NEFDC EXCHANGE

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President's Message

21st Century Education: What Do We Need to Change?

Are we truly educating our students for their needs in today's global, ever-changing, information-rich society? Have they learned to find the resources they need and approach decisions and problems creatively? I'm not so sure. It is so difficult to let go of time-honored practices like lecturing, and to figure out the logistics of engaging students in ever-larger classes, helping them construct knowledge that draws on their different experiences, values and perspectives, and promoting critical thinking rather than memorization.

Some institutions are embracing non-traditional adult students, and giving credit for prior education and training that they bring to bear in the classrooms. Organizations such as the American Council on Education help by providing valuable resources and programs for supporting such adults as well as international and other diverse students. A strikingly different-- and perhaps frightening -- for-profit model of education called the Minerva Project has been created in response to claims that our traditional model of education is not working. Minerva claims to have "stripped the university experience down to the aspects that are shown to contribute directly to student learning" (Wood, 2014). In this institution, students need to be resourceful and teach themselves the "basics", using online courses like Coursera and Khan Academy. Minerva classes are all online, and focus on foundational concepts (not facts), critical thinking, argument, and deep understanding. Frequent quizzes, online discussions and group work demand that every student actively participates. There are no lectures; the professor assigns challenging readings, and oversees and facilitates group work during each session.

Would all students benefit from this radical change to learning? Perhaps not. The Minerva Project seeks motivated and self-directed students, yet not all students have the sophistication or experience to teach themselves, and be able to plow through the deluge of digital information available. Keisha Tracy and Jennifer Fielding suggest in this issue of The Exchange that the college curriculum must be updated to include practical training in information fluency, and instructors must include checkpoints in their assignments that emphasize the process of finding and analyzing appropriate sources.

Are there other models which contribute directly to student learning? Tracie Addy tackles head-on the challenges faced by freshmen science, technology, engineering and mathematics (STEM) instructors who find their students ill-prepared, and the secondary teachers who provide instruction on some of the very same material. Bringing these instructors and teachers together for discussions around the Next Generation Science Standards (NRC, 2012) should at least begin breaking down the barriers and collaboratively supporting the development of learners in the sciences.

Graduate students, our next generation of teachers, can be our hope for changing the philosophy and practice of higher education. In programs at the University of Connecticut in Storrs, these teachers-in-training reflect on and practice methodologies shown to enhance learning of today's students. Highlighting many years of experience, Keith Barker's article also explains how the program obtained institutional buy-in. We hear from another experienced educator in Denise Marchionda's new book, The College Student Whisperer: Taming and Training the Millennial Mind. What are student whisperers? Marchionda defines them as teachers who "demonstrate strong leadership through consistent and fair rules, routines, and professional procedures in the classroom…and who teach students to judge themselves". She offers positive solutions for understanding and managing millennial students.

General education has long sought to provide opportunities for integration of ways of thinking in different disciplines, such as science and the humanities. But often students see these requirements as a laundry list that must be checked off before they can get to the "real stuff" of their major. Mei-Yau Shih and Susan Han write about new interdisciplinary courses for upper division students at the University of Massachusetts Amherst. These courses assign teams of students to solve realistic problems, by connecting their general education to training in their disciplines. The team-based learning approach is designed not only to foster critical thinking skills, but also leadership and interpersonal skills important in the workplace. Our contributors to this year's issue of The Exchange show that small changes in and out of the classroom can indeed enhance student learning and critical thinking skills. Whether you feel higher education needs to take big leaps or make small tweaks, I hope you find yourself reflecting on your own practices and new ways of learning!

Deborah J. Clark
NEFDC President

References

American Council on Education. 2014. Higher Education Topics. Available from: http://www.acenet.edu/higher-education/Pages/default.aspx

National Research Council (NRC) 2012. A Framework for K-12 Science Education: Practices, Crosscutting Concepts, and Core Ideas. Committee on a Conceptual Framework for New K-12 Science Education Standards. Board on Science Education, Division of Behavioral and Social Sciences and Education. Washington, DC: The National Academies Press. Available from: http://www.nap.edu/openbook.php?record_id=13165

Ryu, M. 2013. Credit for prior learning from the student, campus and industry perspectives. American Council on Education. Available from: http://www.acenet.edu/news-room/Documents/Credit-for-Prior-Learning-Issue-Brief.pdf

Saunders, S. and Kardia, D. 2014. Creating Inclusive College Classrooms. Center for Research on Learning and Teaching. Available from: http://www.crlt.umich.edu/gsis/p3_1

Wood, G. 2014. The Future of College? The Atlantic, August 13, 2014. Available from: http://www.theatlantic.com/features/archive/2014/08/the-future-of-college/375071/

Embracing The Changing World: Incorporating Team-Based Learning In An Upper Level General Education Course

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Introduction

For years, universities have undergone major revisions in General Education (GenEd) curriculum to include "emerging" or "essential" curriculum such as communication, technology literacy, critical thinking, writing for the digital age, reasoning, global awareness, and so on, with the goal of preparing students with the knowledge and skills necessary to succeed in the 21st century job market. With the changes in GenEd curriculum, educators realize that they still need to provide an integrative learning experience for students to make meaningful connections between the GenEd learning and their majors. Students need multiple opportunities to draw on their previous learning, apply past and new knowledge and skills to increasingly complex problems, and to reflect upon how the various components of their education can help shape their future engagement in professional, civic, interpersonal, and intellectual activities. But how does higher education prepare students with the skills and depth of knowledge they need to apply in their future career and professional world and infuse their college education into "a source of self-understanding and an identity to the world in which one lives" (Palmer, 2007)?

