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Title: “Lucking Out” with a Good TA: One Lecture, Several Discussions

Course: Anth411 Section 1G and 1U (Methods of Cultural Anthropology) Fall 2007 -- Nancy A Abelmann

About the Author: My name is Anita Chary and I am an undergraduate senior in Chemistry and Anthropology at the University of Illinois. During their college education, most students complain at least once about one of their TA's—which, whether for poor teaching, unfair grading, misinformation, or inability to communicate ideas in English. As a science major at a large research institution, I have taken several classes in large lectures of 300-700 students. In my own experience, a good TA can really make a difference in a student's level of involvement in the class.

This semester I have been leading two discussion sections as a teaching assistant for a general chemistry class, and from my experiences with these two sections and other TA's teaching for the same course, I have become aware of large discrepancies in how different TA's run their classrooms. Although I believe a great portion of a student's academic success is attributable to her/his motivation and personal effort within the class, I do believe that some students "luck out" and have an advantage over other students by enrolling in a section with a great TA.

I am sure that my position, both as a student who has taken large lecture classes in basic science, and as a TA who has taught discussion sections for the same classes later on, affects how I interpret the data I have collected and propose to collect for the final project.

Keywords: "education," "teaching assistant," "discussion section," "chemistry," "transition to college," "science literacy"

Abstract: Some students in introductory chemistry classes claim to have been "lucky" to have been in a certain discussion section, indicating that although discussion sections all ought to cover the same material, there may be differences between them that students feel are significant. Pilot research reveals that in introductory chemistry classes for non-chemistry majors, some TA's teaching methods focus mostly on teaching chemistry, while other TA's cater their classes more towards students’ academic performance and transition to the
university learning environment. These TA's teaching strategies seems to reflect their attitudes towards TAing; in a small sample, graduate students taught in the former manner, while undergraduates taught in the latter manner. Quantitative research by Spinka & Kelter (2005) indicates that students prefer undergraduate TA's, but a qualitative investigation of this preference remains to be undertaken. Therefore, the proposed research project seeks to investigate how chemistry TA's teaching styles are signified both by TA's and by their students within introductory chemistry courses for non-chemistry-majors through ethnographic methods. In the context of improving undergraduate education and US math/science literacy, understanding the teaching methods that are most beneficial to students in the basic sciences is paramount.

Initial Exercises:

Reading Response

Initial Exercises:

Observation

Initial Exercises:

Analysis of a Text

Initial Exercises:

A Practice Interview

Question: Please note: I have decided to include the evolution of my train of thought throughout the course in this entry.

Edit for 10/30/7:
What are TA’s perceptions of their roles in the classroom? What do they feel responsible for teaching their students--material, or skills for academic success in the classroom? Does subscribing to one of these two philosophies (broadly) affect what TA's put into their sections and how TA's teach within the classroom? Is there a notable difference between how undergraduates and graduates generally teach/conceptualize the classroom, or is this too broad of a generalization to make?

Does what they do/feel they are supposed to do match up with their students expectations? With their professor's
expectations?

Edit for 10/23/7:
Sergio's comments for #7 were very helpful for me, and actually prompted me to think of my project in a new way. I decided that my previous questions would rely on methods that would be very time-consuming and even statistically oriented, such as comparing section averages on homeworks, quizzes, and tests--this was when I was thinking about figuring out how inconsistencies in teaching put some students in section A at an advantage over other students in section B. However, this was under the assumption (as Prof. Abelmann) pointed out, that inconsistencies are bad and that standardization is good. On the one hand, from my personal experience, I feel that some standards are good--such as covering the same topics and problems in different discussion sections, so that students in a class can study the same materials together--but I don't really have quantitative or qualitative proof that this is the case.

I thought that a more reasonable and doable project for this semester, as per Sergio's comments, might be more of a comparison about what players at different levels of the education system feel about the discussion section. I plan to focus mostly on TA's with the following questions:

What are TA's perceptions of their roles in the classroom--i.e. what do they feel are their responsibilities to the students? E.g., do they feel responsible for teaching material and concepts to the students, for helping them learn problem-solving skills, or for just helping them get through the class with a reasonable grade? (From my experience, there seems to be a difference in undergraduate vs. graduate TA goals in the classroom). How do these conceptions of their role affect their teaching? Does their idea of what they do/how they are supposed to teach match up with their students' ideas and their professors' ideas?

For a future project (I mention future because I do not think I will have time to explore it this semester), it would be interesting to explore whether students whose attitudes about discussion matched up with their TA's attitudes are at an academic advantage compared to students whose attitudes don't match with their TA's attitudes. Also, it would be interesting to see how TA's attitudes about their roles match
up with the professor's, and to figure out whether this helps determine their students' academic success.

Initial Question: When students arrive at research universities such as Illinois, they must quickly learn that personal effort to learn material is a large determinant of success in a course. But certainly there are other factors that affect their learning and performance: one of these is the discussion section. In science classes, particularly in chemistry, the discussion section tends to be a major site of learning and mastery of material. Therefore, the TA plays a large role in the learning process—perhaps larger than the professor's role, in some cases.

Each large lecture class of several hundred students is divided up into discussion sections of 30 students; this means that there may be several TAs for one class, each with a different educational background (graduate vs. undergraduate), teaching method, and classroom strategy (lecturing at board vs. worksheets). My questions are: do these inconsistencies affect a student’s learning experience? Would an undergraduate “luck out” if placed in one section over another? Although some factors, such as age or experience, cannot be overcome, would other simple standardizations improve the opportunity for students to succeed in a large introductory college science class?

In answering these questions, I would plan to interview undergraduate and graduate TAs as well as a professor for an introductory general chemistry course. I would try and gather TA perspectives about course operations, how they conceive of their role in the classroom, and what their teaching methods involve. I would also hope to talk with professors about their perspectives on/experiences with education and how they encourage TAs to run their classrooms. If time permits, it might be useful to also interview students about what teaching methods are best for them (is that too ambitious?). Texts about college and science education and freshmen would be relevant and of interest.

Plan: Please note: I have decided to include the evolution of my train of thought throughout the course in this entry.

10/30: Ideas for the final project...
I plan to interview undergraduate and graduate TA's for one general chemistry course in the final project (maybe will propose to do sets of interviews for several gen chem courses). In the final project, I would hope to interview some students about the questions I have above, but it may also be constructive to use surveys to reach students.

It would be informative to use focus groups of TAs teaching the same class to let them react to each other's different teaching styles. It would also be helpful to figure out whether some TA's teach more to the test than others by careful observations within the classroom, and by figuring out which TA's are leading extra help sessions, etc.

10/23 Plan Edit: 
I plan to interview undergraduate and graduate TA's for a general chemistry course about what they think their roles are and duties are as a TA. I will also interview the professor for this course and ask what her/his ideas of the TA's job, as well as one or two students (depending on how much time is permitted--maybe a focus group would be better for this?) within the course to ask the same questions.

I would enjoy doing a small focus group with a few TAs talking through their experiences, or as mentioned above with students.

Observations of classrooms and of TA meetings with the professor may also be beneficial, and if time permits I think it would be very informative to do this.

