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IN THIS ISSUE...

- 4** The Canvas Corner: First Impressions
- 5** Making the Connection: From x's and y's to Real Life Applications
- 6** Teaching Our Students How to Do Research
- 7** Organizing a Study Abroad Trip—A Faculty Perspective
- 8** Using Social Media for Classroom Exercises—Twitter
- 9** Supplementing Face to Face Classes with Quizzes and Online Discussions
- 10** What's All This About "Competency-Based Education" and "Performance Based Funding"?
- 11** Outside Voices Inside the Classroom: Engaging Our Community

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Designer & Editor: Nicole M. West
Contributing Writers: Floyd Ballard, Iraidia Carrion, Jennifer Collins, Allan Feldman, C. David Frankel, Fran Hopf, Autar Kaw, Gerry Meisels, Cynthia Patterson, and Nicole West

Academy for Teaching and Learning Excellence (ATLE)

University of South Florida
4202 E. Fowler Avenue, ALN 185
Tampa, FL 33620
(813) 974-1841
atle@usf.edu
www.usf.edu/atle

Transforming STEM Education at USF

Gerry Meisels, Professor

Science, Technology, Engineering and Mathematics (STEM) education became a major national focus in 2007 with the release of the report "Rising Above the Gathering Storm" by the National Academies of Science and Engineering and the Institute of Medicine. The report pointed out that America's economic future depends greatly on technological innovation which in turn requires a workforce that is generally competent to function in that industry, and an adequate supply of professionals in the STEM disciplines who provide the innovation. According to reports released by NSF, while 50 years ago America needed only one fourth of its workforce to be prepared to work in the STEM professions, today three fourths of all jobs require at least some competency in STEM.

Our responsibility has increased from purveying information to advocating and recruiting for STEM education. "Rising Above the Gathering Storm," as well as several other major reports, also noted that other countries produce an increasingly larger fraction of professionals in the STEM areas, and that the fractions of patents granted and publications in top journals such as Physics Review authored outside the U.S. are increasing dramatically. These observations raised the frightening specter of an America that is becoming less competitive with a downward spiral that threatens our way of life as well as our preeminence on the world stage. Increasing the number of professionals in the STEM disciplines to forestall such a future has become a major national priority.

continued on page 2

Toward Universal Design Learning for Inclusiveness

Autar Kaw, Professor

In reading the literature on how one should instruct STEM students to improve creativity and higher-order learning, the influential change agents of the 21st century are advocating the discovery approach (also sometimes generously called the minimal guidance approach). Students are expected to discover the fundamental principles of the subject matter on their own through observations, experimentation, problem-based learning, and real-world problems. I have wondered if this method is the most effective way to learn, and if many students are left behind.

On the other hand, fully guided instruction advocates demonstrate that for students direct and explicit instruction

is the most effective. Each concept is described, and examples and abstractions are shown to reinforce them. Practice and feedback are an integral part of this method.

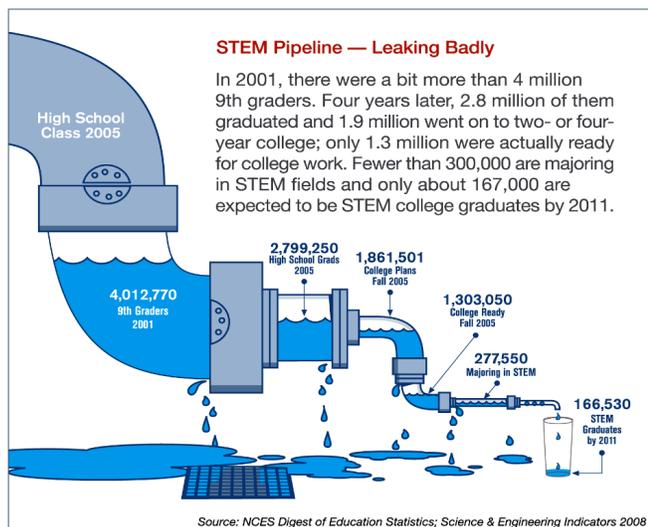
Over the last 26 years of teaching at University of South Florida, I have seen each approach welcomed or disliked by a substantial segment of our students. For years, I pondered if a middle-of-the-road approach is better or if there was an evidenced-based method to reach an even larger number of students than possible with either of the two approaches.