Since 2012, the University of Massachusetts (UMass) Amherst, a research intense public university, has instituted an Integrative Experience (IE) GenEd curriculum to provide a structured context for upper division students to reflect on their own learning and explore connections between the broad exposure provided by GenEd and the more focused exposure of their own majors. These Integrated Experience GenEd courses aim to blend and apply content from more than one discipline to examine a central issue, topic or theme. In addition, the integrated experience courses also emphasize active engagement of concepts and connection between ideas, self and society. Teaching IE GenEd courses may take different forms and approaches, one of which is to take a multidisciplinary content and offer it in a collaborative (teamwork) learning setting. The Team-based learning (TBL) approach, as suggested by Michaelsen (2004), provides plenty of opportunities for students' peer learning, collaboration among team members and assurance of individual accountability in group settings. It uses the classroom as "a meeting place for constant interplay between the knower and the known – between interiority and community (O'Reilly, 1984)." The TBL approach can promote active learning and self-reflection which helps students develop an ownership of their own learning and achievement.

The IE and TBL course: A real course

In fall 2011, the Team-Based Learning Fellowship Program was funded and implemented at the UMass Amherst campus to support faculty in redesigning existing courses. The program focused on helping faculty to design courses based on four key TBL features: forming/designing diverse teams, managing team performance, implementing meaningful team assignments, designing team projects and evaluating team/individual performance.

During the 2012 Fellowship Program year, a faculty member of the Department of Plant, Soil and Insect Sciences used the TBL approach to design a new GedEd IE course: "Global Issues in Applied Biology." The course learning outcomes included:

- Solving real-world problems
- Developing critical thinking skills
- Building leadership skills
- Learning to work as an effective team member

The course had 73 students from 9 different majors. Prior to the start of the semester, a brief article was sent to the enrolled students to introduce them to the concept of Team-Based Learning. For the majority of the students, TBL was a different learning experience from what they had encountered before. The instructor also assigned students to teams of 6 or 7 based on their majors, genders, and academic standing at the start of the semester. Throughout the semester, before each new unit or class, students would read assigned articles related to the class work. Then each class started with an individual readiness assurance test (iRAT) to ensure that every student had come prepared for the course work for that day. Following the iRAT, the same test was given to teams (tRAT); when taking the tRAT, students were actively engaged with their team members to resolve any discrepancy in their iRAT answers. Following the tRAT, the instructor led the class discussions to demystify misconceptions revealed in the tRAT results, and clarify any confusion students may still have had in the course materials. There was an assigned team project every week where each team had to apply knowledge from the reading assignments to resolve a new or more challenging scenario. Right after the team projects, students would evaluate their team members' contributions through a peer evaluation system. The individual team contribution (peer evaluation) scores became a multiplier for calculating each team member's team project scores. The peer evaluation score would also be used as a multiplier for the tRAT score so that each member is accountable for his/her effort in the team's overall performance. The integration of peer evaluation is critical in a team-based learning course as it eliminates the possibility of all team members receiving the same team grade regardless of an individual's true contribution to the group work. The grades were posted online weekly to give students timely feedback of their individual/team progress and to help teams maximize their performance.

The unconventional team-based learning design requires instructors to devote class time to familiarizing students with unique TBL structures. It is essential that some team building exercises are introduced at the beginning of the semester to give students an opportunity to work out any potential incongruity among team members and to maximize the learning experience for the entire team. Setting the tone correctly at the start of the semester is the key to a successful implementation of this new teaching and learning approach. In the "Global Issues in Applied Biology" course, a mocked up TBL class was conducted on the first day; students were asked to complete an iRAT and a tRAT as soon as the class began to familiarize them with the TBL format, and prepare them for the structure and course expectations for the rest of semester. Students were also given a series of technological exercises to get them acquainted with various gadgets in the TBL classroom. It was expected that by the end of the first week, every team would have developed the team contracts and every team member had to agree and sign the contracts.

To understand how students perceived their TBL experience and the effectiveness of implementation, the instructor conducted an end-of-semester survey. In addition, she collected students' feedback on their IE GenEd learning experience in the TBL classroom. Many students reported that this new learning approach helped them learn the subject matter in greater depth (71%). They also commented that the course had taught them how to integrate multiple resources through team projects (52%). Other comments were that it had helped them apply learned materials to real life situations (87%), improved their problem solving and critical thinking skills (74%) and that they had become more appreciative of the power of diversity (74%). Fifty eight percent of enrolled students also reported that this course helped them to develop stronger team skills, such as compromising, negotiation, listening, respect, trust, etc., all of which are crucial skills for successful integration into the work force. As one student commented on her learning in this course: "I have been so used to doing work on my own throughout my college career, yet, this course made me realize that, in the real world, I will never be doing work in this way. All in all, I now recognize the true power and importance of collaboration and how a combined effort is much more effective than an individual one."