**Data:** How much of a difference does the TA make for a student in an introductory science course? As a TA for a general chemistry course, I have noticed that there are a lot of variations in how TAs teach, what they teach, their teaching experience, and how they engage with their students. I am concerned with whether these variations are problematic and how they affect undergraduate science education at research universities. I interviewed a friend and fellow TA for a general chemistry course about her perception of her own role as a TA, her relationship with her students, her teaching strategies, and her views about course management. To protect her confidentiality, I will call her "Sasha" and refer to the course she TAs as CHEM 100 (this course does not actually exist at the U of I).
Sasha and I only met about one month ago, but in that time we have talked about our classrooms/students and done homework together a few times, so our relationship is fairly friendly. My previous impressions of her have been that she is a super-TA: despite being a senior who is applying to medical school, she always goes above and beyond the call of duty (leading extra review sessions, having extra office hours on instant messenger, etc.) and is a great resource for her students. I thought she would be a great respondent. It was easy for me to approach her about being interviewed; she seemed excited and suggested that we meet at a café on campus after dinner. Since it was a student-filled environment and we had a previous cordial relationship (and perhaps given my status as an amateur student researcher, rather than a professional sociologist), I believe we avoided some of the power asymmetries between interviewers and respondents as discussed by Bordieu. The space was fairly neutral, and as my peer and colleague, Sasha seemed fairly relaxed talking with me.

I started out asking her about what she felt is the purpose of discussion sections and the role of the TA. She replied that “discussion is meant to cover topics not reinforced by the professor,” but that it is also an environment for students to ask questions. She also stated that it is a place for students to interact with each other: in her own classroom, she tries to pair up a bright student with another student who wasn’t as comfortable with the material, get students to check to make sure their neighbors have correct answers on worksheets, and ask students to do group work. She made the interesting statement that academic success in basic science classes is sometimes “about who you know more than can you study,” implying that when students either teach each other or work out problems together, they learn more. She feels TA’s are responsible for teaching students concepts, but not “[holding] their hands while in their dorm rooms” through homework problems; the fine-tuning, according to Sasha, is the student’s responsibility.

After we discussed her opinions about the role of discussion in the overall course, we talked about why she decided to become a TA. Her main reason was that it was fun! “I didn’t know the full benefits until after I applied,” she told me—referring to the fact that Chemistry TA’s get a tuition waiver. Her main learning strategy throughout her undergraduate
years was going to her TAs’ office hours and getting one-on-one time with them so that she could absorb their knowledge, and her good relationships with several of her TA’s prompted her to apply for the job.

However, she did mention that she felt like she “got lucky” to be hired this year. In previous years, she characterized the department’s hiring of undergraduate TA’s as very selective, but claimed that “this year was more ridiculous than usual...so many TA’s were hired over email.” I may have prompted this statement to some extent by asking her how she felt about the fact that undergraduate TA’s were hired only 2 days before discussion sections commenced. Sasha implied that the department’s hiring process was unprofessional and disorganized; several upperclassmen in the departments of Chemistry and Chemical Engineering received an email asking them only for their major and GPA as their teaching qualifications. Although these students submit a formal application in May indicating their interest in the position, Sasha complained “there’s no interview process, they don’t ask you to teach anything” as an example of your method, and the fact a student has a high GPA does not indicate that s/he is necessarily a good teacher. Sasha felt that perhaps an interview would make a “slight difference” in the quality of the TA’s, but also mentioned that it was “by luck of the draw” that “Chem 100 has decent TA’s this semester.” We discussed her experiences in other science courses with bad TA’s and concluded the topic with the idea that although everything “worked out fine,” she felt that the entire situation could have been better handled: “why can’t they deal with it earlier [than two days before classes start]?”

We moved on to discuss Chem 100 course and classroom management. I asked Sasha what she thought obstacles to leading a good discussion section were in terms of course management. “[Our professor] expects us to do everything, which no one has time to do!” Her professor, rather than writing standard quizzes for his 600+ students, has his TA’s each write a quiz for their own section. Although these values are normalized by section at the end of the semester, Sasha still feels they are problematic because they are not consistent in their difficulty across sections. Graduate TA’s typically write harder quizzes than undergraduate TA’s. For example, Sasha thought one of the graduate TA’s quizzes was “not helpful” and intimidating to students, rather than helping them prepare for tests, while hers was based on old
test questions that students knew were relevant to the course.

Sasha also complained about the number (“I can’t believe we have them purchase seven books!”) and quality of the course’s textbooks (“[The book of worksheets] is crap...it never helped me as a student.”) Sasha doesn’t use the books she doesn’t find helpful in her class and actually assigns different homework than what the professor asks TA’s to collect. Instead, she assigns them problems from old tests or asks them to write out their answers for online homework and turn it in, which she feels is more helpful.

Sasha’s teaching methods vary depending on the subject. She tries several different techniques to help students learn, and has found that students like having worksheets best. She launched into an example (even without my asking her to “walk me through it!”) of her teaching by describing the Bohr atom to me as she explained it to her students; she explained things slowly and clearly multiple times and told me that she “talked very casually” with her students (eventually telling them that “the Bohr model is a load of crap”). At this point, Sasha mentioned that undergraduate TA’s might have an advantage over graduate TA’s in that they remember taking the same introductory courses and can fine-tune explanations that they found confusing. On the other hand, Sasha mentioned that “what I didn’t have a strong enough grip on then, I don’t now either,” while the graduate students have conceivably mastered everything. Sasha said that she sometimes had to “wing it,” because she simply didn’t have enough time to fully relearn some concepts while also planning out lessons, making worksheets, grading, etc.

Sasha also told me about her classroom dynamics. She teaches classes at 12 PM and 2 PM, and it seems like her 2 PM students are at an advantage since she “works out the kinks” of her lesson in her first class, while it seems her 12 PM students are at an advantage of being more social. She knows all of her students’ names and knows most of them personally. She told me, “you have to watch for the stragglers,” and does so by encouraging them to attend office hours and setting up tutors for them. She seems to be very invested in their academic success, which she claims is part of her “maternal instinct.”

We ended on this positive note after about an hour of talking. The interview gave me a few new ideas. As I discussed with
my comment group, it would be helpful for me to go observe other discussion sections before doing other interviews with TA's. I would like to compare teaching styles, classroom dynamics, and consider how students engage with their TA's and with each other across sections. In terms of my research proposal for a larger project, I think it would be informative to interview all of the ten TA's for Chem 100, the professor, a few Chem 100 students, and perhaps even the administrators who coordinate the TA hiring process.

The interview also certainly made me aware of what Bourdieu describes as wanting to be as attentive as possible, but also needing to simultaneously formulate questions that show you're paying attention and lead your interview where you can get information. I am not very good at this yet, as I still found some of my questions disrupted the flow of the interview, but perhaps it is a skill that comes with practice.

**Data:**  
**PART ONE: Archives**

**The Archive**  
I started out searching the Student Life and Culture Archives with three terms: "chemistry teaching assistant." Two results came up. One of these was a collection of an assistant professor's papers, who had taught for the Department of Chemistry. These were fairly old (1960's) and didn't seem to mention the discussion aspect of chemistry classes (I would have to go and find out, I suppose) therefore I didn't think they were extremely relevant to my current project. The other material that came up was a collection of 44 boxes of materials from the Chemistry Department of 61 years! The papers, from 1939-2000, are arranged under hundreds of headings. What I thought might be relevant to my project were those relating to education. I searched through the document for all of the places that the words "teach" and "assistant" showed up. Some of the entries relating to teaching assistants had to do with stipends, getting funding as a TA vs. through a fellowship, etc. It seems like these papers are administrative documents intended for graduate students. There were also records kept of which professors taught which classes, a few years of teaching evaluations (this may be interesting to look at! But I don't think they are for TA's, but for professors), and some records of awards for teaching (also, I think these are for professors, not TA's). However, most of the records were fairly old--from the 1970's, 1980's, and 1990's. I am not sure about how different the role
of the TA would be from decade to decade, but there have been significant changes to chemistry courses in the past few years. For example, thanks to the internet and the use of computers, a lot of chemistry coursework is now online (online homework, online quizzes, lecture notes on powerpoint, etc.). When I return to the archives, I would want to look at the teaching evaluations. This might reveal student thoughts about the courses.

