

Draft
Feb27

Bringing Modern Software Practices to Your Department and Your Classroom

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**How to teamwork
when students have
heterogeneous
experience levels.**



Agenda



Introduction
• Experience



Theory
• How group work
is difficult



Ressources
• Modern tools in
pratice



Take actions



Questions

Introduction

Dominic Letarte

- GitHub Campus Advisor
- Work the industry for many years
Team leader at Ericsson
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Introduction

Teaching experiences

Software Design (CS major)

- 100 students, 3 Instructors, 5 TAs
- Multiple team assignments.
- One five weeks team project.



Capstone (Information Science & Tech. major)

- 50 students, 3 instructors, 2 TAs
- Two semester projects with a real client.

Theory - Why teamwork is difficult

Learning happen better in groups but grading at the end is a solo affair.

Challenges of teamwork [Walker2002]

- Barriers to Communication
- Diversity of Available Equipment
- Disparity in Technical Background



Theory - Why group work is difficult

Best practices to keep students engaged in project group work [Stoddard2019]:

- Providing Project Structure and Subtask Scaffolding.
- Provide regular opportunities to report on their progress, challenge and roadblock with peers and with faculty.



Ressources

Applying the theory and best practices to provide
communication tools, **progress reports** and **task scaffolding**.

- Issues Tracker,
- Project Board,
- Pull Requests,
- Commit logs and Code Insights,



Ressources - Issues Trackers

Issues Trackers are a usual way to keep track of tasks, enhancements, and bugs for projects. Focus is on collaboration and communication.

- I use them to allow students to share ideas for projects, comments on each other ideas and vote for the more interesting projects.



- 🛠️ Use reaction emojis to help communication.
- 🛠️ Use labels to help navigate issues.

Ressources - Project Board

Project Board allows to organize, prioritize and track work in a project. A foundational tool for Scrum, Kanban and Agile.

- In the agile spirit a project board try to reduce administrative overhead and be good at tracking progress and roadblocks.

- ❖ Use Github Project Board, Jira or Trello.
- ❖ Use labels to help navigate issues.



Ressources - Pull Requests

Pull Requests tell others about changes that have been pushed to a branch, encourage discussion and revision before changes are merged into the base branch.

- 🛠 Lock master and force peer review before merge.
- 🛠 Use Draft Pull Requests.



Ressources - Commit logs and Code Insights

Commit logs and Code Insights use this data to get a better understanding of who's using the repository and how they're using it.

- Use it as a data for discussion and as basis for peer evaluation.



Take Actions

- 🛠 Use more emojis
 - To vote on issues: +1 🤗
 - To grade: 😎A 😃B 😓C 😬D 💩E 🧐F.
 - 🛠 Use **Project Boards** to report on team progress and roadblocks.
 - 🛠 Lock master branch and use **Pull Request** as an internal communication tool.
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Take Actions

🛠 Register as teacher to get unlimited private Github repositories for your student assignments.

<https://education.github.com/teachers>

🛠 Automate repository creation with Github Classroom

<https://classroom.github.com/>

🛠 Create a free Github Organization to host your students repositories

<https://github.com/organizations/plan>.



Any Questions?

Get presentation and references at
⬇ <https://github.com/domincl/sigcse2020>



References

Theory

- *In Stoddard, E., In Wobbe, K., & In Bass, R. (2019). Project-based learning in the first year: Beyond all expectations.*
- *Ellen L. Walker and Oberta A. Slotterbeck. 2002. Incorporating realistic teamwork into a small college software engineering curriculum. J. Comput. Sci. Coll. 17, 6 (May 2002), 115–123.*

Ressources

- <https://guides.github.com/features/issues/>

References

Take Actions

- <https://community.canvaslms.com/groups/gamification/blog/2016/03/23/grade-with-emoji>
- <Https://opensource.com/article/19/2/emoji-log-git-commit-messages>