

Agile Supervision of Bachelor, Master, and PhD. Theses

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ABSTRACT: Supervision of students can often require a significant mental effort from the supervisor to be effective for the students. When supervising one or two students it is relatively easy to remember the context for each students work from one meeting to the next. However, with a large number of students the mental complexity of the supervision becomes significant. This paper presents the authors experience with using planning boards for supervision of students on bachelor, master, and PhD level to tackle this problem.

1 INTRODUCTION

Supervision of students is a complex task that requires the supervisor to understand and remember the tasks and problems that the student is struggling with. With many students it becomes a challenge to remember this context for each student from one meeting to the next, especially over holidays such as Easter when there is more time between meetings. In this work, we examine how tools from software development can be used in the supervision process. More specifically, we use an online planning board called Trello to keep track of ongoing work, problems, and ideas.

Using agile methods for supervision has been reported on before, yet we have found little published literature on experiences for the range of student types and the number of students we examine in this work. Tengberg [1] reported on agile development methods applied to supervision of PhD theses, and focuses on using short planning phases of around two or three weeks, called sprints. His argument is that using agile methods in supervision will decrease the PhD completion time. Dewi and Muniandry [2] reviews some use of agile methods at university level for interactive learning, and Ray [3] presents how Trello can be used to possibly increase students motivation through self efficacy.

1.1 Bachelor, Master, and PhD theses

At the Department of Informatics at Oslo Metropolitan University it is not uncommon for academic staff to supervise multiple students at any given time. At bachelor level students are typically organized into groups of two to five students who collaborate on a technical project. The project is often specified by an external company which acts as a customer, and the students are supposed to plan and execute the project based on the customers requirements and requests. The students have to learn new technology during the project, and typically experience difficulties with planning, team work, technical writing, technical issues, and so on for the first time.

At master level, students complete a so-called long or short thesis. The long thesis consists of 60 ECTS spread over three semesters: the first semester is filled with regular courses, the second semester students have 10 ECTS to do a short preparatory project, the third semester they have 20 ECTS thesis work, and the final semester the students have 30 ECTS thesis work. For the short thesis the students have 30 ECTS of thesis work during their final semester.

PhD students typically have four years to complete their thesis, including a 25% teaching duty. They have to complete 30-40 ECTS as part of their degree in addition to their research work. The majority of PhD theses in Norway today consist of an introduction and a collection of individual papers (which often are also published in international journals).

1.2 Supervision

Supervision of students at bachelor and master level typically consists of regular meetings to discuss progress and make short-term plans, suggestion of related work, reading and feedback on text, and general communication through email etc. At the PhD level the students are often more independent, and the supervision can become more like a dialog. There is a significant amount of context that a supervisor needs to remember from one meeting to the next such as what was discussed, what was decided, what was the student struggling with, what ideas came up, etc. With a few students it is often manageable to remember the context of each student, but with many students it can become challenging.

Often students struggle with similar problems, such as creating a good thesis outline. For most students it is the first time they write a longer scientific text, and they typically e.g., need to see an example of a good outline and discuss how this fits with their specific project. One idea could therefore be to have a large spreadsheet with common problems and cross them out when each student has reached that problem. Unfortunately, however, students most often have very different topics and their individual differences gives rise to a large number of individual problems. This is especially pronounced with bachelor groups where the social and collaborative issues depend on the group composition and dynamics.

A second idea to keep track of the context is to write a short summary for each meeting and review it before the next meeting. This would be similar to meeting notes, and unfortunately these seem to sediment: An important point on meeting four may quickly be forgotten after meeting five. To improve on this, it is therefore possible to keep important points from week to week. The drawback of this approach is that the meeting notes quickly become very long and tedious to read and maintain, and it can become a bureaucratic exercise.

1.3 Planning Boards

The drawbacks of the aforementioned ideas to tackle the complexity of supervision is not unique, but also present in many other parts of society such as project planning, car production, software development, and nursing. For example, a nurse needs to check that the correct drug is administered at the correct time and dose for the correct patient. In software development a developer team needs to keep track of bugs, customer requirements, and development progress.

So-called lean development methods [4] have become popular in software development to keep track of the complexities. Lean methods are designed to have very little administration and bureaucracy and be very flexible with respect to changing customer requirements. They are inspired by the Toyota Production System (also called just in time production) which was developed by the car producer Toyota in 1948-1975 [5]. They defined seven principles of (car) production, which can be summarized as 1. eliminate waste; 2. amplify learning; 3. decide as late as possible; 4. deliver as fast as possible; 5. empower the team; 6. build integrity in; 7. see the whole.