In the meantime, however, I thought I would also do a mini-document/textual analysis of a document on the web. This is the application for undergraduates and graduate students who are not in the chemistry department to become TA's for general chemistry: http://www.scs.uiuc.edu/chem/TA_app/

As I looked through the boxes of papers available at the SLC Archives, I remembered the application form to be a TA as something that could potentially enter the archives. I was actually very surprised as I revisited the website where I had filled out the application, as there is no job description for a General Chemistry TA--simply a link from the 'Employment Opportunities' page on the chemistry website. The application itself is fairly short--it simply requires information about GPA, chemistry courses taken and grades in them, and other employment experiences, plus a 300 word essay with the following prompt:

"Describe your academic work, non-course educational experiences, teaching or other relevant employment, your plans for graduate study and/or career, and why you want to be a TA."

Although this seems like a decent prompt/application for TA's, I think it is problematic that there is no job description provided anywhere on the application. Applicants have no idea how much work is involved with a TA position (the website doesn't list how many hours a TA works per week), what they are supposed to do in the classrooms (teaching material or reviewing concepts?), etc. Therefore, an interesting question for me to ask might be, "Before you became a TA, what were your impressions of what Chemistry TAs were supposed to do?"

PART TWO--Data:
After thinking about what I might find at the archives (and receiving comments that seconded my feeling that what I
found may not be all that helpful), I decided instead to create a pre-survey (to be edited for the final project) that would be a student opinion poll about the purpose of discussion and what students like best and least about discussion (using the "LB/LL" method discussed in the survey articles). I have given the survey to one student so far to figure out what I can improve on it, and to figure out whether I should make things more "forced-choice" or "open-ended." Although I don't like the survey technique, as described below in one of my other entries in which I tried to study time allocation, I think it would be useful to poll a large number of students to determine what they like/don't like/would like to do in discussion, and to figure out how much they are using their TA's as a resource.

My student survey asks for some basic information, such as the student's year in school (the idea here is that freshmen have not had as much time to develop college study habits, rather than using high school study habits, so they may have different ideas about what they would get out of a discussion section), the student's major/whether the course was required for their major (to determine whether these students would only need the chemistry class in which they were enrolled, as well as to determine if they would need to take future chemistry classes--this is often a good indication of how motivated a student is to learn chemistry), and the grade the student wants in the class vs. the grade the student expects to achieve. Although I don't mean to use this data to devalue any student opinions, I have found from my own evaluations that students who expect to achieve high grades but who end up achieving lower grades than what they want often have more negative things to say about their TA's and discussion sections. My last basic information is asking for which course a student is taking--in this case, it would be Chem 101, 102, 104, 202, or 204.

My survey asked a few forced-choice questions, first about what the purpose of chemistry lecture/discussion sections is (interaction with teacher? learn to solve problems? learn new concepts? exposure to, but not necessarily learning of, new concepts?), and second a list of activities for students to check off if they had participated in those activities in their own discussion sections (group work? TA lectures? etc.).

I then used the "LB/LL" method of asking students to list up to three things that they like/dislike about their discussion sections, then provided a checklist for students to check off
the ways that they have tried to get help with hard material or when solving problems. Lastly, I asked for ratings of how helpful discussion, lecture, and the textbook are both in teaching new material and in helping students learn skills for the test on a scale of 1-10 (1 the least, 10 the most).

To "pre-test" the survey so that I can improve it, I gave it to a student named Charlie (not one of my own) in a class I will call CHEM 106 (does not exist at UIUC). After Charlie took the survey, I discussed his answers with him. He told me that some of his answers about lecture were conjectures, rather than from his own experience, as he frequently skips his lecture. However, he seemed to think that the function of his lecture is to teach students new material and expose them to difficult material. He wrote that the purpose of his discussion section was to help students solve problems. In fact, he told me that a poll had been taken in his lecture class in which students stated that they didn't want their TA's to lecture at all during discussion sections, but only focus on solving problems. He told me that he was relieved after that change was implemented, and told me that he had always felt like it was pointless to go to a discussion section where the TA simply rehashed what the professor or book said for about 40 minutes, and then left only 10 minutes for problem solving.

I found his comments about what he liked best and least about discussion interesting. His "LB" was learning how to solve problems, while his "LL" said "stupid people." I asked him to elaborate on this after I looked over his survey, and he told me that he easily grew frustrated with other students who slowed the class down by either not keeping up with class work and causing needless review of material he had already learned, or for not understanding the problems, which meant that the TA would have to spend too much time on problems that he already knew how to do. Of course, it may be important to note here that Charlie expects to receive an A in the class and does not find the material particularly challenging.

Charlie's responses gave me a few pointers about my rating scale. I think I am going to throw out the "scale of 1-10" part, because he did not take it very seriously. He wrote things in like "8.43" and admitted to me afterwards that there were some things he filled in even though he couldn't really rate them based on his experience--such as the professor's helpfulness, since he never goes to class. I am going to have
to find a better way of asking how helpful the professor, TA, and textbook are in learning new material.

I also thought Charlie's responses were interesting in that it shows a sort of disconnect between what Charlie thinks of discussion sections vs. what some TAs and professors think of discussion section. Although TAs and professors mostly claim that discussion section is a chance for students to ask questions and learn to solve problems, professors' TA notes tend to be fairly detailed about different topics that TAs should cover through lecturing. Often, the topics that professors want us to cover among the CHEM 100 TA's I work with, necessitate that we spend at least 15-20 minutes lecturing. Furthermore, it is extremely difficult to launch into problem solving within my class, simply because not many students read the book, pay attention or attend their lectures, or have tried any of the homework problems on their own before coming to class. They also may not have understood material the first time they have encountered it, which makes it almost necessary for me to do at least some lecturing to review/explain concepts. But according to Charlie's class survey, students want more problem solving and less talking.

It would be interesting to administer this survey on a larger scale and consider what students want to do in discussion vs. what they actually do in discussion. Perhaps it will reveal a disconnect between what professor's notes ask TAs to do, what TA's want to do, and what students want TA's to do.

I will work on improving the survey along these lines and re-test it with other students.

**Data:** Time-Allocation Survey/Interviews:

**Data Continued** This week, I tried the technique of a time allocation survey. I wrote a survey composed of both forced-choice and open-ended questions. As my focus has narrowed to how TA's perceive their role in the classroom, I thought I would ask a few TA's to estimate for me how much time they spend preparing to teach their sections each week and how they spend their time in the classroom itself.

In the survey, I ask the background question of whether the respondent is an undergraduate or a graduate student—the key difference is that undergraduates teach for 4 hours a
week, while graduate students teach for 8 hours a week. I started out asking “How much time did you spend preparing for the last full lesson (meaning you did not give a quiz) you taught?” Using Fink and Bernard’s suggestions of ensuring that the specific behaviors I am asking about are representative, I ask respondents to clarify whether this amount is typical and then asked for a general estimate. My next question is an open-ended question of how many hours per week each respondent spends working as a TA, followed by a semi-forced-choice question about how much time each TA spends in her/his last discussion section using different teaching methods (e.g.—how much time spent on lecturing? Group work? Going over homework problems?, etc.). I ask respondents to describe if and how these times vary, and then ask about time breakdowns on days when they give quizzes.

I answered these questions myself to start with, expecting other TAs’ responses to be similar to mine. My estimate is that I work as an undergraduate TA for about 15-20 hours a week: 4 hours of preparation, 4 hours of teaching, 2 office hours, 15-20 minutes of the weekly TA meeting, and 1 hour of email responses are the bare minimum. Weeks with quizzes add about 4 hours for making the quiz and grading it; weeks with tests can add about 10 hours in terms of proctoring, holding review sessions, and writing mock exams.

