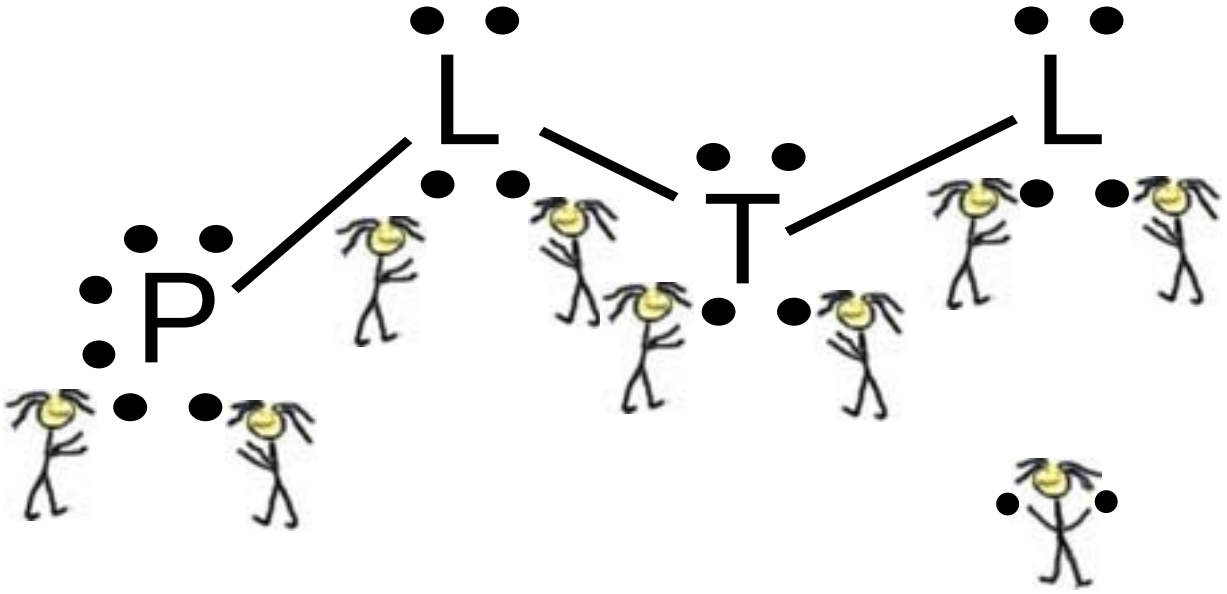
Satisfying the Octet:



Greatest Challenge as a PLTL Leader

SAM Course Fall 2003

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The cover was designed by Maria Littrell and Shanelle Williams.

Introduction

Satisfying the octet. These words fill my mind with images of "happy" Lewis structures. As general-chemistry students learn, the basic principle of Lewis structures is that atoms in molecules form bonds (share electrons) to achieve a noble-gas configuration (i.e., have an octet of electrons surround them). Odd as the following may sound to others, I thoroughly enjoy drawing Lewis structures: pushing electrons here and there, determining formal charges, and seeing different options of electron distributions in a molecule. I delight in satisfying the octet in Lewis structures. G. N. Lewis was a remarkable person to develop such a simple and elegant, yet remarkably useful theory.

Satisfying the octet in PLTL. My mind sees eight students in a group working together weekly to solve problems, to discuss concepts, and to immerse themselves in chemistry. Atoms in molecules share electrons to achieve their desired configuration of a filled shell; students in PLTL groups share their questions and ideas to achieve their desired goal of learning chemistry and becoming mature learners. How do we as instructors and peer leaders satisfy this octet? What are the challenges we face? The essays in this book discuss the greatest challenges our peer leaders had as PLTL leaders in fall 2003. To understand the challenges one faces as a peer leader, a definition of what is a peer leader is essential. Below is my attempt at describing the peer-leader position at Washington University.

Who can be a peer leader? A peer leader for General Chemistry at Washington University in St. Louis must have the following qualifications: successfully completed our General Chemistry 111A and 112A courses; participated in the PLTL study groups while taking these courses; and successfully completed the nomination process which consists of an application, a recommendation letter, and an interview with a chemistry instructor and current peer leaders.

What is the role of a peer leader? A peer leader facilitates the PLTL study groups. He or she is not a lecturer, teaching assistant, or tutor. Nor is a peer leader someone who is an expert in chemistry. He or she is a facilitator, which incorporates multiple roles such as motivator, guide, task-master, group builder, and coach. He or she is a mentor or role model for the study group. Workshop leaders are friendly and

supportive of the students in the study group, but they are employees of the University (at least during the workshop). Hence a peer leader should demonstrate a genuine concern for the students, but keep the focus on the students' academic needs during the workshop.

How does a peer leader facilitate the PLTL study group? A peer leader does not give out the answers, nor does she or he help solve the problems with the students in the study group. A successful peer leader guides and encourages the group as the group solves the problems. A peer leader guides the group to actively engage with the materials and with one another. PLTL facilitation deals with fostering collaboration and assisting students in working together as a group to solve the problems given them.

Because the students in the PLTL study groups must learn to work as a group, it is important that a peer leader set the tone for the discussion in which individuals' comments are respected, criticism among the students is constructive, and all members have an equal opportunity to participate. The peer leader is responsible for the process - that is, managing the time, keeping the discussion on track, and developing consensus. The participants are responsible for the content. The peer leader is responsible for empowering the students to take control of their own learning.

To accomplish the goals of PLTL, the peer leader needs to know techniques for dealing with different personalities, unprepared students, different learning styles, diversity, and group interactions. These techniques are discussed in the SAM course that all new peer leaders take. Peer leaders know from studying chemistry, it is one thing to learn about techniques in a course and another to use these techniques in practice. As one will see when reading the essays contained in this book, the ability to satisfy the octet depends on implementing these techniques in a way that is complementary to the peer leader's personality and style. Turn the page and enjoy discovering ways to satisfy the octet in PLTL.

Regina Frey

Where's the Answer Key?

by Cate Allen

Almost everyone starts the same way. They imagine 7 over-achieving students, anxious to succeed at Washington University who will fly through the problem sets in no time, and everything will be a breeze. Instead, you end up with 7 smart freshmen, fresh out of high school, who have never had to think analytically nor complete problems without an answer key or a "procedure" for doing every question. And the good news is: they think you're a chemistry genius. After a few sessions, they realize maybe you don't know everything, and you realize they know a lot more than you thought. After I discovered how much everyone knew, I had to convince the students themselves how much they were capable of doing.

Going to the first few "Gen Chem" lectures can be pretty terrifying. You walk into a huge lecture hall full of 400 scared freshman all determined to be doctors. Then you do a few problem sets and get to the quiz and see something you've never seen before. "It's not fair," some might say. "We never learned that," is another one I've heard. Fortunately for them, they have a great study group available to them, and I have to say that the whole experience has been very rewarding for me and hopefully for the students in my group as well.

