AC 2011-2569: THE DEVELOPMENT OF A TEACHING ASSISTANT TRAINING PROGRAM IN APPLIED SCIENCE: DESIGN AND IMPLEMENTATION

Faizal Karim, UBC Faculty of Applied Science

The Development of a Teaching Assistant Training Program in Applied Science: Design and Implementation

Introduction

Teaching Assistants (TAs) make an important contribution to teaching and learning at the university while they develop competencies and skills relevant to their professional lives. In recognition of this, the Faculty of Applied Science (APSC) has committed itself to providing an educational program specifically addressing TAs needs. It is also recognized that in APSC, TAs have a broad range of cultural diversity, which includes varying learning styles and language/communications competencies. Furthermore, it is understood that any training provided as part of this proposal will assist TAs in understanding some of these topics (or in becoming aware of them) but may not be sufficient to meet some of the TAs training needs. Thus, part of the training makes TAs aware of campus resources that are available to support them in their roles as TAs and as students.

The training program consists of two three hour sessions with approximately 20 TAs being trained per session. The training was part of the TAs employment contract for all new TAs and is offered during the first months of the fall and winter term.

Program Development and Core Modules

The program was developed iteratively with several meetings between faculty members, academic growth professionals, and graduate students. The diverse group from various disciplines helped identify core areas specific to APSC that needed to be addressed. These core competencies have come to include:

1. Understanding of the TA instructor relationship.
2. Understanding of the TA student relationship.
3. Fair, efficient and effective marking strategies.
4. Effective Laboratory\Tutorial development, presentations and time management skills.
5. Professional expectations and acceptable conduct (TA, Instructor and students).
6. Philosophy and culture of how things work at the departmental, university, and national level
7. Safety culture and expectations.
8. Awareness and understanding of how to include consideration of diversity, equity, cultural and intercultural challenges for learners and teachers in the classroom/laboratory.

From these main objectives, the training was split into two 3-hour modules, Module 1: TA-Instructor, TA-Student; Module 2: Teaching, Marking. A schematic of this system is shown in Figure 1. Here the modules and some of the goals are highlighted. Also highlighted is the interconnection between many of the themes that run throughout the training, such as establishing a clear role with the instructor to aid in the development of a rubric or particular lesson strategy.