Since 2001, with my colleagues around the nation, I have been leading the development, revising, refinement and

continued on page 3

continued from page 1

Achieve, Inc. and a number of other organizations have analyzed the flow of students into the STEM professions, using the image of a leaky pipeline (graphic courtesy of Achieve, Inc.). Only about 20% of college-ready high school graduates begin their studies declaring one of the STEM disciplines as their major, and only half of those, or 10% overall, eventually earn degrees in one of the STEM disciplines. The same general results are found at USF, according to a recent analysis by our Office of Undergraduate Research. To address this need, USF began several initiatives to reduce the “leakage”, including the Science, Math, and Research Technology (SMART) Lab, the NSF-supported STEM Talent Expansion Program (STEP), and the addition of four new positions in discipline-based education research (DBER) in the College of Arts and Sciences.



USF is a community-engaged university, and takes very seriously its responsibility to address our society's and especially our region's needs. Faculty and administrators began contemplating how we could develop a comprehensive approach that will increase the fraction of our graduates in the STEM areas and reduce the leakage rate. We recognized that much of the shortfall is shaped by the diversity of the student body since African-Americans, Hispanics, and women participate in STEM education to a much lesser extent than white males, yet constitute almost three fourths of our workforce. This is a major change from the mostly white male STEM workforce 50 years ago. At the same time, we recognize that as a large, urban-serving university we provide a model for other such institutions which, together, already produce over half of all STEM graduates in the US.

Developing a comprehensive, institution-wide plan to increase the retention of STEM major is a challenging task because of the diverse audiences, subject areas, and units. USF submitted a proposal to NSF to support a thorough and careful, in-depth planning process using a shared leadership model. We were pleased that this proposal to transform STEM education in

a large urban-serving university was successful. The proposal focuses on developing an effective plan to increase the retention of STEM majors, especially of those who are members of underrepresented groups. Students interact with tenure-line faculty, instructors (contingent faculty), and teaching assistants. The planning process will identify specific programs for each of these audiences, and consider separately FTIC's and transfer students. Planning activities are structured in two phases. The first phase seeks to develop a broadly based understanding of what it takes to create wide-spread institutional adoption of best practices, and to identify what these evidence-based best practices are. To this end, the central activities in year one are approximately eight seminars and informal workshops on these topics built around a presentation by outstanding leaders in these priority areas, and the development of a community of practice. The second year will be devoted to creating the plan, identifying necessary resources and institutional commitments, and analyzing how support from NSF could be used to advance implementation of the plan. The outcomes of the planning grant are therefore an institutional plan for implementation and a proposal to NSF.

Planning is led by a team of USF faculty, department chairs, and administrators (Gerry Meisels, Coalition for Science Literacy and Chemistry, PI; Catherine Beneteau, Mathematics, co-PI; Scott Campbell, Chemical Engineering; Allan Feldman, Science Education; Gladis Kersaint, Mathematics Education and Associate Dean of Education; Randy Larsen, Chair of Chemistry; Jennifer Lewis, Chemistry, co-PI; Marcus McWaters, Chair of Mathematics; Rick Pollenz, Integrative Biology and Associate Dean of Undergraduate Education; Bob Potter, Chemistry and Associate Dean of Arts and Sciences, co-PI; Peter Stiling, Chair of Integrative Biology, co-PI; and Kevin Yee, Director of the Academy for Teaching and Learning Excellence). An advisory board of eight persons, including the USF deans of Arts and Science, Engineering, and Education and five well-respected leaders in the subject areas, will provide general advice and oversight. The planning team has met several times; the first major public activity was a seminar/workshop on December 9th and 10th, culminating in a presentation by Professor Adrianna Kezar (University of Southern California) on the subject “STEM Education, Shared Leadership, and You.”

Gerry Meisels is Professor of Chemistry and Director of the USF Coalition for Science Literacy. He served as USF's Provost, Chief Operating Officer, and Vice President for Academic Affairs from 1988 to 1994. He is the author of over 100 refereed publications in mass spectrometry and radiation chemistry, and a dozen on various aspects of science education.



continued from page 1

assessment of an open courseware for an engineering course in Numerical Methods (<http://nm.MathForCollege.com>). The course content is available in multiple formats and multiple contexts including digital audiovisual lectures, textbook chapters, class presentations, worked-out problems, real-world applications, anecdotes and simulations. Repeatedly via formal student satisfaction surveys at several participating universities and informal student comments via social media, the students overwhelmingly mentioned the multiple formats and contexts made their learning more satisfying and convenient, while the performance at the participating institutions in a final examination based on Bloom's taxonomy improved by as much as 22 percent. These observations are supported in the book *How People Learn* where it mentions, "knowledge that is taught in only a single context is less likely to support flexible knowledge transfer than is knowledge that is taught in multiple contexts."