Within the classroom, I spend up to 5 minutes going over administrative topics (increasingly I’m doing this over email since we frequently run out of time), about 25 minutes lecturing over new material and trying (normally in vain) to solicit student participation, and about 20 minutes on problem-solving—which I either lead with student input, or let students attempt individually or as groups so that we can discuss answers afterwards. This stays fairly consistent, unless our Professor asks us to cover theoretical chemistry, which requires more lecturing, or if we give a quiz, which takes up 30 minutes.

These figures by themselves are rather boring, but a comparative look at what different TA’s do for the same class can be mildly shocking. I started out giving this survey to two TA’s for CHEM 100 (course name changed), one a graduate student and the other an undergraduate. Sasha, the undergraduate “super-TA” I interviewed previously, spends about 2-3 hours preparing for each lesson and estimates
spending 15-20 hours a week working on CHEM 100 TAing. Daniel, the graduate student, estimates spending 1 hour in preparation per lesson; for some reason, he reported spending only 3 hours a week teaching, although in truth he teaches 4 one-hour-long sections twice a week, which means his total estimate of TAing time would be 13 hours/week. Immediately, I thought it was worth noting that although Sasha teaches 2 sections and Daniel teaches 4, Daniel estimates that he spends a little bit less time TAing than Sasha does per week. I also thought it was interesting that while both Daniel and Sasha's estimates of how much time they spent using each teaching method in class were fairly similar to mine, Daniel gives his classes the entire 50 minute period for a quiz and teaches no extra material, while Sasha told me that she gave her students anywhere from 15-50 minutes depending on how difficult the quiz was. Although quiz scales between different sections in any general chemistry class are normalized at the end of the semester, it really made me wonder about how some students have more chances to review material with their TA's than others. For example, I always make sure to review quiz material for about 10 minutes before giving a quiz to my sections, while Daniel's students don't seem to get such a review.

In any case, however, I'm not sure that either of them gave as much thought to the survey as I would have liked. For instance, Daniel didn't include how much time he spends grading in his weekly estimate, although I know that grading 120 quizzes is fairly time-consuming. Each of them finished the survey within ten minutes and didn't include a lot of details for what I thought were open-ended questions (e.g. “Please describe...”). For this reason, I've decided that I don't really like the survey technique. I still think that it could potentially be useful in my final project, but I couldn't help but feel that I would have rather interviewed them—however briefly—about these topics rather than give them surveys.

I decided to treat these time-allocation surveys as my “test” surveys and thought that I should try to use it as part of an interview instead. With my first respondent, Juan, another CHEM 100 TA, this worked quite well. I asked him about his ideas of the purposes of general chemistry lectures and discussions, the roles the TAs and professors ought to play for their students, and what he feels his students’ expectations of him are. I was not surprised by any of his answers; most people think of discussion sections as one of
the ways of coping with large, intimidating lecture classes where students are too afraid to ask questions, and Juan’s response was along these lines. Juan believes that discussion sections serve to reinforce material from lecture and help students develop their problem-solving skills. When I asked him what he felt his responsibilities are to his students, he said it was most important that they “come out of there knowing basic chemistry.” This comment seems intuitive and obvious—if a student is taking a general chemistry course, one would expect that student to come out of the course knowing the material. However, as I will expand upon later, I think this is one of the most important attitudes that differs among TA’s.

I then asked him about how he actually teaches his discussion sections to see how his ideas play into his teaching style, and indeed I believe they do. Juan tries to spend a fair amount of time reviewing homework problems, and that’s most often his first question: “Are there any homework questions?” When the answer is no, Juan picks his own problems from the book to go over. Furthermore, Juan does not always follow his Professor’s TA notes (a weekly guide to what TAs are supposed to be teaching in discussion with problems and topics to cover). Sometimes, when the professor asks TAs to ignore a certain topic, Juan teaches it anyway if he’s convinced that the topic will show up in a future class or will make problem-solving easier. Also, professors tend to give unfeasible amounts of material for TAs to cover, and when I asked Juan how he chooses which material to cover, he often picks things that are guaranteed to show up later in the course or in later chemistry courses.

I asked Juan to fill out the time-allocation survey in the context of these questions, and then we discussed some interesting points about these data. Juan’s estimate of how much time he spends per week TAing is 11.2 hours, but grading during quiz weeks can add on about 5-6 hours. Again, although I cannot generalize this as a broad trend, I think it is interesting that despite teaching more sections than the undergraduate TA’s, the undergraduates seem to have higher estimates of how much time they spend working than graduate students. Despite however many hours either type of TA actually works per week, the fact that the graduate students I interviewed report less time than the undergraduates (who, as a reminder, are not teaching as many sections) is noteworthy.
I was also shocked when Juan told me that he normally goes into his discussion sections without a definite plan, and that the way he makes a “lesson plan” is by reading over the TA notes on the bus on the way to campus before teaching! He admitted that he was being brutally honest, and that he knew it was “terrible in a way.” To contrast this with my own style, or Sasha’s (or Priya’s, another TA I interviewed later), we all write lesson plans on overheads and/or make worksheets for the class to follow along with us. This can take up to 3 hours per lesson.

Priya, another undergraduate TA whom I interviewed, seemed to have a lot of similar thoughts to Juan about the function of discussion sections. She also stated that it was a time for students to hone their problem-solving skills, and that for this reason she tried to spend as little time lecturing as possible, and as much time doing problems. She felt that having her students do group work allowed her to best determine whether students were understanding the material since it allows her to interact with them in small groups and ask individual questions. One thing I found important was that she stressed her responsibility of showing students how problems could show up on tests and quizzes. Although she stated that spoon-feeding students exactly what material would be on a test was not the professor’s job, she felt that her role as a TA encompassed some of those duties. Rather than having Juan’s goals of giving students a great understanding of basic chemistry, Priya seemed more interested in her student’s academic success within the course in picking and choosing examples from her professor’s TA notes.

Priya’s estimate for the amount of time she spends TAing each week was 15-19 hours (19 hours including grading). Her estimates of how much time she spent lecturing and having students do group work was fairly consistent with that of the other TA’s. However, Priya also made the interesting comment that between her two sections, there were discrepancies in how much material she could cover with one group vs. another in one class period. Her morning section frequently gets through more material than her afternoon section.

My interpretation, which I admit may be extremely incorrect based on my limited data at this point, is as follows. It seems that the undergraduate TA’s I interviewed spend more time on their sections than do the graduate students I interviewed.
Sasha herself mentioned that such discrepancies may have to do with status as an undergraduate/graduate student and told me that undergraduate TA’s tend to remember which material was challenging and spend more time thinking about various ways to explain things and about how to show students how such material is tested. As a caveat, I am sure that this is not true of all undergraduate TA’s. It may also be that the undergraduate TA’s I interviewed are in touch with the fact that students increasingly want to learn only what they need to know to succeed in the course, and accordingly cater their discussion sections towards helping students learn test material. For example, Sasha and I both led mock exams for our sections in order to better prepare them for the test, while some of the other TA’s did not do anything outside of their normal classes (nothing was required).

Although the time allocation exercise did point out an interesting dynamic of how TA’s attitudes affect how much time they feel they spend on their job, I am not sure of how reliable their estimates of in-class activities and time spent TAing are. Perhaps it would be better for me to observe their in-class activities rather than ask for estimates. The exercise also opened my eyes to the interesting dynamic described above, which has given me some ideas for my question/plan.

**Data:** Video Plan, 2-3 minutes:

**Video/Plan**

- General comments: I’m kind of unsure where my project is pointing right now, so I am openly admitting that what I’m trying to argue in this video plan may be completely incorrect or misguided. I’m also unsure of the wordings of my narrations, and would be all ears to any suggestions about them.