The philosophy of Peer-Led Team Leading really encourages students to understand that the concept is what matters—not necessarily the answer. An answer key does not exist in study group nor does a massive book have all the answers in the real world. With everyone brainstorming, discussing, asking questions, and actively learning, the students learn that individually they may not have the answers, but as a group they can work through all of the problems and see the logic behind the solutions. I've led a few sessions where the students don't necessarily get the correct numerical answer, but they understood the concept and how to work the problem, so I made the choice to forego correcting them. They had performed slight calculation errors, but that was not what was important. I knew that if they had made the same exact error on an exam, they would have lost a point or two. I try to let the people in the group realize that understanding the

big picture is what matters. The numbers are fairly insignificant—but high school teaches you that they're everything, and to "undo" that mindset takes some work.

Have you ever been in a class where a student always seemed lost and consequently just gave up? Study group gives students the opportunity to get back on track and realize they really know a lot more than they think. I had a few students in my group who lacked quite a bit of confidence in the beginning, but because other students in the group included them and talked them through questions, they began to participate, catch on, and learn what to look for when facing a daunting problem. Pretty soon, they discovered what their strengths were and in turn became leaders themselves. They started teaching concepts they understood to the other students who were unsure about certain topics. Just having other people look to them for the answers made them feel like their input was valuable and hopefully that transfers to confidence in themselves come test time. Seeing the once-struggling students take on a leadership role and succeed is highly rewarding and makes you want to come back to the group next week and see how they have progressed.

Being part of a group that, in my experience, improves rapidly and starts working better as a unit each week makes for a pretty worthwhile job. I think most leaders will agree that watching the somewhat-frightened freshmen figure out that they can meet for a few hours each week and take what they learn in a casual group setting and apply it to how they study and learn individually is exciting. Pretty soon, after they discover that you may not be the chemistry genius they once thought you were, they look to each other and realize that as a whole, they actually do have the answer key—the key is in their expanding mind and as a group, they have all the answers they ever wanted.

Satisfying the Octet

by Cody Anderson

Apprehensive and excited. These two words can describe any number of situations, ranging from your first day of kindergarten to your first day as a doctor, but they also accurately describe the feelings I experienced prior to my first PLTL session as a leader. As a naturally shy person, I faced more problems with my own feelings and insecurities than I ever experienced as a PLTL leader. I honestly had no idea why Dr. Hockings and Dr. Frey chose me as a PLTL leader at the beginning, because I knew that I would teach something wrong or cause my students to fail the class. I was terrified of working problems with the other group leaders; I knew that I would work problems incorrectly and all the other leaders would wonder why Dr. Hockings and Dr. Frey had chosen me as a leader. I loved General Chemistry my freshman year, but I completely lacked confidence in my own abilities as a student and a leader.

As a shy person, I have never felt completely comfortable in small groups of people; I can play an instrument in front of an audience of two thousand, but if I have to explain a concept to a group of a few students, I worry that I will make a mistake. PLTL helped me to overcome a lot of my fears my freshman year, but when I became a leader an entire new set of insecurities appeared. What if I made a mistake? What if the students thought I knew nothing about General Chemistry? What if I didn't know the answer to one of their questions? I did not want to make a huge mistake, so I prepared very well for the first session, but I discovered something after that first session that eased a lot of my insecurities. The students in the PLTL groups do not expect the leader to know everything about General Chemistry, because they know the leaders do not have degrees in chemistry. If I don't know the answer to a question a student asks me I tell them the truth, and if I cannot find the answer during the session I tell them to either go to a help session or I tell them that I will find the answer and let them know next week. A leader cannot answer every question perfectly all semester.

Before the first session where the PLTL leaders work problems together, I had no idea what to expect. I truly thought that I would make a fool out of myself during the class by incorrectly working every problem. Every other leader is a chemistry or biology

major, and I definitely felt as though I could not lead as effectively as someone who majors in a science subject. After the first class for leaders, I no longer had any fears at all. We all know the material, and we all make mistakes on occasion. None of us have worked these problems in at least a year, and we all forget certain things at some point; none of that means that we do not know the material.

Transitioning from a student to a leader can pose some difficulties, but none of the problems that I encountered proved impossible to overcome. At first I thought that I might seem too much like another group member and that the students would not respect me as the leader, but I found that the students readily look up to the leader. The students just need someone who can help them to learn the material in different ways, and they do not care if that person knows everything about chemistry, as long as that person can help them.

I did not know whether I would make a good PLTL leader or not, but I tried to do things the best that I could throughout the semester, and everything turned out fine. The biggest issue I faced throughout the semester centered on my own fears and insecurities. Once I became comfortable in my role as a leader, I had no problems fulfilling my task as a leader. I learned one very important lesson during my first semester as a PLTL leader. It does not matter if you are extroverted, introverted, or apprehensive. If you know the material and will work hard to become a good leader, you will succeed as a PLTL leader. “The most dangerous leadership myth is that leaders are born -- that there is a genetic factor to leadership. This myth asserts that people simply either have certain charismatic qualities or not. That's nonsense; in fact, the opposite is true. Leaders are made rather than born” (Warren G. Bennis).

Why Can't You Just "Get It"?!?!?

by Scott Bevan

My initial thoughts of becoming a PLTL leader and being responsible for leading eight freshmen through difficult chemistry problems were not so positive. I thought that my somewhat passive, non-intervening personality would just get eaten up by rowdy students hell-bent on getting an A, no matter the cost. I remember my first PLTL Study Group Session and needless to say, it did not go well. I felt that I gave the group members five minutes to do a problem when only a few seconds had passed. Any moment of silence felt like an eternity. This feeling of helplessness was by no doubt a common occurrence among my fellow group members as well. Overcoming my fear of silence and my fear of failure has been my greatest challenge as a PLTL leader. This challenge has been met with great success. The greatest advice that I can give to you, future PLTL leaders, is quite simple. When things seem so bad that they can't get worse, so bleak that you just want to give the students the answers and leave, or so silent that you can hear a pin drop, there is only one thing that you should do; be patient!

This simple advice seems just that, too simple. How can just being patient solve all these problems? The answer lies in the goals of group study and in the big picture, the philosophy of Peer-Led-Team-Learning. There is no agenda or checklist in group sessions. There are no schedules or requirements for what needs to get done during a given session. This is a very important point. As a leader, you cannot get discouraged if the group does not progress smoothly through the problems. The philosophy of PLTL says that this is in fact, a good thing. It allows students to try and work out the problem on their own, because as you all know, "in real life, there are no answer keys". Being patient and just stepping back and letting the students work may seem like you are not doing your job, but in fact, the opposite is true. Your job as a PLTL leader is to let the students do the work and allow them to build their confidence and problem solving abilities. This objective is achieved through passiveness and being patient, not intervention and acting as a "teacher". As a three semester veteran of PLTL leading, I can tell you that this is not a simple task. I have still never been satisfied with my level of involvement in a group session. It is quite difficult to not stay involved, especially

when the answers seem so simple to you. One thing that you don't want to do is get frustrated. That is the main thing that I tell myself before each session, don't get frustrated and just have fun. Sometimes, actually…, a lot of times, things do not really go the way you want them to. This is just part of the fun of being a PLTL leader! All you can do is be patient and do the best you can.

