From teaching assistants to learning assistants – lessons learned from learning assistant training at Excited

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ABSTRACT:

As enrollment in higher education increases, our courses grow larger and educators sometimes struggle to scale good pedagogy. In many cases, the use of learning assistants (LAs) is one way of keeping the educational design and quality of courses intact. The fact that LAs are students themselves is viewed as an essential aspect of their success, as they are closer to the students both socially and academically. LAs understand the curriculum in a similar way as the students and can perhaps draw from their own experiences in the course, not that long ago. On the other hand, they are still students, most often not studying or aiming to become teachers. Although being a good LA may fall naturally to some people, most students are in need of some training in the art of teaching. NTNU has recently made a LA training course mandatory for all new LAs. The whole course is 20 hours in total, where six of them are specific to the subject they are teaching.

This paper presents how we do the course specific training at the Department of Computer Science. We have approximately 500 LAs in action every year, and around 100-150 take the LA training course every semester. Instead of having the various lecturers run individual modules, we gather all LAs in seminars covering topics relevant to learning and teaching in the computing disciplines. We also discuss concrete ethical and pedagogical cases, as well as reflection on the role as a teacher. The paper also includes some reflections on the main challenges these LAs face in their practice as both teachers, facilitators, mentors, FAQ-bank and evaluators. Both feedback from LAs, students and lecturers have been very positive, and we wish to share how and why our system works with other educators.

KEY WORDS: Learning assistant training, formative assessment

1   INTRODUCTION AND BACKGROUND

The use of learning assistants (LAs) have a long history at the Department of Computer Science (IDI) at NTNU. LAs are generally students who are employed by the department to support faculty teachers in their various courses, and the task varies from course to course. Formerly, we have referred to them as student assistants or teaching assistants; however, the goal has always been for them to support students' learning. As this paper will describe, we have renewed our training program to ensure that the teaching assistants become learning assistants.

The use of LAs in higher education is common across the world and especially in courses with a large number of students and is seen as a good way to keep the quality of education high while supporting the teaching staff [4, 6, 8]. Previous research has shown that LAs can be an essential factor for student success [2], and institutions are increasingly reporting on initiatives and programs to solve that [1, 4, 9]. The main reason for the success of LAs was found to be that they can make it more comfortable for students to learn because they are closer in age and competency level than a professor [3, 12]. The fact that LAs are students who recently learned the materials themselves is valuable to a student, both pedagogically and socially. On the other hand, there is also evidence that shows that the LAs are poorly prepared for their role as instructors and have not received sufficient training [2, 11, 13]. LAs themselves also view training as a factor that helps them be better LAs [7].

As the number of students in courses at IDI has grown, so has the number of LAs. Currently, we employ nearly 500 LAs every semester, in almost all courses. In general, using LAs is seen as a valuable part of the educational organization at NTNU and an important part of ensuring the quality of students' learning [5, 14]. Overall our experiences with employing current students to help and support other students in

their learning have been very good. Both students and faculty praise the arraigment; however, there is always a need for more training and guidance. Since 2014 NTNU has offered a training course to all new LAs; however, it was based on LAs themselves volunteering to take the course. It was first in 2018 this course was made mandatory for all LAs.

At the IDI, we had 26 participants in the LA training course in the fall of 2017, 101, one in the spring 2018 and 174 in the fall of 2018. In other words, we saw a 400 % increase from one semester to the next. Although this increase had some organizational challenges, we saw the change as a big positive. By making the LA training course mandatory for all of NTNU, including our LAs, we got the opportunity to teach and train them. This paper presents how IDI implemented organizational and curricular changes to match the increase of participants over the last two years and the evaluations we have gathered. Before we get to that, an introduction to how and where we use LAs at IDI and a description of the whole LA training course organization.

2   THE ROLE OF LAS IN COMPUTING EDUCATION

IDI has nearly 3000 students enrolled in computing study programs, as well as running courses taken by 2000 students from all over NTNU. The high number of students in some courses requires a high number of LAs, as well as an effective organization. In our largest course, introduction to information technology (ITGK), there are 2800 students and 160 LAs organized in a hierarchy. For the remainder of this paper, this course will be used as an example, because it is so large it illustrates well all the ways LAs can be used. In Table I below, we have described how LAs are often organized by example from ITGK.

Table I. Overview of the LA hierarchy at IDI and in the example course ITGK.