- All of the following shots would have to be recreated from interviews I’ve already done. The responses below are taken from responses people have given me in interviews—I’m not sure how easy it would be to get people to say the same things, or be willing to appear on the camera saying any of these…but assuming they would, this is something close to what I would expect to turn out.

- This video plan is intended to be a general introduction to my project. I am introducing the idea of discussion sections first. Next, I argue (based on interviews) that what goes on in different discussion sections varies depending on the TA,
which may reflect a discrepancy between how undergraduates and graduates feel about their roles as TA's.

A/V 1: ~15 seconds
VIDEO SHOT #1: The video begins in a large lecture hall—e.g. Lincoln Theater, Foellinger Auditorium, 100 Noyes, etc. The first shot is from the very top row of the classroom and shows the professor writing/talking/clicking through a powerpoint presentation from the perspective of a student seated in the very back. The next shot shows the students from the point of view of someone at the front of the room: a slow pan over the hundreds of students in attendance, who are presumably involved in normal student activities (taking notes, talking to each other, sleeping, looking to the front of the classroom, etc.). Viewers hear the professor's speech faintly in the background as narration says:

AUDIO #1: “At large research universities like the University of Illinois, most basic science classes are taught in large lecture halls with several hundred students. For the chemistry department, discussion sections supplement these lectures.”

A/V 2: ~15 seconds
VIDEO SHOT: The camera shows a TA, preferably in either a TA office, laboratory, or the empty classroom, seated at a desk or table. At the bottom of the screen we see something like, “Joe Smith, Chemistry Teaching Assistant.”

AUDIO: The audio is the TA’s response to the question: “What is the purpose of discussion section?” Based on my interviews with TAs so far, I imagine the response (audio) would be something like this: “Discussion sections are a chance for students to ask questions in a less intimidating environment than the large lecture hall. It’s where students can learn how to solve problems and get personal attention.”

A/V 3: ~15 seconds
VIDEO SHOT: The video cuts to a classroom with the same TA writing at the board, using an overhead, etc. The camera ideally shows the students during this shot, as well, the point being to show the smaller size of the discussion classroom and to show students interacting with the TA on some level.

AUDIO: For about 10 seconds, whatever is going on in the classroom. I imagine something like this: TA lecturing and writing at the board: To draw this structure,
we have to count the number of valence electrons first. How many valence electrons does nitrogen contribute?
(Here there would either be silence and a shot of students not participating, or a shot of a student answering the question—either way, we return to the TA at the board answering the question her/himself (which is fairly typical) or affirming what the students answer)

A/V 4:
VIDEO SHOT: Muted shot of previous video.
AUDIO: Narration voice-over—“What goes on in different discussion sections, even within the same lecture class, tends to vary depending on the TA teaching.”

Note: For A/V 5-8, maybe have a display at the top of the screen that says “undergraduate TA” or “graduate TA” for each.

A/V 5:
FIRST VIDEO SHOT of TEXT: Chemistry 100 TA’s are instructed to write and give 30-minute quizzes.
VIDEO SHOT: Several different shots of TA’s responding to the following question.
AUDIO:
Interviewer behind camera: “How much time do you give your students for each quiz?”
(Most of the TA’s I talked to, all for the same professor, gave different responses. The Professor instructs them to give 30 minutes for the quiz, and responses varied from 15-50 minutes. The following responses are from my interviews/surveys…I’m not sure they’d necessarily be recreated on camera, but just to show variation
TA 1: “30 minutes on the dot” (Graduate)
TA 2: “It depends on how hard the material is. Sometimes I give them 15 minutes if it’s short, other times I give them the whole time.” (Undergraduate)
TA 3: “I give them the whole period.” (Graduate)

A/V 6:
FIRST VIDEO SHOT of TEXT: The Chemistry 100 Professor expects TA’s to write quizzes with an average of 13-14/20 points.
VIDEO SHOT: Several different shots of TA’s responding to the following question.
AUDIO:
Interviewer behind camera: “What are your typical quiz
averages?"
TA 1: “11 or 12” (Graduate)
TA 2: “My averages are pretty high. Normally 16 or 17. I feel like if it’s anything less than 14 it’s not even helping them, just destroying their confidence.” (Undergraduate)
TA 3: “About 14 or 15.” (Undergraduate)
TA 4: “13 or so” (Graduate)
TEXT: (Quiz grades are normalized at the end of the semester)

A/V 7:
FIRST VIDEO SHOT OF TEXT: The Professor tells TA’s to collect even numbered problems from textbook assignments.
VIDEO SHOT: Several different shots of TA’s responding to the following question.
AUDIO:
Interviewer behind camera: “What homework do you collect?”
TA 1: “The even problems from the syllabus…that’s what Professor X asks us to collect” (Graduate)
TA 2: “I assign old test problems.” (Undergraduate)
TA 3: “I make them write out their work to the online homework and turn it in.” (Undergraduate)

A/V 8:
FIRST VIDEO SHOT OF TEXT: TA’s are not required to hold review sessions for their students in Chemistry 100.
VIDEO SHOT: Several different shots of TA’s responding to the following question.
AUDIO:
Interviewer behind camera: “Do you hold review sessions for your students for exams?”
TA 1: “Not outside of class, but I do move my office hours to help them with tests.” (Graduate)
TA 2: “I didn’t the first time, because I moved my office hours, which no one came to anyway. But the second time I held a two-hour review because the students didn’t do too well on the first exam.” (Undergraduate)
TA 3: “Yeah, we have a review session on the weekend where I make a mock exam with problems from old tests and then we go over it.” (Undergraduate)

A/V 9:
VIDEO SHOT: A shot of a street and a TA getting onto an MTD bus. The camera shows the TA sitting down on a seat, reading something over. Next shot is of the TA walking down a hallway toward a classroom.
AUDIO:
Narrator: “These differences may reflect TA’s different attitudes about teaching, which seems to be linked to whether they are graduate or undergraduate students.”
TA voice-over—“I used to spend more time prepping for class, but now I’ve gotten lazier. Sometimes I just read over the TA notes on the bus on the way to discussion sections, and as long as I know the concepts I feel like that’s enough. I take homework questions at the chalkboard for most of the period and go over the problems in the TA notes.” (This is based on what one TA told me in an interview—if he is comfortable saying the same thing on camera, I would include it here and contrast it with another TA’s perspectives)
TEXT: At bottom of screen, TA’s name (or pseudonym) appears on one line; on next line, “Graduate Teaching Assistant, Chemistry 100”

A/V 10:
VIDEO SHOT #9: Another TA, typing at a computer.
AUDIO:
Interviewer behind camera—“Can you tell me how much time you spend preparing to teach?”
TA—“(laughs) It’s ridonculous. Somewhere from 2-3 hours each lesson.” (This is what she said in our interview…I don’t think she would say the “it’s ridonculous” part on camera, but I’m deliberately and controversially using this stark comparison between her and the TA on the bus).
TEXT: At bottom of screen, TA’s name (or pseudonym) appears on one line; on next line, “Undergraduate Teaching Assistant, Chemistry 100”

A/V 11:
VIDEO SHOT: Same TA from shot 5, copying worksheets and bringing them to class. Next, in her classroom, walking around the classroom as students fill in worksheets.
AUDIO: TA’s voiceover: “The students like having worksheets, and I think it’s more useful for them than using that stupid React book. That thing is crap. I never use it when he tells us to do problems from there in the TA notes.”

A/V 12:
VIDEO SHOT: TA helping students in office hours.
AUDIO: Narrator: “Regardless of how much time TA’s spend each week on their job, undergraduate students typically report spending more hours on their job than do graduate students. Do some of the differences between discussion
sections depend on whether they are undergraduate-taught or graduate-taught?"

A/V 13:
VIDEO SHOT: Black background, white letters of text
“Preliminary research from interviews indicates: yes.”
Fade to black.
AUDIO: some sort of music? Undecided, but presumably something instrumental.

