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Working Effectively with Teaching Assistants

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Abstract

New engineering faculty usually have the opportunity to work with teaching assistants. How can they make effective use of them? This paper presents a list of tasks TAs might perform, comments on what these duties entail, and discusses how one might structure meetings with one's TA. It is useful to formalize the instructor/TA relationship with a contract. Examples of contracts are presented.

1. Introduction

Although virtually unknown in liberal-arts colleges, teaching assistants¹ (TAs) are a fixture of most engineering programs, where class sizes are large and the subject matter is technologically complex. Usually, teaching assistants are assigned to instructors to assist with a particular course section. Sometimes TAs are paid hourly, but more often, they are on a monthly stipend for ten or twenty hours' work per week. It is difficult for a beginning instructor to know how to make effective use of that time until (s)he has taught a class several times.

Much has been written about teaching assistants at the ASEE Annual Conference [1–6] and elsewhere [7–9]. Most of it, however, has focused on programs for training TAs and on studies of TAs' attitudes and behavior. The author could not find a single paper devoted primarily to how to manage TAs, although McNeill et al. [10] provide data on tasks TAs are actually assigned to perform, and Reges [11] explains how to organize undergraduate TAs and lab assistants to provide comprehensive support to large introductory courses.

To gather data for this paper, the author solicited ideas from members of three mailing lists: the Engineering Technology listserv, etd-1@listproc.tamu.edu, serving ASEE's Engineering Technology division; the SIGCSE members list, SIGCSE-members@LISTSERV.ACM.ORG, serving the Special Interest Group on Computer Science Education of the Association for Computing Machinery; and the listserv of the Professional & Organization Development Network in Higher Education, POD@listserv.nd.edu, the professional organization for faculty development experts. More than 25 individuals shared ideas. Occasionally the online contact was followed up with a phone call.

Often, teaching assistants are assigned by the faculty member's department. Whoever assigns them may solicit recommendations from the faculty teaching the course. Sometimes the instructor is given a budget and allowed to hire any qualified student. In this case, it is a good idea to hire a student who has taken the course in the last year or two, preferably from the same instructor. This is because the students in the class can better build their confidence by contact

¹ At many schools, teaching assistants are routinely called "GTAs" for "graduate teaching assistants." Since the material described in this paper applies to undergraduate TAs as well, I have opted to use the abbreviation for the more general term.

with someone “like them” who has recently mastered the material. When they see the instructor presenting the material, they may think, No wonder he understands it ... he has a Ph.D.! Or, if the TA is an international graduate student, they assume, All international students are good at science. But if they see another undergraduate who can explain the work to them, they realize, Hey, if she can do the problem, so can I! Such a TA is a “peer model,” and peer models are effective in promoting “self-efficacy,” the belief that, by performing in a certain manner, one can achieve certain goals.

There is also an advantage to hiring the best student you can find who has taken the course from you. This is because that student understands the material as you have taught it, and thus is better able to answer student questions on your lectures and assignments. As a TA, (s)he is also qualified to grade papers; if the student’s work is up to the TA’s standards, then it receives an A; otherwise it receives a lesser grade.

If your department hires the TAs, then you should try to make recommendations on which of them would be good matches for your class. If you’ve taught the class before, you will have a good idea of whom to recommend. Otherwise, seek recommendations from other instructors who have taught the same class. In a large department, the person assigning TAs will not be familiar with the strengths of all of them. Certainly that person will not be able to distinguish between the students who earned the highest and lowest A in the class. Moreover, assignments from a fixed pool of TAs tend to be badly overconstrained; that is, there is no way to give each instructor his or her first choice. By having a good idea of the capabilities of multiple prospective TAs, you give yourself a better chance of obtaining a competent TA.

In the worst case, the TA assigned for you may not possess the competencies required to assist with the course. In that case, you should immediately bring that to the attention of the department and request authority, if necessary, to hire someone outside the pool. If the course is online, it may be possible for the TA to acquire the necessary skills by “taking” the course two or three weeks ahead of the class (s)he is TAing, but in face-to-face teaching, there seems to be no way for the TA to “come up to speed.”

Another option, at least in some departments, is to give course credit (rather than pay) for performing some TA functions. Projects like this are typically structured for independent-study credit [12], with duties and deliverables that are very similar to the TA contracts discussed in Section 4.

The first time that you teach a particular course, your TA can provide continuity. The TA will know the material that the previous instructor has covered, and can recommend problems, etc., to assign for homework. Continuity is important in a class taught by multiple instructors, because it assures that students will cover the prerequisites for future courses.