One examples of a popular lean method is Scrum [6]. Scrum is an iterative process in which each iteration typically lasts around 14 days. This is referred to as a sprint, and the customer and the development team start the sprint by prioritizing tasks, called cards, to complete. The cards can then be placed on a project planning board, also referred to as Kanban board [7]. The board has different columns, with labels such as “Tasks”, “In progress”, and “Complete”, and a card is moved from one column to the next by the team. New cards can be added to the board, for example if something unforeseen happens. This gives a good overview of the current project progress.

A Kanban board can be very simple to implement. The simplest version can be a whiteboard with post-it notes. Columns can be drawn on the whiteboard, cards can be written on the post-it notes, and then placed and moved on the board. Completed cards can then finally be archived in the paper recycling bin. Trello is an online version of such a planning board which is very customizable. It is free to use, and a user can add or remove columns, add or remove cards, and so on. Essentially it is a digital version of a whiteboard with post-it notes. The benefit of an online planning board is that notes do not fall of the board by themselves, you can access the board from anywhere in the world, and archived cards can be viewed.

2 TRELLO FOR SUPERVISION

We have used Trello for keeping track of the supervision of 17 bachelor students, three master students, and one PhD student during the spring of 2018: Bachelor group 1 (3 students), bachelor group 2 (2 students), bachelor group 3 (4 students), bachelor group 4 (4 students), bachelor group 5 (4 students), master thesis 1 (short), master thesis 2 (short), master thesis 3 (long at the University of Oslo), PhD thesis (at the Norwegian University of Science and Technology).

This represents the work of a total of 21 persons spread over nine different projects. Keeping track of all of these projects is a challenging task without any aids, which is why we have used Trello. The Trello board we used, shown in Figure 1, was divided into four columns: tasks, prioritized tasks, in progress,

and complete. Each group had their own project board, which was presented to the students during the first meeting. They were given full write access to it, and the ability to edit it as they saw fit.

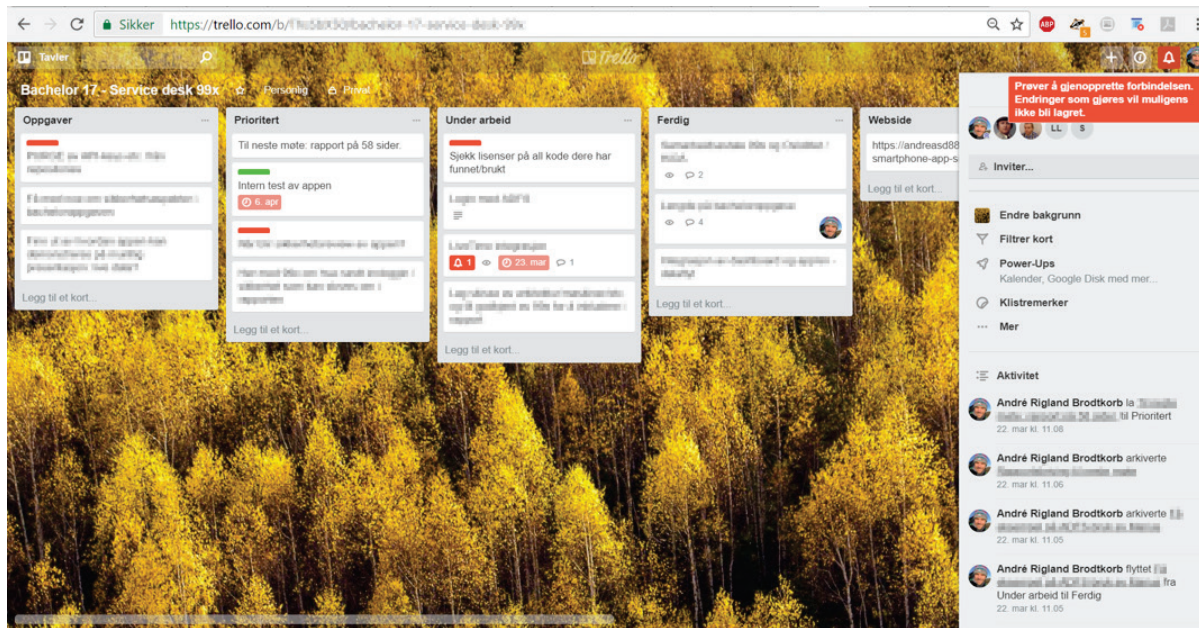


Figure 1: Trello planning board with the columns Tasks (oppgaver), prioritized tasks (prioritert), tasks in progress (under arbeid), and completed tasks (Ferdig).

