2010 Research Residency
Pre-Institute Assignments

Team 1
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Assignment #1: Introductions

1) Describe your teaching responsibilities and the type of student you teach.

My path to teaching has been somewhat winding. I began at UNR as a Research Professor in the Biochemistry Department and worked there for about 15 years with no formal teaching responsibilities—just the mentoring of grad students and postdocs etc. Then, I resuscitated a course (Science and the Citizen: Biochem for non-majors) as part of the Core Curriculum requirement. Needless to say, not many non-majors are going to choose a Biochem class to fulfill their requirement, but after teaching my first brave twelve students, I realized I really loved the teaching as well as the research. After a couple of semesters, I began teaching the larger (240) non-majors Biology Core Curriculum course, and then the Introduction to Microbiology course for mixed majors. I also worked on redesigning the Molecular Biology Laboratory Course and the Biochemistry Lab Course. Now, some 10 years later, I mostly teach the non-majors Bio course and the Micro course. Enrollment in the Bio course has remained roughly the same over the years, but the Micro course has grown from 40 to 140 students. I have enjoyed writing new lab exercises for both courses as well. Both courses have a tremendous range of students, a range in motivation, preparedness, interest and ability. A great challenge—never a dull moment! I also have started a Microbiology Journal Club for undergraduates and an undergraduate microbiology laboratory assistant training program—both very fun to teach and appreciated by the students.

In the summer, I teach a short mini term (3 week) version of the nonmajors Bio course. Again, a challenge, but a great opportunity to try out new strategies on a smaller class (60 students max). And then in June and July I teach a six week Summer Academy for Upward Bound. Upward Bound is a federally funded program for first generation college-bound or low income students. It is a year long program that tracks a number of students with monthly meetings and then culminates in the summer academy. I get the cream of the crop (no remedial students in my group!) and have a chance to teach a really small class again (usually around 12). Another wonderful opportunity to try out my new labs, lectures, group projects, interactive exercises etc.

2) Describe what you would like to take home as a result of attending the SoTL Institute.

I look forward to discussing with like minded teachers the importance of interactive learning and how to creatively assess whether the strategies I employ are successful—beyond just whether the grades go up. I have begun developing a modular approach in my basic bio course for non-majors. I want to continue to develop half the semester into a group oriented, case-based learning course. I hope to come home with ideas on how to assess whether this approach works with the widely varied students I work with. I also hope to come back with a better agility with assessment overall. Six or seven years ago, when assessment became important campus wide, some of our faculty rebelled against "teaching to the standards," etc. However, after many QUE (Quality in Undergraduate Education) meetings and CUE meetings, I have gotten much more interested in the process and hope to bring some of that excitement back here to UNR to my less excited colleagues.

3) Tell us about your interests outside of the classroom and a book that you have read recently.

I love to hike, ski and sail, so living in the eastern foothills of the Sierra Nevada has been a wonderful experience. I have also learned to love the desert north and east of Reno—some beautiful country out there that took awhile to appreciate, having lived the rest of my life where it is pretty green (grew up in Ethiopia and got my degrees in California). I have become a cheese-maker. I began with a demo for my micro class and got hooked! I love to cook, garden, travel and read. In the book club a friend and I began over 10 years ago, we just finished Oscar Wilde's, "Picture of Dorian Gray," a fairly weird and wonderful book. More serious reading a few weeks ago was James Watson's "Double Helix," and "Rosalind Franklin: Dark Lady of DNA," both as a basis on a case for my module on DNA in the general bio course. As a new "empty-nester," I miss my two daughters (both at college) and am learning how to juggle different things, now that the active mothering is slowing down.

Assignment #2: Reflections

1) How would you describe your "research problem(s)" to the Research Scholars group?

