

# TEACHING AND LEARNING PORTFOLIO

by

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Delta Program in Research, Teaching, and Learning  
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# Teaching and Learning Portfolio

Jennifer Jean Dufek

A note to the Delta Certificate defense committee:

Thank you so much for taking the time to read through my portfolio. I hope that taking part in this defense will spark in you an interest to work with Delta to improve your teaching, as well as your graduate students'.

Please keep in mind the audience that would eventually view this portfolio. I would most likely present it to school boards, high school principals, or search committees at technical colleges. I have kept it relatively brief to be used as such a tool.

Jen

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Distributed to the faculty of the Botany Department at the end of my internship, this piece explains the process created during my internship. It informs the faculty that this practice will be continued and stands to improve the department's introductory curriculum. As the class rotates instructors each semester, I wanted to inform them about what they may be asked to take part in.

Appendix M- Statement from Mike Clayton

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Mike Clayton is the course coordinator for Introductory Botany and was my faculty partner in the internship. I proudly include this statement from an experienced educator whom I respect deeply.

## Teaching Philosophy

There are two reasons people turn on a radio: for background noise or to listen to something they're interested in. Hearing is a passive activity normal senses do not prevent us from partaking in. Listening is an action; in essence it is taking responsibility for hearing. It is the same for student learning. For learning to happen, each student must be fully immersed in an environment rich with exposure to content they can assimilate. And they must be interested. To keep myself and the classroom a fresh environment full of resources, I constantly inform my practice using the scientific method. I also strongly promote student-student interactions and group work. This takes me out of the authority role and puts students at the helm of their own learning. This leads to my final core principle: students must learn who they are to better achieve their learning goals.

Teaching isn't an easy thing and many of us try to find ways to make it easier for ourselves. Often this consists of using the same materials semester after semester, with minor adjustments as new findings dictate. The error is this: when considering teaching, education is our discipline. It takes continual experimentation including a clear statement of a hypothesis, experimentation, collection of data, and reflection. And just as in all sciences, the answers stir new questions. Researching my teaching, using student learning as my benchmark, my methods, tools, and content only stand to be improved. It is in this continual experimentation that I find solace.

Leaving the responsibility for the action of learning with the student can be very liberating for an instructor. By creating group work situations for traditionally independent work, I take students slightly out of their comfort zones forcing them to feed off one another and formulate ideas about the problem. This is the environment I find to be most effective. Students are learning at the highest levels when they are experimenting with several hypotheses, finding support for differing lines of reasoning. The discussions amongst group members forces logical, critical thinking or another student surely questions the reasoning. In this context, students become self-directed and self-motivated and seek validation in a group of learners. I am allowed to tour the room observing and gently guiding discussions, addressing misconceptions along the way. Pulling back together at the end of class ensures that all students leave with the overview of the

discussion. I do respect that some students just hear what the instructor says and make sure to wrap up at the end of class.

As a teacher must constantly question the content and delivery of teaching, she must also ensure her students are not only reflecting on the material but the methodology of their learning. Even at the college level, students are surprised by their results after completing the learning style surveys. Instead of quizzing students on material before an exam, I asked them each to say a little about how they were studying for it. This was one of the best teaching experiences I've been a part of- students teaching students ways of learning. Without student learning, there is no teaching- it is this circularity I charge myself with guarding through continual assessment, reflection, and adaptation.

# Evidence of Growth

## Reflection 1- Analogy for Good Teaching

Through Delta, a teaching and learning organization on the UW-Madison campus, I was trained to practice instruction under the “Three Pillars.” These are teaching-as-research (TAR), diversity, and learning communities. Teaching-as-research is the scientific process as applied to teaching. It is a method for instructors to test the efficacy of instruction using student learning as its measure. It is an iterative process and can be used to test instructional objects, new methods of presenting material, and student preferences to name several. The diversity pillar is all-encompassing and forces us to recognize each student as an individual with unique experiences and predilections. Diversity also exists in learning and teaching styles, teaching tools, honestly, it is everywhere. The third pillar, Learning Communities, emphasizes the increased potential for learning in groups through interaction with multiple viewpoints and styles.

While taking my first course through Delta, I was skeptical of the three pillars. They seemed like feel-good concepts with not a lot of content. Then I began teaching and the pillars came to life. I could see diversity in action when my students read the same procedure and went about it in different ways. I could see it when they argued about a concept that appeared different from each side when in reality they were arguing the same thing. When my students embraced group work for more than an easy way out of labor, I could feel their learning communities develop. I saw that they learned about each other as individuals and worked with each others strengths to achieve goals. When I started the internship and began practicing TAR, informing my students along the way of the question and methods, I felt myself growing. But the more I practiced TAR, my discomfort with the Three Pillars reappeared.

I began to see TAR as more than the research aspect and integrated wholesome teaching into my definition. Someone simply studying a phenomenon can not affect it. It is the same with TAR. I wasn't merely studying teaching, I was also performing it- and trying to improve it along the way. I was consciously researching my teaching and consciously teaching. I began to see that good instruction includes diversity and learning communities. TAR is my way of checking up on my teaching and keeping diversity and learning communities in the forefront. I no longer supported the Three Pillars with connotations of their equality. I felt compelled to write an analogy illustrating my new schematic and immediately a radio tower with sound waves appeared to be an instructor with a message. This piece is available as Appendix A.

## Reflection 2- Teaching and Learning Styles

The first day of class, I let my students know that they'll have more work than other sections. I use instruments during class-time and as homework to help students understand how they learn. For example, teaching and learning surveys a third of the way through the semester, after I've gotten to know the students. I post my learning and teaching profile results (Appendix B) and talk about them for a few minutes. I ask all students to turn in their results and enjoy being surprised by any misconceptions I may have had. I also encourage students to share their results with the class. Students often share that they knew they were certain type of learner (ie. visual), but were surprised by another aspect of their learning. For the majority of my students, this was the first time they had heard of global versus sequential learning. After this exercise, I rarely have students complain about the additional work on learning.