As I stated earlier, there is no agenda in PLTL, so just do what you can with the group in the allotted two hours and be happy with it. No grades are given and your job is not at stake, so just go with the flow and most important, be patient! There will be numerous times when you will wonder why your group members don't just "get it". It can, and will be, frustrating at times, but the goal of PLTL is to have a good time and help the students understand Chemistry.

A Guide Rather Than a Teacher

by Mehul Bhakta

The PLTL program was very beneficial while taking general chemistry. It encouraged group participation by allowing students to openly discuss chemistry. However, as a group leader, I was trained to no longer participate in the group. My role was that of a guide, to ask questions and direct the conversation to be as productive as possible. This transition from an active group member to a more passive leader was more difficult than I had anticipated. The greatest challenge was to fight the temptation of participating in the group as I had done the previous year.

A number of realizations convinced me that being a guide was indeed more rewarding than being the member with all the answers. My first realization was that if I were a more active leader, I would be going against the philosophy of PLTL. The entire reason PLTL was started was to teach students how to work in a group. If I were to assume the role of a teacher rather than a guide, PLTL would be nothing more than another organized help session for chemistry. Although this may benefit some students, the majority of students do not need another help session.

Another realization was that I would be robbing the students of valuable skills if I were a teacher rather than a guide. Working in groups and learning how others think have been very valuable skills since my freshman year of college. I applied the same principle to a variety of my other classes. Before any major test, a group of us students would always gather and teach each other the material. By studying in such a manner, students reinforce key ideas and concepts and learn to present them in new ways. This tactic was especially helpful in Calc. III and Orgo I and II. I did not know how to study in this manner before college. I believe that I learned these skills while in PLTL. If PLTL were just another help session, I would have never learned how to learn.

The last realization that I had was that students will learn material far better if they are forced to struggle through the difficult problems. By struggling through the hard problems, students have to review and analyze the class material and recombine ideas in creative ways. Although some students will get frustrated, the students will feel overjoyed when they eventually get the answer. This has the added bonus of boasting

confidence as well, which is essential to good test taking. I have seen and experienced this self-esteem boast a multitude of times and it really does make a difference when taking a test. If we leaders were there to just hand out answers, students would not try the difficult problems at all. They would not only be less prepared, but they would also feel less comfortable with the class material. Thus, by giving out answers, the entire purpose of PLTL is defeated.

These three realizations helped convince me that by being more of a guide, I could better help my group. Although the students may initially prefer a group leader with all the answers, the students will thank you for being a guide in the end.

Satisfying the Octet

by Kristin Castillo

When I first came to school at Washington University, most of the upperclassmen that I spoke to about my class schedule immediately warned me about General Chemistry 111. I was told that the course was impossible. The exams for the class were supposed to be the most difficult at the school, and by all accounts, no one had ever done well in the class. Needless to say, I entered chemistry lecture the first day as a scared freshman, wondering if I had been crazy to think that I could handle the course.

It only took a few weeks to realize that although chemistry was difficult, it certainly was not impossible. I had joined a PLTL Study-Group, and its weekly meetings not only increased my understanding of the concepts, but they also helped me to gain confidence about the course. A year later, I have now had the opportunity to transition from being a member of a PLTL Study-Group to becoming a leader. The experiences that I have had while holding this position have been among some of the most rewarding and challenging in college.

As a study-group leader, the ability to adapt to a specific group of students and work well in that environment is crucial. Because each student in the group brings a particular strength and perhaps a weakness to the group setting, a leader must be perceptive to the different personalities and the overall group dynamic. While one person in the group may be very outspoken and quick to answer questions, another group member may be timid yet able to offer important insights to the problem-solving process. It is the role of the leader to recognize how to work with these different personalities so as best to encourage and facilitate a positive learning experience.

Adapting to the group includes recognizing the diverse learning styles among students. It is important to adjust teaching methods so they are tailored to the specific group of students and can best encourage their learning. For instance, in my particular group, one student explains most concepts on the board with equations, and another student primarily uses visual methods. After identifying these different learning styles, it was important for me to find a way to incorporate both visual and equation-based descriptions into my explanation of every concept. In particular, I found that the most

effective ways for me to present material to the group is by first drawing a picture and then supplementing the picture with equations. As a visual learner myself, it has been a challenge for me to think of equation-based explanations to make my points, but in addition to helping the group, it has also caused me to gain a deeper understanding of the material.

Another challenge for me has been in learning to help the students solve the problems by themselves rather than simply showing them the answer and then explaining the methods used. For my particular group, I have found that the most effective way to help the students is by asking questions about concepts. If the students have difficulties with a problem, I immediately try to ask questions about the core concepts involved and encourage them to look up definitions and equations in their notes. After gaining a clearer understanding of the concepts, the students are better equipped to work together to solve the problem. By relying on each other rather than me, the group members are learning a new way to think that will be useful in exams and other courses that they will encounter.

Altogether, the transition from a student in a study-group to a peer leader has been challenging. While this process has allowed me to increase my ability to perceive different group dynamics, learning styles, and group situations, it has also increased my knowledge of core concepts in chemistry. The obstacles encountered have taught me useful skills that can be applied not only to future experiences as a study-group leader but also to other facets of my experience here at Washington University.

Teaching Anxiety

by Ronald Chen

As ridiculous as it may sound, I had the students make nametags on the first day. This was my attempt to make the students to feel comfortable. My next objective was to let the students understand PLTL's philosophy. During the first two or three sessions, I spent most of my time concentrating on not violating the PLTL philosophy. However, I struggled immensely with one aspect of PLTL. Especially in the beginning, I caught myself explaining too much. Anxious to teach them, I fell into the trap of being a tutor instead of a mentor.

If you are confident about your understanding of a subject, you know at least one way to approach problems within its realm. In fact, you probably "have it all figured out." Sometimes you may feel this way on certain topics during throughout the course of the year because you have already been exposed to the material previously. As a result, you may feel the urge to share your methods with others. This is teaching, a clear violation of PLTL philosophy.

Maybe you picture a concept in a way that seems the most clear. Perhaps you know of other ways to approach the problem, but in your mind, they are all inferior methods as compared to yours. These other methods are either more cumbersome or are not as direct as yours. Because you want to help the students realize how easy it can be, you try to explain your thoughts to them. However, they don't think of it in the same way, and your explanation does not have the same effect on them. As a result, you have achieved nothing, and they have not gained any significant insight. Two possible solutions to this problem involve either learning many ways to solve a particular type of problem and being able to explain those using different angles, or just letting them figure it out on their own. Following the PLTL philosophy, the second approach may be better.