I agree with one of you who said they feel like a kid drooling in a candy shop—what problems/questions should I choose—so many things I have been working on! I think my focus will begin with continuing the updating of our general biology for non-majors. Strategies that are successful in this arena will then be directed towards updating my general microbiology course. Over two hundred students generally take the non-majors biology course each semester to fulfill one of two natural science requirements. During the last few years, as I have discussed with the students, "Why are you taking this course," the general response is, "Because I have to." And then, because they have to, they are not very invested in it. I want to help them rethink why they are taking it, and look to learn and look to enjoy. After doing some basic reorganization of the lecture and lab portions of the course, I am now interested in determining whether some of these more interactive strategies are effective. There are now four modules; I want to teach the first and third modules in a traditional lecture based style, second and fourth modules in a case/problem-based mode with assigned groups given the cases/problems and using those as a jumping off point to then come back to mini-lectures to support what they are (or are not) learning. My problem is how to really know whether this different approach helps them learn more than the traditional approach. From all of our reading and interest in interactive learning in the last 10 years or so, it has become apparent, that, indeed, interactive learning can be very effective. But how to measure this—grades on exams, student satisfaction, ability to extend critical thinking skills to other problems. As an enthusiastic biologist, I want them to gain expertise in the bare minimal of content necessary to make ones way in the modern world. I also want them to become (as we all hope they will be) "life-long learners." A couple years ago, when I was excitedly writing a lab exercise based on the beauty of termite gut endosymbionts, one of my

undergraduate lab assistants made a very telling statement, "What do you want them to learn?" I have used this as a "mantra" (?) ever since. Does the exercise I am working on help them learn what I hope they will? So, does group work on interrupted cases help them learn basic content?

2) What theme(s) based on your readings, resonate with your "problem" and/or your proposed approach to address your problem.

As I read back through the articles and my notes, most of my highlighting had to do with assessing outcomes. In Bass's article, ". . . make every course component intentional," were they (the students) ". . . merely learning to perform. . .to appear knowledgeable?" How do we begin—how do we ascertain ". . . student prior understanding and their capacity to acquire new understanding. . .?" I have not used opening day pretests, but would like to do so. However, altering my proposed modules on the fly, based on these pretests will clearly not be possible first time around. In Hutching's article, most of what seemed to be immediately pertinent was the idea of change—of looking at what worked and didn't and learning from that, of how to generate and shape a question to focus on measurable outcomes, rather than just anecdotal evidence—"changing the status of the problem in teaching from terminal remediation to ongoing investigation. . ."

3) Based on Pat Hutchings article, what taxonomy would you use to describe your research question and why?

My research question(s) seem most closely related to "visions of the possible." I have been working on a number of strategies that address "what works," and "what is," and now I think I am ready to fine tune these numerous strategies in an overall modular system that pulls them altogether.

Assignment #4: Annotated Bibliography

The literature I have been perusing has to do with the impact of case studies in large classes on overall understanding of material by students, and also whether their retention of the material is enhanced. Because I am just finishing up my second summer course (two days left!) I have not had much time to search the literature thoroughly. However, I have found time to read and begin to annotate three articles pertinent to my project.

This page will be updated after I finish my class on Friday!

1. Herreid, C.F, *Case Studies in Science: A Novel Method of Science Education.* This article is online..

As I consider how to assess the success of my current case studies embedded in my lecture and lab courses, I found it useful to go back to one of my original sources on strategies of case studies. The author describes the methodology, some of the pros and cons, and continues on to describe some of the variations. This is not a research paper, but more of a foundation.

2. Chaplin, S. (2009) *Assessment of the Impact of Case Studies on Student Learning Gains in an Introductory Biology Course.* J Coll Sci Teaching,

In this research-oriented article, strategies are presented on assessment of efficacy. Limitations: sample size. Positive aspects: long term teaching experience and looks like pretty decent statistics.

3. Fife, E. (2007) *Using Focus Groups for Student Evaluation of Teaching.* MountainRise xx.

As I continue to develop cases, I have used small informal focus groups to assess whether my goals in helping the students learn are being met. This article on formalizing the focus group assessment may play a big role in my future work.