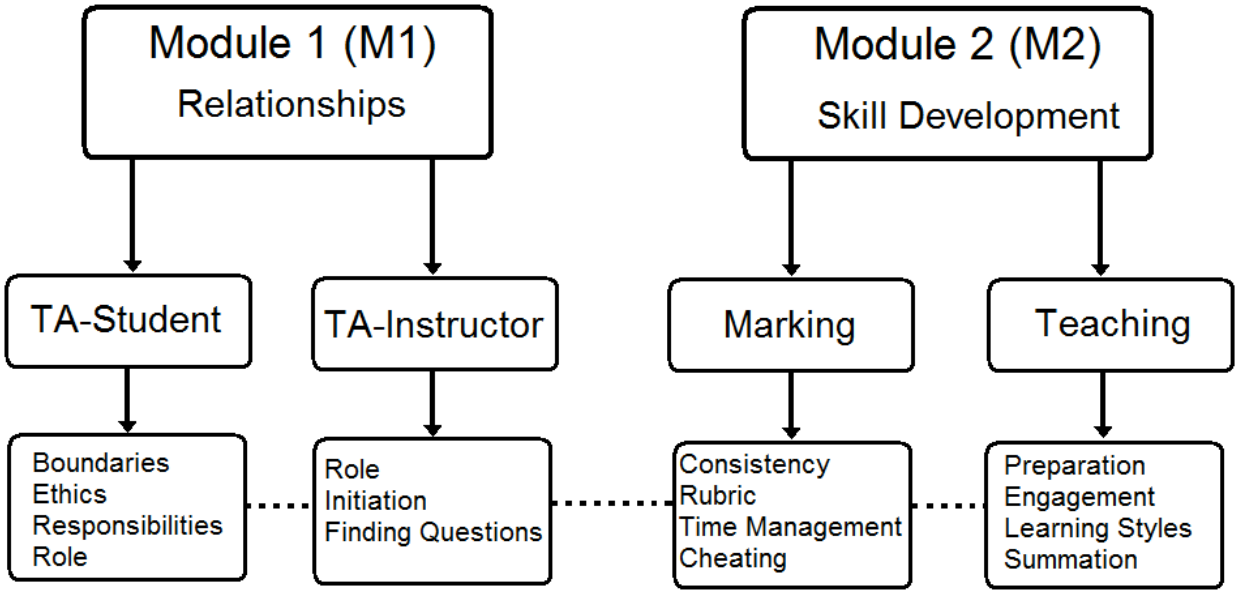

Figure 1. Schematic of the two TA training modules (M1 and M2)

The training model used was based on a train-the-trainer approach. Professional academic growth personnel assisted throughout the process and trained six graduate student TAs to deliver the training to the larger body of TAs. Generally, two TA-trainers facilitate each module.

The modules are scenario based with scenarios brought to the group by the senior TAs facilitating the sections. The intent of the sessions was for the TAs taking the training to arrive at the answers with assistance from the facilitators. This method encouraged discussion and sharing of experiences while learning the material. The room was also arranged to facilitate discussion among smaller groups and the TA trainees are asked to move locations between sessions to meet fellow trainees. A schematic of this setup is shown in Figure 2.

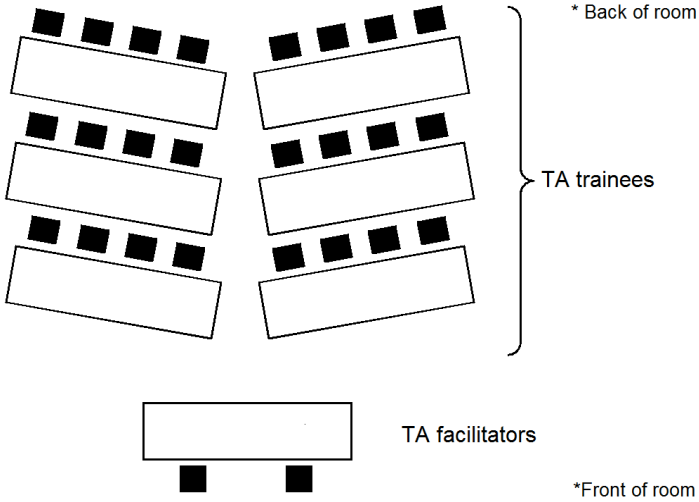

Figure 2. Schematic of room to facilitate group discussion

Each section follows the same basic lesson plan, which is discussed in the section on teaching/presenting. The four core areas within M1 and M2 are described below along with a summative table highlighting the key components in the facilitator's lesson plan.

TA-Instructor Relationship: In many cases, while the number of hours for which the TA has to commit to the course is provided, how those hours will be spent is not. And often, since this topic has not been discussed, TAs find themselves working many more hours than required at the request of the instructor, and the TA is either unable or unsure how to say no. This problem can be resolved by having a brief meeting with the course instructor prior to the course beginning. The facilitators propose techniques on how to initiate that discussion with the instructor, talk about what questions to ask, and how to conduct the meeting so that the TA can obtain all of the needed answers. The facilitators also discuss how to leverage this initial meeting when asked to work hours above what you are required to do.

The session achieves its goals with two role-playing scenarios where the facilitators act the role of an instructor and a new TA. In the first scenario, the student comes unprepared and meets a busy professor. The student leaves learning very little about his/her responsibilities. In the second scenario, the student has made an appointment and comes with a checklist of relevant questions. The student is then able to clearly define the goals and expectations of the instructor. After discussing the differences, strengths, and weaknesses of the two scenarios, a general checklist is passed out to the current TAs and time is given for them to identify any areas of uncertainty in their own TA appointment.