Many of you may be taking organic chemistry now and have become very proficient in determining formal charge and drawing Lewis structures. Your students have not gone through organic chemistry and consequently have not been exposed to Lewis drawings to the extent that you have been exposed. A simple drawing to you may not be as simple to them. Your inclination may be to tell them to "just draw it," or to

make the molecule “happy.” Or, as in my case, formal charge is just the difference between the electrons that belong to the atom and the ones that do not. These instructions or “definitions” may be very meaningful and easy to you, but they will not mean anything to the students. Being flexible has helped to deal with these urges. Allowing other members of the group explain their methods of approaching a problem has prevented me from doing the teaching. The other members of the group are peers to a greater extent than you. Even though you are a peer mentor, the way you approach the problems differs from the way they do, mainly because they have just been exposed to the material. In realizing this notion, I have tried allowing the students to play around with the problems using their own methods. This method will try your patience; however, realize that if they can find it out on their own, the effect is better than telling them what to do.

Being a first-time leader, you may think that your chemistry skills are not good enough, or that you don’t have enough knowledge of chemistry to be leading a group. You have no need to feel this way because you are not supposed to do any teaching, and you are not a doctor in chemistry. You’re a peer like everyone else!

After the initial sessions, my anxiety level decreased to a manageable level. I stopped offering too much guidance. The students, in turn, respected my role and knew that I did not give answers and was not there to teach. Lay back, relax, and let the students get dirty with chemistry their way. You will be surprised with the results.

Is That Right?

by Catherine Choi

On that first Sunday afternoon, I walked into the Gregg seminar room feeling pretty confident. As the students slowly trickled in, I offered cheerful smiles and initiated some informal conversation to break the ice within the group. It was not a difficult task to accomplish. Within a few minutes, the students were appearing relatively comfortable with each other, and as we went through the problems, each person contributed equally, unafraid to express their opinions or questions.

By the end of the session, I was feeling rather proud of my group's progress. I felt as though we had set the stage for good group-dynamic potential, and I was very optimistic about the future of the study group. Unfortunately, that feeling did not last a very long time. In the following sessions, students were frequently absent or tardy, either with or without prior notice. Such actions quickly undermined the growth of group dynamic, an aspect I found quite disappointing. By the end of the semester, two students had dropped out, and irregular attendance was still a commonality. In one particular session, only one student was present! I was quite shocked.

Hence, this year's study-group experience has been quite different from what I previously expected. As a participant in a study group last semester, attendance had always been quite regular, and I thought the same would apply this year to my own group. Now I realize that not every peer leader's experience is the same. Perhaps the biggest disappointment about such irregular attendance was that it was not immediately within my control to fix. Despite my attempts to email the absent students with motivating messages in hopes for their return the following week, student attendance did not improve.

In terms of my experience as a peer-group leader, I thought it would be relatively straightforward: I would just have to offer a little guidance here and there, and the students would do all the work themselves. After having led a study group for the past semester, however, my views have changed. First of all, the responsibility is not as simple as I had previously thought. The students have been much more reliant on me as a

teacher-figure rather than a peer facilitator, and so it has been somewhat difficult trying to stick to the PLTL philosophy while satisfying the students simultaneously.

Certainly, the biggest challenge that I have faced as a leader this year has been maintaining the appropriate balance between peer and teacher roles. I find it hard to refrain from answering the students when they continually pose questions about whether their solutions are correct or whether they are implementing the correct strategies. Although I have been trying to match their questions with my own questions to stimulate their own responses, this technique has not completely stopped the questions from arising. At times, it gets to be quite frustrating when I am bombarded with "Is that right? Is that right?" knowing I cannot easily answer that question. The students also appear to grow frustrated at not being able to receive a tangible answer for their questions.

Yet, the experience as a whole has been a good one. It has helped me pinpoint and strengthen my areas of weakness, along with giving me the opportunity to interact with other students in a different way. Additionally, it has exposed me to the variety of different learning styles that do exist and has helped me become more patient with explaining concepts to beginners. Despite the difficulties I have witnessed this semester, I continue to remain optimistic as I look forward to another semester of PLTL.

Being an Effective PLTL Leader

by Dan Daranciang

When students enter my PLTL room, I want them to feel like they're in a comfortable environment. Although it is their responsibility to learn the material before they come to group, they should feel okay asking questions when they don't understand something. Students should also feel confident that their leader knows the material. Even though the leader is not supposed to provide answers for the group, and therefore spends a lot of time staying silent, the leader should nevertheless be following the discussion and be ready to answer the obvious questions. Hence, a lot of "behind the scenes" responsibility rests on the leader even as the group churns away at the problem set.

To my mind, the desire to be a good PLTL leader is simultaneously its greatest potential reward and its greatest challenge. The hardest thing to do and the best thing to do for yourself in any academic pursuit is to be prepared, in my experience. It's difficult enough sometimes to keep up with my own classes, never mind Chemistry 111 and 112, which I don't even take anymore. But the pressures of outside homework and the fear that I might not know something as well as I should are both challenges that threaten my effectiveness as a group leader.

The amount of homework I have can detract from my performance. Unfortunately, I'm no less of a procrastinator this year than I was last year, which means that on Sunday, all my assignments converge into one huge problem. I frequently have turn-in assignments for math that I need to work through, there are usually large readings to finish for German literature, and even if the daily work assignments are finished, the specter of long-term assignments—such as reading the orgo chapters and working all the practice problems—still looms. The collective impulse to do work that all these tasks create is hard to fight off, and sometimes requires a great deal of mental effort. Whenever I have to consciously spend time re-focusing myself on the material, I know it's possible that I'm not noticing when someone in the group needs help.

My level of comfort with the material can affect my performance as well. Although most of the time, I am comfortable in my level of understanding, there are times when I realize that I don't have the answer to questions that I'm asking myself. The

particle-in-a-box (PIB) topic is a good example of this. I am reasonably good at answering PIB questions—I know how many nodes a given energy level will have, I can explain why the energy levels get closer and closer together, and I can use Bohr's formula to calculate the change in energy when photons move up and down—but I am hard-pressed to describe the setup of the PIB theory. I have trouble visualizing the electron, which I usually think of as a particle, as a standing wave, and I still don't know the definition of a potential-energy well. Whenever I have to admit to myself during a session that I don't have the answers to certain questions, I know that I haven't prepared enough for that week. That knowledge also decreases my effectiveness.

Overcoming these difficulties shows that I am doing what I came to this university to do—to make use of the marvelous human facility to learn. Although confronting the challenges of being an effective PLTL leader is sometimes a hard task, the feeling of accomplishment that I get when I do it well surpasses joy.

Having All the Answers, but Not Really...

by Carl Gismervig

Wait, you mean that I don't get an answer key either? I thought that was just the study group. I definitely need an answer key. There should be written-out steps for me to follow in every situation for every problem, both those related to the chemistry, and those related to everything else in the group. What if I make a mistake? What if I say the wrong thing? What if I give the wrong hint, favor certain members of the group, or heaven forbid, destroy the entire group's chance of succeeding in general chemistry? What can I do? I have tons of chances to fail, and no definite way to avoid it. What in the world did I get myself into?