A/V 14: Acknowledgements.

Discuss: ORIGINAL: 11/25
My preliminary research indicates that there can be significant differences between discussion sections even within the same lecture class. These differences may reflect whether TA’s are graduate students or undergraduates, as these two groups tend to conceptualize their roles differently. Although the TA’s interviewed agree that the purpose of discussion section is to offer students the personal interaction needed to help them develop problem-solving skills, graduate students and undergraduates seem to manage their classrooms differently.

For both graduates and undergraduates, TAing is a fairly time consuming job. Graduate students teach more sections than undergraduates do, and thus would be expected to spend more time (four more hours plus some extra time for grading) on TAing per week than undergraduates. However, in a self-reporting time allocation exercise, both graduate students interviewed estimate spending somewhere from 11-13 hours/week TAing, while both undergraduate students interviewed estimate spending from 15-20 hours/week TAing. These time differences may arise for several reasons. The graduate students interviewed report spending less time preparing to teach than undergraduates—in fact, one admitted to simply reading the TA notes (notes written by the professor about material to cover in class) on the bus before coming to class. In contrast, one undergraduate TA told me that she spends a lot of time preparing for each class because she writes worksheets and tries to remember what was most confusing about the class to think of multiple ways to explain the same thing. The undergraduates also reported providing extra help sessions, such as mock exams or exam review sessions, while graduate TA’s did not, since this is not a job requirement.
Regardless of how much time each TA actually spends working in a week, my interpretation of this self-report is that undergraduates think of their TAships as a higher priority than graduate students do. Undergraduates are awarded TAships based on an application submitted voluntarily and are hired to fill in positions that cannot be filled by graduate students. The few positions available to undergraduates are said to be selective and competitive, so undergraduate TA’s are typically enthusiastic about teaching. On the other hand, TAships are required for graduate students. The common consensus among graduate students tends to be that there is more pressure to be a productive researcher than to be a dazzling teaching assistant, so a TAship may be viewed as a burden rather than an opportunity.

While both undergraduate and graduate TA’s interviewed hope that their students will come out of CHEM 100 with a firm knowledge of general chemistry, the undergraduate TA’s seem to cater their classrooms more towards students’ achievement of academic success while graduate TA’s seem to cater their classrooms more towards developing knowledge of chemistry. For example, all TA’s for CHEM 100 are given the same instructions to collect even-numbered problems as assigned on the class syllabus as homework and to write and give quizzes that take 30 minutes with averages of 65-70%. However, I found that some TA’s craft their own homework assignments that are not from the syllabus. While the two graduate TA’s interviewed collect even-numbered problems, the two undergraduates interviewed do not. One undergraduate TA interviewed feels that the problems on the syllabus are confusing and not always useful, so she makes students write out and turn in their work for their web assignments; another undergraduate gives students old test problems as homework. Additionally, quizzes written by graduate students typically yield lower averages of 60-65%, while those written by undergraduates have 75-80% averages. Although quiz scores are normalized between sections at the end of the semester, one undergraduate TA opined that averages of less than 70% on quizzes are detrimental to student confidence and do not help students learn.

Each week, CHEM 100 TA’s are also given a packet of “TA Notes” written by the professor of the course. This packet includes all of the information that TA’s are supposed to go
over as well as specific instructions about what TA's should not cover. Some TA's follow the professor's notes fairly closely, while others look over the problems he wants reviewed in class and pick their own examples—in one interview, a TA mentioned to me that an undergraduate friend used nothing but old test problems in his class. One graduate TA even teaches material the professor does not want covered when he thinks it will help students later in the course or in future courses.

In the interests of improving undergraduate education at large research universities, I pose the question: how do these differences in teaching styles affect students? Quantitatively, they do not appear to make a huge difference. Section averages on tests between all sections, regardless of the TA, tend to be within 5%. Given that a student's academic success is in large part related to her or his personal motivation and effort within a class, this is understandable. However, research by Professor Paul Kelter of the University of Illinois Department of Chemistry indicates that students tend to like having undergraduate TA's more than graduate TA's.

Therefore, three types of continued research on this topic may be helpful. The conclusions I have made are based on my interpretations as a participant-observer and shaped by conversations I have had with students and TA's outside of this research project. Therefore, I suggest that first, the differences between undergraduate and graduate TA's perceptions of their own roles and how these perceptions affect their teaching should be further explored to determine whether the tentative generalizations I have drawn in this paper reliably reflect wider trends. To probe my interpretations, I suggest a larger number of open-ended interviews with undergraduate and graduate students about their teaching styles and attitudes towards teaching, as well as several types of focus groups (among undergraduate TA's alone, among graduate TA's alone, and mixed). Observations of discussion sections, shadowing TA's during their class preparation/TA meetings, or asking them to keep a journal about TA-related activities may also be useful.

Second, administration of a survey to students about what they feel are the differences between classes taught by undergraduate and graduate TA's are, as well as analysis of TA evaluation forms at the end of the semester, could be
informative. Focus groups and interviews with students would also be helpful depending on the timescale of the continued project. This information could contribute to the existing literature about this subject. Third, professors of general chemistry courses should be interviewed about what they feel the differences are between graduate/undergraduate TA’s and how their teaching varies. Where possible, I suggest that the research be conducted with a team of ethnographers—both students and TA’s—so that the researchers may access different populations and better entertain possibilities of multiple theories and explanations.

With the analysis of further research, the Department of Chemistry may be able to incorporate student comments into TA training/teaching manuals or design a better hiring and placement process for TA’s. If the differences between undergraduate and graduate TA’s I have discussed are widely present, it may be advantageous to place undergraduate TA’s in low-level classes for mostly freshmen, where catering towards students’ academic success can serve to bridge the transition from high school to college coursework.

UPDATED: 12/1
After presenting this discuss in front of the class, I have chosen to make some amendments as follows…

My preliminary research shows that among the TA’s I interviewed, there are two different styles of teaching. One of these, I call the “Chemistry” style for lack of a better term, since it is focused mostly on teaching students the subject material/material that may be useful in later courses. The other style caters more towards students’ academic success, or perhaps teaches to the test. TA’s who teach in this style seem to display empathy for freshmen entering the university. This style of teaching relies more on helping students “pass the class” and orienting students to the university (i.e. teaching students how to study for a test, providing test-taking strategies, letting them know about tutoring options, etc.), in a way bridging a transition between high school and college coursework and environments.

In the paper I have written below, I show that I have found undergraduates interviewed teach “to the test”/cater towards students’ academic success, while graduate students focus more on the subject at hand. However, with such limited data, no larger generalizations can be made. There are certainly
graduate students who teach in the second style described and undergraduates who teach in the first style described. I am reconsidering exactly how the undergraduate/graduate difference will fit into my final research proposal.

Research Proposal: “Lucking Out” with a Good TA: One Lecture, Several Discussions
Anita Chary
December 9, 2007

Abstract
Some students in introductory chemistry classes claim to have been "lucky" to have been in a certain discussion section, indicating that although discussion sections all ought to cover the same material, there may be differences between them that students feel are significant. Pilot research reveals that in introductory chemistry classes for non-chemistry-majors, some teaching assistants' (TA's) teaching methods focus mostly on teaching chemistry, while other TA's cater their classes more towards students' academic performance and transition to the university learning environment. These TA's teaching strategies seems to reflect their attitudes towards TAing; in a small sample, graduate students taught in the former manner, while undergraduates taught in the latter manner. Quantitative research by Spinka & Kelter (2005) indicates that students prefer undergraduate TA's, but a qualitative investigation of this preference remains to be undertaken. Therefore, the proposed research project seeks to investigate how chemistry TA's teaching styles are signified both by TA's and by their students within introductory chemistry courses for non-chemistry-majors through ethnographic methods. In the context of improving undergraduate education and US math/science literacy, understanding the teaching methods that are most beneficial to students in the basic sciences is paramount.