Table 1. Facilitator's lesson plan for the TA-instructor relationship

Topic	Procedure	Approximate Time
Objectives	• Identify main questions to ask to understand your role as a TA • Know how to handle requests that fall outside of your duties	--
Bridge (relevance)	• Link the role of the TA to the role of any employee • In any relationship, personality plays a role	5
Pre-Assessment	• Who has been a TA (at this institution or elsewhere)? • What was that experience like?	5
Engaging the group	*Simulation #1*: facilitators role-play TA & instructor; instructor is brief/dismissive *Debrief #1*: ask 'What happened here?' and 'What could be different' *Simulation #2*: facilitators role-play TA & instructor; with set meeting time and a checklist of questions, the TA engages the instructor and learns relevant info about his/her responsibilities *Debrief #2*: ask "How was this situation different from the previous?" Highlight the pros/cons and what relevant questions a TA should ask *TA trainee participation*: Pass out a sample checklist and allow the TA trainees to consider what questions they need to ask their instructor or find areas where more info may be needed for a complete understanding of the TAship.	5 10 5 10 10
Closing	• Put the learning back in context: reinforce key points (keep track of hours, identify responsibilities at the beginning of the appointment, identify potential problems and address them early in the appointment)	5

TA-Student Relationship: In this section the facilitators talk about the roles, responsibilities, boundaries and ethics of being a TA and how they pertain to their relationship with the student. During this section, groups are split into small teams that look at various scenarios that could present themselves while being a TA. The three scenarios deal with a TA who is being overworked during office hours and via emailed questions, a student offering a bribe, and team members not working well together. There are generally six groups, so two groups discuss each scenario. Each group records their thoughts on large sheets of paper, which are then attached to the wall. One group explains their solution, and the rest of the TAs being trained are asked to discuss the advantages and disadvantages of the particular solutions. Then, the second group presents their solution and a similar discussion ensues.

The goal of the facilitators is to encourage discussion and continue to change the scope of the discussion. Several "what if" questions are asked to expand the topic, such as "what if the group is not functioning well because a student has a personal problem instead of just being a lazy student?". This has been very effective in producing good group discussion and debates. It also highlights the notion that being a TA in these situations is often ambiguous so one should be fair, consistent, and transparent. It is often mentioned that consultation with a professor is needed to reduce the responsibility of the TA in these situations.

Table 2. Facilitator's lesson plan for the TA-student relationship

Topic	Procedure	Approximate Time
Objectives	• Set boundaries/expectations early in the course • Know what is and what is not a TA's responsibility	--
Bridge (relevance)	• TA is a link between the professor and student • Life-skill connection: have to be able to effectively manage subordinates and work with others	5
Pre-Assessment	• Trainers/trainees discuss previous experience with students • As a student, what leads to good vs. bad experiences?	5
Engaging the group	*Setup*: Break into 6 groups and pass out 3 scenarios (each scenario used twice) Scenarios: 1. TA overworked during office hrs 2. A student offering a bribe 3. Team members not working well together *Group work*: Have each group discuss/write down solutions to the scenario and post them on the wall (large enough for all to see) *Group discussion 1*: 1. Have one group read scenario 1 and give some of their main points 2. Have the group discuss the proposed solutions 3. Have the second group add any of their major points 4. Again open to group discussion for additional solutions or a discussion of proposed solutions 5. Repeat this general scheme for the remaining scenarios *Group discussion 2* : Pull out major themes of the previous discussion. Determine what general actions can be taken to handle/prevent these situations.	5 15 25 15
Closing	• Reinforce the importance of managing expectations as a TA and	5

	setting boundaries early. • If a problem is encountered, document it, ask for help if needed (from other TAs or instructor), or guide students to other resources.	