Incorporating TBL strategy in the GenEd IE course can motivate students to go beyond rote learning of subject maters. The well-crafted in-class application exercises in a TBL course allows students to apply knowledge to realistic situations and to see the value of the prior knowledge and skills that they have acquired in the GenEd, as well as in their major courses. As students attach relevance and value to a problem, it becomes significant and meaningful to them, and when they are working in teams, they are developing important team and problem solving skills. Using the TBL approach in this upper level undergraduate course underlined the GenEd IE core values of active engagement of concepts and connection between knowledge, self and society. The GenEd IE curricula helps to deepen college students' knowledge and prepare them for their future careers in the professional world.

References

Michaelsen, L.K., Knight, and Fink (Eds) (2004). Team-Based Learning: A Transformative Use of Small Groups in College Teaching. Stylus Publishing, LLC.

O'Reilley, M. (1984). The peaceable classroom. College English, 46 (2), 103-112

Palmer, P. (2007) The Courage to Teach: Exploring the Inner Landscape of a Teacher's Life, 10th Anniversary Edition. John Wiley and Son, Inc.

Information Literacy: From Today's Critical Challenges To Tomorrow's Critical Thinking Opportunities

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Information literacy is an evolving discipline, as reflected in the proposed updates to the Association of College and Research Libraries (ACRL) "Information Literacy Competency Standards for Higher Education." The last Standards published in 2000 were informed by the nascent concept of relating traditional "library skills" to the interconnected world of digital information. As the landscape of information has shifted more permanently from print to digital, from consumer to participant/producer, and from protected to open access, information literacy now becomes a crucial critical thinking skill without which our students will not succeed. Indeed, a recent survey by Project Information Literacy of employers ranked "finding and using information" fourth in the list of necessary skills for new college hires, ranked only behind communication skills, the ability to work in groups, and problem-solving (Head, 2012). With this squarely in mind, the newly proposed Standards relate information literacy directly to higher education curriculum, proposing a series of "threshold concepts," recognizing that "the dynamic and often uncertain information ecosystem in which all of us work and live require(s) new attention to foundational ideas about that ecosystem. Students have a greater role and responsibility in creating new knowledge, in understanding the contours and the changing dynamics of the world of information, and in using information, data, and scholarship ethically" (ACRL, 2014). According to the Presidential Innovation Paper "The Students of the Future," produced by the American Council on Education (2014), "Society has moved from scarcity of knowledge to knowledge being available 24 hours a day...and people have more ways to access that knowledge. That represents a significant change for educational institutions, which no longer control how information will be disseminated."

Yet, even in light of the seemingly self-evident need for information literacy as a set of skills critical for student success as well as the need to keep up with consistent change, it is often overlooked, due to the expertise gap of instructors, the lingering belief that information literacy is the province of writing and English courses, or the perception that we do not have the time to include information literacy training in our courses. In a recent Chronicle of Higher Education article "At Siege in a Deluge of Data," Alison J. Head and John Wihbey (2014), examine the repercussions of what they call the "crowded information landscape" and the effects on students of being awash in such large amounts of information and such varied repositories of that information. The digital "deluge" has offered us much in terms of resources. It has, however, also raised serious complexities. In "The Students of the Future" (2014), they argue that "[s]tudents will be coming to higher education with a very different idea of what knowledge acquisition looks like. Many of them know how to find the information themselves. They don't want a master expert holding forth in the front of the class - they want a facilitator who will encourage connected learning with their peers" We would argue that students may believe they know how to access information themselves, but, in reality, they are indeed not aware of how to evaluate, winnow, and analyze this information. One of the bigger picture issues raised is how our curriculum is going to catch up.

There is no denying that research looks different today even if some of the same skills are necessary. Students, perhaps increasingly due to the digital nature of information, often examine sources in isolation. One study found that students seem to focus on sentences within a source rather than the source as a whole and its context: "Citation counts for little if what is being cited is a fragmentary representation of the source" (Howard, Serviss, & Rodrigue, 2010). This method fails to recognize that research, particularly research in the digital age with both its opportunities and challenges, is a network of connections. Head and Wihbey (2014) suggest, "The skills that students cultivate through traditional assignments—writing essays based on library research—are far different from those required to perform efficient, high-level, accurate research in the digital world. All of those types of research skills take practice under the eye of experts." Indeed, the process by which our students commonly access information - keyword searching in a search engine or database - actually facilitates informational "cherry picking," with no sense of how the source chosen relates to the larger environment (journal, website, or otherwise) in which that information is situated. We would argue that it is just as important to realize that, while our students struggle with the traditional methods of research, they also struggle with new methods of research as well. Given how quickly the landscape is changing with more institutions of higher education trying out, for instance, tablets and other mobile devices, it is likely the areas of information literacy in which students struggle will evolve and continue to evolve rapidly.