Statement of Research Problem
Undergraduate education in the basic sciences at a large research university such as the University of Illinois can be a frustrating experience for incoming students. Students often have limited contact with their professors during large lecture classes, with the result that the majority of their learning may occur in discussion sections led by a teaching assistant (TA) (Boyer Commission on Educating Undergraduates 1998). Although a student's experience of college coursework depends largely on personal motivation and effort, some
students consider the TA critical to their success in a class. For example, a student told me she was “lucky to have had awesome [chemistry] TA’s” her freshman year and that she does not think she would have made it through her classes if it were not for them. On the other hand, a TA told me that as she was holding office hours, students who are not in her discussion sections overheard her explanations, approached her telling her that she was a “good” TA and that they had a “bad” TA, and asked if they could come to her office hours in the future. In the context of efforts to improve undergraduate education, the idea of being lucky or unlucky to have had a certain TA should be examined. Discussion sections within one lecture class cover the same material, but if students feel “lucky” to be in one section over another, there must be significant differences between them.

Pilot data gathered in Fall 2007 show that TA’s within the same general chemistry lecture course, CHEM 100 (for non-chemistry-majors), manage their discussion sections differently, perhaps because of different conceptualizations of their roles as TA’s. Some TA’s focus their teaching efforts on providing their students with a solid knowledge of chemistry, while others cater their teaching more towards their students’ performance in the class and negotiation of the university learning environment—for example in teaching students how to study for the class in review sessions, helping students find tutoring services, informing them about resources within the chemistry department, and writing mock exams to help them practice in test-like situations. Interestingly, in a small sample, graduate TA’s tended to teach in the former way, and undergraduate TA’s in the latter; their teaching styles seem to reflect different attitudes about the teaching assignment. Quantitatively, section averages on tests are generally within 5% and two sections taught by the same TA may have averages several percentage points apart, indicating that collectively students’ performance in the course is not necessarily correlated with having a certain TA. However, as indicated above, students do seem to have qualitative preferences. Furthermore, research indicates that students prefer to have undergraduate TA’s in chemistry (Spinka & Kelter 2005), but what does this preference mean? What are the qualities that make one TA more preferable than another?

**Statement of Proposed Research**

In the proposed study, I intend to investigate how chemistry TA’s teaching styles are signified both by TA’s and by their
students within introductory chemistry courses for non-chemistry-majors. These students’ majors range from philosophy to biology to engineering, therefore their expectations of these courses and their TA’s vary depending on how much chemistry they will use in their future educations and professions. Through participant-observation as a TA for a general chemistry class, I will first investigate what TA’s do both in and out of the classroom to analyze different categories of teaching styles. I will relate these styles to TA’s ideas about their job responsibilities. Second, I will evaluate which qualities of TA’s students feel help them learn most effectively and which benefit them the most. I will also relate students’ preferences about TA’s to the expectations they have of the chemistry courses. I hope to apply this data to determine whether generalizations can be made about how undergraduate TA’s teach vs. how graduate TA’s teach and about how students react to undergraduate vs. graduate TA’s.

Methodology
In the first phase of the project, I will concentrate on gathering TA’s ethnographic accounts through participant-observation, interviews with TA’s, class observations, a time-allocation exercise, and a survey followed by focus groups.

As a participant-observer, I will gain familiarity with a chemistry TA’s responsibilities and how students respond to different teaching styles as I teach two sections of an introductory course. I will also take part in TA training, a two-day orientation to TAing in late August, in which only graduate TA’s are currently required to participate, in order to acquaint myself with the rhetoric and teaching techniques graduate students learn before they begin their assignments.

I also plan to conduct several interviews over the course of one semester with both undergraduate and graduate TA’s about what they do as TA’s, how they teach, and how they approach teaching. These will be semi-structured interviews, mostly following what my respondents wish to discuss, so that I can avoid leading TA’s into making statements that bolster any of my pre-existing notions about teaching. I will also tape-record these interviews and transcribe them afterwards, where consent is given, rather than taking extensive notes, in order to maximize my engagement with the respondent. As Pierre Bourdieu et al. (1993) stress, demonstrating an understanding of participants is key to interviews. I believe that my common identity with these respondents as a fellow
TA will help establish a comfortable environment for them to discuss their experiences honestly. However, I am also aware that the location of an interview plays a role in a respondent’s discourse (Bourdieu et al. 1993). For example, certain environments such as a TA office or classroom may be conducive to TA’s describing their jobs as they ought to be, as prescribed by the department, rather than as they experience them. Therefore, I will ask TA’s to choose an informal and non-academic environment, such as a café, which will minimize intimidation.

After interviewing a TA, I will observe her or him teaching discussion sections and helping students during office hours to learn how each TA interacts with students and what activities occur at these times (such as group work, discussion of administrative issues or homework questions, etc.). As discussed in Anthropology 411, Methods in Cultural Anthropology (University of Illinois, Urbana-Champaign, Fall 2007), people may alter their behavior when they know that they are being observed. However, I will assure TA’s that no evaluative judgments are being made that could affect their jobs; I will also observe each TA in discussion multiple times so that they become accustomed to my presence. I will also sit through classes with the students as a student so that my presence is unobtrusive to them.

In my pilot research, a time-allocation survey was helpful in illuminating differences between how TA’s spend time working. I will expand on this technique by asking TA’s for a preliminary estimation of how much time/week they spend TAing, followed by having TA’s keep a time log/diary, in which they would write a short entry about how much time they spend doing anything TA-related over a two-week period. As Gross (1984) discusses, people may over or underreport activities in these diaries, but I believe that these accounts have their own realities and will reflect how TA’s prioritize and conceptualize their jobs. Furthermore, this is much less intrusive than my direct observation of their TA-related activities and more reliable than survey data, in which some TA’s in the pilot research project misreported time they spent TAing (perhaps because of not considering the question in depth given the short length of the survey).

After collecting data from several TA’s over the course of the semester, I will hone in on differences between sections/teaching strategies. I will prepare a report for each
TA interviewed including how and why the person became a TA, opinions about TAing, activities and amounts of time the TA spends on the job per week both in and out of the classroom, and my notes from classroom observations. I will read these comparatively to describe different categories of teaching styles and will be open to amending and adding to the categories I have described above from preliminary research.

I will also examine similarities and differences between undergraduate and graduate TA’s, both from the reports I prepare as described above and from a self-administered, online survey with open-ended questions about undergraduate vs. graduate teaching styles. I will ask TA’s about whether undergraduate and graduate TA’s teach differently, and if so, how. Personal interviews about this topic could be intimidating, and therefore an anonymous survey will allow participants a greater degree of comfort. I will next choose respondents randomly from this group to conduct three focus groups of 3-5 TA’s. The first focus group will consist of only undergraduates, the second of only graduates, and the third will be mixed. I will employ this technique in order to compare how TA’s think collectively and individually about the topic and examine how some TA’s statements may influence the opinions of others (Gibbs 1997).

In the second phase of the project, the following semester, I will gather ethnographic accounts from students about their experiences with TA’s. I will begin with an online anonymous survey in order to collect data from a large number of students (Bernard 1995). Student participation will be elicited through a mass email to all students enrolled in introductory chemistry courses. In the pilot project, students had difficulty answering questions with forced-choice answers and rating scales, therefore I plan to use Fink and Kosecoff’s (1998) “LB/LL” method, asking students to list three things that they like best and like least about their discussion sections, as well as open-ended questions about their expectations of their TA’s and positive/negative experiences with introductory chemistry courses. The survey will state clearly that students’ responses have no effects on their grades to maximize respondent comfort.

