

Teaching Portfolio

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Delta Certificate in Research, Teaching, and Learning

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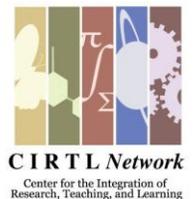


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The Delta Program in Research, Teaching, and Learning is a project of the Center of the Integration of Research, Teaching, and Learning (CIRTL—Grant No. 0227592). CIRTL is a National Science Foundation sponsored initiative committed to developing and supporting a learning community of STEM faculty, post-docs, graduate students, and staff who are dedicated to implementing and advancing effective teaching practices for diverse student audiences. Any opinions, findings and conclusions or recommendations expressed in this material are those of the author(s) and do not necessarily reflect the views of the National Science Foundation.

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About this Portfolio

This portfolio is a formative, dynamic document that is the culmination of my experiences as a student, teacher, and a Delta certificate cohort member. My intention is that this portfolio will be a roadmap for the reader that highlights key events that shaped who I am as a student and instructor. In addition to serving as space to present my thoughts on these experiences to date, this portfolio also displays a collection of artifacts from my efforts to put those philosophies into practice in various teaching settings.

About the Delta Program

During my last two years as a graduate student in the Animal Sciences department at the University of Wisconsin-Madison, I participated in the Delta Certificate Program. The Delta Certificate in Research, Teaching, and Learning confers recognition of a student's achievement in both formal and informal roles as an educator, awareness of current issues in higher education, an understanding of basic educational research, and how to implement changes to improve learning in the college classroom.

The Delta Teaching and Learning Certificate

Coursework

The College Classroom: Teaching in Science and Engineering: International Students, International Faculty

Small groups of STEM graduate students and post-docs discussed various aspects of teaching at the university level including: ethnic-sensitivity, diverse student populations, and attitudes towards teaching in different university environments. Weekly panels of professors from varied cultural and teaching backgrounds took part in lively discussions that brought different educational issues to light for the class participants.

Instructional Materials Development

In this project-based course, STEM graduate students paired with faculty mentors developed instructional materials for an existing undergraduate course. Background reading materials were provided by the IMD course instructors and included topics such as Bloom's taxonomy and the development of clear course objectives. My project in this class involved implementing an active learning tool for muscle physiology into an intermediate level Equine Business and Management course and assessing subsequent student perceptions of learning.

Participation in the Delta Learning Community

In the Fall of 2012, I will be working with the UW School of Nursing to establish a Learning Center for both nursing and pre-nursing students specifically for Physiology; a pre-requisite for the program. My interest in creating a positive learning environment that inquiry-based group learning creates stems directly from my work in Physiology 335. The course instructors have set precedence for this dynamic teaching approach which I wish to continue at the School of Nursing Learning Center. My intimate knowledge of the course, a good understanding of the student population, and what is necessary for success in the course, will serve well in constructing a tutorial program and my Delta experience provides an ability and understanding of education so that I may critique and improve the services of the Learning Center.

Teaching as Research Internship Project

I developed a series of surveys to assess student knowledge of physiology entering and leaving an upper level Animal Science production course. With the question of how to test the effectiveness of such a tool to increase student learning too large to accomplish within this internship, I took a slightly different perspective and sought to examine how using an easy to follow analysis method would affect students' confidence when reading scientific literature. Analysis also included comparing pre- and post-assessments of student perceptions as well as a focus-group discussion on the use of literature articles in the college classroom currently at UW-Madison.

Creation of a Teaching Portfolio

Compiling all of my teaching and learning experiences allowed me to carefully reflect upon them, my journey in my development as a teacher, and why, ultimately, I will continue to teach in the future, wherever my career may take me. While some may find quotes trite, I personally, can give no higher praise than to admit when my own words are inadequate and defer to someone much wiser than I. Professor Stephen DiCarlo from Wayne State University School of Medicine from his Claude Bernard distinguished lecture states, "Teaching is the unique and central mission of institutions of higher learning. Teaching is not just an addendum to research. It is not an obligation that comes along with the job. Teaching is the continuation of a culture, the continuity of what we have done and known, the substance of our intellectual life." These words capture the essence so succinctly of what I have been struggling to encapsulate in my portfolio.