Jacqueline Hoffman
North Carolina State University, Raleigh, NC

Assignment #1: Introductions

1) Describe your teaching responsibilities and the type of student you teach.

My teaching responsibilities fall into the realms of both formal and informal teaching. With respect to formal teaching, I teach a 200-level Introductory Poultry Science course during fall and spring semesters.This course is a survey course that is required for all Poultry Science majors. Additionally, this course is a requirement for students in other majors who would like to enroll in upper level poultry/avian courses. My intro course covers all production and management aspects of the poultry industry as well as avian anatomy and physiology. I also teach a 400-level Avian Physiology course and laboratory during fall semesters. This course is an intensive course where I systematically cover avian anatomy and physiology while making significant comparisons to mammalian species. The type of students I teach fall into two distinct categories:

1. highly academically motivated pre-veterinary students with strong science backgrounds and study skills who are typically from the suburbs
2. less academically motivated students who plan to work in the poultry industry in the future with weak science backgrounds but lots of "on-the-farm" training who are typically from very rural areas

My informal teaching responsibilities include training both undergraduate and graduate students in conducting research in my avian reproductive physiology laboratory. The focus of my research is examining the influence of stressors (environmental, genetic selection, management practices etc) on ovarian follicular development and maturation in avian species. I train my students in a variety of techniques including avian ovarian dissection and tissue collection, real-time PCR, cell-culture, RIA's etc., presentation skills they utilize at national/international meetings, and manuscript preparation.

2) Describe what you would like to take home as a result of attending the SoTL Institute.

Ultimately, I would like to learn how to transform my teaching practices, both in the classroom and the lab, into scientific research of their own right. I would like to learn how to utilize the problem-based case poultry curriculum I am writing to teach my students how to problem solve and utilize analytical thinking skills rather than just regurgitate content information. I consistently see excellent students struggle in "application-based" courses such as my avian physiology course because they are not used to applying the knowledge they gain in class to a problem they have not previously seen.

3) Tell us about your interests outside of the classroom and a book that you have read recently.

My primary interest outside of the classroom is spending time with and attempting to train my menagerie. I have two cats, two dogs, and three birds that keep me pretty busy. I also enjoy figure skating, gardening, hiking, and spending time with friends and family. I recently read "The Dog's Brain" which is an introspective look into canine psychology. I was hoping it would help me to understand the mischief my coonhound, Humphrey, engages in!

Assignment #2: Reflections

1) How would you describe your "research problem(s)" to the Research Scholars group?

As an Assistant Professor of Poultry Science, I teach and advise many pre-veterinary students at North Carolina State University. Typically, these students are highly-motivated individuals who have achieved "academic success" throughout their academic careers. However, the majority of these students hit a "wall" when they take courses such as organic chemistry or genetics which require synthesis, integration, and application skills. I believe this problem is widespread due to the large number of straight "A" students I advise who struggle to maintain a "C" average in application-based science courses. Personally, I believe that the underlying cause of this problem revolves around the lack of training students receive in actually having to integrate information and apply it to solve a problem. However, the underlying assumptions that many professors make regarding this problem is that students are not capable of thinking at a higher order level. As described by Bloom's taxonomy, knowledge and comprehension are skills that require lower order thinking skills. In contrast, skills such as application, analysis, synthesis, and evaluation are much more challenging, higher order thinking skills. Because education in grades K-12 focuses so heavily upon providing students with knowledge and testing students to see if they have adsorbed and comprehend the presented information, most students are not asked to utilize higher order thinking skills until they enter their college careers.

