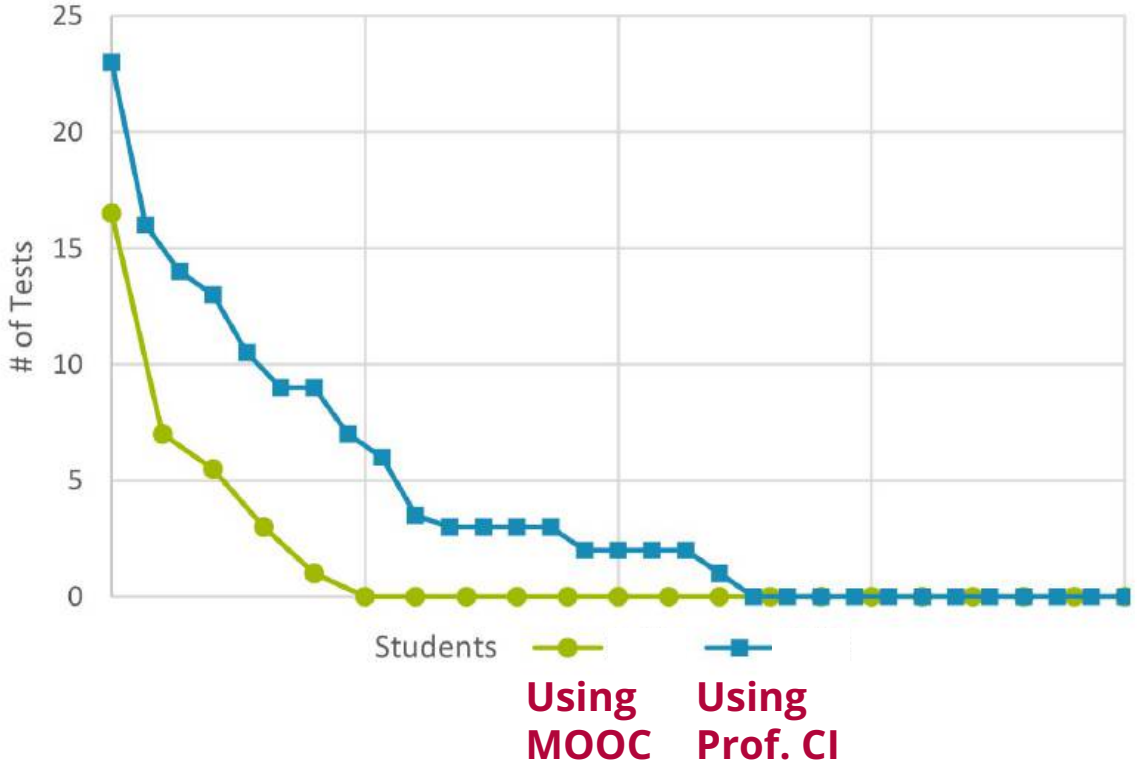
# Extract of Free-Form Feedback

**What students noted about the exercise**

> I would appreciate some more **hand-holding regarding the tests**. It's sometimes unclear which functions are available. Otherwise a great exercise :)

# Writing Tests in Later Project

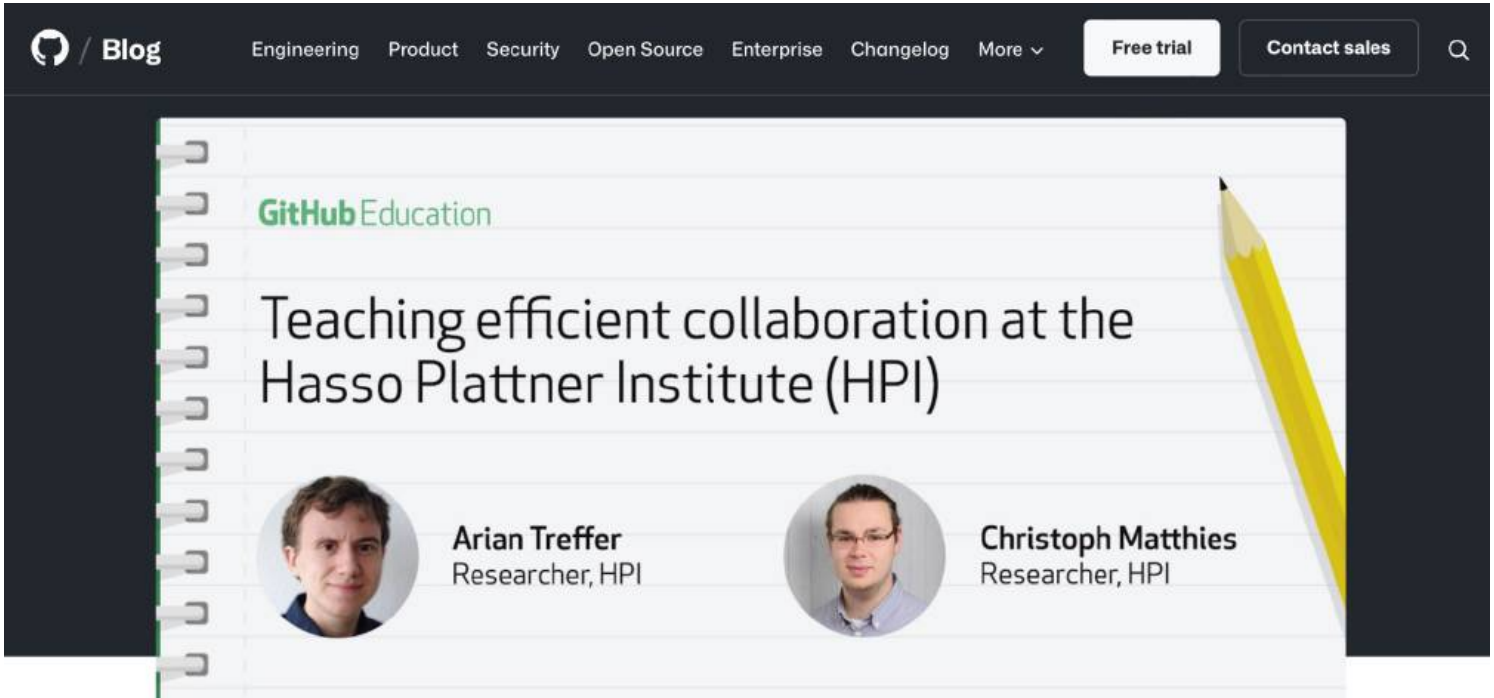
**Amounts of tests written by students in subsequent dev. project**