With respect to this idea that our curriculum is in need of reexamination, it is true that major impediments to student competency in information literacy in varying disciplines often lie in the structure of assignments. Perhaps our assignments no longer reflect the contemporary process of research. Students are frequently asked to manufacture a topic, usually in a highly compressed amount of time, research this topic, and produce work that reflects careful thought and understanding of the process. A 2010 report from Project Information Literacy, "How Handouts for Research Assignments Guide Today's College Students," asserts, "Instructors offered a detailed and formulaic framework in the [assignment] handouts because they recognized that their students came into the classroom with little knowledge of the course-related research process, especially as it applied to conducting research in individual disciplines—and their class" (Head & Eisenberg).This is certainly a valid assessment of the challenges, yet the parameters of this task do not encourage crucial elements: ownership of and pride in the process. Rather, it encourages imitation and mechanical thought. Students can become overwhelmed by the "big paper" due at the end of the semester and strive unthinkingly to get the required elements on the page. They become "intimidated by the plethora of print and online sources […and find] it difficult to figure out the critical inquiry process while developing competencies, practices, and workarounds for evaluating, integrating, and applying the sources they [find]" (Head, 2013). The focus is on completion, not on engaging with sources, interpreting clues, and questioning information. It creates the impression that research is clean, often bland, and one-dimensional, rather than messy, sometimes chaotic, and complex – in other words, interesting. Students remain aloof from the process, if they are even aware a process exists, without becoming invested in the work they produce.

The question then is: what can we do? A strategy we have had success with that can overcome some of these issues is the development of activities and/or checkpoints over time that emphasize process, not production. Emphasis on process is a common concept in composition studies. Here, however, the focus is not on the writing process, but on the information literacy process, on thinking critically about sources and breaking apart arguments. This approach also speaks to the Presidential Innnovation Paper (2014) assertion mentioned previously that students respond more to facilitators rather than master experts. Activities could lead students through becoming familiar with both the physical and digital resources of the library, engaging in exploratory research, identifying scholarly trends, arguing with sources, leveraging citation mining, annotating bibliographies, working in research groups, etc. The keys are consistent feedback and guidance, reinforcing effective dispositions of mind and pointing out the pitfalls of other habits. It is also important to consider assignment terminology as there is frequently a breakdown between what the instructor states and students hear. This particular difficulty is one that we are continuing to research in hopes of providing feedback to instructors concerning assignment design. Students "live" with a topic, watching it build and evolve, eventually (not initially) becoming a thesis. Through task chunking and regular reflection, students can take control of their work, hopefully increasing their investment, awakening their curiosity, and building their awareness of the importance of what is available to them so that they may revel in the "deluge" that is the present and future of information literacy.

Preparing Future Faculty: By Chance Or Design?

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It is widely recognized that new teachers tend to teach like they have been taught – or think they have been taught. So their style and approach is likely to be, by chance, effective or not. There is a wide range of opportunities for our graduates to teach in programs in their disciplines in different colleges but they will almost certainly have to provide instruction at the introductory level at least initially in their careers. This paper describes the procedures that can create opportunities that lead a graduate through a pre-career design process, to prepare for a range of challenges and to be successful in the design and delivery of undergraduate curricula.

It doesn't take a large grant or a multi-university program to attract graduates to an opportunity to learn how to succeed in their prospective new appointment in a higher education institution (Bok, 2013; Buskist, 2013). It has been my experience that many graduates want to learn how to teach well whether they plan to enter a research-intensive university, a small liberal arts college, or community college. "Those who mentor and educate most graduate students work in the environment of large research universities that are radically different from the environments where most jobs are available, namely, small public and private colleges, public comprehensive universities, and community colleges" (Adams, 2002, p.8).
They recognize that their worth to their new institution, colleagues, and particularly their students will depend on an ability to engage and educate. However they are also aware that the balance of teaching, research, and service will determine the emphasis placed by an institution on that place's reputation for producing well-educated graduates. "Research has clearly documented the impact of the mismatch between graduate training and the multiple academic responsibilities facing new faculty" (Adams, 2002, p.8).

Through my leadership our approach has been to focus on the classroom environment in post-secondary education and to role model good practice over a wide range of disciplines. I have had over 500 students in classes of about 20 who now represent close to 80 different disciplines and a multitude of cultures.

So where does one start? Where are the road blocks? What does it cost the students? What are the parameters for success?

Beyond individual graduate enthusiasm there needs to be a culture of acceptance, if not encouragement, from the general faculty. Particularly in the case of a research institution, the faculty advisors should be enthusiastic about their graduates broadening their skills to help them acquire the faculty positions they seek. (I have found this to not always to be the situation and some graduates have had to resort to time-management subterfuge to take some classes.) To establish institutional acceptance of a future faculty teaching program it is important to start with the inclusion of the most respected instructors at the institution either through an advisory board to the program or/and individual contributors to the classes. Our program is intended to attract and be appropriate for graduates from such a wide range of disciplines that the support of a wide range of advisors, particularly senior faculty, is important.

My experience has been that once a single class has been established, the graduates are stimulated into requesting further instruction and opportunities to learn and to demonstrate their instructional abilities. Hence the growth of a program needs to be envisioned and planned to meet the needs of the graduates who will certainly want more experiences once a successful start has been made. This raises the issue of resources.