After observing numerous hard-working, motivated, and intelligent pre-veterinary students fail to realize their goals of gaining admission to veterinary school due to their inability to apply, synthesize, and solve problems in application-based science courses, I began to ask myself how I could enhance my students' problem solving skills. I decided to incorporate problem-based learning (PBL) in my Introductory Poultry Science Course in order to expose students to problem solving as soon as they began their academic careers at NCState. Throughout the course, students are taught how to write their own problem-based cases for their peers to solve. This method teaches students how to pose a problem and guide other students through the act of problem-solving by carrying out their own independent research. I am interested if this framework of problem-based writing and peer-moderation in addition to problem solving is actually working to improve my students' analytical problem-solving abilities and thus helping them to be more successful in science courses later on in their curriculum that require analytical thinking skills.

2) What theme(s) based on your readings, resonate with your "problem" and/or your proposed approach to address your problem.

I definitely related to Miles Kelley's description of how he first felt when he began trying to figure out how to do this thing called "scholarship and teaching." I often find it difficult to translate my knowledge of experimental design, data collection, and analysis that I use in my molecular biology lab into the classroom. While I believe there are some aspects that overlap directly, educational research is an entirely unique realm where subjects (aka students) are not as easy to manipulate as RNA or proteins :)

Bill Cerbin's point regarding how important it is to understand why some things are hard for students to learn is really what drives my research question. I am interested in determining why students who do well in content-driven courses seem to struggle significantly with application, problem-based courses.

3) Based on Pat Hutchings article, what taxonomy would you use to describe your research question and why?

I definitely feel that my research problem spans two of the taxonomic classifications presented in Hutchings' article. First, I am trying to answer "what works" with respect to modifying how problem-based learning is typically presented to students in class. I am interested in determining if the act of developing, writing, and guiding other students in solving their own problem-based case study will enhance a student's ability to better conceptualize the process of problem solving. This research question also falls into the category of "formulating a new conceptual framework for shaping thought about practice." Specifically, most undergraduate and graduate curricula that are based on PBL provide students with a set of problems and teach them a very specific technique to research and solve that problem. I am proposing that students be given the opportunity to create their own problem cases and then act as peer moderators in guiding classmates to solve a problem. This is a new way to frame problem-based learning because I am interested in understanding how shifting a student's focus from direct problem solving to problem development and peer moderating helps to develop analytical problem-solving skills.

4) Do you have any questions/concerns/comments that have evolved from your reading?

One question that I have after completing the readings is how to correlate a student's exposure to a new conceptual framework in one class with their academic success in courses that relate to that skill set later on in their academic development.

Assignment #4: Annotated Bibliography

Heather Seitz

Johnson County Community College, Overland Park, KS

Assignment #1: Introductions

1) Describe your teaching responsibilities and the type of student you teach.

I currently teach at Johnson County Community College in Overland Park, Kansas. My responsibilities each semester include 2-3 sections of Microbiology lecture. This is a sophomore level course in microbiology that is a pre-requisite for allied health programs. I also teach 2-3 sections of Microbiology lab, again this is a sophomore level course that is designed to complement the lecture, although they are separate courses. Each section contains between 20-30 students and I love having class sizes this small to be able to really connect with my students. Occasionally I also teach sections of our majors biology course and biotechnology courses. In the summer I help with biotechnology workshops for high school students, high school instructors and industry training workshops.

The types of students I see in my courses are mostly non-traditional, I have students that range in age from 18-50+. There is no pre-requisites for my course which allows students with all

backgrounds to jump into an intensive microbiology course without having had a college-level biology course previously. This is a challenge at times!

2) Describe what you would like to take home as a result of attending the SoTL Institute.

I would like to learn how to better engage and assess student learning in my face to face sections as well as my “hybrid” sections. My definition of a hybrid course is a 3 credit hour course that only meets in a classroom for one hour each week. The remaining content is provided online. I have continuously found that my hybrid students do worse on assessments than their face-to-face peers and I would like to develop effective methods for testing why this may be the case. I am hoping that the SOTL institute will help me develop some methods for evaluating differences between my student populations and really begin to make my hybrid courses as effective as my face to face courses.