It is one of the most amazing transformations, to see a student become introspective about learning processes. Having students who think about how they learn and are comfortable with the class dynamic is a miraculous thing: they will help you understand how to better teach them. This is formative assessment to the n<sup>th</sup> degree.

One of my key principles is to have students learn about themselves as learners. I see these surveys as an easy way for students to improve their own learning. The Felder-Solomon survey is one I will incorporate in the long-term. After completing it, students can learn about their tendencies as well as ways to excel when information is not presented to them in their preferred formats (please see appropriate web sites in Appendix B). I will also post my results to remind myself of my tendencies while trying to incorporate those which do not come naturally.

### Reflection 3- Evolving Teaching Philosophy

An assignment in the first teaching course I was enrolled in was to write a personal teaching philosophy. This was one of the most difficult assignments I've ever had. I wasn't given a rubric and was told it wouldn't be graded but that the piece was for me. I pulled together all of the ideas I had learned about that sounded compatible with the type of instructor I would like to be and I set out to write a teaching philosophy (Appendix C). I had never taught.

A semester later, the teaching philosophy underwent a revision. I had re-read my first edition and had actually laughed out loud. I had made it sound like I had experienced those listed aspects of teaching and found myself nauseated by its false representation. I had become very excited about the Three Pillars proclaimed by Delta and decided to base my teaching philosophy on them (Appendix D).

After composing the Radio Tower Analogy, I decided that the three pillars should no longer be the basis for my philosophy. I thought about my three major goals as an instructor- the three things I would want someone who sits in on any of my classes to come away saying I did well. I have included these in my current Teaching Philosophy. Is this philosophy finished? Is it in the beautiful, polished form, ready for the display case behind lock and key? By reading my current philosophy, you'll see this goes against one of my core beliefs. Expect it to change.

## Reflection 4- Maturing as a Practitioner

I love when someone asks you to tell them what you're not good at. It's no hard task for me to come up with a bulleted list (two bullets if it needs big improvement). But when I was asked to write about it, I was really forced to examine myself, trying to find where I had first gone wrong. I felt that my knowledge of the education publications was quite lacking, as I felt about my own area of research in Botany. In most aspects of my life I tend to reinvent the wheel. How hard can it really be to put together an entertainment center? Not using instructions has always been my way of testing my spacial and logic skills and pits me against the inventor. I also felt that I hadn't been using learning communities to their full potential due to defining it too broadly.

Since writing my reflections on my growth in these two areas (Appendix E), I have thought about learning communities and have come up with my working definition. A learning community is a group of people who care about the discussion taking place and see to it that each member leaves with insights and a renewed vigor to explore the question. The group is a sounding board for new concepts and doesn't criticize but thinks critically, helping each other along the path to enlightenment. Though it may sound whole-ly corny, when you're part of an effective learning community, you'll know exactly what I mean.

I have become more aware of the teaching and learning journals available to me. Recently I have been reading articles in the Journal of College Science Teaching and hope to submit an article on my internship experience. I admit that this is still an area I need to work on. However, I have begun using the resources available.

# **Classroom Tools**

## Reflection 1- Designing a Solution for the Quiet Class

Learning is best done in an environment with different types of thinkers and I encourage group work in areas normally viewed as individual seat-work (ie. microscope dissections). Due to equipment needs, students are assigned seats in lab. When equipment isn't required, I mix up tables to keep interactions fresh. But when I ask the easy questions to segue into more difficult material, I got no response. No one wanted to answer the obvious questions. In the same way, no one, save the same few students, wanted to make attempts at the higher-order of synthesis and cross-application. I was mortified and felt that my students must not have formed a very good community if no one was comfortable enough to answer. After this happened multiple times, I became very frustrated. I didn't want to be the TA who cold-called on students. They'd never see me coming and I could put them into a constant state of panic.

I came up with the "Round Robin." I go through all of the students, based on seating, asking questions about the material just covered. This way they can take solace knowing that the whole class will be gone through before any one is expected to come up with another answer. But then I hit a rut: students didn't know the answer and I'd have to cold-call on someone to help out. I decided to take the responsibility out of my hands and put it back in theirs. If a student doesn't know the answer, he can "bounce" the question to another student. Only one bounce is allowed and the two students have to work out the answer together- in view of the class. For a procedural outline of this method, please refer to Appendix F.

I explain this as a tool for me to find areas where better coverage is needed as well as to foster a sense of class-wide community. I've had stumped students turn in their seat to try to decide to call on for help. Independently, in each of my sections, I've had students raise their hands to come to the aide of another. You can never imagine the look of relief in their eyes. I plan on using Round Robin in situations where my classroom falls silent and never until silence prompts it. But the community I've seen come out of it is excellent.

## Reflection 2- Getting Off on the Right Foot

As a teacher, I have two agendas. I need to get the assigned material into my students' heads and I need them to understand who they are as learners. I am transparent about this and can't help but get excited about both. Admittedly, my excitement may come off a bit over the top, but I want my students to see the subject as fun and I want them to be comfortable coming to me. I feel most comfortable in a role-model position and use an outline format in class, with time allotments guided by the students. Students should know what is expected of them and in turn, what they can expect from their instructor. I wrote a Class Expectations sheet (Appendix G) that I hand out and read through during class. The handouts are three-hole punched and I ask them to put it in the three-ring binders their lab manuals come in.

Throughout the semester, I would pull out the expectations and read through it. If I felt I was falling short in any of the areas I promised my students, I worked harder at revitalizing them. For example, I started using outlines when I felt I wasn't making the expectations for each class clear enough. I also used it in one instance where I suspected a student of cheating by pulling it out and reading a line about how cheating will not be tolerated. It may have taken a bit of time out of the quiz, but I asserted the value in this tool.

I really like the idea of giving a teacher contact sheet more pizzazz by listing what I expect from my students. It lets them know I'm transparent about my methods and up front about my rules. I try to let my personality shine through in the way I phrase things. This document could be tailored for future classes and will adapt to reflect my changing teaching philosophy.