Some of the above process can be achieved through volunteer faculty contributions but a structured approached needs a dedicated and rewarded champion to organize and lead the development process. There is no question that beyond the instructors, the physical learning environment, time of day, length of session, and number in the class play a large part in the success. This tends to imply institutionalization of the process which will inevitably be needed if the program is to continue to succeed. My solution was to engage the Graduate School and the Registrar's Office in a friendly manner in the early development of the process. The former provides credentialing and the latter the ability to schedule classes in appropriate places and times for the attending students. Taking chances in the formative part of this activity can easily lead to failure so deliberate cooperative involvement is a helpful if not essential element.

Mine was not a top-down design. It evolved as pressure from the students grew once they could see the value of the early opportunities. This gradual evolution helped in persuading colleagues, both academic and technical, to support the program as is grew and needed more resources. Pressure to attend from the students has grown dramatically in that each semester all the courses are full with waiting lists for the first course (1 credit). Some departments have required their graduates to attend this initial course but the vast majority come of their own volition having heard of the course's value by word of mouth. The second (2 credits) and third course (3 credits) requires prerequisites of the previous ones. If the graduates are full-time students then their fees cover the cost of these courses.

Reflections play a large role in the sequence of courses. Many students are not used to thinking at a meta level about their discipline and so the reflective exercises sometimes challenge them when considering teaching. This is similar to a certificate program in The Higher Education Consortium of Central Massachusetts where one of their goals is that "Graduates will engage in ongoing systematic documentation of and reflection on their teaching practice and their students' learning" (http://cct.heccma.org). The most difficult task of the first course is to write a philosophy statement. It usually requires a series of writings, putting aside for a while, and reconsidering. Occasionally they are torn up and rewritten! But mostly I consider the practicalities of interacting in a classroom. I recommend popular books from authors such as Linda Nilson (2010), Barbara Gross Davis (2009), Ken Bain (2004), and Parker Palmer (2007) and encourage the students to share their own readings with us. One of our delights is to have students from a range of countries who are able to bring their local experiences to the group. The students are required to visit recommended faculty members. They are expected to talk about the faculty's teaching philosophy, and then in a classroom visit compare the philosophy with the practical delivery of the class. Further decomposing of the class with the instructor is followed by a reflection of the graduates on the visit and discussions to the course.

The second course is a seminar in which the students are required to present a 'vexation', a problem or issue that is a real concern for them in the teaching. They have to prepare a written document followed by a presentation on class. The contact time is spent in discussing the issue, asking questions, and offering resolutions. The students are expected to try out some of the suggestions and report back to the class at a later date. All issues remain confidential within the course as we find many issues relating to the behavior of instructors of record, course advisors, and departmental structures. Although some of these issues create much sympathy, they may not be immediately resolvable but illustrate possible problems for the graduates in a subsequent job situation.

Course design within a group/individual course follows the seminar class. Each student is required to do a complete course design following the formal instructional design principles. We meet as a group each week to discuss topics but the work on the design is individual. The process really taxes the graduates but at the end they have something tangible – a course portfolio that they use at interviews etc.

On completion of these courses the graduates have recognition on their transcripts but it was felt that some certificate of the completion of a series of courses might be enhanced with a formal certificate. Thus the final 'summer institute' course (3 credits) was created, a 40-hour class in late April and early May that became required for the Certificate and which covered a wide variety of topics delivered by experts in the educational field. Included in the sessions were special topic lectures, discussions related to a provided book, and reflections and observation of the participants. Although intense, this course is often referred to as the most useful that the students have taken. The Graduate Certificate in College Instruction has now been awarded to over 60 in recent years.

Have we been successful in preparing students for teaching well? Feedback from many of the graduates' advisors and instructors of record has been very complimentary. Student evaluations of teaching within the university are high for these graduates. Many of the students have gained introductory tenure-track faculty positions and others have few-year adjunct faculty contracts. The courses have a very high reputation with our interested faculty.

It is very easy to be able to write references for these hundreds of students. The work, particularly the written reflections are kept and sections can be quoted verbatim in letters of recommendation. The value of being able to quote accurately a student's approach to a problem, a reflection of an issue, or an approach to an educational task is of great value to us and should not be minimized in the collection of student work.

It has been my pleasure to help develop many hundreds of young teachers who have attended the courses because they want to and not because they had to. The personal feedback I have received have driven me to gradually provide more opportunities for them to learn over an increasingly wider range of aspects of teaching and learning. Nothing is better than to see one's students succeed and I have had nothing better over my half century as a higher education educator.

References

Adams, K. A. (2002). What Colleges and Universities Want in New Faculty. Association of American Colleges and Universities.

Bain, K. (2004). What the Best College Teachers Do. Cambridge, MA: Harvard University Press.

Bok, D. (2013). We Must Prepare Ph.D. Students for the Complicated Art of Teaching. The Chronicle of Higher Education, Retrieved from http://chronicle.com/article/We-Must-Prepare-PhD-Student/142893/.

Buskist, W. (2013). Preparing the New Psychology Professoriate to Teach: Past, Present, and Future. Teaching of Psychology 40(4), 333-339.