Teaching Philosophy

What is learning?

Very simply, learning is the broadening and deepening of a person's perspectives; both emotional and intellectual. This activity cannot be confined to a classroom, but permeates and enriches our daily lives.

What is teaching?

Teaching is the act providing the foundations of knowledge and then guiding an individual so they may develop a new and valid perspective on the topic at hand. Good teaching can show individuals their full, wonderful potential and give them the tools they need to attain that potential.

Why do you teach?

The joy I experience when students finally grasp a sophisticated concept or dare to strive for incredible goals is the main reason I enjoy teaching.

I love learning; challenging and expanding my ideas, thus improving myself. Explaining a concept to another invites commentary, expanding our abilities in not only reason and logic, but communication. In the act of teaching, one is forced to grapple with one's own understanding of the topic in order to be explicit and concise in the explanation to ensure the correct message is received.

How do you teach?

The task of the excellent teacher is to stimulate "apparently ordinary" people to unusual effort. Using the Socratic method of inquiry to facilitate student learning of a subject matter is only the beginning. This questioning style of teaching pushes students to develop their critical thinking skills and approach a topic as intellectual, active learners. My very broad teaching objectives include:

1. Development of a working knowledge of a subject through supervised, small group interactions.
2. Expansion of knowledge by application of information in a new situation.
3. Creation of logical, testable hypotheses for unknown mechanisms and observations.

I can provide an applicable and lasting physiology education. I can create an educational experience where 'big picture' concepts are constructed by weaving a patchwork of specific ideas and mechanisms. By fostering a relaxed yet exploratory atmosphere in my classroom, with questions asked and answered from both teacher and students, I can encourage my students' thoughtfulness and desire to learn. My teaching methods are shaped primarily by student suggestions, so that together we can explore the principles and push the limits of their current understanding of the subject. Given a supportive atmosphere, and interactive and passionate instruction, I believe that any student can walk leave my classroom not only with a firm grasp of the subject matter, but with lessons that will serve them well, whatever their future endeavors.

How do you measure your effectiveness?

Student feedback that continuously serves as a system of checks and balances to ensure that I am engaging, informing, and encouraging students in a conducive and open learning environment is the foundation of my evolving teaching style. I incorporate both formal quantitative and qualitative measures of student evaluation into my class but also conduct informal polls frequently so I can be attuned with current student attitudes, successes, and frustrations to better adapt my teaching to suit any particular situation dynamic.

What qualities describe an effective teacher?

Imaginative

An effective teacher is one who presents information in an invigorating manner, whether by using an interesting method of instruction or presenting a topic from refreshingly new perspective.

Adaptable

An effective teacher is one who can adjust to any situations that students present. While having a plan of action on any particular day is important, the ability to change according to the students' learning needs is essential.

Goal-Oriented

An effective teacher is one who clearly outlines specific learning and course objectives. Providing a learning 'roadmap' allows students to understand both why they are learning the material and why the course is taught in a particular manner.

Contextual

An effective teacher is one who connects their subject matter to the students' own frame of reference. Providing real-world applications to sometimes seemingly unrelated material is the easiest way to gain student interest and foster self-motivation.

Persistent

An effective teacher is one who maintains their learning objectives in the face of student frustration or fatigue. Placing the responsibility of learning back onto the students and gently encouraging critical thinking through intentioned questions will allow students to walk away confidently from a class with a dynamic understanding of the topic.

Artifact #1 Summative Report

Student Perceptions of Primary Literature Articles as a Teaching Tool by Nora O'Reilly

Introduction

Through my academic adventures in graduate school, I discovered that I learned best in seminar or journal club settings. Having this opportunity to put relevant information in the context of applicable research and put the pieces of the puzzle together to create a working knowledge of a subject was crucial. Throughout my undergraduate training, most classes were large and lecture-based, where education became merely a perfunctory regurgitation contest rather than a dynamic, long-term exercise in critical thinking. While I accept that some form of foundation-building must be encompassed in any university program, with scientific discovery moving at break-neck speeds, the role of university educators is shifting from that of the expert, to one of a learning facilitator. Professors must provide students with basic concepts, and, more importantly, an approach to critical thinking to enable students to think well for themselves.