A few months ago, while conducting a literature search on the learning process, I came across the Universal Design Learning (UDL) approach that is believed to have been first mentioned to make instruction more accessible to students with disabilities. However, the philosophy of UDL makes it naturally inclusive, and hence reaching a diverse population.

The first principle of UDL of having multiple means of perception matches what we have been doing all along with our open courseware philosophy of presenting information in multiple platforms and contexts. However, it is the other two principles that I am formally implementing this semester to make students master the learning process itself.

The second principle of UDL is to provide multiple means of expression. We are implementing this by having multiple forms of assessment required of all students such as concept inventories, essays, problem solving, projects and regular in-class tests, but also by allowing students to either submit a final project or take the regular in-class final examination.

"...students overwhelmingly mentioned the multiple formats and contexts made their learning more satisfying and convenient..."

The third principle of UDL is to allow multiple means of engagement. We are doing this by conducting clicker quizzes to create think-pair-share interactions, opening discussion via tools like Piazza, and by assigning mini-projects that are individual as well as group-based.

Following these three major principles of UDL not only makes learners masters of the content but of the learning process as well. If you want to know more about my teaching experiences, I will be glad to sit down for a chat. Just drop me an email at kaw@usf.edu or call me at 813-974-5626.

Autar Kaw is a Professor of Mechanical Engineering and was recently named a Carnegie Foundation/CASE U.S. Professor of the Year—the nation's highest honor in undergraduate teaching. His expertise includes: Engineering Education Research Methods, Mechanics of Composite Materials, Elasticity, Fracture, Thermal Stresses, and Online Course Development.



Congratulations to the winners of the 2013-14 Provost's Award for Outstanding Teaching by a Graduate Teaching Assistant!

STEM Category:

Provost's Award – Michael Cross (Physics)
Honorable Mention – Hannah Torres (Geosciences)

Arts and Humanities Category:

Provost's Award – Tasha Rennels (Communication)
Honorable Mention – Ella Browning (English)

Education/Business/Social Science Category:

Provost's Award – Berna Colak (Economics)
Honorable Mention – Loren Wilbers (Sociology)

Health/Medicine/Behavioral Science:

Provost's Award – Vanessa Chee (Community and Family Health)
Honorable Mention – Shitaldas Pamnani (Epidemiology and Bio-Statistics)

For more information, please visit <<http://www.usf.edu/atle/faculty/ta-award.aspx>>.

The Canvas Corner: First Impressions

Nicole West, Assistant Director & Adjunct Instructor

You know what *they* say—“first impressions are lasting.” They also say, “you never get a second chance to make a first impression.” Fortunately for faculty that second statement is not entirely true. In fact, we get many chances to make a first impression. Each new semester, we face a brand new crop of students who are anxiously waiting for us to make a first impression upon them—and for those students, these impressions are lasting!

Consider the following statement regarding student evaluations of teaching from Dan Willingham’s *Why Don’t Students Like School*, “A two-item survey would be almost as useful as a thirty-item survey, because all of the questions really boil down to two: Does the professor seem like a nice person, and is the class well organized? Although they don’t realize they are doing so, students treat each of the thirty items as variants of one of these two questions.” In addition to having a positive effect on teaching evaluations, being aware of students’ perceptions of our personalities and how well our courses are organized, can also impact students’ motivation, engagement, and ultimately their success in our classes.

Although student evaluations of teaching typically occur at the end of the semester, we know that students start keeping score even before they meet us on the first day of class. One of the contexts where students meet you, “before they meet you” is via USF’s new learning management system (LMS), Canvas. This article offers a discussion of several relatively easy to implement, high-impact strategies that can be employed to enhance students’ perceptions of our organizational skills.

There are several ways that students judge how well a course is organized. Do you come to class on time and are you prepared? Do the assignments and assessments match the course objectives? Do you provide students with an easy-to-follow, yet detailed course schedule? It is likely that students will also form an impression regarding how well your course is organized based upon how the course is presented in Canvas. Spending a little extra effort in the beginning when designing your course in Canvas can go a long way towards helping students succeed (or at least being less confused) throughout the semester. Here are a few recommendations that will impress students with your organizational skills.

- Use a home page option that is visually attractive and concise, yet informative. Using the “Page I’ll Design Myself” is a much better option than the “Recent Activity Dashboard,” which is the default. Be sure to include course information, instructor name and contact information, and direct students to their next steps in navigating the course in Canvas.