All of these thoughts were pounding through my head the summer before I first met my PLTL group, as I went to my first PLTL group meeting, as I left that first PLTL meeting, as I continued to lead three semesters worth of PLTL groups, and now as I write this. Whoops, guess I still don't have that answer key. So, why am I still doing this?

I have always wanted everything to be laid out sequentially—perfect order, nice little piles—so that I know exactly what I need to do and when I need to do it. Having no surprises makes me feel secure. My biggest challenge in leading PLTL has been overcoming my own fear of failing at being a PLTL leader. Fear of failure is a huge fear on this campus. Last year my dorm floor filled out getting-to-know-you type surveys, and these surveys were later posted in the common areas of the floor. One of the questions asked people to identify their biggest fear—far more popular than death, spiders, heights, or anything else was the fear of failure. Over half of the floor listed this as their biggest fear. So, I'm not alone, but that does not change the fact that I could ruin chemistry for an octet of people.

The first semester I led a PLTL group, I tried so hard to follow exactly all of the dictates of the PLTL philosophy. I remember long drawn-out silences where I only gave very meager hints. People left frustrated and confused largely because I was so focused on making them find the answers on their own that I neglected to see that they actually got the answer. When a group works together cooperatively to solve the problems they are given, the results can be awesome. Everyone has a great understanding of what is

going on, and they are pleased with their abilities. It is so much fun to sit back and watch the group solve a problem successfully. Some groups on some days need a little more guidance than other groups, as was evidenced by my first group meetings. When do I let them sit and ponder for a while, and when should I give them hints that will push them ahead? Ha, back to the answer key—remember there isn't one.

Another problem that I have had is that I cannot always motivate people to do their homework—when do little reminders about how the homework helps explain this concept (you did the homework, right?) turn into nagging nuisances that make people annoyed with me and push them into totally shirking their responsibilities to the group? Oops, here's a new question for the answer key. Wait—guess what—I did find an answer key. It is pretty short. There is only one answer on it and it fits almost every question: Trust Your Gut.

I have learned that sometimes I have to stop thinking and worrying, and just do whatever feels right. The more time I spend in front of a group, the better I am at judging their responses, their understandings, and their needs. My biggest challenge in being a PLTL leader is my fear of failing at it. My only way not to fail is to ignore that fear and simply do what feels right. When there are no detailed answer keys explaining each step of the process, I have to trust myself. I accept that I am doing my best and that is all that anyone can expect me to do.

Stabilizing the Octet

by Kelli Grim

To me, the hardest aspect about "filling the octet" was being able to facilitate group dynamics through being comfortable with the leader/peer role that I had. My personality is one such that I am a typically more laid-back and passive person. Coming into the first few sessions, I realized that my group members were really friendly to one another; yet, the stronger students did not go out of their way to help the weaker students. I told myself that I would wait until the next week, to see if the same thing would happen again; I was hoping that the students in my group, being just as mature as I am, would realize this fault and fix it themselves. Yet, the next week, the same thing occurred—the stronger students were sitting near one another and working together and finishing their work before the students who were weaker in the subject of Chemistry.

So, the following week, I had to overcome my desire to only be a peer and fulfill my leader role as well as my peer role. That following week, I paired the students into groups and specifically called on people who I felt did not understand the material. If the student told me that he/she was in fact confused, I would, then, tell one of the stronger students to explain the concept or problem to the confused student. This method worked well, because for the stronger student, having them explain a problem reinforced what he/she already knew about the problem and for the confused student, having a peer explain the problem offered more clarity about the problem than I could have probably given (since the students did not have as much experience, and therefore a general understanding of some of the concepts in Chemistry that I had). I realized immediately, after doing this that it was a great idea and that it allowed group dynamics to flow a lot easier.

After this initial time of taking on the 'leader' aspect of being a peer leader, I became more comfortable with the idea of being an authority to people who I generally saw as peers. The following week, I was even more active in my authoritative role, assigning students to go to the board or asking more pointed questions to ensure the students understood the material. As the interactions between the students grew, the students became better at explaining problems and relaying ideas and insights to one

another. Often, I was quite impressed with how the students began to relate a particular problem to a problem that they had seen in the past and to concepts that they had seen in the past. The group, in my eyes, eventually entered into the "Performing Stage" of PLTL when I no longer had to ask a student if he/she was confused because they would turn to the student sitting beside them and ask for himself/herself how the student went about working the problem; this really impressed me because often, confused students would turn to me for the question since they say me as an authoritative figure or they would, out of reservations, not voice their confusion and wait until the group had finished working the problem. Thus, through my initial facilitating of group dynamics by placing students into different groups and asking questions about the material, the students were able to overcome their reservations and, even more importantly, became comfortable enough with and assured enough in other students to ask them questions.

Even though I entered PLTL with a laid-back mentality and thought that this would be the best for my students, I eventually realized that PLTL and "filling the octet" is about engaging the students, making them think of new and different ways to solve problems, and helping them build off of the insights of other students in their group. I would have never been able to accomplish this or understand this through only being a peer. In order to accomplish these goals, I had to take on the authoritative role of leader.

Satisfying the Octet: Biggest Challenge as Leaders

by Rui Guan

Group management can be tricky, even when working with the most cooperative group. The most challenging aspect of facilitating a group has been gauging how and how much to help students in my PLTL group. I have found that there really isn't a recipe for how best to do this because each student is different. Even for the same student, what works one week may not work so well the next. So to keep up with these changes, I have been trying something new every week, resulting in the ruminations below of what worked and what didn't.

How much do I help my group? Sometimes it's difficult to judge how much is too much. If the group is stuck, leading them in the right direction is conducive to learning and time efficient. But when the students ask me if they have the right answer, I know I've led too much. When that happens, I have found that simply by asking the students to explain for themselves helps them gain confidence in their problem-solving skills.

Also very important is a good use of resources within the group. Every one of my group members is a wealth of Chemistry 111 information! They not only go to class—when they can, but they take notes. The group members have made up well for gaps in each other's knowledge and the group's notes have been useful to all when referring back to how a certain type of problem was done in class. Another trick to guide rather than lead is to look to the students for answers. Quite literally, when I look in the direction of a student who wants to explain, the entire group will look in that direction as well.

How to help the group? This is where much experimentation comes into play. As times change, the group leader's tactics must change too! In my group, there are people who are equations oriented and pictorially oriented, reflective and visual, as well as those who do not like to explain their solutions. With many different personalities, it is difficult to cater to everyone's preference all the time. Yet even in a diverse group, it is possible to accommodate different learning styles simply by asking for alternate solutions. Although this type of insightful discussion is helpful and necessary, it can be time consuming. Therefore, as group leader, know when to move on or extend discussion. Time management is key to covering all the important concepts in two hours. During each

PAM session, I make note of which problems take longer or are repetitive. Then in PLTL, I watch for and ask about my group's comfort with certain problems so that when there is a crunch for time, we can prioritize and switch up the order of problems. Another time management trick is to write an agenda. This has helped me immensely in keeping tabs on our progress and is now second nature.