3) Tell us about your interests outside of the classroom and a book that you have read recently.

My interests outside of the classroom really center on my little men, I have two little boys 6 and 3 years old and a third little boy due this week! They of course keep me very busy, we love to be outside, go for bike rides, explore nature and I spend a good deal of time capturing memories of them through scrapbooking. My most recent reads include: *Dreams Of Trespass: Tales Of A Harem Girlhood* by Fatima Mernissi and *In the Time of Butterflies* by Julia Alvarez.

Assignment #2: Reflections

1) How would you describe your “research problem(s)” to the Research Scholars group?

I feel energized by so many of us who struggle with similar issues and are developing the tools to better our classrooms. My research problems are focused on the problem I have between my "face to face" classroom and my "hybrid" classroom. I teach a sophomore level introductory microbiology class to allied health students, mostly pre-nursing and pre-dental hygiene, my face to face sections meet three times a week for one hour. I define my hybrid classroom as a 3 credit hour course that meets in the classroom with me only 1 hour a week, the other two "hours" are then spent online. I have very similar tools for both classroom environments, with the biggest difference between the two being that my face to face classroom hears me lecture "live" three times a week, whereas my hybrid students listen to my talk and view the same PowerPoints that my face to face students see. The problem I see with these two classrooms is the difference in retention and achievement. I have taught both formats of the course for three semesters now and each semester I lose a larger portion of hybrid students and the ones that remain have lower averages on all the assignments. This is a concern that a number of my colleagues have as well, although I haven't found a suitable explanation for it. I want to explore this problem fully through the techniques we have begun to learn.

2) What theme(s) based on your readings, resonate with your “problem” and/or your proposed approach to address your problem.

The first theme that resonated with me was the idea that designing a course and changing a course may not always come with praise from the students, and through meta-cognition and using it with my students we might be able to resolve some of the critical issues in the course. I am always astounded at the students that don't know what they don't know, and therefore do poorly in my course. I am hopeful that taking the inverted pyramid approach I can begin to simplify my expectations and hopefully make them more clear to the students.

3) Based on Pat Hutchings article, what taxonomy would you use to describe your research question and why?

I feel my "problem" falls mostly within the "what is" taxonomy. I am really searching for "what is" the difference in students/ interaction/ learning styles/ ???? that is making a difference in achievement between my two formats of class. I am hopeful that when I resolve the "what is" problems that i can then transition to "what works" by implementing tools to make both formats of my course equal in achievement.

4) Do you have any questions/concerns/comments that have evolved from your reading?

I feel the same as others who have already responded in that I feel unprepared for this line of research, the CAR approach seems very workable as a way to implement our studies, but from the scientific background that most of us have it is difficult to swallow the lack of rigor. However, how do we attain scientific rigor with human students in our classrooms? Others have discussed this and I am hopeful that through learning more about SoTL we will all be able to find workable solutions to begin to solve our "problems".

Assignment #4: Annotated Bibliography

Kathy Zoghby

University of Richmond, Richmond, VA

Assignment #1: Introductions

1) Describe your teaching responsibilities and the type of student you teach.

I am currently the Director of Molecular Biological Laboratories in the biology department at the University of Richmond, Richmond, VA. A typical teaching load each semester consists of 4 or 5 lab/lecture sections.

My teaching responsibilities include the laboratory sections of our Genetics course. We currently run 3 or 4 sections of lab and lecture each semester.
Each lab has up to 20 students, and I teach 2 or 3 of these labs. The students in this course range from 1st to 4th year students and are a mix of majors and pre-health students. My responsibilities include the design and implementation of the lab exercises for all the sections and students.

I also teach a lab and lecture course in Human Genetics for non-major students fulfilling their natural science requirement. The enrollment in this course is 18-20 students each semester.

I am creating a course called Bad Behavior: Is it in our Genes? for the spring of 2011. This course will be part of our first year seminar series.