- Turn off as much as possible in the course navigation menu. Only enable the tools and items students need to access. For example, if you are using Modules and have added assignments and quizzes to your modules, you do not need to make Assignments and Quizzes visible in the course navigation.

- Use consistent module structure. Each module might have readings, a quiz, an assignment, and a discussion—present these elements in the same order in each module.

- Use the Syllabus tool to embed your syllabus text directly on the page. Although copying and pasting your syllabus content from a another document will strip all of your formatting, you can use the rich text editor to re-format your syllabus. This method of sharing your syllabus enables you to include clickable web hyper links, as well as YouTube videos and links to other course content.

- Restrict upload file types for online assignment submissions. Using this feature will help guide students when completing and submitting their assignments and reduce confusion regarding the specific deliverable you are expecting them to turn in via Canvas.

- Preview the Canvas course (and its component parts like assignments, quizzes, and discussions) using the Student View. Once you have built your course in Canvas, make sure that what you intend for students to see and experience is actually what is there. Canvas makes it much easier to do this than Blackboard using the Test Student. No more Ferris Bueller or Lisa Simpson!

Incorporating one, or a few of these suggestions, into future courses may enhance how much students enjoy the course and ultimately how much success they experience. You may even want to make a few changes now, because you know what *they* say...your first impression is not the last chance to make a good impression!

Nicole West is the Assistant Director in the Academy for Teaching and Learning Excellence (ATLE) and an Adjunct Instructor in the College Student Affairs M.Ed. program. She earned a B.A. in Psychology, M.Ed. in College Student Affairs, and Ph.D. in Higher Education Administration from USF and has worked in postsecondary education for more than 15 years.



Making the Connection: From x 's and y 's to Real Life Applications

Fran Hopf, Instructor

Given the slope and the y -intercept, a college algebra student can find the linear equation $y = mx + b$ and successfully perform other such algebraic skills, but what does it all mean and when will he or she ever use it? Students in college algebra ask me that question often. Presently students who take college algebra at USF meet in a large class format offering a modified lecture once a week and then are required to attend three hours per week in the SMART Lab where they use the online resources and live tutors to fill in the gaps. This flipped-classroom design has improved student success in terms of the overall student passing rate, but now it is time to provide learning experiences that will



help them to connect the equations and graphs they study with real life applications. Also, it is important for students to be able to read and write mathematics in complete sentences and not just list values, algebraic expressions, and graphs. Since most of their required assignments and tests are administered using a computer program, there is a need to provide richer experiences for students to use critical thinking skills to solve applications and express the mathematical solutions in written form.

Understanding this need and developing activities that would provide practice writing solutions to real life applications would not normally be too difficult in a smaller classroom situation, but because the class size of college algebra can range from 150 to 250 students, it is challenging to keep up with grading 250 written papers each week. I have implemented a plan this semester that utilizes team/group work to critically think through applications and write solutions in complete sentences. A few students have mentioned they are not fond of working in groups, but most seem to approach it positively. Adding the team sessions means that now the class meets twice a week—once for the modified lecture and overview of the content and then the second class is for solving applications in teams. The teams were established the first week of the semester by coming up with 5 characters for each of 30 popular movies (class size 150), writing the character's names on cards, passing out one to

each student, and then having them find their “Team Movie” characters. Once they were in their team, they were asked to make a list of five things they had in common which were not body parts and not school related. After sharing some of their lists with the entire class they had to use their syllabus to figure out how to find a weighted course grade average with a given set of fictitious student grades. The applications for the subsequent weeks have been related to the course content. Teams remain together for the entire semester in order to allow time for them to improve their group process.

During the actual class when the team activity is taking place, I give a brief introduction regarding the focus of the application, sometimes using short videos followed with some class discussion and questions. A TA assists for the team sessions to help the groups should they need some guidance. Each of the 5 members of the team submits a paper for that day in a Team folder that was provided for them. Randomly, I choose one of the five papers to grade and the whole team gets that grade. I try to emphasize they should be sure to work as a team and be sure all team members understand and can write the solutions correctly since they don't know whose paper I will grade. I select one team paper each week that exemplifies a correct model and post it on Canvas so they can compare it to their own work when they get their folders back the following week.

In addition to providing opportunities for students to work on their critical thinking skills and mathematical writing skills, engaging students in team learning activities may foster a sense of belonging, provide closer contact with other students in the class and their instructor, and heighten their awareness that just because most of their freshman classes are large, USF cares about their success. I plan to give the class a survey of questions at the end of the semester to collect data regarding how this team learning approach impacts students' experience in the course.