Current educational literature on the subject acknowledges the importance of critical thinking skills for undergraduates in the sciences and also highlights that even upper level students find developing these skills challenging. This along with my personal experiences led me to my internship project topic of augmenting a current course physiology curriculum with relevant literature articles and providing the students with a tool to help them analyze a primary literature article. With the question of how to test the effectiveness of such a tool to increase student learning too large to accomplish within this internship, I took a slightly different perspective and sought to examine how using an easy to follow analysis method would affect students' confidence when reading scientific literature.

Approach

The method I chose is Hoskins' C.R.E.A.T.E. approach which provides an organized way to 'dissect' articles in preparation for a group discussion.

Consider

- Sum up introduction in a sentence or concept map
- Define relevant variables/concepts
- Determine their relationships

Read

- Define unknown terms/words
- Sum up figures in a sentence or concept map
- Create cartoons/sketches of complex models/ideas

Elucidate Hypothesis

- For each figure, define the hypothesis being tested or question addressed
- Rewrite the title of each figure in your own words

Analyze and Interpret Data

- Using all your findings from the previous steps, track the logic of each experiment.
- Prepare a concept map for the paper using each illustration as a point of reference to reveal the logic of the study design.

Think of the next Experiment

- Consider a follow-up experiment to test any questions that were raised during the discussion of the paper.
- What is your hypothesis and how would you design those subsequent experiments?

The plan for this study was to have the students in an upper level Equine Business and Management class take a 'perception of scientific literature' survey, and then hand out the C.R.E.A.T.E. approach along with an assigned journal article, The Effects of Forced Exercise on Collagen Type II Fragments, Lysyl Oxidase Concentrations, and Total Protein Concentrations in Sera and Synovial Fluid of Lambs by K.L. Vernon et al. The students would have one week to read the paper using the C.R.E.A.T.E. approach and return to class where a group discussion would cover the paper, how students used the C.R.E.A.T.E. approach, and students would complete another survey that examined how the learning tool affected their confidence in reading and analyzing the paper. My initial thoughts were that having a concrete tool to use to analyze an article would increase students' confidence in their abilities to do so.

However when the students and I met to discuss the paper, I discovered that they had not received the C.R.E.A.T.E. method with the article. So with the enthusiastic, if slightly confused, students, I began a lively discussion of the article. To my slight chagrin, the students were quite competent at critical analysis. They eagerly discussed the strengths and weaknesses of the study design, the real significance of the results, and how they would construct and implement any future experiments. Following, I asked the students where they had learned how to so voraciously critique an article. It seems that most of their introductory classes included some exposure to journal articles, but the majority of their skill came from experience (4 out of 5 students) came from classes offered by their own department, Animal Science. With my hypothesis proven null, I quickly searched for a way to salvage what was left of my internship

project. Remaining with the topic of student confidence, the next week, I attempted to discover if it could be shaken when they were given an article, Systemic Elevation of PTEN Induces a Tumor-Suppressive Metabolic State by I. Garcia-Cao et al, that covered biological topics outside their area of study, Animal Science.

Evaluation

To assess student perceptions of scientific literature, I created a survey that was given to students with each literature article. The survey covered student views on primary literature as an effective and engaging learning tool, what aspects of articles could prove intimidating, what methods students used when reading and analyzing a journal paper, and student self-reported confidence in their ability to critically analyze the article. During each discussion period, which became more like focus groups, I took notes on the topics discussed so the professor and I could review them further away from students.

Results and Discussion

While the testing of my initial hypothesis could not be maintained, this internship project was ultimately successful as it brought the professor and I a new understanding and appreciation for not only the students themselves but for the quality of life sciences education that the University of Wisconsin provides to its undergraduates. The knowledge that I acquired during the discussion periods mirrored the results that were tabulated from the formal surveys of students' perceptions so for simplicity, I refer directly to what I learned in my face to face interactions with the students in the Equine Business and Management class.