Teaching/Presenting: In some cases, TAs may have to deliver a tutorial or a lecture, and many new TAs have not been in that position before. The facilitators discuss the various learning styles of students in a general manner and how to prepare a lesson plan in order to maximize the learning and effectiveness of the TA. Again, smaller teams (4-5 TAs) are formed, and each team prepares a lecture (or tutorial) on a fairly simple topic. These topics are on the level of explaining the difference between series and parallel resistance or explaining static and dynamic friction. These simple topics allow the TAs to focus on the lesson plan and not the subject.

Each team is given a handout that describes one basic mechanism for developing a lesson plan. The main topics include: identifying the objectives, establishing relevance, giving a pre-assessment, engaging the group, and closing. It should be noted that the facilitators in each module use the same structure (Tables 1-4 of this paper also use this structure). After each team is done, they present their lesson plan and the facilitators discuss the various aspects of the lesson plan with the entire group. Specifically, the discussion centers around how well the groups addressed the main topics of the lesson plan (i.e identifying the objectives etc).

The facilitators also aim to ensure the TAs know this lesson plan system is not the only way to effectively design a tutorial, and often the lesson plan needs to be adapted for specific situations. The suggested lesson plan thus serves as a baseline for a new TA who does not have a clear idea about developing the lecture/tutorial.

Table 3. Facilitator's lesson plan for teaching/presenting

Topic	Procedure	Approximate Time
Objectives	• Explain and apply a framework for organizing lesson content • List key points for effective delivery	--
Bridge (relevance)	• This session applies to communicating in any setting (tutorial, lab, meeting, conference presentation etc)	5
Pre-Assessment	• Ask: "Who has taught in a classroom setting" • Ask: "How do you decide what and how to teach a lesson?" o Identify systems already in place	5
Engaging the group	*Setup*: Break into groups of 4 and provide each group with large paper for recording answers to share with the entire group. Sample lesson plan topics (simple engineering concepts): 1. Difference between series/parallel resistance 2. Relationship between force and distance in moments 3. Difference between static and dynamic friction *Group work*: Have each group use the framework to build a lesson plan (this is the same framework as the one used in this table). *Group discussion* : The groups should look at all of the proposed lesson plans and discuss the pros/cons. Typical discussions include: 1. How are the framework's main components addressed? 2. Why were specific approaches taken?	5 15 25

Closing	• When asked to present, a structure with prompts can help organize thoughts. • Be clear about what the audience needs to know and how the audience is most likely to gain that knowledge. • Handouts on delivery.	5

Marking: Marking tends to be the most tedious and time-consuming part of TAing. It can also be the most controversial part of a TAs job and often results in the bulk of the complaints. The goal of this section is to offer various techniques on how to mark consistently and efficiently, while at the same time being fair. The TAs are split into pairs, and they are provided with 2 lab reports (one is very well presented, but has poor results, the other is very poorly presented, but has good results). Each pair is polled afterwards to see how they marked the lab reports and discuss why they gave the marks they did. This discussion establishes the basis and relevance for marking schemes and rubrics. The facilitators point out that in scoring each report the groups have effectively created their own rubric, which can change with different requirements from the instructor. By knowing how points are given for an assignment, the TA can consistently and efficiently mark.

Finally, the pairs are given a third lab report that is nearly identical to one of the previous reports, and they mark that one as well. The TAs often notice the similarities but others will implement the aforementioned marking rubric, which leads into a discussion about cheating. Again, the importance of discussing the rubric and cheating with the instructor is highlighted by the facilitators.

Table 4. Facilitator's lesson plan for marking

Topic	Procedure	Approximate Time
Objectives	• Construct a basic rubric for marking • Identify how to handle issues that arise while marking and the TA's responsibilities in these situations	--
Bridge (relevance)	• Marking is where much of TA's time is spent • Need to be fair and consistent; applies to any type of feedback	5
Pre-Assessment	• Ask: "Who has marked and who has used a rubric?" • Ask: "What difficulties have been encountered when marking"	5
Engaging the group	*Setup*: Break into groups of 2 or 3 and pass out a) an assignment for a simple lab report b) completed lab report from Student A and Student B *Group work # 1*: Have the students mark each report on a scale of 0-10 *Group survey # 1*: Poll the number of TAs who marked the reports in the range of 0-3, 4-7, and 8-10 for Student A and Student B. *Group discussion # 1*: Ask "What are the marks based on?" Note that the construction of standards is the basis of a rubric. Ask "What criteria and standards did groups use in evaluation?" *Group work # 2*: Pass out the report from Student C (this solution is very similar to Student B's). Ask the TAs to mark this report using the rubric. *Group survey # 2*: Poll the number of TAs who marked the report in the range of 0-3, 4-7, and 8-10 for Student C.	5 10 5 15 5 10