Barbara Gross Davis (2009), Tools for Teaching. Jossey-Bass

Higher Education Consortium of Central Massachusetts. (2014). Retrieved from http://cct.heccma.org.

Linda Nilson (2010), Teaching at its best. A research-based Resource for College Instructors. Jossey-Bass

Parker J. Palmer (2007), The Courage to Teach. Exploring the Inner Landscape of A Teacher's Life. Jossey-Bass

The NEFDC welcomes proposals for interactive workshops, teaching tips and poster sessions related to effective programming that reflects how we are designing pedagogy and documenting our approaches to successful learning outcomes for engaged learning.

Topics might include:

- **peer instruction**
- **collaborative, interdisciplinary and/or engaged learning**
- **learning in the disciplines as well as approaches to general education**
- **blended and online learning**
- **transfer and continuation options from high school to higher education (as well as from two-to four-year institutions)**
- **documenting student outcomes inside and outside the classroom**

Watch our website for guidelines and deadlines.

NEFDC EXCHANGE

Encouraging Crosstalk: What Higher Education Can Learn From The Next Generation Science Standards

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A predicament facing science, technology, engineering and mathematics (STEM) teaching and learning today is sparse communication between higher education (HE) and the K-12 level. HE faculty and administrators can be unaware of the changes occurring within pre-college education, and, similarly, K-12 educators may have limited knowledge of movements occurring within higher education. The purpose of this article is to foster dialogue by describing what STEM disciplines at the undergraduate level can learn from the Next Generation Science Standards (NGSS). The intent is not to take a stance on whether or not the NGSS should or should not be adopted, but rather to accept them as a set of guidelines currently being integrated in K-12 schools across various states. The significance of this discussion is multifold as such crosstalk: (1) enables science faculty to evaluate how their curriculum can build upon the NGSS, (2) provides institutions insight into the pre-college science backgrounds of future students who will enter their schools, and (3) facilitates discussion to encourage collaboration between two seemingly separate systems.

As an individual trained within both the basic sciences and science education, my career has involved teaching science courses within STEM departments in higher education. One major desire I have is to build bridges that connect K-12 and post-secondary science education. A driving force behind my motivation is witnessing at times a lack of connection between colleagues within higher education and K-12 teachers. I have heard higher education faculty question what students with major deficiencies within science are learning in their classes prior to their arrival at the institution. I have heard secondary teachers express their desire for their students to perform well in science, and witnessed them providing excellent instruction on the very material that I have taught within my introductory level college courses. What has seemingly united many of the teachers and HE faculty within my sphere of influence is their desire to see their students succeed, and sheer disappointment when they do not. Yet, despite these similar goals, college faculty and K-12 teachers rarely converse with one another in a productive, collaborative manner.

A current movement driven by a partnership between individuals at the K-12 and post-secondary levels is the Next Generation Science Standards (NRC, 2012). The overarching goal of these standards is to prepare students for post-secondary success. Distinct from the Common Core standards, the NGSS were developed by scientists, science educators and other experts and practitioners to enhance science teaching and learning. They involve three core concepts: how science is practiced, cross-cutting concepts within science, and core ideas within scientific disciplines. The NGSS were designed using the learning progression model, the idea that students build upon their current knowledge in subsequence grades. Such a framework limits the needless repetition of material and supports the development of learners in a manner consistent with the literature (NRC, 2000).

Each core concept within the NGSS is aimed to enhance knowledge or performance within a particular aspect of science. The Practices dimension addresses student proficiency in the process by which scientists carryout science (see Table 1).

If students arrive on campus with a developed understanding of the core practices of science, at the college or university level they can seamlessly build upon this knowledge by participating in more authentic science practices using enhanced available resources. Independent studies are vehicles through which college students currently conduct their own experiments. If institutions lack research space and/or capabilities, they can assist students in finding internships or other experiences where they can perform authentic science. While such practices do occur within higher education, often only high-achieving students or science majors are able to partake in these experiences. If the goal of the NGSS is to prepare students for college-level science, we build upon this framework by encouraging all students to carryout scientific inquiry, not just a select group, or solely those reaching upper-level courses. More elegant experiments can now be performed in the college laboratory, especially in introductory majors as well as non-majors courses. Cookbook laboratories which followed a prescribed protocol and do not involve high level of inquiry would be limited in

Table 1
Core practices and cross-cutting concepts of the next generation science standards (ngss, 2014)

Core Practices	Cross Cutting Concepts
Asking Questions and Defining Problems	Patterns
Developing and Using Models	Cause and Effect
Planning and Carrying Out Investigations	Scale, Proportion and Quantity
Analyzing and Interpreting Data	Systems and System Models
Using Mathematics and Computational Thinking	Matter and Energy
Constructing Explanations and Designing Solutions	Structure and Function
Engaging in Argument from Evidence	Stability and Change
Obtaining, Evaluating and Communicating Information	

Table 2
Disciplinary core ideas of the next generation science standards (ngss, 2014)