## **Provoking Institutional Change**

## Reflection 1- Internship Project

I partook in an internship with Delta using my TA position teaching Introductory Botany. Spurred by my interest in formative assessment, I investigated three methods of eliciting student feedback to improve the lab manual. I wrote a summary of my methods of this primary investigation (Appendix H). I also included the process used during the second semester extenuation of my project, also applied to Introductory Botany. In addition to being a brief scientific report, Appendix H illustrates how I put teaching-as-research into practice as a new TA.

Writing the overview helped me to clarify some of my own thoughts on applying the scientific method and deliberate teaching in the classroom. It was through this writing that I began to see teaching-as-research as a synthesis of evolutions, not just one or the other. Documents that are somewhat useful can be modified and not scrapped altogether. They can evolve in this way independent of each other and still come together as part of a whole story.

## Reflection 2- Eliciting Student Opinion

After administering three methods of drawing out student responses over the course of a semester, I administered the form found in Appendix I. I wanted students to understand that their opinions mattered to me and how grateful I was for their responses and for the time they devoted to the project throughout the semester. I was very deliberate when writing this document to ask questions which would give me the most informative responses. I wanted them to pick one method which they preferred above the others and to explain their reasoning. I was also interested in whether or not they would complete the forms without the reward of extra credit

I was somewhat surprised by student response to this document. The majority of students did pick a preferred format, with the majority choosing 1-minute papers and less for the computerized form (few chose an interviewer coming into the class) (please see Appendix H for an overview). Almost all of the responses commented on two of the three methods, with startlingly few listing pros and cons for each, as suggested. Along with my preference for the 1-minute papers, student input helped me decide that this sort of form would be used the next semester in a lecture-wide format.

The responses to the final form were my favorites to read. The students really seemed to have given their answers quite a bit of thought. I could tell that they felt included in the process and not like they were the subjects of an educational experiment. This has taught me that when researching and informing my teaching practices to do it transparently when possible.

### Reflection 3- Modifying Forms

During my first semester collecting information from students about the lab manual, I developed three methods of gathering data. The 1-minute paper (Appendix J) was the method I deemed most appropriate for continuing the next semester. I created the Student Response Form (Appendix K) for use the second semester. I decided to go from asking very open-ended questions (What did I learn this week?) to asking leading questions (List helpful things. Why were they helpful). These seemed easier to answer and refined responses from quite abstract to useful comments directed at the lab manual. The biggest changes I made were in formatting. I found that listing questions in a group (Appendix J) was less effective than asking questions individually with a response section set aside for each (Appendix K).

I've learned that standard design rules apply to classroom documents as much as they do to a graphic artist. I now keep **CRAP** in mind when designing layout for assignments and handouts (for reference, please see Appendix G). **C**ontrasting colors, fonts, and shapes draw attention, such as bullets and bolding typeface. **R**epetition creates a feeling of familiarity and keeps a deluge of information feeling simple. In my Class Expectations sheet (Appendix G), I use bullets and repetitive section heads to achieve this element. **A**lignment keeps the eye flowing and alerts students to chunks of information, as my bulleted lists are separated by section heads further to the left margin. **P**roximity keeps like things together while respecting each individual idea's space. I kept positive elements at the top and, when reading, kept my responsibilities as an educator at the end to leave them feeling like I had taken them into account.

## Reflection 4- Faculty Exchange

Upon completion with my work with the Botany Department, I released a faculty-wide memo (Appendix L) outlining what I had done and where the project was leading. As Introductory Botany rotates instructors each semester, I wanted all potential lecturers to know what the course coordinator and I had worked for in the lab manual. As I was transparent with students, I wanted to be so with the lecturers. I thought it was very important that they know the coordinator was interested in improving the teaching tool he had constructed and that they could be part of the project.

I received no response from any of the faculty regarding the memo. If I had it to do over, I would follow up with each member in person or via email asking to address any questions or concerns they may have had.

Because the course coordinator and I had worked so closely together in developing a method that he could continue after I left the department, I thought it appropriate to ask him to write a letter regarding his view on the experience. Appendix M is a letter written by Michael Clayton about my work with him as a Delta Intern and about his observations about me as a practitioner.

# Appendices

## **Appendix A: Radio Tower Analogy**

*Here is an abstract piece, no doubt, illustrating my love of analogy. This is how I think of teaching and learning and the people who do these things—and the interaction between them that links it all together. It's the “why what's important and how to use it” of my thoughts on teaching.*

The DELTA program holds that there are three pillars, those being teaching-as-research, learning through diversity, and learning communities. Through discussions and internal reflections, I have modified this for myself as follows.

An extremely tall radio tower broadcasts a message. Inside a home a distance away, a person is listening to his radio. If he is interested in receiving the message, he will have installed an antenna on his home. There are two reasons he may turn on the radio: to hear it or to listen to it. These are very different actions. Hearing noise is an automated response to the noise stimulus; it is perception. Listening to the radio is an active response, requiring cognition.

All it takes is one gust of wind to blow the radio tower over. This can be averted by first pouring a concrete base anchoring the tower. Guy-wires are sunk and attached at two different heights on the tower. The guy-wires placed three stories up stabilize the lighter, more constant winds buffeting the tower. However, the fastest and strongest winds occur further up and the tower would still be unstable without wires mounted at the top.

The workers at the radio station know whether or not the home owner is receiving the signal only when a survey is completed by phoning homeowners. When the homeowner invites the station workers into his house, they can understand how he feels about the music coming out of the radio.

As educators, we broadcast course materials hoping our students achieve the learning goals we set for them. Each student has an individual manifestation of the teaching message we deliver. When these students learn about their personal biases, preferred methods of learning, etc., they

have taken responsibility for their own learning and are prepared to hear us. They can memorize the material, which is the lowest level of learning, all the way to evaluating new concepts using the tools we have provided, which is evidence of the highest level of learning (according to Bloom's Taxonomy of Educational Objectives, 1984). Our message is merely perception to students who have not chosen to own their learning.