	Group discussion # 2: Debate the possibility of cheating with Student B and Student C. Discuss the role of the TA is this situation highlighting the ambiguity in this situation.	15
Closing	• Rubrics allow the TA to be consistent and fair Discuss with the instructor how to handle issues such as cheating at the onset of the course. • Handouts on other rubrics.	5

Additional resources for TAs

It is understood that this training course cannot cover all aspects of being a TA. There are times when a TA needs additional resources, so a handout is provided with the contact information and goals of several resources on campus. These include:

- Teaching Assistant's Union
- Counseling Services
- Equity Office
- Office of the Ombudsperson
- International House
- Writing Centre
- Centre for Intercultural Communications
- Disability Resource Centre
- Graduate Student Society

Implementation and Assessment

This TA training program was firstly implemented for the academic year 2009/2010 and required that all TAs (new and returning) participate and be paid for attending as part of the job duties. This led to 194 engineering students taking the training in Term I and 49 engineering students taking the training in Term II (Term II numbers were lower due to fewer new TAs being appointed in that term). In total, of the ~ 250 TAs that attended the sessions 75% had already been a TA at the university before. At the conclusion of each module, TAs were asked to fill out a feedback form to help us quantify the effectiveness of the training program. Table 5 summarizes the feedback received from those TAs who took the training in Term I. It should be noted that not all TAs filled out the feedback forms (about 175 filled out the forms), and not all forms were filled out completely. Feedback collected during the training was quite positive with 23% of the students finding the training "very useful" and 70% finding it "somewhat useful". The feedback received in Term II was even more positive, as 100% of the trainees found the program to be *at least* somewhat useful and felt *at least* somewhat more prepared. The results from Term II were consistent with the feedback received from the new TAs who took the training in Term I, which was expected since 95% of the participants in Term II were new TAs.

Most TAs liked the materials provided to them during the training, saying that they "might" or "will probably" use them. The following are the responses to two questions that were also asked on the feedback form. Next to each statement is the number of TAs who felt that answer best described their thoughts/feelings about the training:

Table 5. Quantitative feedback on the effectiveness of the training: new vs. returning TAs

	Question/Responses	# of students	% of students
1	How useful was the training?		
1.a	Very useful	61	22.5%
1.b	Somewhat useful	189	69.7%
1.c	Not useful at all	21	7.7%
2	Returning TAs: After taking this training, how prepared do you feel to be a TA?		
2.a	I feel more prepared	45	15.9%
2.b	Somewhat more prepared	189	66.8%
2.c	I don't feel any different	49	17.3%
3	New TAs: After taking this training, how prepared do you feel to be a TA?		
3.a	I feel more prepared	11	28.9%
3.b	Somewhat more prepared	27	71.1%
3.c	I don't feel any different	0	0.0%

Upon implementation, all students, new and experienced, had to complete the training. However, training new TAs vs. someone who has been a TA previously is a different task. Since the modules rely so much on discussion, it was easier to implement the modules to an experienced group. Several people in the group could call upon past experience to provide specific examples of many of the topics covered in the modules. This environment was likely the most beneficial for new TAs, as discussion could freely flow from the facilitators, to the experienced TAs, to the new TAs. Once the experienced TAs had taken the course, the remaining sessions were comprised of nearly all new TAs. At times, the lack of experience in the room stifled discussion. With no experience to draw on, the new TAs often waited for the facilitators to provide "an answer". Thus, it took practice, patience, and effort on the part of the facilitators to effectively keep a group discussion and avoid 'lecturing' to the new TAs.