I am excited at the challenge presented by this unique course as the class will be discussion based and consist of students from all disciplines. The enrollment for this class will be approximately 16 students.

2) Describe what you would like to take home as a result of attending the SoTL Institute.

I am looking forward to learning from each of you as we participate in the Institute. I have adopted the team-based learning method for my non-major course. The question for me becomes: How do we best engage this population of students so the deepest learning can occur in spite of the natural resistance these students have for learning "science" material? What is the best approach? There is team-based learning at one end of the teaching spectrum and straight power point lecturing on the other. How do we find out if it makes any difference at all in student learning outcomes?

3) Tell us about your interests outside of the classroom and a book that you have read recently.

I have 3 sons - ages 22 (a junior at UVA in architecture), 17 and 15. My life outside the classroom right now revolves around their school activities and events. My family enjoys traveling when we get the chance, including trips to the mountains and the coast. Richmond is situated just right! I do enjoy reading (mostly between semesters). I have recently read The Immortal Life of Henrietta Lacks and a Jodi Picoult novel - Handle With Care.

Assignment #2: Reflections

In my application for the Biology Scholars Program, I outlined my problem around the question: Do our teaching methods truly make a difference to student learning outcomes, and if they do, what questions do we need to ask in order to determine the best approach for our teaching? I am approaching this problem from my teaching of primarily non-science majors looking to fulfill their general education natural science requirement. I see now that this question leads to a very simplistic view of what I thought I would accomplish with all of you in the SoTL Institute. This assignment has led to more questions than answers, and while that is probably a good thing, I think I no longer have a well-defined problem. I still want to focus on the ability to investigate what best helps my students learn, but I am not sure if the approach needs to be from the students viewpoint, not from my teaching viewpoint. These articles have created something of a conundrum - almost, but not quite, along the lines of the chicken or the egg!?

I found myself highlighting so much of the information in these articles that I had to stop and seriously focus on what I am trying to discover. I had never thought of questioning the idea of the problem in quite the same way as stated by Randy Bass. Now his view makes perfect sense we first need to define for ourselves if the problem is our teaching or the ³problem² is our students learning capabilities. This leads to another statement that was made by Bass we probably know very little about how students come to know the material we teach. Deep down I suspect that students will either work hard or not, pay attention or not, and exhibit mastery on our exams or projects, but I sometimes am left with the felling that I had very little to do with their performance. I loved his statement that he strove to make every course component intentional. I confess that in order to get my syllabus together each semester, I find myself including assignments or activities that make my cringe slightly, but I run out of time to recreate something better. I need to find that time to create my own inverted pyramid. Finally, I was happy to see his statements about asking the students what they think they know I have started doing that at the end of my course, and then have tested the concepts to see how well they match up. When I see a disconnect between what they think they know well and their (wrong) answers, I know I have a problem in my teaching.

My research question fits easily into the what works approach, however, this is obviously on the surface. I found myself relating to some aspect of all the questions asked in this article, and find a particular interest in the idea of a very flexible approach to our inquiry. One question leads to another, and we will find ourselves crossing the lines to investigate student learning processes.

All these concepts are not mutually exclusive, and I think part of my problem is to try and focus! As someone pointed out in the Hutchings article, the idea is not to choose camps but find the common ground on important educational issues.

These assigned readings have given me a better understanding of the scope of this world of scholarship of learning. I thought all the research had to be filled with controls, and with quantifiable data before we could make any analysis about what works. These readings allowed me to see that one can take a very personal approach to many different styles and questions of the scholarship of learning. I am excited at our prospects, and looking forward to working my way through this process with all of you.

Assignment #4: Annotated Bibliography

My research is going to focus on best practices for teaching students in non-majors biology courses. There is a breadth of literature on this topic, and I definitely had trouble focusing in on my topic. I found myself chasing down many side roads as I read through my articles. The question for me becomes: How do we best engage this population of students so the deepest learning can occur in spite of the natural resistance these students have for learning the material we are going to cover? What is the best approach? How do we find out if it makes any difference at all what method we use?