2. Duties of a teaching assistant

The instructors responding to the listserv posts mentioned many different tasks that TAs could perform. The list provided in Table 1 can be used as a checklist to identify duties that may be appropriate to your class. Obviously not all of these duties will be required in any one class, and no TA would have time to perform *all* of them (and indeed, if (s)he did, you would not have

much left to do!). But you should make good use of the TA hours you are allotted.

While most of the items in the table are self-explanatory, a few comments are in order. When choosing homework problems, the TA can help, for example, by going through the textbook to identify candidate problems. Beware of counting (as part of the grade) problems assigned the previous semester; instructors who reassign the same problems year after year have noticed an increased incidence of cheating [13]. Also, do not just choose problems whose solution is in the

Table 1. Duties that Teaching Assistants May Perform

	Before	During	After
Class	Print out attendance sheet	Attend every class Take attendance Lead part of class meeting	Record attendance
Homework	Select problems for problem sets Revise/enter machine-scorable questions	Be available in office or lab Visit student teams	Run plagiarism-detection software
Grading	Help create grading rubric		Help create grading rubric Grade homework Explain why points taken off Record grades
Labs	Attend training session on lab safety Prepare materials needed for lab Check lab equipment Repair equipment if necessary	Teach concepts at start of period Assist student teams Repair equipment if necessary Administer quiz on lab	Perform maintenance on lab equipment Grade lab reports
Exams	Pre-test exam	Proctor exam	Help grade exam
Office hours	Hold office hours		
Help sessions	Hold sessions on use of software	Hold sessions on problem sets	
Web site	Administer course Web site (load materials, maintain calendar, etc.)		
Evaluation			Set up surveys

publisher's solution manual, since a large number of students have access to these [14]. Other possible sources of homework problems include problems you did for homework when you took a similar course as a student, problems from other textbooks, or problems made up for homework by students who took the class in a previous term [15]. It may also be possible to exchange problems with instructors who teach the same subject at another school, but this is usually difficult due to varying styles of covering the same material, and the fact that few instructors devise their own homework problems. In any case, having helped choose which homework questions to assign, the TA will have to look at the problem and solution in advance, which will make it easier for the TA to help students. The TA will also be able to choose problems (s)he feels comfortable grading. Students should take academic integrity seriously, and so should instructors. Toward this end, it may be helpful to use plagiarism-detection software, such as Turnitin (turnitin.com) for prose, or Moss (<http://theory.stanford.edu/~aiken/moss/>) for computer programs. TAs are quite capable of running this software and reporting suspicious similarities to you. To help them get started, direct them to former TAs who have been responsible for running the software.

A detailed grading rubric [16] is essential to grading projects consistently. It is good to make up the rubric before the project is assigned, if possible. This will help both you and the TA explain to students what is expected of them. But frequently it is not clear in advance what will be the most difficult parts of an assignment. You will find this out from student questions, and from looking at the first few student submissions. In this case, it is better to give general guidelines to the students on what work should be submitted and how it will be evaluated, but you needn't decide at this point how many points will be awarded for each objective. Then you can solidify the rubric after the work is submitted, but before grading begins.

Teaching assistants should always explain why they have "taken off" (or awarded) points, so that students will understand how they can improve their work. It sounds superfluous to remind TAs that they should record the grades they give, but the author had one experience several years ago of a TA who wrote scores on papers, which were then handed back to the students, but kept no other record of the grades!

It is not a good idea to give an exam to the students without having someone "pre-test" it. This is especially true if the class is large, or if you have not taught the class before. Pre-testing can (i) help make sure the exam is of appropriate length, and (ii) uncover errors that might waste students' time during the exam, or confuse the results. A TA is a good pre-tester. So is a student who, for some good reason, cannot take the exam at the regular time.

To improve your teaching, it is often helpful to survey students at various points during the term to assess what they are learning. SALG (Student Assessment of Learning Gains, <http://www.salgsite.org/>) is a software system that can perform such surveys for you. Your TA can assist you in setting up these surveys, and in summarizing the results. With this kind of involvement, the TA is sure to have first-hand knowledge of how the students perceive the course, and be in a position to improve their perceptions.

3. Communication with your TA

You should meet regularly with your TA, if for no other reason than most work tends to get done right before meetings. In many classes, once a week will be sufficient. Or you might meet two

or three times per week, right before class. This is especially recommended if the TA is assisting with a lab. The first meeting can be longer, to show the TA how to teach the lab.

Before the term begins, you should be sure that you are aware of university policies regarding training of teaching and lab assistants [17]. Assignments should be given to the TA early—ideally ten days in advance—to avoid the pressure of working on a tight deadline. You should discuss course objectives with the TA and explain how your materials are designed to achieve those objectives. For problem sets, TAs should be provided with solutions in advance, because that will help them answer questions for the students. Occasionally it may not be possible to do this for every problem, but in this case, the TA should be given time to solve it on his/her own before the students see it.