In order to reflect university strategic priorities addressing intercultural understanding, diversity and equity, TA training programs were expected to explore various strategies to prepare TAs to work in culturally and socially diverse classrooms. This mandate is met in the program by introducing these topics in the discussions and having the trainees approach various scenarios from different cultural perspectives other than their own. This tends to lead to discussions about the various cultural and social hurdles that exist in our diverse classrooms. Generally, these conversations work better during the TA-Student Module. This result is likely due to the trainees being able to more readily/easily identify with the issues.

At the conclusion of the 2010 Term I TA Training sessions, in lieu of feedback forms, we inaugurated a "roundtable" feedback session for which we invited TAs who had recently taken the TA training to discuss the effectiveness of the training program. This form of feedback is more useful since the TAs who participate in this roundtable discussion have now had the opportunity to put in practice the topics discussed in the training program.

Most TAs enjoyed the group discussion aspect of the training, with many feeling that it was the strongest part of the program. In particular, the TAs enjoyed the scenarios from the TA-Student relationship session, adding that discussing `real-life' situations was quite instructive. There was also a lot of positive feedback about the checklist to help guide the initial discussion with the course instructor. The TA-Instructor relationship session was generally met with positive reviews; however, given that the training was offered after TAs had already accepted their jobs,

many felt the timing of it was inappropriate. There was also positive feedback for the marking session, in particular, how to create and implement a marking rubric. In fact, many felt more time should have been spent on the creating and using of a rubric. A number of the TAs also suggested re-ordering the session to discuss rubrics first and then do the marking activity. Presenting it the other way around (as presented in Table 4) did not allow for the TAs to try and use a rubric when marking the sample lab reports.

A number of the TAs also suggested that we have a professional (i.e. a teaching/academic growth professional) run the sessions. Additionally, many of them felt that having a faculty member present could have improved the overall quality of the training modules. Lastly, some TAs would have liked to have a union representative available to discuss some of the union roles and responsibilities.

There was also constructive criticism offered through the feedback. Many TAs felt that most of the material was “common sense" and could easily have been condensed into a number of documents. Others felt that the bulk of this material could be “easily learned on the job" and that these mandatory sessions were not needed. Some also felt it was too long.

It was widely suggested that the number of scenarios discussed in the training should be increased. Many felt that this led to the bulk of the group discussion, which was a highly praised aspect of the training program. Moreover, many TAs suggested that the TA-Instructor session be modified such that it took the same form as the scenario-based TA-Student relationship session. A lot of the TAs would have liked more information on departmental policies, guidelines and code of conduct/ethics. Additionally, offering documents (or web links) detailing UBC's policies for professional conduct etc was suggested. There was not much material the TAs would remove; however, many felt that the “Teaching" session was of no use and should not be included.

Conclusions

A teaching assistant training program was developed to address core issues identified by the Faculty of Applied Science. The content was developed in consultation with academic growth professionals, professors, and graduate student teaching assistants in various engineering disciplines. The program is mandatory during a student’s first teaching assistantship appointment and students are paid for a total of six hours of training. Senior TAs deliver the training to the larger body of TAs. The six hours of training are split into two three-hour modules. The modules are run by the facilitators through five general steps: identifying the module’s objectives, establishing the relevance of the module, assessing what ideas and experiences the group has already had, engaging the group, and closing. The engagement is the main task and here the facilitators use open-ended scenarios, role-playing, and group activities to explain and explore the concepts of each module. It is found that the most successful modules are the ones in which the trainees do much of the discussion after being prompted by pertinent questions/comments from the facilitators. The effectiveness of the program was assessed through facilitator de-briefing sessions after each training module and solicitation of feedback from the TAs receiving training. In 2009 there were 243 students trained, and it is anticipated that 200 students will

complete the program in 2010/2011. In general, the feedback has been very positive, with most students finding use in the training program.