1. Knight, J. K., & Smith, M. K. (2010). Different but equal? How nonmajors and majors approach and learn genetics. *CBE – Life Sciences Education,* 9: 34-44, doi: 10.1187/cbe.09-07-0047

This paper is helpful for my project as it contains relevant observations concerning the attitudes of majors and nonmajors toward learning genetics. The student attitudes, study time and study techniques were compared. Content assessment was made using a validated test – the Genetics Concept Assessment. I have already used this assessment test in my course with mixed results. The authors of this paper suggest that changing the approach for nonmajors so the course is relevant and topical may help them to be more engaged in the material and the class, which then leads to learning gains.

2. Russell, J. S., Martin, L., Curtin, D., Penhale, S., & Trueblood, N. A. (2004). Non-science majors gain valuable insight studying clinical trials literature: an evidence-based medicine library assignment. *Advances in Physiology Education,* 28: 188-194, doi: 10.1152/advan.00029.2003

These authors show that non-science major students show significant learning gains when they are assigned a project involving the use of primary literature. The students are allowed to choose a topic for their Responsible Patienthood Project. This assignment culminates in a poster presentation. Using surveys and questionnaires, the authors concluded that students would be able to become better informed in making decisions for their own health care and would be more empowered to seek information in appropriate venues – not just WebMD or Wikipedia. This article is another example of how the education of non-majors can lead to significant, scientific learning.

3. Wood, W. B., (2009). Innovations in teaching undergraduate biology and why we need them. *Annual Review of Cell and Developmental Biology,* 25: 93-112, Retrieved from arjournals.annualreviews.org by University of Richmond

This is a wonderful article that touches on almost all the topics I have come across in my reading of the literature. The author offers a summary of different teaching approaches and introduces a concept I had not seen before – DBRE, or discipline-based educational research. He discusses

the current notions of how students learn and how this knowledge can be applied to the classroom. He points out that most university faculty are not aware of or do not know how to make their teaching more effective. He summarizes practices that have been shown to yield promising results of increased student learning. There is so much information in this article that I simply cannot summarize everything here. One thought though, that sticks with me since it is a question I am asking, and I quote "Traditional teaching methods do not prevent the progress of superior students …..but they fail the majority of students…" Therefore, changing our teaching methods will benefit the population of students that need it the most.

4. Crowe, A., Dirks, C. & Wenderoth, M. P., (2008) Biology in Bloom: implementing Bloom's taxonomy to enhance student learning in biology. *CBE – Life Sciences Education,* 7: 368-381.

This paper presents the Blooming Biology Tool (BBT) as an assessment tool which can be used as a guide for development of classroom teaching activities. I am particularly intrigued by the authors description of using the students in the classroom to develop questions according to Bloom's taxonomy at all levels. The authors show that study skills improve and students are capable of learning to use Bloom's taxonomy to write and identify questions. Students can also apply their knowledge of Bloom's to their studying practices and evaluate the levels at which they understand the scientific concepts. This finding is of particular interest to me – one of my questions has always been how to help students find out what they do not know. Students always tell me they studied so hard, yet their grades do not reflect their effort. This paper gives me some ideas to help students recognize how they need to study and look at the material.

5. Wright, R. L. & Klymkowsky, M. W. (2005) Points of view: content versus process: is this a fair choice? *CBE – Life Sciences Education,* 4: 189-198

I find this article useful for the development of the idea of "a lived curriculum in biology: first do no harm". I believe the article is important to the SoTL since it simply points out the idea that we are in the midst of a so-called revolution to change the way we teach, yet there are examples dating back to at least 440 BC where scientific literacy had been promoted as an important goal. I agree with the author that we need to use examples of what has been done in scholarly research so we are not constantly re-inventing the wheel.