During group work, it has worked well for my group to allow for a minute of independent thinking before collaborating. Most of my group likes to think alone briefly, to collect their thoughts as well as simulate quiz and test situations. While this can run counter to PLTL philosophies if done in excess, first thinking independently about a problem briefly has been conducive to group learning. After all, when people feel that they have something to contribute to a group discussion, they are much more at ease and the discussion be meaningful. I have found that telling my group to think alone for just a minute not only makes everyone feel more comfortable working together, but also makes group work more efficient.

Lastly, it is important to pay attention to those who need help but tend to stay quiet and as a result may be missed. In my group, the people who don't understand tend to change from week to week, usually due to different learning styles. Quiet members of the group may understand the material very well or very poorly. Either way, hearing what they have to say may help reveal something that the rest of the group may have missed and therein lays the benefit of group work.

Integrating New Skills with Old Experience

by Sam McMillan

There are many skills, techniques, and strategies that we learned in the Seminar in Academic Mentoring class to help us become better PLTL study group leaders. I would say my greatest challenge has been trying to use my experience as a PLTL study group leader and the new skills I have learned to better my ability to lead a study group. With all the information presented to us in SAM, how could we possibly remember everything and how to handle all situations that might arise in a study group?

Despite everything I have learned in SAM, I think what has helped me most to become a better leader is experience. The more you interact with students in a study-group setting, the easier it becomes to get them to interact together to answer their questions and solve problems. My rule of thumb is to remain as non-involved as possible as long as the group is working well together. That way your words have more weight than if you were to just tell the group how to interact and how to solve the problems. At first it is hard to hold back that natural temptation to jump in and show the group how to solve a problem whenever they get stuck. But if you give it time there might be someone in the group who knows how to solve the problem, but isn't very sure of himself, who will step up to the plate and throw out ideas. By letting the group run itself the students will feel as though it is their group and they will feel more comfortable interacting with each other.

Awareness of different learning styles was probably the most valuable thing I learned in SAM but the hardest to implement in study group. This is mostly because as a study group leader you don't really know what learning style each student prefers and some students may not speak up if they don't understand something. So it may seem as if everyone understands a certain concept or problem but there may still be students in the group or are just going through the motions, copying down the solution but not really understanding where it came from. And it's not easy to tell when a student is doing this. That's why it is sometimes necessary to take a more active role in the group and ask group members to explain how and why they did a problem a certain way. If it is an

especially difficult concept such as molecular orbitals or the photoelectric effect, I have found it useful to go ahead and present the concept from another angle. I do this by describing it with pictures or equations depending on the circumstances, the most important part being that it is presented in another manner than the one in which they learned it. This can help the students who are lost to better understand and it can help the students who already understand the problem to understand it more fully.

There isn't any formula or strategy that I used to tell myself when to do this, I relied on my experience. I know what the difficult concepts are and I remember what problems I had learning them. And although these might not be the same problems other students are currently having, it always helps to hear a concept explained from a different point of view.

All in all though, I wouldn't say there any hurdles too high to leap or any challenges to great to conquer. I relied foremost on my experience firstly as a chemistry learner, and secondly as a chemistry tutor. The skills we learned along the way just helped me to better use my experience to convey my knowledge of chemistry to others.

The First Day

by Bonike Oloruntoba

I accepted the position of a PLTL leader confidant in my abilities in General Chemistry. After all, I was successful in the class and to the shock of my peers actually enjoyed the concepts taught in the course. Chemistry to me was my Philosophy class, pushing me to think in ways I never thought I could before. However, nothing, not the extra class on how to successfully facilitate study groups or even the laid-back sessions in which my fellow PLTL leaders met to review problems could prepare me for the sudden wave of insecurities I felt as I walked in for the first session of PLTL.

It was only right for me to be a PLTL leader. I truly believed that my leaders from the previous year were a substantial factor in the outcome I had in the course. And to whom much is given much is expected. At the same time, I believed that it was important for my peers to see an African American female as a Chemistry academic mentor or a PLTL leader thereby showing that success in the course is not limited to one race or sex. However, these same points that lead me to this position held me back on that first day. Will I be able to help them as Carl and Julia helped me? Will they respect my guidance even if I was a female? Even though I was black? What if I can't explain a concept or even worse told them the wrong explanation which would lead to a wrong answer on a quiz or God forbid an exam, which would lead to failure in the course and the end of the dream to be a doctor…all because of me.

That first day of PLTL I was just as nervous as my students were about the sessions. They like me were wary of the unexpected and also insecure in their ability to communicate confidently what they already knew. Needless to say it took time for me to overcome my insecurities and just chill. I realized that I was putting too much on my shoulders and making an otherwise simple task entirely too complicated. There was something that Dr. Hockings and the other PLTL leaders saw in me when they chose me and there was obviously a reason why my peers asked me to help explain concepts that they couldn't grasp at lectures or help sessions. The day when one of my members eyes lit up with comprehension when I offered an otherwise unrelated topic to explain a concept was enough for me to realize that I was there for a reason. Enough for me to

realize that my insecurities helped once again build up my confidence in my abilities to lead a Chemistry study group and beyond.

Improvising

by Michael Reich

The ability to improvise is fundamental to being a study-group leader. Each session is unique; each poses its own set of difficulties be it a lack of attendance or rowdiness. Thus, regardless of how much a leader prepares for a session, the leader will almost certainly be faced with something unexpected. Being able to handle these issues and still maintain a successful session is imperative. This past semester, dealing with the aforementioned issues were two of my greatest challenges.

Attendance is one of the most unpredictable aspects of a study group, but is also pivotal for a group to function properly. When the majority of the students of my group were not present there were fewer productive inputs to be considered which in turn fostered an uncomfortable environment. Within every group there are those who participate frequently, those who are more reserved, those for whom chemistry comes easily, and those for whom it is more difficult. More than once this semester I have had to deal with groups of two or three students. Once, this small group consisted of the quieter students and those for whom chemistry was rather difficult – given a little push, they could work solidly to solve problems, but without the students in the group who usually served this role, the students present had much difficulty working. The students would work together, often becoming discouraged when none of them knew an effective method for solving a question. As a leader, I dealt with these situations by posing questions related to the concept that would help spark insight within the students. Doing this not only showed the students that they knew more chemistry than they realized, but it also helped build their confidence and enabled them to complete the required tasks. While this responsibility is required of the leader in every session, in a group of only a couple students, much more weight is associated with the leader's role. It becomes a great deal more challenging to maintain a productive group when there is not a balance in students' participation and abilities as is usually present.