# Prof. CI & Lecture Concept

GitHub Education blog entry on the topic:

https://github.blog/2017-10-23-teaching-efficient-collaboration-at-the-hasso-plattner-institute/



# Summary

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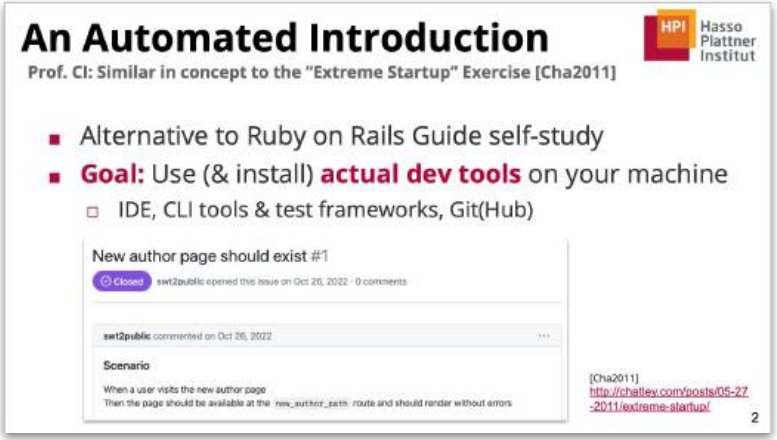
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Closed
Scenario
When a user visits the new author page
[Cha2011]
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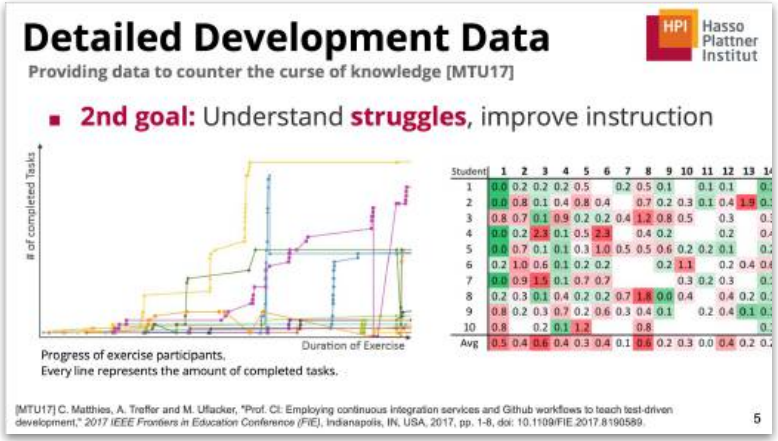
2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Duration of Exercise
Progress of exercise participants.
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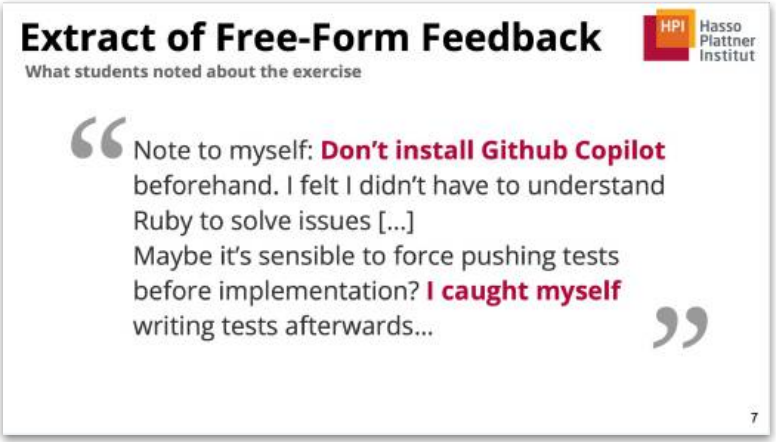
5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7

# Image Sources

## In order of appearance

- **Archaeologist** by *Gan Khoon Lay* from the Noun Project (CC BY 3.0 US)
- **Scrum** by *M. Oki Orlando* from Noun Project (CC BY 3.0)