Teaching Lab

Training Novice Computer Science Teachers

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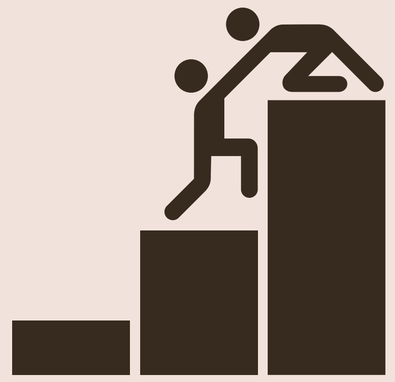

Background: The faculty had many student teaching assistants but no pedagogical training.

A third of the teachers are students

With about 1700 students and 450 people participating in teaching, the body of more than 150 student teaching assistants (undergraduates, graduates and postgraduates) constitutes an essential part of the teaching process.

Faculty teachers: **35% students,**
40% employees, 25% external experts

No pedagogical training

No centralized pedagogical training was organized. The individual courses were fully responsible for the management (and growth) of their student teaching assistants.

We created a platform supporting novice teachers.

Initiative of senior students

Teaching lab was created from the initiative of multiple senior student teaching assistants with the faculty support and help from an external communication skills teacher.

Course with weekly sessions

The core of the Teaching lab is a semester-long course with weekly sessions of two hours. The course is optional and open for all people participating in teaching.

Reflection and class work

Apart from weekly sessions, a critical part of the course is the teachers' work and reflection directly in their own classes gaining new experiences and improving.

What goals do we have in Teaching lab?

1. Encourage reflection

Reflective diary

We created a semi-structured reflective diary [1] to encourage reflection right after the taught classes.

Pair reflections in class

We include a regular pair reflection on almost all Teaching lab sessions. This establishes reflection as common practice for teachers.

Visiting each other's classes

We require novice teachers to visit each other's classes and subsequently discuss together what went well and what could be improved (and how).

What have we learned?

Explicitly name concepts

Giving names to teaching principles, group dynamics and other teaching bits supports knowledge transfer (teachers are more likely to see them, use them and have common terminology to talk about them).

Reflect shortly after class

The teachers need to reflect during or shortly after their classes. Postponed reflection (for example in TA training session) is less effective.

Be ready for questions!

Teachers trained to reflect can start questioning existing course design and seminar practices. Be open for discussion and value their opinions.

Reflection under pressure

Reflection is one of the first things novice teachers cut out of their schedule when under pressure of work. Emphasize its importance but don't push too hard.

2. Provide inspiration

Showcasing teaching tools

We use many tools for active learning directly in class: voting, rubrics, subgrouping, Parsons problems, faded examples, group questions, student investment, …

Basics of didactics

We introduce the concepts of group dynamics, question formulation, lecture structure, Bloom's taxonomy of educational goals, scaffolding, student motivation, …

Tips for further resources

We work with existing CS education books [2, 3] and research to show teachers the direction for digging deeper.

Stack for teaching activities

We collect interactive exercises created by the teachers into "the Stack" [4], a shared repository of CS activities.

What have we learned?

Lecture and facilitate

Balance giving novice teachers new information and facilitating their own discussion, knowledge sharing and exploration. Both approaches are important.

Didactics vs. teaching tools

Mix classes showing ready-to-use teaching tools with those discussing theoretical concepts. Theory is important in the long term, teaching tools can be adopted immediately.

No silver bullets

Novice teachers sometimes think that to teach well, they must use all the tools you show them all the time. Emphasize that not all the tools are always useful.

Give clear motivation

Many covered concepts are new to novice teachers. Thus, always explain or demonstrate why they are useful in teaching. This helps the transfer to their own classes.

3. Build a community

Informality

We keep Teaching lab informal and welcoming to support sharing and openness in class/community discussions.

Inclusion of senior teachers

We try to have 1–3 senior teachers (faculty employees) in every course run to include their experience and opinions.

Organizing additional events

Besides Teaching lab sessions, we organize additional events. Examples include discussions on course redesign, student failure rate or possible improvements of teaching environment at the faculty.

What have we learned?

Community sharing is crucial

Sharing (even trivial) experience and opinions with other teachers is crucial among novices to suppress the impostor syndrome and encourage cooperation among teachers.

Employees add a perspective

Senior teachers (faculty employees) attending the course provide a course-level and faculty-level perspective to the discussions. This helps novice teachers see the connections beyond their own classes.

External attendees in class

One or two attendees from outside of the faculty (college alumni, IT company employees, high-school teachers) introduce an interesting "real-world" view and enable mutual inspiration.

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[1] M. Ukrop, V. Švábenský and J. Nehyba: **Reflective Diary for Professional Development of Novice Teachers**. ACM SIGCSE 2019. *https://github.com/teaching-lab/reflective-diary*

[2] G. Wilson: **Teaching Tech Together**. Taylor & Francis, 2019, ISBN 978-0-367-35328-5. *https://teachtogether.tech*

[3] S. Ambrose, M. DiPietro, M. Norman, M. Bridges, M. Lovett: **How Learning Works: Seven Research-Based Principles for Smart Teaching**. Jossey-Bass, 2010, ISBN 978-0470484104.

[4] **The Stack of Activities for Teaching Computer Science**. Masaryk University, 2018. URL: *http://stack.fi.muni.cz*