When our teaching is biased, not centered on the learner or his learning, or we allow the learners to become disengaged, our message is shaken to the base. Teaching-as-research (TAR) is a solid base we must center our teaching on. This iterative process allows us to stabilize with each new issue that confronts us. It is, bar none, the most basic step to ensuring our teaching is reaching its full potential. Learning communities stabilize this process further by allowing us groups to sound off of and allow our students to practice their responsibility and reflect on other students' experience. This leads to embracing diversity in the classroom. Diversity, when used improperly, is like a strong and unexpected gust of wind- and our students can lose respect for the classroom, each other, and the teacher when this happens. TAR, when practiced deliberately, holds learning communities and diversity close to heart.

Assessment is how students can inform our practice, much as a survey team informs a station of their listeners' opinions. We can offer assessment of the learning goals, which tends to be summative. Formative assessment can help us improve our teaching before the students have left the material behind- with or without learning it. This method also allows us to see if our teaching practices need to be modified and may key us in to whether or not our TAR needs to be revised.

Only when our students invite us in to their learning can we see them making the information their own. It is in their living rooms that we can see our students dancing to the music. And when they hum while going about their day, they have made our teaching into their learning, and they own it.

## Appendix B- Teaching and Learning Style Results

*Here I have posted my personal results from three surveys. My duplicity in conflicting areas interests me as well as my preferring methods of learning I find difficult to endorse as a teacher.*

### Grasha-Reichmann Surveys

#### *Teaching*

<http://www.longleaf.net/teachingstyle.html>

Expert: 2.5, low

Formal Authority: 2.6, moderate

Personal Model: 4.2, high

Facilitator: 4.1, high

Delegator: 3.1, high

#### *Learning*

([http://academic.cuesta.edu/wholehealth/disted/ls\\_invent.htm](http://academic.cuesta.edu/wholehealth/disted/ls_invent.htm))

Independent: 4.2, high

Avoidant: 2, moderate

Collaborative: 3.7, high

Dependent: 3.4, moderate

Competitive: 2.2, moderate

Participant: 4.4, high

### Felder and Soloman: Index of Learning Styles

(<http://www.engr.ncsu.edu/learningstyles/ilsweb.html>)

ACTIVE	11	9	7	5	3	1	1	3	5	7	9	11	REFLECTIVE
						<--- --->							
SENSING	11	9	7	5	3	1	1	3	5	7	9	11	INTUITIVE
						<--- --->							
VISUAL		X											VERBAL
	11	9	7	5	3	1	1	3	5	7	9	11	
						<--- --->							
SEQUENTIAL			X										GLOBAL
	11	9	7	5	3	1	1	3	5	7	9	11	
						<--- --->							

- If your score on a scale is 1-3, you are fairly well balanced on the two dimensions of that scale.
- If your score on a scale is 5-7, you have a moderate preference for one dimension of the scale and will learn more easily in a teaching environment which favors that dimension.
- If your score on a scale is 9-11, you have a very strong preference for one dimension of the scale. You may have real difficulty learning in an environment which does not support that preference.

For explanations of the scales and the implications of your preferences, please go to <http://www.ncsu.edu/felder-public/ILSdir/styles.htm>

For more information about learning styles or to take the test again, please go to  
<http://www.ncsu.edu/felder-public/ILSpage.html>

## **Appendix C: 2004 Teaching Philosophy**

*This teaching philosophy was written after taking a Delta course in college classroom instruction, but before any formal teaching experience. Catch-phrases and optimistic views of “best practices” are evident. When compared to my current teaching philosophy, this document illustrates my growth as an educator and learner.*

Many times college-level instructors focus on presenting facts and information to their students. Albeit a necessary foundation to learning, information is often not connected to the overall concepts or class objectives. As an instructor, I introduce learners to overall key concepts and link them to the factual knowledge attained in readings and lecture. My over-reaching goal as an instructor is to help students achieve a higher-level of thinking by making connections between class material and their outside life as well as honing their problem-solving skills. I also try to garner student respect for ideas, beliefs, and ways of processing information different to their own.

I make myself available to students outside of class and scheduled office hours, encouraging them to stop by for any reason. By maintaining this informal relationship I feel better equipped to elicit honest thinking and feedback in both individual and group settings. Asking students to work collaboratively, with a different group of classmates for each section of the class, holds them accountable for preparing adequately for discussion. This, in turn, gives them the chance to grow through interaction, both explaining concepts and obtaining differing viewpoints. The method I find most intriguing is the “Learning Cell,” in which students prepare questions from the assigned material and are paired with another to pose their questions and discuss responses (Goldschmid, 1971).

Though collaborative learning and group discussion are great ways to help students learn, I also take time to ask questions and call on individual students. I vary the intensity levels of the questions, both factually and cognitively, as an honest form of assessment. Though I try to foster an environment where students feel allowed to formulate ideas and take a chance that they may be off the mark, I also permit students the option of passing on a question. By observing

Learning Cells and reading the assigned “one question per week” responses, I can easily assess student learning and spot problem areas in the curriculum. I use continual formative assessment of my practices in order to determine how to better help this specific group of students learn. Self- assessment could be as simple as observing blank faces or asking the students to write an anonymous one-minute reaction to the day’s activities.

Knowing that a deeper understanding of Botany lies within more people than before my class is quite a reward. Knowing that students are more able to solve problems and more tolerant of one another is an unbelievable payment for services.

## Appendix D: 2005 Teaching Philosophy

*This teaching philosophy was guided by the three pillars of Delta. I now believe that researching teaching practices (teaching-as-research) integrates diversity and learning communities, represented in my current philosophy.*

My teaching philosophy is based on the three pillars of Delta<sup>1</sup>. These are Teaching-as-research, Diversity, and Learning Communities. I tie these in to every session I have with my students. Whether it is planned and deliberate, like incorporating group discussion on a topic to strengthen student-to-student learning, or spontaneous, like letting a planned lesson go in an unanticipated direction when student interests are piqued.