Many undergraduate general science classes such as Microbiology 201 and Animal Science 101 are routinely incorporating relatively rigorous assignments that include the reading, synthesis, and analysis of scientific literature. The general movement in higher education towards an active learning, student-focused classroom, and putting the responsibility for learning back onto students to ultimately become self-educators, facilitates a research-based teaching approach.

Also students discussed the importance of providing a strong background for then when beginning a new topic. Emphasizing how new material relates to what students already know is critical in their engagement in the classroom and subsequent retention of material. However when students brought up influential professors on campus, the attributes they all shared was that they were memorable; eccentric and enthusiastic, 'real characters.'

Ultimately at the end of this project, I learned what we knew all along. If a professor can make a connection to their students, peak their interest, and instill a curiosity that lights a fuse to ignite a passion for lifelong learning, they have succeeded. Using scientific literature as a teaching tool is quite an effective tool as it provides context and application for novel ideas to be explored and pondered by students.

On this note I would like to applaud the Animal Science department especially, as the professors have taken full advantage of its small size and eager student population to constantly explore innovative didactic methods; producing graduates who are capable of working with others, gathering evidence, evaluating, and learning from it.

Artifact #2 Sample of Student Perceptions of Primary Research Literature as a Learning Tool Survey

Name: _____

(Same as breed used in Physiology assessment)

Please respond to each statement on a 1-10 scale with a 1 indicating “strongly disagree” and 10 indicating “strongly agree.” Please take the time to reflect on and answer the questions that may follow some statements.

Scientific literature explorations in the classroom are worthwhile as a learning tool. _____

Why or why not?

Scientific literature explorations are an effective way for me to learn topics in the classroom. _____

If so, why? If not, by what method do you prefer to gather information and learn?

I am intimidated by reading primary scientific literature. _____

What intimidates you about primary literature articles? Please rank each of the following.

_____ Statistics

_____ Graphs/Figures

_____ Vastness/Scope of topic

_____ Terminology/Jargon

_____ Confusion as to the ‘mission of research’ in general.

_____Difficulty in seeing the ‘forest through the trees’ and relating minutia back to the ‘big picture’ and real life.

Consider how you would begin reading/evaluating a paper.

Do you have a formulaic approach? (yes/no)

If so, when did you first learn this method of analyzing articles?

Do you read the abstract and discussion and then decide if you will read the entire piece? Do you evaluate figures/graphs rather than reading the body of the paper? Or do you simply skim?

I feel confident in my ability to read and interpret primary literature articles._____

I feel confident in my ability to analyze/critique primary literature articles._____

I feel confident in my ability to read a primary literature article and think of a logical, follow-up experiment._____.

Why did you rank yourself accordingly in the above statements?

Artifact #3 Sample of Pre/Post Physiology General Knowledge Test

1. Where is the sinoatrial node located?
 - a) between the left atrium and the left ventricle
 - b) between the right atrium and the right ventricle
 - c) in the interventricular septum
 - d) in the upper wall of the left ventricle
 - e) in the upper wall of the right atrium

2. Select the correct statement about O₂ transport in the blood. During normal activity, a molecule of Hb returning to the lungs contains one molecule of oxygen:
 - a) As pH decreases, oxygen's affinity for Hb increases
 - b) A 50% oxygen saturation level of blood returning to the lungs might indicate a higher activity level than normal
 - c) All of the above
 - d) None of the above

3. The red blood cell count increases after an individual spends significant time at higher altitude because:
 - a) temperature is lower at higher altitudes
 - b) basal metabolic rate is lower at higher altitudes
 - c) basal metabolic rate is higher at higher altitudes
 - d) atmospheric PO₂ is higher at higher altitudes
 - e) atmospheric PO₂ is lower at higher altitudes

4. Aerobic exercise will have this effect on skeletal muscle tissue:
 - a) increased # of mitochondria per muscle cell
 - b) increased # of muscle fibers
 - c) increased # of motor units
 - d) decreased # of skeletal muscle fibers
 - e) none of the above