I will interview a smaller number of (randomly selected) students who respond to the survey about their previous good/bad experiences with TA’s and discussion sections and
what they hope to get out of such classes. I will use “keyword analysis,” a method detailed by Strauss (2005), in which ethnographers look for and examine words that respondents use repeatedly and carry a special significance. Keywords that show up across interviews may indicate important concepts to students. Furthermore, in order to describe students’ ideologies, I will also look for students’ value assumptions, described by Fairclough (2003) as ideas about what is desirable or good. I will also use focus groups to learn about students’ shared experiences and to allow them to brainstorm about what would improve their experiences of discussion sections, since focus groups are often effective in generating a flow of ideas (Morgan 1988). It will be of interest to correlate different needs and ideas about what makes a “good” TA/discussion section, depending on what students hope to achieve in and take away from a course. The focus groups will therefore also explore how students perceive chemistry courses in relation to their majors and career paths.

Positionality
Having taught and having been a student in these types of classes, I must acknowledge my subjectivity. I will therefore allow participants to view and comment on my written analyses of the data collected in this project and discuss their own interpretations with me (Duneier 1999). Additionally, in order to avoid simply looking for support for my pre-existing opinions about experiences of undergraduate education in the basic sciences, I will allow respondents to guide the interviews as much as possible. I will ask relevant follow-up questions rather than only allowing discussion of topics of immediate interest to the research project (Anderson & Jack 1991; Weiss 1994). Lastly, in the written ethnography, I will include my own voice in interviews when quoting respondents so that readers understand the context of responses (Bourdieu 1993).

Ethics
This project relies heavily on the participation of respondents. I have found that most students and TA’s respond positively to interview requests and do not foresee difficulties with recruitment, but I will give all respondents my contact information and the opportunity to withdraw from the project at any point. Because respondents may disclose personal information that could potentially damage their reputations as students or TA’s, I will refer to all students and TA’s by pseudonyms. I will also limit the amount of information I
provide about individuals who may be easily identifiable from personal characteristics.

As noted by Pierre Bourdieu (1993), researchers must be aware of power relations between themselves and respondents. I hope to lessen the effects of power that I have as an interviewer by emphasizing that I am an undergraduate student to student respondents, and that I am a TA to TA respondents. I will also emphasize to students that their voluntary participation will not affect their grades in any way. I will not interview any of my current or past students.

Another issue that I will address, raised by Fink and Kosecoff (1998), is that it is insensitive to ask people about circumstances and situations that researchers do not have the means to improve for the respondents. However, I believe that providing students with opportunities to critique their education will be empowering for them (based on experiences in conducting pilot research). I will also inform respondents that their participation in this project may not change undergraduate education in the years that they attend the university, but that resulting recommendations will hopefully be considered in the future.

**Significance of Research**

This research may have the potential to improve undergraduate education. By examining different TA’s teaching methods and strategies and analyzing which of these are most helpful to and preferred by students, the Department of Chemistry will be able to incorporate new information into TA training sessions and manuals. Introductory courses may also function in acquainting students with the university’s learning environment; therefore, if undergraduate TA’s are indeed generally found to help students get acquainted with the university learning environment more so than graduate TA’s, the Department of Chemistry may consider assigning undergraduates to TA classes that students will most likely be taking as they transition from high school to college. This research will also be applicable to other departments and universities that plan to adjust TA hiring and training processes. Finally, in light of the US’s poor math and science literacy by global standards (Mervis 2007), the function of introductory courses in making students comfortable with scientific materials is paramount. Providing learning environments that aid students in developing problem-solving skills and confidence in the
sciences may have implications for their understanding of numerical and scientific trends outside of their undergraduate education.

References


EUI Links: Work Cited:
Gonzalez-Brennan, Ashley, Do Resident Advisors’ Perceptions of Their Jobs Vary From One Residence Hall to Another?, in the Illinois Digital Environment for Access to Learning and Scholarship, http://www.ideals.uiuc.edu/handle/2142/1899 (accessed October 14, 2007)

This research project by Ashley Gonzalez-Brennan is methodologically and topically related to my inquiries about how Chemistry TAs’ perceptions of their role in their discussion sections affect their teaching. Gonzalez-Brennan’s study focused on how Resident Advisors in two different halls had different perceptions of their jobs. While her study did not focus as much on how their perceptions affected their job performance as mine does, I thought this was topically related to my project; both TAs and RAs can play significant roles in terms of impacting students academically/socially and as authority figures. For this reason, I thought learning about how RAs conceive of their own roles and responsibilities
would be relevant to another very student-oriented job of being a TA.

Additionally, her methods were similar to what I hope to do. Gonzalez-Brennan interviewed RAs from two different halls and studied their group and individual dynamics as a participant-observer. She attended some of their staff meetings, participated in staff activities, and interviewed individual RAs from each of the halls. She was also previously an RA herself for two years, so she was able to use her own experiences in structuring her observations and interviews. Just as Gonzalez-Brennan examined different groups within one organization, I plan to work with different TAs within one course. I plan to observe discussion sections and interview TAs individually, as Gonzalez-Brennan did by observing each hall and interviewing RAs. However, her work also involved analyzing group dynamics and discussing how group meetings contributed to RAs’ self-perceptions. I may use her method of observing a staff-meeting to consider how personal interactions and collaboration between TAs contribute to their attitudes towards discussion sections.

Reflect: In terms of the online interface: I enjoyed working in an online environment in which other students could comment on my work. Other students' comments helped narrow my research interests. However, I feel that the web interface for writing each entry could be better--for example, if it were possible to comment on a specific entry, rather than on the whole project in general by default, it would be preferable. I also think the moodle page for each student research project itself is aesthetically intimidating--if each entry could be clicked to display the text on the page, rather than having all the text there automatically, that would be an improvement as well (think--on computers when you open up folders, you have the option of displaying all the documents in that folder, or clicking on an arrow tab so that everything in it is hidden--that's what I'm thinking).

In terms of the actual research itself: IRB limitations in this project were frustrating, although they could be accommodated because of the short duration of the research. Another frustration was that I collected limited data, so I feel very tentative in drawing hypotheses from this research--I think several of my classmates agree that we weren't always sure about the direction of our project because we hadn't
conducted enough ethnographic research.

Archiving: I am a little bit nervous about archiving, but I like the idea of our research projects actually having some meaning and not just sitting around on our hard drives, unused for years. I chose to archive with my name attached to the work, simply because I want anyone who is interested in the project to be able to contact me with questions about it. With the fact that I am archiving, I would like to be especially careful to note that my data is from a very small sample and that I am not trying to argue that one style of teaching is better than another--that is up to students to decide.

**Recommendations:** Based on preliminary research, undergraduate and graduate teaching assistants in the Department of Chemistry at the University of Illinois conceptualize their roles in the classroom in different ways. Undergraduates, for whom teaching is voluntary and application-based, seem to perceive the job as a higher priority than do graduate TAs, for whom teaching is a requirement. This appears to cause discrepancies among how discussion sections are taught. Undergraduates seem to cater their classrooms more towards students' achievement of academic success, while graduate students seem to conduct their classrooms more in line with a goal of students having a solid background in general chemistry. It is recommended that the university conduct further research about how classes taught by undergraduate and graduate TAs differ and whether students and professors prefer to have undergraduate TAs or graduate TAs. The University's Chemistry Department should seriously consider these results in order to design a better system for deciding how and when to hire and place undergraduates. If undergraduates are widely found to cater their classrooms towards students' achievement of academic success, it is recommended that undergraduate TA's be placed in lower-level classes that help freshmen transition from a high school to college course load. This will fit into the University's larger goals of improving undergraduate education.