2.1 Supervision meetings

A typical supervision meeting has been structured around the planning board, and would commence as follows:

- Informal and social chitchat about their progress, what they are working on, etc.
- Run-through of project board
- Prioritizing tasks until next meeting

The first informal chitchat has been a great tool to get a relaxed atmosphere. During this informal discussion we would add cards to the project board if something interesting comes up. The discussion is typically very unstructured and fluid and based around idea generation and problem solution.

The run-through of the project board then starts with the completed tasks. We would then discuss whether or not the card was in fact complete, and either archive it or move it back to ongoing work. The next item would be a discussion around the cards in progress. If a card would not complete within one or two weeks, we would have a more thorough discussion on it. A typical reason for a card to stay in progress for a long time is that the card is vaguely described or a too large task. We resolved such cards by archiving them and creating new more specific cards instead. We then discussed the cards remaining under prioritized tasks, which should have been worked on in the period prior to the week. The main reason for students to not start with a card in this column was often that other cards took all of their time. Finally, we ran through the cards in the tasks column to remind ourselves what the task was and remove it if it was no longer relevant.

After having discussed the cards on the board, we planned the next weeks work by moving cards from the tasks column to the prioritized tasks column. We here used ideas from Scrum, in which the student(s) and supervisor together discussed what to prioritize and how long each task may take to complete.

2.2 Experiences and evaluation

The students accepted the use of Trello as a supervision tool from the start and contributed to the project board. Some groups added their own columns such as “Questions for meeting” and “Ideas”, and were quite active users of the project board, whilst other groups used the board only during the supervision meetings. Structuring the supervision meetings around the project board has been an important step in keeping the project board updated as a useful tool. This forced us to remind ourselves of the full project

context every week, especially for the groups who did not touch the board outside of the supervision meetings.

It was surprising how little overhead there was in maintaining the Trello board, and it functioned very well with the supervision meeting setup. On average, each Trello board had 10-20 cards at any given time, and three new cards per week. This low number of cards is very manageable, and an important point to note. With too few cards on the board the tasks are typically too large (and not possible to complete within one week). With too many cards on the board, each card is too detailed and one loses the general overview of the whole project.

It was very nice to see how independent the students quickly became with using Trello, and it became a natural way to collaborate in the supervision process. It was also a huge benefit for the supervisor to transfer knowledge between groups: If an important point was made in the discussions with one group it could easily be transferred to other groups as a new card. It was also very easy to keep track of administrative tasks, such as deadlines etc. which were common to many groups. Tasks could also be assigned to the supervisor, such as giving feedback on text.

The most difficult part of using Trello for supervision is to create meaningful project card descriptions. For some cards, we could not remember what the original thought behind it was after as little as one week. These cards were then rewritten more clearly or discarded from the board.

A feedback from students with the use of Trello was that there was a feeling of reward when moving a card to “Completed”. This was especially noticeable with tasks that were often not associated with fun, such as writing.

3 SUMMARY

We have in this short paper presented our experiences with using tools from software development within a supervision setting. By using a project planning board called Trello it was possible for the author to keep track of 21 students spread over nine different projects with very little bureaucracy. The tool is free to use, easy to get started with, and was seen as helpful for students as well.

REFERENCES

- [1] Lars Göran Wallgren Tengberg. The agile approach with doctoral dissertation supervision. *International Education Studies*, 8(11):139, 2015.
- [2] Deshinta Arrova Dewi and Mohana Muniandy. The agility of agile methodology for teaching and learning activities. In *Software Engineering Conference (MySEC), 2014 8th Malaysian*, pages 255–259. IEEE, 2014.
- [3] Nicole Ray. Prioritize, plan, and maintain motivation with trello. *The Agricultural Education Magazine*, 88(6):16, 2016.
- [4] Mary Poppendieck and Tom Poppendieck. *Lean Software Development: An Agile Toolkit: An Agile Toolkit*. Addison-Wesley, 2003.
- [5] Yasuhiro Monden. *Toyota production system: an integrated approach to just-in-time*. Productivity Press, 2011.
- [6] Ken Schwaber. *Agile project management with Scrum*. Microsoft press, 2004.
- [7] David J Anderson. *Kanban: successful evolutionary change for your technology business*. Blue Hole Press, 2010.