*Teaching-as-research* (TAR) is something I practiced as a teaching assistant. This begins with collecting information from students, analyzing it, and responding both immediately (formative) and the next term (summative). This is an iterative process and I try to adapt my teaching practices each semester to best instruct each new group of students. During an internship with Delta, I helped form a model for continuous feedback on the course lab manual. Mike Clayton, the course coordinator, is continuing it this semester in the hopes of revising the tool based on student feedback and TA suggestions.

*Diversity* is another focus of my teaching. I constantly remind myself that each student is unique- the product of individual experiences and emotions. Each student's experiences can separate them from one another or bind them together in a learning episode. For instance, by using experiential methods of instruction I find students begin to share stories and learn from each other. It is my belief that these experiences, which are "self provoked" instances of learning, stick in the students' minds better. Though lecturing is a useful traditional tool, it is not the only way for students to learn facts.

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<sup>1</sup> Delta is a community on the UW-Madison campus focused on helping researchers become better instructors, focusing on graduate students.

*Learning Communities* are important to both students and instructors. As an instructor, I believe that collaboration occurs on many different levels. Reading and learning from research papers is collaboration, as is sharing teaching stories and seeking advice from an instructional mentor. Students learn more than the topic at hand when they work together. They also develop social and team work skills necessary for the rest of their academic life and their future careers. One of the most important learning communities is that between an instructor and her students. From body language alone, the instructor can discover that her students are having a hard time with the material and modify the rest of the period. This ties in with formative assessment, part of TAR.

As a TA for general Botany courses at UW-Madison, I've gone beyond typical duties to ensure that I gave each of my students the best instruction I could. The goal, of course, being improved student learning while maintaining learning motivation. As I taught lab, I tried to maintain the role of a facilitator or personal model. Doing this I am able to accept that keeping students' interest is an instructor's responsibility.

## **Appendix E: Change in Teaching as Research**

*Composed at the end of the Delta internship, I reflected on how my practice of teaching-as-research had evolved and outline the areas I felt needed improvement*

I've considered how my thinking has evolved in regards to Teaching as Research (TAR) over the last semester. I've also thought about how my practice of TAR will be affected by the conversations which occurred in seminar. If I had to give a definitive response to the request of listing the two ways in which I will alter my practice of TAR, I would have to pick the two largest, overarching themes. These are a far cry from the multitude of subtle amendments, which I'm sure will have a greater effect on my interactions with students. In general, to practice an improved method of TAR, my resource base needs to be more substantial.

### *Researching the Literature*

The area I feel most inadequate in when it comes to my thesis work is knowledge of the background literature. I often find myself thinking that my P.I. would tell me if there were important things I should read to have an acceptable knowledge base in our field. I would expect this even more so if new publications are modifying our past conclusions. The internship seminar has helped me realize this is a cop-out in my own research by forcing me to see it as a shortcoming to practicing good TAR.

There are many topics with respect to TAR that I need to read up on. Diversity, transparency issues with students, creating (and fostering) a healthy environment where diverse learners and their views are safe to flourish, methods of putting TAR into action, alternative assessment measures: these are a few of the areas I'd like to focus my readings on. Aside from learning about these topics, I would be exposed to TAR in its most reflective and conclusive<sup>1</sup> form.

Reading the literature would give me insight into how to form a good research question. My questions tend to be complex, which is incredibly daunting when you're just beginning to practice TAR. Where should I begin? Looking at the research findings of the "tried and true"

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<sup>1</sup> Although I don't feel TAR is ever conclusive, I would find myself exposed to the reflective thought processes that precede the re-cycling of TAR. I hope I would find instances of "second time through" reports.

TAR practitioners would give me insight into what types of questions they're asking. A good starting point when perusing these papers would be reading to answer: What aspects of classroom dynamics are they looking into and how many variables are considered in their inquiries?

### *Learning Communities*

After my first Delta course and at the beginning of the seminar, I felt that a learning community was inherent. The people you TA with are inherently in your learning community as your P.I. and lab mates are part of your research-specific learning community. I no longer see this as being the case. The manner in which the internship seminar was conducted felt very much like a research group to me. It was composed of intelligent, guided discourse on things people had given thought to before sharing and was fluid with the members' needs. I now feel this is a true and functional learning community. Each of the members must be consciously aware of what you expect from them. And learning may be inherent, but a learning community is definitely not.

A learning community can be thought of as a teaching resource. Members can recommend reading to one another, widening the knowledge base available to all who take part. Student feedback is very important to TAR, but members of a TAR learning community can contribute valuable feedback on the process of TAR to each other. This is an aspect I hadn't realized I was lacking. I felt that, like working in my lab, I could just go collect data, analyze it, and then bounce things off of lab members. Since I'm new to TAR, I need someone to keep my lab protocols in check. Attending the seminar brought to light many aspects of the procedure of TAR that I would never have given a second thought to (see "Researching the Literature" above!) as being integral parts of the process.

### *Conclusions*

Because of the internship seminar and my experience doing an internship putting TAR into practice, I will seek out conversations with professors in my area about teaching. Through these conversations I would like to find if any of the professors in my area are engaged in TAR. I know of one professor in my department who has taken part in a Delta course and currently has a graduate student with an RA focused on improving his teaching. Another professor in my

department teaches a Botany course for non-science majors and receives rave reviews every semester. I've recently learned that he does intensive reading of educational literature. I hope to use him as my "starter" for good things to read up on. I would also like to engage my TA group next semester in educational conversations. Several of them TA'd with me this semester and I think a meeting once a week about the teaching and learning aspects of the course we feel we can improve upon would be a valuable learning community to engage in.

## Appendix F: Rules for Round Robin

*Confronted with a room full of students who didn't want to answer questions, I came up with the Round Robin on the fly. I added the "bounce" option using feedback from students.*

After a couple of attempts at eliciting student response, tell them the rules of Round Robin. The first time, tell the students that you will go through the whole class once. If they feel more comfortable and begin answering questions, discontinue. I prefer to use Round Robin during informal classroom settings when the students have chosen their own seats.