During the grading process, you can meet with the TA and go over the first few papers. This helps make sure that the TA is paying appropriate attention to detail and not grading too harshly or too leniently. This is especially important on exams, where losing a few points can have a significant impact on a student's grade.

After work is graded, it is good to meet with the TA and discuss difficulties that the students seemed to have. Better yet, at each meeting, you can ask the TA for any feedback that (s)he is getting from the students. This is important, because students are often more willing to discuss their difficulties with a TA than they are to discuss them with you.

4. Contracts

Experience indicates that few instructors enter into contracts with their TAs, but it is a good practice, because it makes explicit the expectations, and therefore makes it more likely that the goals will be met. Appendix A and Appendix B contain two sample TA contracts. Though neither is from engineering (they are from Sociology and Hospitality & Tourism Management, respectively), both are indicative of what could be included in a contract for an engineering course. Note that both of them stress the importance of interacting with students regularly, and of submitting a report on those interactions.

A good contract should include the following items.

- Goals and objectives for the experience. This may include (i) how the class is supposed to benefit from the experience (e.g., quick response to questions, minimize dropout rate) and (ii) how the TA is supposed to benefit (e.g., deeper learning of material, skills in teaching the material to others).
- Responsibilities of the TA. These may be drawn from Table 1, above.
- Responsibilities of the instructor. Any contract between two parties specifies the responsibilities of each. In the case of a TA contract, the TA needs to receive inputs from the instructor (e.g., plans for homework assignments and/or labs, grading rubrics, solutions to homework assignment) in a timely manner. Some of these items may be developed jointly by the instructor and the TA.
- Evaluation criteria. This is in effect a mini-rubric for grading the TA. Most likely, the department will be interested in an evaluation of the TA's performance. By specifying in

advance how the TA's performance will be measured, the instructor helps the TA focus on the most important tasks.

5. Conclusion

Successfully managing teaching assistants is quite similar to effectively managing research assistants. The duties must be carefully delineated, there must be a schedule of tasks to be performed, and there must be some way of assessing the results. However, relatively few instructors have taken the time to formalize their agenda for their TAs, and even fewer have written about the process. By making engineering educators aware of what can be done, this paper should encourage others to invest more thought into their relationship with their TAs, and thereby reap greater rewards.

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Appendix A. TA Contract of Donna Bird, Director, Center for Teaching, U. of Southern Maine

Goals for XXX's Undergraduate Teaching Assistantship in Donna Bird's Sociology 100J Fall 2008 class

- ❖ Increase student retention (minimize leaves and dropouts)
- ❖ Improve student learning outcomes (both grades and quality of learning)
- ❖ Cultivate sense of class as a learning community (increase opportunities for student interaction inside and outside the classroom)
- ❖ Introduce more explicitly auditory, kinesthetic and visual learning approaches into the class that may appeal to students with those learning styles and provide a greater variety of learning opportunities for all of us
- ❖ Introduce more contemporary cultural material (e.g. music and videos and other visuals) into the class that may make it easier for traditional-aged students to relate sociology to their daily lives
- ❖ Enable XXX to develop an understanding of his major as an integrated learning experience by revisiting the basic ideas typically presented in an introductory course from the perspective of an advanced undergraduate student.

General Responsibilities for XXX as Donna's Sociology 100J TA

- ❖ Attend class regularly (not necessarily every class meeting).
- ❖ Complete all assigned readings (you have a copy of the textbook and all other assigned readings).
- ❖ Get to know the names of the students (I will give you a class list and share the brief writing assignments with you for the first few weeks of class)
- ❖ Let me know if you are going to be late or will miss class.
- ❖ Follow through on commitments made to me or to any student in the course OR let us know ASAP if you cannot.
- ❖ Participate in, but do not dominate, class discussion.
- ❖ Meet with me regularly (at least once a week); keep me posted when you meet with students.
- ❖ Give me oral feedback throughout the semester, written feedback at midterm and at the end.