Physical Sciences	Life Sciences	Earth and Space Sciences	Engineering, Technology, and Applications of Science
Structure and Properties of Matter	Structure and Function	The Universe and its Stars	Defining and Delimiting an Engineering Problem
Chemical Reactions	Growth and Development of Organisms	Earth and Solar System	Developing Possible Solutions
Nuclear Processes	Organization for Matter and Energy Flow in Organisms	The History of Planet Earth	Optimizing the Design Solution
Forces and Motion	Information Processing	Earth Materials and Systems	
Types of Interactions	Interdependent Relationships in Ecosystems	Plate Tectonics and Large-Scale Systems	
Definitions of Energy	Cycles of Matter and Energy Transfer in Ecosystems	The Role of Water in Earth's Surface Processes	
Conservation of Energy and Energy Transfer	Ecosystems Dynamics, Functioning and Resilience	Weather and Climate	
Relationship Between Energy and Forces	Social Interactions and Group Behavior	Biogeology	
Energy in Chemical Processes in Everyday Life	Inheritance of Traits	Natural Resources	
Wave Properties	Variation of Traits	Natural Hazards	
Electromagnetic Radiation	Evidence of Common Ancestry and Diversity	Human Impacts on Earth Systems	
Information Technologies and Instrumentation	Natural Selection	Global Climate Change	
	Adaptation		
	Biodiversity and Humans		

this environment. The reality is that for many college students, the science courses they take during their first year will be the only ones taken while enrolled at the institution. Thus, it will be important to continue their progressions in learning during these early years.

Another defining aspect of NGSS Practices is that they encourage active learning through instructional methods not conventionally used in science courses. The developers of the NGSS purposefully embed the engineering design process (EDP) within the NGSS. In EDP, students participate in the process of designing a product that addresses a particular problem, then test and revise their technology as needed (EIE, 2014). As a practical example, high school students can learn about acceleration in a physics class, and later be challenged to design a roller coaster track for an amusement park that encourages maximal acceleration using certain available materials. Building this model track can enhance their foundational knowledge and engage them in the process of learning in a manner distinct from only a lecture on a topic. There is support in the literature that active learning environments foster student learning in science compared to traditional classrooms, demonstrating that the use of EDP is consistent with current research on instruction (Freeman et al., 2014).

As such, science education at the college and university level would look quite different if students carried out EDP in class beyond the bounds of courses designed for engineering majors. Students may be more inclined to attend their college courses and learn the material. In this, arguably, more engaging learning environment, a student may be more likely to take a personal investment in understanding underlying concepts required to build a product that actually works. Learning is seemingly more fruitful when it is enjoyable, and students today have many devices, social networking technologies, and other items competing for their attention. This is not to say that we are in the entertainment business in higher education, but rather that we ought to design relevant and appealing experiences in our classrooms that have the intent to enhance student learning. The developers of the NGSS acknowledge the latter by proposing to use EDP in the science classroom and HE can learn from this stance. Further, if our students matriculate into our institutions having participated in EDP, we can support their learning by enabling them to build even more advanced technologies while learning science.

The second major dimension of the NGSS, Cross-Cutting Concepts, addresses ideas that traverse science disciplines (Table 1). These concepts support the development of courses that are interdisciplinary in nature. While such courses do exist to a limited extent at institutions of higher education across the nation, notably, they are not commonly formed through a partnership between two or more different science disciplines. One practical example of an interdisciplinary science course is an integrated chemistry and biology course. Having taught general biology for several years, I have seen how there is overlap between several topics within the biological and chemical sciences. For example, introductory biology curriculum often includes the "chemistry of life," which integrates topics such as the features of atom and how chemical bonds are formed between atoms to create molecules. Cellular respiration and photosynthesis are also biological processes that have biochemistry as their foundation. These are interdisciplinary concepts that fall under the umbrella area of matter and energy. An integrated course that incorporates these topics is logical. Also, because much of science is interdisciplinary in nature, designing such courses that transcend disciplines provides students a more realistic outlook of the field.

The University of Delaware is an institution that has taken on this approach by having special courses that utilize interdisciplinary science laboratory spaces (UDel, 2014). In interdisciplinary chemistry/biology courses, students work on laboratories and problem-based learning activities that incorporate crosscutting concepts between the two disciplines. Other similar courses can be developed that bridge concepts in other disciplines. For example, a physical sciences course may integrate basic chemistry of atoms then explore how electricity travels within circuits. This course can involve project-based learning, whereby students design their own elegant circuits to power a particular device or item. In the design of their project, students can be tasked to uncover knowledge within basic chemistry and physics. On another note, rather than focusing upon a particular course, institutions can even more holistically examine the interdisciplinary nature of the majors that they offer. For instance, an integrated STEM major would be appropriate for a student who desires a broad knowledgebase. This major can afford students the opportunity to take courses that bridge several disciplines.

As demonstrated through the design of the NGSS, the interdisciplinary nature of science is important, but so also are the paradigms and concepts that are fundamental to different disciplines. The latter is exhibited through the third major core concept of the NGSS which is the Disciplinary Core Ideas

(Table 2). These core ideas are those that can be taught across different levels as a learning progression. Within higher education we have done much with identifying important concepts within the confines of our courses. We can continue to take objective, global stances when designing curriculum to prevent becoming too in invested in our own specialty areas that we lose site of the bigger picture of the education of the student, following the model of the NGSS.