Role	Description	Example: ITGK 2019
Teacher staff	Professors/associate professor(s) in charge of planning, teaching and assessing the course.	8 professors/associate professors were involved, teaching the course in six parallels.
Head LA(s) *Vitass*	Student(s) with a minimum of 180 ECTs and usually has experience from LA positions. In charge of implementing the assignments/projects, organizing the labs and exercise lectures. Can sometimes be PhD students. Employed in a 50% position.	4 master level students and 2 PhDs with at least two years of experience in the course.
"Teaching" LA(s) *Undass*	Student(s) with at least one year of experience as a LA. In charge of answering emails, publishing information, coordinating the labs, giving feedback, etc. Employed for 10 hours/week.	12 students with between 1-3 years of experience as LAs. Pairs of LAs were given specific responsibilities, such as managing Blackboard, checking and publishing assignments, tech support, lab organization, etc.
"Student" LA(s) *Studass*	Student(s) who have taken the course before. Usually they need to have received a C or higher. In charge of answering questions, assessing assignments/projects, manning the labs, etc. Employed for 6 hours/week.	114 students who each had the responsibility of 18-25 students. They are in the labs 6 hours every week. All students must have their assignments approved by their LA. These assignments do not count towards their grade.

It is important to note that other smaller courses use LAs in similar manner but for different types of activities and roles. In Table II, the various learning activities used at IDI and the different roles of the

LAs are described. Sometimes, the LAs have two roles, for instance, helping students as well as grading assignments. Juggling these roles is a very common challenge for many LAs.

Table II. Overview of learning activities and roles of LAs

Type of activities	Assignments		Open/closed labs	Projects	
Role of LA	Pass/fail assignments	Give feedback	Facilitate activities	Evaluate	"Playing" a stakeholder
	Help and support students learning				

3   THE LA TRAINING PROGRAM

The general Learning Assistant Training course at NTNU is commonly referred to as LAOS and is led by the Educational Development Unit [10]; however, the various departments are required to offer a part of the training. In total, the training amounts to 20 hours and is divided into the following modules:

- Core modules (8 hours). Run by Educational Development Unit.
- Online modules (6 hours). Run by Educational Development Unit via Blackboard.
- Course specific modules (6 hours). Run by the department or course coordinator.

In the core and online modules, students from all different departments and disciplines are mixed together and learn about general pedagogical and practical aspects of being a LA. The course specific modules on the other side are different from department to department and course to course. In most instances, these are run by the course coordinators. However, some departments, such as IDI and the Department of Mathematics, have chosen to run one centralized course specific module for all LAs at the department. In our case, this decision was based on the fact that with so many LAs and courses, the most effective way to teach all of them was by centralizing the course.

Throughout LAOS, there is a 100% attendance requirement. Meaning students must attend all lectures and participate in all online activities. In order to facilitate the many different schedules, most lectures are run at least twice. The LAs are paid additionally for hours spent on the course.

3.1   Course specific modules at IDI

Starting up during the spring semester of 2018, the course specific modules offered at IDI have been adjusted and revised to become a fine-tuned educational module. The main challenge of offering this module was keeping the content course specific enough for the LAs to gain concrete knowledge for their practice, and at the same time, ensure that it was broad enough for all LAs to see the relevance. Looking at feedback through the years, the LAs have requested more specific training towards their individual jobs. With these aspects in mind, the course specific modules at IDI were designed with the following goals:

- Give all LAs knowledge about pedagogical and didactical challenges and possibilities within computing education.
- Give all LAs an introduction to main themes within the research on computing education.
- Give all LAs some practical tools to use when meeting the students.
- Give all LAs space to reflect on and improve their practice as LAs.

The course specific module at IDI consists of three parts; two separate workshops and a home assignment. The first workshop introduces pedagogical perspectives and tools for the LAs to take with them in the home assignment. In the home assignments, LAs write about their experiences as a student and reflect on their practice as a LA. In the second workshop, which is held after the assignments are due, we focus on these reflections, share experiences and answer challenging questions.

3.1.1 Workshop 1

During the first workshop, we spend most of the time on lectures and discussions. The main topics covered are:

- **How to be a good LA for computing students:** what characterizes the students in our courses, the importance of considering the difficulties of learning something new and the fact that some students might need more help and support than others (including yourself), how to juggle the different roles as a LA.
- **Pedagogical tools for programming assignments:** how to give good feedback, tips to debugging code and how to help students find solutions and improve their problem solving skills.
- **Common misconceptions and how to deal with them:** presentation of important theoretical and empirical research findings relevant to LAs in computing and programming courses.

The workshop lasts for two hours in total and consists of both passive and active elements. The facilitator will present a topic or tool, followed by some sort of activity. Some of these activities are described further in Table III below.