1. Ask which student would like to start off the Round Robin. If there are no volunteers, pick a student.
2. Ask a question of the student. If he is having a difficult time formulating an answer, or his answer is incorrect, ask him to "bounce" the question to another student.
  - a. When a question is bounced, the first student must re-ask the question of the new student.
  - b. A student can only bounce once. If neither student is able to answer the question, work through it with them in front of the other students. This can help the whole class learn how to think about higher-order questions extrapolating from material they already understand.
3. Ask the student immediately next to the first to answer the next question.
4. Proceed around the room in a logical pattern and use the same pattern if you go through the class again.

I do not discourage students from offering help to one who looks confused, even if I haven't yet asked if they would like to bounce. I make sure that the helping student asks permission before adding their ideas. For example, a student may say, "Oh, I know this one. Let me help." I respond, "James, would you like help or are you thinking about this one?" Students have eventually picked up on this and adapt to something like, "I think I can help you out if you need it, James."

## **Appendix G: Class Expectations**

*I created this document to be distributed to my Introductory Botany students the first day of class. It addresses student responsibility, diversity, and community among the students and with me. I hope that letting them know my expectations up front removes some anxiety they may have about who I am as an educator.*

Jennifer Dufek

Office: 342 Birge Hall, 265-4523

Office Hours:

Email: [jjdufek@wisc.edu](mailto:jjdufek@wisc.edu)

### Do Do's

- Take responsibility for your learning. This includes coming to class prepared. If you haven't done the readings or work, I can't really help you.
- Ask for clarification on assignments that don't make sense.
- Realize that having a wrong answer isn't the worst thing in the world. It helps me to realize that the class may need more of an explanation than you've gotten.
- You'll be working in groups a lot in this class. Make sure to practice patience and tolerance with other points of view when conflict arises in group. If you have a problem working in a group, or with a particular group member, make sure to talk to me about it.
- If you're going to miss discussion or lab, you must email before you miss class. Make sure you attend my other section, or talk to me about attending a different section. Your attendance is required and proof may be requested to justify your absence (for example, a doctor's note).
- Email me, call me, or drop by my office if you have questions, comments, or concerns about the class.
- If you have any special needs, please tell me as soon as possible. These include McBurney students, athletes, disabilities, religious obligations, etc.

### Do Not Do's

- Cheating will not be tolerated. Group work is not cheating if it is pre-approved.
- Late work will not be graded. But even if it's late, you must hand it in; an incomplete is worse than a 0.

Expect me to:

Do my best to help you learn about Botany and its applications.

Listen to your points of view.

Help you to think critically.

Be fair when grading.

Be clear about my expectations as well as my goals for each time we meet.

## **Appendix H: Overview of Delta Internship Project**

*This is a brief documentation of my teaching-as-research in practice during two semesters of Introductory Botany at UW-Madison.*

After completing the The College Classroom, I was interested in formative assessment from the role of the educator. It was a new idea to me that a teacher is supposed to improve his methods. I suppose I had assumed that if students weren't grasping a topic, they weren't trying hard enough or the teacher made the tool better. I failed to connect that development of teaching methods should be experimental, with optimized student learning as the outcome of a well-designed, thought-out, and tested teaching tool. I was especially interested in the methods of assessment not related to student testing. Students have voices, and I wanted to understand how to hear it as an instructor.

I decided to complete a Delta Certificate and applied to begin my internship the first semester I was a teaching assistant. I was to teach two sections of two labs and one discussion (6 instructional periods) each week. After meeting with Mike Clayton, the course coordinator, and discussing the possibilities of formative assessment in the confines of the course, I decided to focus on student-based improvement of the lab manual. I designed three different methods of collecting their feedback and hoped to pick one of these at the end of the semester based on ease of integration (from the TA's point of view) and ease of use with maximum critical content from the students. To pique student interest, Mike had agreed to allow me to extra credit points to those students who completed the assessment tools.

Two one-minute papers (see Appendices J and K) were administered to my sections at the beginning of lab, before moving on to a new topic. I had thought of handing out the forms to students and collecting them another day, but I hoped that providing in-class time would increase the number of student responses as well as showing them that their feedback was important enough to warrant class time. Half-way through the semester, Thomas Emborg, another graduate student who took The College Classroom, came in and interviewed both of my sections. It took approximately 20 minutes and the lab topic was not interrupted compared to other sections due to a shortened amount of material to cover. Finally, a Student Assessment of Learning Gains

(SALG), an online multiple choice and free-write survey hosted by the Wisconsin Center for Education and Research, was created to elicit student response to the lab manual. At the end of the semester, students were given a Final Response Form (see Portfolio Appendix) asking which method they preferred and why.

Student responses were by far the most helpful from the one-minute papers. The lab manual was available for them to page through and they were given class time to complete it. I believe that seeing an entire classroom of students writing would spur those who weren't interested to at least give it minimal thought. The interview session was difficult as Thomas wasn't familiar with the lab manual as a whole, though he was given copies of the topics the students were to comment on. He didn't have the context to maximize the usefulness of the comments. This method was also time consuming, with Thomas and the students of both sections reporting that the first five minutes were wasted by student shyness and students agreeing with one comment without expanding much further. Finally, the SALG was easy to set up and modify and allows for easy data manipulation. Getting acquainted with the format options was time consuming, but a one-time experience. Many students filled in the multiple choice answers but didn't write much providing content in the free write sections. The luxury of completing this at home may have compromised their full attention to the task.

Students responded that the one-minute paper and the SALG were their preferred methods of reporting, with one-minute papers winning out. They cited ease of use for the SALG and time convenience. Two-thirds of the SALG reports were made the evening before its deadline, giving further evidence to procrastination and not focusing to the extent given the papers. Students liked that one-minute papers were given class time and appreciated its brevity in comparison with the interviewer method.

The second semester I was TA-ing Intro Botany again and approached Mike and that semester's instructors about continuing my project. I had decided to use one-minute papers during class for the entire lecture (approximately 250 students) and not to grant extra credit. For the first half of the semester, the sheets were available in all lab rooms and could be turned in to my mailbox anonymously. The first couple weeks I received forms pointing out typos and a few making

general comments about procedure changes. After that, I nearly ceased to receive feedback from students. The second half of the semester, I spoke with the TA's about making the forms part of class time, as in the first semester. I tailored each form to suit a small group of topics, spanning approximately two weeks, and asked 5 minutes to be devoted to filling out the sheets. Students were told that it was optional but that class time was set aside for it. All responses were placed in my mailbox.