5. During ventricular systole:
 - a) the atria are contracting
 - b) the AV valves are closed
 - c) the intraventricular pressure is less than the intraatrial pressure
 - d) the mitral valve is open
 - e) blood is forced into the ligamentum arteriosum

6. As blood travels from the aorta to the capillaries:

- a) pressure increases
- b) viscosity increases
- c) resistance increases
- d) velocity increases
- e) flow increases

7. Which of the following is not true regarding the comparison of type I (slow oxidative) and type II b (fast-glycolytic) skeletal-muscle fibers:

- a) Type I fibers have more abundant mitochondria.
- b) Type I fibers fatigue more readily.
- c) Type I fibers have more abundant myoglobin.
- d) Type I fibers have more abundant capillaries.
- e) Type I motor units contain fewer fibers than type IIb motor units.

Learning Community

University of Wisconsin-Madison School of Nursing Learning Center

Background

The Nursing Learning Center (NLC) is intended to provide academic support for pre-nursing students enrolled in the required pre-nursing science courses. GPA data gathered by the School of Nursing points toward Physiology 335 (Human Physiology) as a course where the resources will be first deployed. I have been hired as a teaching assistant to lead weekly study group sessions as well as provide office hours for individual appointments beginning in Fall 2012. An office for the NLC is planned on the first floor of the Clinical Science Center in the Nursing Communications space.

Pre-nursing students will be invited to join this learning community with the goal of creating a diverse group based on several criteria including academic ability, gender, and ethnicity.

The Learning Center initiative is focused to assist all students; especially targeting students to help reduce the achievement gap. By providing increased academic support with the NLC and the UW School of Nursing will be able provide additional resources and assistance for targeted and under-represented student populations.

My Role

Using my background as a teaching assistant for Physiology 335 and experience helping struggling students find their own path to achievement, I will shape this learning community by focusing on the individual experiences and motivations of the students. Working with students to identify their own academic strengths and weaknesses, discover personal study strategies, and form specific learning intentions for the subject of physiology will not only allow them to succeed in this particular subject. I hope that in addition to providing a solid foundation of physiology knowledge, I can provide a positive learning experience for the NLC's target populations that will give them the ability and confidence to complete their nursing education successfully.

While the exact methods I will use as a classroom facilitator may vary according to a group or individual's specific needs, the most crucial interaction that I will have with the students is during their orientation to the NLC. I will invite all students who plan on attending the NLC to come to an informational meeting where I will introduce myself and my teaching and learning philosophies. I will then ask students to put together a short reflection that allows them to reflect on their journey to the University of Wisconsin-Madison and the nursing profession. Specifically I would like students to include:

- What are your three favorite free time activities?
- Where did you grow up?
- Where did you attend elementary and high school? How was that experience?
- What are six words (Three positive and three negative) to describe your family?
- What are six words (Three positive and three negative) to describe you as a person?
- What is your purpose in higher education?
- Why UW-Madison?
- Why were you drawn to the nursing profession?
- What is a current issue in nursing that inspires you?
- Who have been three important life role models in your life?
- Who is a nursing mentor or role model in your life?
- Who is in the population of patients you wish to serve as a nurse?
- Where do you see yourself in the nursing profession following nursing school? In ten years?

Using these questions as a way to get to know the students I am working with, I can be well-equipped to put material in an appropriate context for them; an underemphasized important element in higher education. My ultimate goal is to help college students become intentional learners who can adapt to new situations, integrate knowledge from different sources, and become voracious lifelong learners. To unashamedly quote *Greater Expectations* from the 2002 report from the Association of American Colleges and Universities, "Becoming an intentional learner means: developing self-awareness about the reason for study, the learning process itself, and how education is used. . . . Intentional learners are integrative thinkers who see connections in seemingly disparate information to inform their decisions." These words exactly echo my sentiments on how I view learning and how to best inspire students to perform to their fullest potential.

Additional Artifacts~ will be added before defense

* Several anonymous student evaluations

*Thank you card from student