Table III Description of activities used in Workshop 1

Activity	Description
The yes-no game	The LAs are asked a yes or no question about a topic (can also be agree/disagree). Firstly, all are asked to answer individually by showing a thumbs up/down or using a digital tool such as Menti or Kahoot. Afterward, they discuss with a partner, and the team must reach an agreement before a second vote. An example of such a statement is "Pineapple on pizza is delicious." Statements should be designed with no clear answer; in this case, stereotypes and misconceptions about IT and computing were explored.
Spontaneous feedback session	The LAs are shown a typical student assignment and are given the task of giving feedback using tools from the lecture on feedback. They discuss in teams and share with the whole class. In this case, they were shown a snapshot of some computer code. The main goal of this activity is to practice giving feedback, but also making the point that giving feedback to unknown work spontaneous is challenging. Especially when the assignment and context are unknown. However, giving good and useful feedback is still possible!
Ethical dilemmas	The LAs are presented with some ethical dilemmas from "the real world." They discuss in groups and share their conclusions in plenary. These situations should be illustrative of problems the LAs face, and the instructor should make sure that if LAs have solved dilemmas differently than the class concludes, that is also OK. An example of a dilemma is how to handle students asking LAs for help or support in random settings, i.e., at parties. Or how to handle queuing, should some students be given more time than others?

3.1.2 Home assignment

The home assignments consist of two essay questions where the students are challenged to reflect and confront their own or existing practices. The students are encouraged to use what they learned in Workshop 1 to enlighten their reflections. The two questions are as follows:

1. If you could improve one thing in your course, what would it be and why? In this assignment, you can feel free to think big or focus on one detail. It does not have to be realistic to implement but should be thoroughly explained.
2. Describe an interesting situation or interaction you have experienced as a learning assistant. It can be something you fond challenging, an ethical dilemma, or just something that has been on

your mind. Reflect on how you handled the situation. What did you do well? What would you have done differently? Is there something you would like feedback on, or questions you have?

The students are free to write this assignment in their own time, but the expected workload is 1-2 hours. They are given at least one week to finish and deliver. The experiences so far are that students are very open and willing to share in these essays. It is always interesting to read their reflections and experiences. We have not been able to give each student individual feedback on their essay, but as will be described in the next section, general feedback is given to everyone as a whole. We have made sure to inform all LAs that if there are situations described that need further attention, they will be notified, but this has so far never happened. In addition, LAs are welcomed, so follow up with the instructor after Workshop 2 if they still have unanswered questions.

3.1.3 Workshop 2

The overall theme of the workshop is "how to improve your practice as a LA," and the whole session is based on the LAs home assignment. Before the workshop, the instructor reads through the assignments and decides on 5-7 main topics to discuss. Usually, there are similar themes every semester, so this task becomes increasingly less time consuming over time. It is essential to do this preparation well because every LA should be able to see their reflections being addressed at some point.

With these topics prepared, the workshop is facilitated based on the "World café" method[1]. Tables or areas are set up with papers, pens and post-its, as well as a description of the topic with some example questions to answer. The topics are all presented with a run-through of the plan:

- **Chose a topic:** No group should be more than five LAs per group.
- **Round 1:** Say hello to you group. Spend five minutes individually, making notes on the related topic. Go around the whole group and share notes. Discuss thereafter and land on three main points you want to make.
- **Choose a new topic:** Leave the three main points where they are and choose a different topic and group.
- **Round 2:** Say hello to you group. Spend five minutes individually, reading the three main points from the previous group and making your own notes on the topic. Go around the whole group and share notes. Discuss thereafter and land on three main points you want to make.
- **Plenary session:** Go through each topic and let the groups present the 3-6 main points from the discussion. Give everyone a chance to comment or disagree. Also, it is a good idea to make some notes ahead of the most important points you think should be made. Very often, the students will come to the same conclusions as you, but it is a good idea to point it out if they are missing something. And make sure to confirm their points and reassure them that their discussions were good.

If there are a lot of participants, there can be several groups on the same topic. For example, if you have 80 participants and 7 topics, make two groups per topic. Also, this can be done in non-flat auditoriums. It might not be ideal (or comfortable), but the students have not complained that much so far.

4   EVALUATIONS AND FEEDBACK

The feedback from the course specific modules at IDI is generally very positive. At the end of Workshop 2, the LAs are all asked to fill out an evaluation survey. These results show that in general, the course specific modules are seen as a lot more useful than the core- and optional modules. The home assignment is also seen as more useful; however, not by that much. These results are shown in Fig. 1.