Throughout the second semester, and especially when forms were given class time, I was revising the sheets. I improved wording to elicit more specific responses from students. I also edited the format to make it more user friendly and included a section asking for student suggestions, not just criticism. I drew up a human subjects consent form and had all students sign to approve their comments to be used in any future publications I deemed necessary. The human subjects board ruled that approval was not needed as all responses were anonymous.

The following summer, I compiled all of the comments and transcribed those I felt were due to the lab manual's content and not TA teaching style. When students suggestions were provided, I included these. I also commented on some responses and made additional comments. This document was given to the course coordinator to inform him of the student voice. It was hoped that this would prompt changes which increased student comprehension and learning.

The next fall semester, Mike Clayton continued this format with each TA responsible for their sections' responses. I composed a departmental memo to inform the faculty of the project Mike was undertaking to improve his documents. Other uses for this process of collecting student comments include use on labs of interest, where the coordinator feels improvement is possible as well as eliciting student comments when introducing a new lab to the curriculum.

## Appendix I: Final Response Form

*This form was distributed to students at the end of the first semester to elicit their feedback on their preferred method of submitting assessment comments.*

Please take a couple of minutes to write at LEAST 4 sentences. Explain what you liked/didn't like about each of the three methods we tried this semester for Delta. These were: (2) "minute papers," (1) session with an interviewer, (1) computer survey (SALG). You should also comment on which one you preferred and why. You could do this by creating a table with the three methods and the good/bad aspects of each. Would you do your "preferred method" if you weren't given extra credit? Make any suggestions you'd like me to take into consideration if I were to continue this project next semester with 130 students using one of our three methods. This is worth (1) extra credit point.

Thanks for all your input and time. I really appreciate it! -Jen

## Appendix J: One-Minute Paper

*This is the form students used the first semester of to remark on the lab manual. This form was chosen over two other methods of collecting student evaluations.*

Please answer a set of these questions in reference to each topic.

A. Plant Body and Microscopy lab

B. Organic Chemicals in Plants lab

1. What did I learn this week?
2. What questions remain unclear?
3. What questions would you ask your students if you were the professor to find out if they understood the material?

A.

B.

## Appendix K: Student Response Form

*After several revisions throughout the semester, this is the last response form students filled out the second semester. I compiled and commented on the data collected from this semester. It was then given to the course instructor to be reviewed for changes in the manual.*

Please comment on one of the labs we've done in the past two weeks since the last comments sheet. This includes Topic 19 (Green Algae) through Topic 22 (Ferns).

1. Please list some things you felt were helpful in the lab manual. Why did you find these elements helpful?

2. If you had difficulties in this lab due to the lab manual, please explain what they were. Given these difficulties, what changes would you propose so that it's easier for students to use?

3. List any procedures which were unclear or written incorrectly in the manual. Please list any typos that you found.

Feel free to use the back of the sheet, or attach more pages as necessary.  
Please turn in to Jennifer Dufek's mailbox

## **Appendix L: Department Memo**

*Distributed to the faculty of the Botany Department at the end of my internship, this piece explains the process created during my internship. It informs the faculty that this practice will be continued and stands to improve the department's introductory curriculum. As the class rotates instructors each semester, I wanted to inform them about what they may be asked to take part in.*

To: All Professors Associated with Botany 130  
From: Jennifer Dufek  
Date: 28 August 2005  
Re: Changes in Botany 130 TA Duties and Lab Manual Revisions

The short of it: Jen and Mike have worked together on putting a procedure in place to allow student and TA feedback to be incorporated into the lab manual. These changes will be implemented this fall.

Goal: Improve student learning by eliciting considerate feedback from students, which will inform further iterations of the lab manual, to more adequately meet their diverse ways of learning.

Strategy: Create a sustainable system, in line with Botany 130's goals, for receiving, processing, and incorporating student feedback on the lab manual.

### *Background*

- Mike Clayton has created the Botany 130 lab manual based on his experience with the course as taught by previous professors. The many iterations of this lab manual have been condensed into one document, which could use revision. There is a need for a system of continuous formative feedback from students to aide Mike in tailoring the manual towards student learning.
- Mike has incorporated vocabulary, background material, and concise instructions to aide in the students' learning. These elements are largely based on Mike's views of how the course objectives can best be achieved. Recognizing an opportunity to continually assess the curriculum and the manual based on student input, Mike collaborated with Jennifer Dufek in

a Delta Internship<sup>1</sup> to determine the efficacy of such an approach. The hope is to weed out problems and exploit hidden opportunities within the lab manual, the learning instrument used across all sections.

In the Fall 2004 semester, Jennifer tested three different formats for obtaining student feedback. In addition to students remarking on their preferred methods of providing feedback, Jennifer also assessed which method prompted the most honest and informative comments. The next semester (Spring 2005), Jennifer implemented this “best method” in all sections of Botany 130 by requesting unprompted, anonymous student feedback. After the first few weeks, comments declined substantially. Five minute periods were then allocated every other week during lab to allow students the time to fill out the comment sheets; comment sheets were revised continually to focus the types of feedback students were volunteering. Jennifer is going through that information and annotating a copy of the lab manual. By doing this, she can sift through multiple comments on the same topic providing a TA’s perspective; she can identify when students are frustrated by one of the built-in crisis points<sup>2</sup> or by an area in the lab manual that should be fine-tuned. She is also able to remove rude or malicious comments as well as give suggestions to solve a problem when students failed to do so.