In conclusion, an understanding the framework of the Next Generation Science Standards can encourage efforts that bridge and enhance science education at institutions of higher education. Our educational systems will reflect the time that we take to assess and improve upon them. Crosstalk between systems is integral as our learning environments and the students who enter them continually change.

References

Engineering is Elementary (EiE).(2014). Available from: http://www.eie.org/overview/engineering-design-process

Freeman S., Eddy S.L., McDonough M., Smith M.K., Okoroafora N., Jordt H., Wenderoth M.P. (2014). Active learning increases student performance in science, engineering and mathematics. PNAS, Early Edition, 1 -5. Available from: http://www.pnas.org/content/early/2014/05/08/1319030111

National Research Council (NRC) (2012). A Framework for K-12 Science Education: Practices, Crosscutting Concepts, and Core Ideas. Committee on a Conceptual Framework for New K-12 Science Education Standards. Board on Science Education, Division of Behavioral and Social Sciences and Education. Washington, DC: The National Academies Press. Available from: http://www.nap.edu/openbook.php?record_id=13165

National Research Council (NRC) (2000). How People Learn: Brain, Mind, Experience, and School: Expanded Edition Committee on Developments in the Science of Learning with additional material from the Committee on Learning Research and Educational Practice. Washington, DC: The National Academies Press. Available from: http://www.nap.edu/catalog/9853.html

Next Generation Science Standards (NGSS). (2014). Available from: http://www.nextgenscience.org/next-generation-science-standards

University of Delaware (UDel). (2014). Interdisciplinary Science Learning Laboratories. Available from: http://www.cas.udel.edu/isll/Pages/default.aspx

SAVE THE DATE

Spring Conference 2015

Collaborations for Empowerment & Learning

Friday, May 29, 2015
Fairfield University

Keynote by Katie Novak author of *"UDL Now! A Teacher's Monday-Morning Guide to Implementing Common Core Standards Using Universal Design for Learning"* (2014).

Center for Academic Excellence

NEFDC is proud to announce our collaboration with Fairfield University's Center for Academic Excellence (CAE) for our spring conference. The conference will be held in the Dolan School of Business at Fairfield University, Fairfield, CT, from 8:00 am - 4:30 pm. Accommodations will be available for overnight stay on campus.

NEFDC EXCHANGE

The College Student Whisperer

Denise Marchionda, Ed.D. - Professor of English
Middlesex Community College

In my day-to-day work, I share teaching and management strategies with both full and part-time faculty, and they appear grateful for advice and guidance. Through many of my presentations at NEFDC conferences, as well as professional development workshops, the positive feedback I have received for my work has been humbling. These experiences have led me to share my effective strategies with others in a new book.

The College Student Whisperer: Taming and Training the Millennial Mind is a compilation of practical applications for effective college classroom management. Written with the community college instructor in mind, the advice provided would be helpful to any college or university teacher looking for a strong classroom management model leading to student success.

College professors, who are new to teaching, or any professors who are having difficulties understanding or managing millennial students in their classrooms, will find answers and positive solutions for classroom management in this book that blends the theoretical with the practical. Through clear expectations, consistent efforts, and effective classroom management techniques that create an active and compelling educational experience, true scholarship can occur in anyone's classroom. *The College Student Whisperer: Taming and Training the Millennial Mind* provides these management strategies to advance course goals and objectives, as well as move toward a higher-rate of student retention and success.

Questions answered and content of the book include:

- What is a millennial? Why are they in my classroom?
- How to use brain-based classroom management procedures.
- Examples of sustainable standard operating procedures for the classroom, why they work, and how to create them.
- Point-by-Point: An Objective Grading System – a description and how-to of a grading system that encompasses standard operating procedures and instills tenacity and resiliency in millennial students.
- How to create effective lesson plans engaging the brain functions of the prefrontal cortex, left and right brain, as well as the amygdale.
- How to create a cohesive course structure and build an effective syllabus.
- How to write and develop clear and effective assignments through modeling, specification check lists, and concrete directions.
- Suggestions for effective reading assignments to encourage students to read and do assignments across the curriculum.
- Suggestions for review and reflection of instructors' behaviors and how they impact the classroom environment.
- What to do when all the best intentions, reflective practice, and professionalism fail to create the model classroom.
- A compendium of answers and advice for faculty questions about classroom management problems, procedures, and negative student behavior.

From the Introduction:

"A Student Whisperer is a teacher who demonstrates strong leadership through consistent and fair rules, routines, and professional procedures in the classroom. No preferential treatment is shown for any student; personal feelings and judgments are set aside. Classroom policies are fair to all, and those policies are set forth at the beginning of the course and are adhered to – NO MATTER WHAT. …

A Whisperer's job is to teach students to judge themselves. Whisperers set the parameters; students exhibit, develop, and mold their own behaviors. Want to be a Student Whisperer? Here's how…"

Reference
The College Student Whisperer: Taming and Training the Millennial Mind is available (September 1, 2014) through Amazon.com or Bibliobookstore.com.

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