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[1] *More about the World Cafe method here:* https://en.wikipedia.org/wiki/World_caf%C3%A9
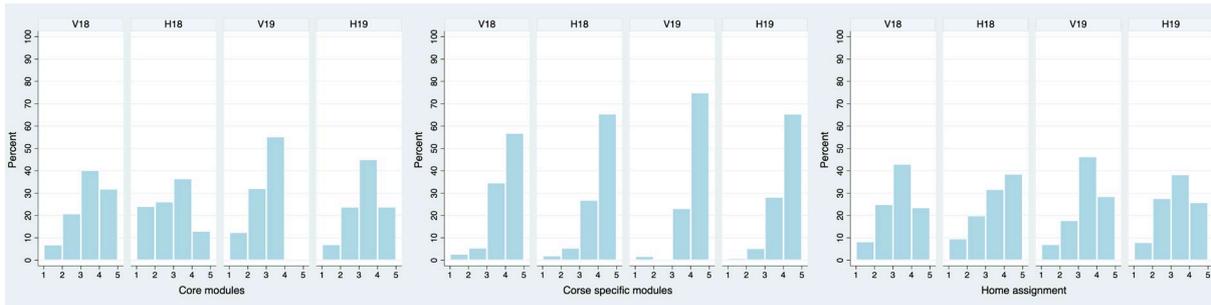
Fig. 1: Histograms showing LAs response to how useful they found the various models. 1 being "Not very useful," and 5 begin "Very useful."

Considering the topics covered in the various modules, it is perhaps not surprising that the more specific modules are seen as more useful. However, when asked about what they would like more of in the LA training program, even more specific training towards the course they are employed in, is popular. As summarized in Fig. 2 more presentations of relevant research and training in techniques and methods are also requested.
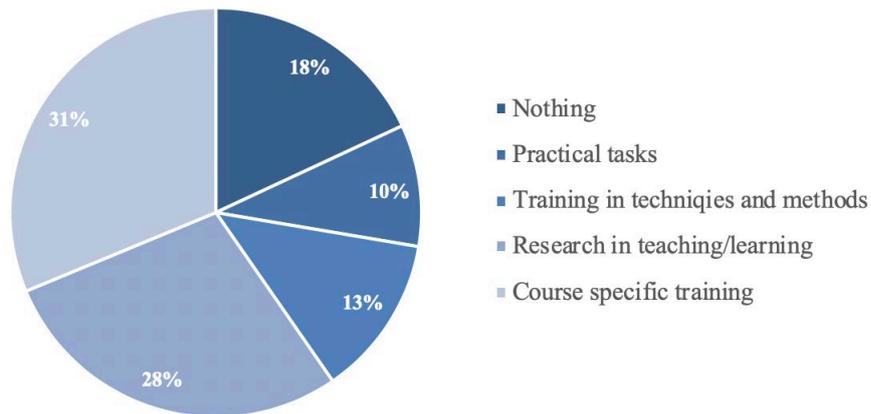

Fig. 2: Overview of what LAs requested more of in the course specific modules at IDI.

The last question was an open text box. As usual, with open text answers, the responses here were mixed. Some viewed the whole training program as a waste of time; however, most LAs were positive to the course, or at least parts of it. In line with the quantitative questions, the course specific modules were highlighted as more useful for their practice as LAs. It seems like the more specific such a course can be, the more useful the LAs will find it. On the other hand, one could argue that the LAs will not always see the potential in the material until later in their "careers" as LAs. In addition, a common critique was that the timing of the course was too late. The whole LAOS course takes almost the whole semester to complete, so by the time the LAs are finished, they are also at the end of their contracts. Again, their careers as LAs, learners and teachers are not necessarily over at the end of the semester, and this course gives them competencies that will become useful later in life and employment for sure.

5   CONCLUDING REMARKS

When creating a training program for LAs at IDI, we have aimed for a practical and active design, with room for reflections and discussions. Having run this course four times, it is clear to me that being a LA means being everything from a teacher, facilitator, mentor, FAQ-bank, evaluator to a student. These LAs are genuinely interested in doing a good job and enjoy helping their friends and peers learn.

It is understandable that some of the topics covered in LAOS will not seem useful to LAs who have not encountered that specific problem, or worked in that context; however, they might come in the future. Becoming a good teacher or LA is a process that requires experience. It takes time and learning from lots of mistakes to become a confident LA equipped with the skills to handle any situations, and I would argue that a LA is never fully trained. There is always more to learn.

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