### *Procedure*

For the Fall 2005 semester, the Botany 130 TA’s will be broken up into two groups: the Assessment team and the Evaluation team. Assessment team members are responsible for grading the quizzes throughout the semester and the Evaluation team members are responsible for eliciting and collating student feedback and suggesting improvements to the lab manual. Each member of the Assessment team will have a partner on the evaluation team (herein assessment partner and eval partner). The assessment partner will grade her sections’ and the eval partner sections’ quizzes. The eval partner will elicit feedback from his and his partner’s sections. The members of the evaluation team will be active once every three weeks. Please see Table 1 for an outline of partner duties and Table 2 for a procedure outline for the evaluation team.

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<sup>1</sup> Delta is a Learning Community on campus devoted to continually refining teaching to enhance student learning through rigorous testing and re-applying based on the scientific method while incorporating diversity and learning communities.

<sup>2</sup> A crisis point is a question or point made in the lab manual that requires the student to seek out the TA for help and clarification. These assure that the students make contact with their TA’s several times throughout the lab session.

Table 1. Partner Duties

<b>Assessment Team</b>	<b>Eval Team</b>
Grade quizzes for theirs and their partner's sections	Evaluate the lab manual once every three weeks for theirs and their partners' sections
Have the opportunity to ask Mike Clayton to grade one set of quizzes	Update feedback forms as necessary, seeking input from all members of the eval team
	Mark-up a clean-copy of the lab manual inserting student comments and personal suggestions as necessary
	Turn marked up copies in to Mike no later than 1 week after the evaluations are submitted

Table 2. Evaluation Team Procedure Outline

The eval partner will be "E" and the assessment partner will be "A"
<b>Monday/Tuesday</b>
E provides A with copies of the feedback form for A's two sections
E and A each give their first section the feedback form allowing 5 minutes at the beginning of lab for students to fill it out; forms are turned in to a box at the front of the room. A places feedback forms in E's mailbox
<b>Wednesday/Thursday</b>
E and A each give their last section the feedback form allowing 5 minutes at the beginning of lab for students to fill it out; forms are turned in to a box at the front of the room. A places feedback forms in E's mailbox
E marks up the first lab with the Monday/Tuesday comments and the second lab with the Wednesday/Thursday comments. E inserts personal suggestions and comments where necessary in a different color.
Mark-ups are due to Mike the following <b>Friday</b> . These will be incorporated in the next semester's lab manual as Mike sees fit.
If any of the evaluation team members feel that the feedback form should be modified in order to elicit more specific feedback from the students, all members should be consulted and notified of the change. Changes in the form can also be suggested by Mike Clayton or one of the instructors if they have a specific goal for one of the lab topics.

*Continuation*

After the Fall 2005 semester, Mike Clayton, all of the Botany 130 TA's, the instructors from that semester, and a representative of Delta (Don Gillian-Daniel or an interested intern) should gather for a genuine feedback session to discuss the process and results. At this time, procedural

changes should be considered as well as the goal of the lab evaluations. An area which could be considered for development in the Spring 2006 semester is lab manual modification and testing. Should Mike Clayton want to revise lab exercises for the lab manual, the evaluation system as described would assess student response to those changes. In this case, a control and test group should be compared to decide if implementation improves student learning. This may require modification of the feedback forms into assessment tools. Assessment of student learning using common learning objectives between labs could help make an informed decision on whether or not to either revise the lab or use it in further iterations of the lab manual. One resource that could be used is Student Assessment of Learning Gains, which is an online assessment tool at <http://www.wcer.wisc.edu/salgains/instructor/>. Computers are available in Birge 113 making this method a viable one.

Some other areas which could be explored are:

- Funding for an evaluator position; offering an RA through course development funds would allow a graduate student to become fully engrossed in evaluating/assessing the lab manual and the learning outcomes
- Coordinating with Delta as an Internship Opportunity recruitment area
  - Focus on updating/revising activities and the resultant changes in student learning

## **Appendix M: Statement from Michael Clayton**

*Michael Clayton is the course coordinator for Introductory Botany and was my faculty partner in the internship. I proudly include this statement from an experienced educator whom I respect deeply.*

Dear Delta Certificate Committee Members,

I was Jennifer Dufek's faculty partner during the fall semester 2005. I am the course coordinator for General Botany (Botany 130). I am most directly involved in the lab curriculum, and I design the lab topics and web lessons for the course. These may all be viewed or downloaded at the laboratory section of our course page:

**[http://botit.botany.wisc.edu/courses/botany\\_130/Laboratory.html](http://botit.botany.wisc.edu/courses/botany_130/Laboratory.html)**

Our lab curriculum evolved in the context of an on-going dialogue between me, the teaching assistants, the professors and, sporadically, the students. However, until I worked with Jen, I have not formally sampled the views of the students in regards to the effectiveness of each lab topic.

I have worked with literally hundreds of excellent people who have served the course as teaching assistants. Of all of these people, Jen stands out as the only TA who, not only worked hard to teach her sections well, but who also analyzed the teaching process. I know that this was her task as part of her Delta project, but her involvement in the course, at this level, was not forced. It flowed naturally from her experiences and observations, and reflects her talents as an educator. She has the ability to see connections between concepts interwoven within each topic and across topics. She could discern where the presentation of ideas, embedded in lab activities, were not optimal, and she was able to effectively present suggestions diplomatically. I have a lot of emotional energy invested in the curriculum, which was developed in light of 22 years of experience. When dealing with Jen, I was never put on the defensive. She is clearly tactful. Her comments and observations always made sense to me. If we disagreed our disagreement served to arrive at a synthesis of ideas. In my role in the course, I don't have colleagues. I differ to the

professors, and I attempt to persuade the TAs to differ to my ideas about how each lab should be conducted. However, during the time I worked with Jen, I viewed her as a colleague. She should pursue a career, not just as a teacher, but also as someone who designs writes and analyzes the curricula she teaches.

I am still working out the details of making permanent the process of student evaluation engineered by Jen. This assessment, though, will become a permanent part of what we do each semester, and will positively affect the course and the thousands of students that take the course in the future. Further, it has heightened by awareness of the need to develop other ways of evaluating our effectiveness in achieving our learning goals. Clearly Jennifer Dufek did a great job for Botany 130 and certainly merits a Delta certification.

Best Regards,

Michael Clayton