On the other hand, a direct consequence of all group members being present is excessive socialization. One of the initial duties of leader is to allow for all the students to befriend one another in a relaxed, yet productive atmosphere. In doing this, however, I

found that friendships grew rather quickly – to the point where digressing was more of an objective for some than chemistry. As the weeks progressed I found that merely asking the students to return to topic was only temporarily effective. After solving the problem they had begun, or possibly after the next question, the students would return to conversing. While the friendliness allowed for great group problem solving when working on chemistry, it made veering off topic a more popular option. The trouble here arises because the students ought to recognize their own responsible to work on chemistry during study group and the leader has no desire to police the students. Nonetheless, when the pleasant reminder to stay on task was insufficient, raising my voice to a more stern tone kept the students on task for a much longer period of time and they quit talking about random subjects, focusing on chemistry.

It is easy to understand why these to issues are not necessarily easy to deal with. Understanding the chemistry being presented each week is within one's own control, but whether or not students are present and how they will behave in the group setting are beyond the leader. Consequently, establishing group efficacy regardless of the situation is crucial to being an effective study group leader.

Building Bonds One Name at a Time

by Tara Scherer

As I trek home from yet another successful PLTL workshop with thoughts of the SAM paper running through my brain, I wonder, "What is my biggest challenge as a leader? It's really not that hard. For the past three semesters, I've spent two hours every Sunday helping students with problems. There's not much else to it!" However, at the same instant these thoughts pass through my mind, I realize that leading a group is much more complex than it may initially appear. Images of my first workshop as a group leader bring back memories of me anxiously waiting for the group members to come wondering why they weren't there fifteen minutes early—like me. When the group members finally arrived, I was so anxious to get started on the problems that I completely forgot to take notice of the students' names that were given in the icebreaker. By the end of the session, everyone tired of me pointing to them suggesting, "Why don't the two of YOU work together?" On the walk home—much like the one today—I was confident that the students knew the concepts, but did they really know each other? I quickly realized that developing a successful group requires a non-intimidating environment that allows students to feel comfortable enough to work together to become a successful, independent group.

One of the most important factors of building a group is a strong relationship between the group members and the leader, which starts with the simple ability to remember people's names. As embarrassing as it might sound, after the not-quite-so-successful first meeting, I actually studied the students' names and pictures on Faces. It really helped and has even given me insight into the students' lives. For example, I found out that a student in my group this semester was from my hometown of Peoria, Illinois. This fact allowed me to initiate conversation with her, not only relieving the tension of the student but also the group as a whole as they realized that I was a student, their peer. To keep the open communication, I now always address the members by name, and my rule is "the more, the better." By frequently reinforcing the students' names, the group members become more comfortable with each other and will soon begin using each other's name while talking in the group, which aids in group development. Another idea

that I just implemented this year was having the students make and wear nametags to the first two meetings. This proved to be very successful in creating a welcoming environment that is open to group development.

In order to make this environment even more open to communication, I try to create a comfortable setting that allows for free exchange of ideas. As the students come in, I often ask them about their weekend and if they have any exciting upcoming plans. We also discuss any questions or comments about chemistry in general. This is especially true during the first meeting when students have many doubts and fears about the chemistry class. Also, students often like to vent after exams, which allows them to form connections with others in the same situations. The group may complain about the exams, but at least they are acting as a group with a common goal! In addition to open communication, I sometimes bring snacks as rewards for positive group work. This motivates students to work in groups, and it is always nice to have little evening snack.

As a result of this open, comfortable environment, the members quickly form a group that has a common goal of solving problems and can work together independently. As students become acquainted with each other, a group begins to form in which students rely less on their notes and more on the knowledge of the members in their group. This exchange of ideas promotes higher thinking that takes the students beyond the basic concepts in the book. To test and strengthen this independence that has developed throughout the semester, I sometimes leave the room for several minutes while students are working on a problem. This eliminates the safety net that a leader provides and gives the group a sense of freedom that does not require the presence of the leader. These ideas have led to successful study groups in which students actually solve problems as a group, and it all started out with something as simple as remembering the students' names.

Chemistry and the Forgotten Art of Qualming

by Daimon P. Simmons

Never be afraid to completely confuse your study group. If you can find a way to confuse them, students can undoubtedly find a way to block this out for years. Stimulation of latent neuroses will help the study group members to build character as they begin to forge their way through a college career. Additionally, this can spark the initiative to create fruitful interactions with overworked professors. Although qualming one's students is of utmost importance in a successful study group, it is only secondary to the exhibition of creativity and flexibility of thought.

Although a leader's duties do not generally include the explanation of material, travesties such as these occasionally manage to work their way into the group session. Often, none of the students understand the material quite as well as they would like, despite having prepared for the session. Fortunately, students may find a facilitator nearby when such problems occur. Such an instance allows the leader to prove his or her birthright as a facilitator by leading the students onwards.

Clearly, a straightforward lecture fails to achieve study group standards. Thus, the leader must use superhuman powers of creativity to bring students to their desired level of understanding. The easiest method of explaining things is in straightforward chemistry terms. Some students do well when presented with information as it is taught in class; others are not satisfied with that. Some students thrive on mathematical expressions and analysis of equations to derive meaning, while others require visual explanations. It is important to figure out which sort of learning style study group members prefer so that a mathematical analysis is not used with a purely visual learner.

One of the critical tools of the flexible facilitator is the analogy. While analogies prove difficult to create, they are invaluable in communicating ideas to study group members. While it is easy to describe the energy of a group of photons as a multiple 'n' of those photons, it takes more of a leap to describe it as a pack of speeding cars as opposed to a single car. However, a bad analogy is worse than no analogy at all and will merely serve to further confuse students. Thus, while a bad analogy is an excellent tool in creating a group of bewildered students, it does not serve as well in the goal of

explaining material. Thus, proper usage of analogies is something best left to the discretion and creativity of the facilitator.

When discussing with the students, use open-ended questions. Having just elucidated the hidden path to the Holy Grail, asking "does this make sense?" will often yield an affirmative murmur. Unfortunately, some students lack the courage to affirm their continued failure to understand and are left in a quandary. Open-ended questions force the students to evaluate what they have heard and respond appropriately. "Does this concept now make more sense or less sense than it did before?" This sort of neutral question allows students to honestly evaluate their feelings about the question without any sort of bias. It also discourages the use of a meaningless murmur in response.

It is important to keep an open mind while facilitating study group because this will facilitate the opening of other minds as well. The courage to confuse your study group can prove invaluable because sometimes this can lead the way to enlightenment. Have faith in your ability to qualm your study group, but remember to leave them a lifeline so that they can find their way back. Happy qualming to you!

qualm, *v.*[1]

1. intr. To have a qualm or qualms. (Cf. QUALMING vbl. n. and ppl. a.) Obs.

2. a. *trans.* To make sick. **b.** *absol.* To induce qualms. *rare*.

(Oxford English Dictionary, Second Edition 1989).

Learning to Let Go

by Shelly Wang

As teenagers especially, most of us probably wished (are wishing) that our parents would grant us more freedom to live our own lives. This desire for autonomy likely dominated our thoughts when our parents' attempted to bequeath the wisdom of their experiences onto us. Albeit their advice was always well-intentioned, it was nevertheless often the case that they could not serve as substitutes for what we might learn from our own experiences. It is understandable that our parents wanted to shelter us from the mistakes they foresaw us making, but this they could not do forever. Eventually, they had to let go, willingly or unwillingly, and allow us to learn from our own mistakes.