**Potential Specific Responsibilities for XXX
as Donna's Sociology 100J TA
(to be negotiated on an ongoing basis throughout the semester)**

- ❖ Work with me in an ongoing way to create a team approach to the class, whereby each of us "leads" part of each class meeting. We will plan to reassess this approach around the time of the midterm exam to decide whether to continue it for the rest of the semester.
- ❖ In ongoing collaboration with me, develop and implement in-class exercises that enable students to use auditory, kinesthetic and visual skills to enhance their learning and comfort levels.
- ❖ Work with me to select music, videos and other cultural materials that can be used in class to enhance the learning experience further.
- ❖ Help students learn to use on-line resources (Blackboard and library databases—you have instructor rights on the course BB site; we devote a class meeting to learning to use library databases).
- ❖ Work intensively with student teams in class (there are enough teams so that having two of us on the floor makes a lot of sense).
- ❖ Review student project proposals.
- ❖ Review and summarize students' midterm evaluations of the course.
- ❖ Review all ungraded writing assignments (we do four of these at the start of the semester---this is a good way to learn students' names and interests).
- ❖ Write samples of these ungraded writing assignments to be posted to the Blackboard site before they are due (so students can use them as models)
- ❖ Help individual students in need of extra support—we will carry out regular case conferences to determine the best approach for these.
- ❖ Review and comment on draft or revised papers (you can't grade---that's not part of the arrangement).

**General and Specific Responsibilities for Donna Bird as Course Instructor and
XXX's Faculty Mentor for this Course**

- ❖ Attend, co-facilitate, and oversee all classes.
- ❖ Complete all assigned readings.
- ❖ Prepare class discussion notes and PowerPoint slides.
- ❖ Prepare and grade exams.
- ❖ Grade final papers.
- ❖ Monitor class attendance and participation.
- ❖ Meet with students as needed.
- ❖ Meet periodically with you to review our progress and make necessary modifications.
- ❖ Provide you with support and feedback on an ongoing basis.
- ❖ Assess your overall performance and assign an end-of-semester grade.

Criteria for Grading XXX's Teaching Assistantship

- ❖ Reliability of performance (how well does XXX fulfill the commitments he makes to me and to the students in the class?)
- ❖ Quality of performance (how thoughtfully does XXX reflect on his experiences in the classroom as a sociology major and an undergraduate TA?)
- ❖ Effectiveness of interventions (to what extent does XXX's work with individual students and with the class as a whole enhance their learning experience?)

I will assess XXX's performance based on the following:

- ❖ General contributions to the class (based on Donna's field notes)—15 points
- ❖ Participation in planning and conducting in-class learning experiences—30 points
- ❖ Preparation of three reflective writing assignments (15 points each), as follows:
 - Prior to the start of the semester (by the end of August), looking back at his own experiences with Sociology 100 and his decision to declare a Sociology major
 - At mid semester (due by the end of October), considering how his second encounter with Sociology 100 is affecting his overall understanding of the discipline
 - At the end of the semester (due by December 18), reviewing the TA experience in light of his own career goals and providing feedback to Donna on her teaching approaches
- ❖ Solicited and unsolicited feedback from Sociology 100 students regarding XXX's work with them (10 points)

Donna C. Bird

Date

XXX

Date

Responsibilities for HTM 100 Teaching Assistants

I am most pleased that so many of you decided to help with HTM 100 class. I want very much for you to be a mentor in your role as teaching assistant to the students, mostly freshman, in the class. Students should come to you first with questions or concerns about the class before going to see supervising TA then myself. You all know the way the HTM 100 class operates so will look to you to manage your section. If not sure about something get the answer from me before giving an erroneous answer to the students.

So, as a Teaching Assistant, I expect that each of you will be an excellent role model for the students who are under your care, as the majority the students in the class are incoming freshman. Below are the duties, responsibilities, and/or expectations I will have of each of you this semester.

1. Attend class regularly. If going to be absent you must inform _____, who is TA Supervisor, and get another TA to fulfill your duties and responsibilities.
2. We take attendance for every class starting the second week of class. After a week or so I do not want attendance taken with a pass around sheet, I want you to know all of your students and know whether they are in class or not.
3. Record the grades for all assignments in WebCT at the end of each week and then create a backup copy in Excel spreadsheet. This is pretty simple to do and worth the effort.
4. Know the syllabus and the agenda by heart (to answer questions posed by students as to what is due, etc.) and execute it to the letter. I have made changes since you took the class.
5. Monitor WebCT e-mail and website regularly.
6. Be a mentor. Remember when you were a freshman?
7. **Absolutely, positively accept no late assignments from your students**, even if a student misses an exam. If you have trouble saying “No” to the student send them immediately to me.
8. Do not take any grief from students – you are in charge. Those who do not respect your authority should be brought to supervising TA.
9. Under no circumstances are you to have any kind of personal relationship with your students.
10. You are to model the behavior I expect of students in terms of professionalism, attitude, timeliness, punctuality, attentiveness, etc. I do not want to find out that a TA has badmouthed the instructor, class, program or University.
11. Do not broker special deals or arrangements with students that violate any 1 through 11 listed above.
12. I want a summary report of the community service that students did in your respective section. The report will have the name of the student, the community partner where service was performed, and number of hours. There have been reports of students cheating on this activity in the past and I have taken steps this summer to reduce it as much as possible.