In becoming a PLTL leader, I became in some respects one of those parents who is unwilling to set his or her child free. I have traveled the road of general chemistry before and I knew it could be a tricky one. I wanted to pave a smooth path for the students in my groups or at least alert them of the potholes before they reached them. Given these tendencies, it would initially make me anxious to see students take the wrong approach when starting a problem. I would be eager to address mistakes at their inception. Albeit correcting mistakes set students on the right problem-solving path for questions in study group, it could not ensure that students would be able to diagnose their own mistakes when they studied independently or during tests. Although it was a challenge, I had to learn to sit back and let students practice not only solving problems correctly, but more importantly, practice detecting their own mistakes.

A crucial part of this process was trust. I had to trust that, even if students went down the wrong path, eventually someone in the group would point out the error and provide an alternative strategy. Furthermore, I also had to gain confidence in my own ability to navigate the group back to the correct path, even if it meant waiting till the end of the problem and then sorting through a series of errors. Slowly, though, I became more comfortable allowing students to make mistakes, seeing the mistakes not so much as problems but as opportunities for other students and myself to ask questions that would lead the group to articulate and review key concepts.

PLTL teaches students to practice critical-thinking and problem-solving skills so that they may become more confident and independent scholars. In order for my students to meet those objectives, I had to shift the emphasis of my involvement and in doing so make the students more responsible for their own learning. One thing that has helped me meet this challenge is continually asking students questions and asking them for explanations of their thought processes. After all, just as it is not often the case that we voluntarily gave our parents a summary of what we did in school each day, students generally do not volunteer a summary of how they solved a problem.

In my experience it seemed to be the case that the more the group succeeds in working through a problem, or even struggling through a problem without relying on the steady hand of the peer leader, the more the group members benefit. When I learned to ease my involvement, the group adapted by pushing themselves to think harder, by becoming more reliant on other resources such as their notes, and more importantly, each other. To their credit, these latter methods exemplify learning approaches that are more active in nature and ones that will truly help their learning in the future.

Challenges Faced as a Peer Leader

by Shanelle Williams

This past semester of being a first-time study group leader has been one of much enjoyment, academic maturity, and further development of interpersonal skills. Sustaining mastery of the material and enthusiasm about PLTL took discipline and a conscious effort. However, making it part of my weekly routine to look over my notes, review the questions, and give myself a little pep talk before the sessions helped a lot. It was initially frustrating to realize that no matter how hard I think, I can never predict all of the questions that I may be asked and have a good explanation prepared.

Unfortunately, it was not until nearly the end of the semester that I stumbled upon something that did a pretty good job of breaking the ice for the members and me: Things tend to run more smoothly and people are less uneasy when I begin with some Chemistry joke or interesting fact that relates the concepts of that session to something going on in the world outside of Washington University. All semester, I had wondered what I could do to "break the ice." Each Sunday following, opening in such a way and taking a couple of minutes to discuss or laugh at some silly Chemistry joke proved to be a great way to somewhat relieve some of the uneasiness that a lot of the students feel about the material.

Also, it was a challenge for me not to "over-think" how I would establish my role as a leader and present the material. A lot of this was due to the fact that I initially lacked confidence in my abilities and feared that I may not be helping the students understand the material and the PLTL study-group philosophy. After seeing the group improve, express enthusiasm about the material, and "look up to me," I realized that I had been helping and that I should just continue to be prepared and do my best, and my attitudes and habits will eventually "rub-off" on the group members.

In addition to initially failing to trust that I was actually doing a decent job, I had a little difficulty with remaining patient. Although I am always outwardly calm and amiable in my sessions, there were a few times when I was feeling so anxious and impatient within when the course material started getting really difficult for the group. But then, I remembered that I had been nearly just like them when I was in PLTL and things started seeming impossible. I remembered how I hated when people got frustrated

with me for asking them to explain the same concept over and over. It only took a second for me to stop, remember my experience as a group member, and disregard my feelings of impatience.

Overall, transitioning from a group member to a group leader was something at which I had to work. I had to actually think about the way I would present myself, the material, and be prepared to handle just about anything. Realizing that the transition was not just something that happened to me and that it was a role that I would need to develop was a challenge indeed.

The Importance of Variety

by Kilby Yarbrough

As a member of a study group last semester, I recognized that we worked problems with a variety of methods during our meetings and during the course of the semester, but I did not realize the importance of this variety to the central concepts of PLTL philosophy and successful group work. Variety and diversity are very important to the successful functioning of a study group. Handling diversity and variety in study group this semester as a leader proved to be more challenging than I thought it would be.

An important aspect of being a peer leader is recognizing the different learning styles of all the group members. I believe that this process simply takes time. One must get to know the members of the group and their personalities so that one can recognize the ways in which different people learn most effectively. Also, one must emphasize that every different method for working a problem or understanding a concept can be a useful study tool. At various times during the semester, some students obviously felt that the way they were working a problem was useless or not beneficial to their learning. At the time, I found it difficult to explain why every method is important, even if you do not believe it to be at the time. Now I am able to stress that learning a variety of methods for studying and understanding difficult topics is very useful and can be applied to many classes besides chemistry.

Understanding the different personalities in the group also helps in facilitating the group and ensuring that everyone involved understands both the solution to a problem and, more importantly, the concepts behind the problem. When you know a person well enough, you can tell when he or she wants to ask a question but isn't vocalizing his or her confusion. As a peer leader, you want to ensure that every group member leaves the session with his or her questions answered and not feeling at a loss about a topic.

Additionally, once you know someone's personality and learning style, you know the best way to approach explaining a concept. Some people respond better to graphs and pictures, whereas others draw more from facts and numbers. While everyone can gain an understanding from any type of explanation of a topic, one more suited to a person's learning style will have a greater effect. Often it can be challenging to come up with

different ways to explain a confusing topic. As a peer leader, I was forced to start thinking about concepts in different ways so that I could offer a variety of explanations, some more beneficial than others.

In addition to variety and diversity in a number of topics, communication is also a key aspect of group work and PLTL philosophy. To benefit from working in a group, there must be constant communication between group members. Even though I stressed the importance of communication in the first meeting, at the end of the semester I still needed to remind group members to communicate. I was challenged to come up with different ways to compel group members to communicate with each other and not just work through a problem and then check answers with other group members.

Having been a peer leader for a semester now, I truly appreciate the importance of variety to a successful study group. A leader must be flexible and able to deal with a variety of issues, learning styles, personalities, questions, and more. From my experiences both as a peer leader and as a student, it is always helpful to hear several explanations for a concept. As a peer leader, you must be prepared and able to answer questions in a variety of ways in order to offer the best explanation to someone confused about a topic. A successful peer leader handles and uses variety to ensure a positive outcome for all students participating in a study group.