Fran Hopf coordinates all college algebra classes for the USF Department of Mathematics and Statistics. She has a Ph.D. in higher education in curriculum and instruction with a cognate in mathematics. Fran designed and helped implement the pilot mathematics classes in the USF SMART Lab.



Teaching Our Students How to Do Research

Allan Feldman, Professor

As faculty in a research university one of our most important roles as educators is the supervision of students engaged in independent research. The students may be master's students doing theses, doctoral students preparing their dissertations, or undergraduates doing honors projects or participating in short term research programs such as the NSF-funded Research Experiences for Undergraduates (REU). While there is a large body of research on teaching in higher education, it turns out that there is little on how to advise students engaged in research.

For the past 7 or 8 years my students and I have been engaged in the study of how people learn to do research by participating in research groups. Through our research we developed a model for the learning to do research in the sciences: The research education of science and engineering students occurs as part of an apprenticeship. The apprenticeship takes place in research groups. Research groups are usually tightly- or loosely-organized. Students have different roles in the research groups: novice researcher, proficient technician, or knowledge producer. The members of the research group, including the professor and other students, facilitate the development of students along the continuum of roles.

A research group usually consists of a lead researcher, a group of students, and possibly post-doctoral fellows and technical staff. Tightly-organized research groups meet on a regular basis to report on the progress of their research to share knowledge and skills, and to critique one another's research. We also found that tightly-organized groups engage in social activities together, such as cookouts, holiday and birthday parties. In loosely-organized groups the lead researcher serves as the center of action. In this type of group, students work individually; for example, they do field work, bring samples back to the laboratory where they are analyzed on communal instruments to quantify the data, and then work individually on their analysis.

Novice researchers are short-term members of the group. They lack research skills (methodological proficiency) and do not have the ability to formulate research questions, have difficulty drawing defensible conclusions from data, and are not expected to contribute much if anything to the analysis of data or the creation of new knowledge (intellectual proficiency). Proficient technicians have the skills needed to collect and analyze data, as well as report their findings. They can also apply the methods that they have learned to new situations (methodological proficiency). Knowledge producers are usually long term members of the research group. They have the ability to search out existing research methods and to develop new research methods (methodological proficiency). They also have the ability to integrate information from their field and other domains, formulate research questions, draw defensible conclusions from

data, and create, disseminate, and defend new knowledge that is a contribution to the field (intellectual proficiency).

Our research has demonstrated that while these roles are developmental in nature, faculty often think of them as corresponding to students in particular degree programs or research experiences. For example, there is little expectation that the typical undergraduate honors student would develop much beyond a novice researcher. In those fields that have terminal master's degrees such as engineering or geology, the expectation is that a master's thesis demonstrates that the student can go out in to the field and engage in professional practice as a proficient technician. It is only doctoral students who are expected to gain the methodological and intellectual proficiency that enables them to advance knowledge in the field.

We believe that the importance of our research lies in the way that it can inform how faculty advise their students engaged in independent research. While our focus has been on the sciences and engineering, we believe that it is applicable to almost all fields. Therefore, I end with some suggestions based on our findings:

- It is important to acknowledge that our students are in the role of apprentices, and that as apprentices their working experiences are also the primary mechanisms for them to develop methodological proficiency.
- We need to provide our students with formal opportunities in which to develop intellectual proficiency, such as journal clubs and aspects of mentoring as cognitive apprenticeships: modeling, scaffolding, articulation, reflection, and exploration. Given that advanced students serve as mentors, we should provide them with training in these methods.
- Tightly-organized research groups can be more fertile ground for learning than loosely organized groups. Therefore, even in the fields that do not naturally have tightly-organized research groups, we should hold regular research group meetings, have journal clubs, and arrange social functions for our students.

Allan Feldman is Professor of Science Education in the College of Education. His research areas include teacher learning and action research. Most recently he has been studying the ways in which people learn to do research.



Organizing a Study Abroad Trip—A Faculty Perspective

Jennifer Collins, Associate Professor

Are you thinking of running a study abroad field course? If so, start planning for it now. This essay will provide some practical advice and considerations for developing and implementing a successful study abroad trip. It is written from the perspective of a faculty member who offered her first study abroad course this past summer (2013). The class offered was a 2-week experience where the students examined physical geography and environmental science in the United Kingdom.

The first major piece of advice is to consider the stage in your career. I am an Associate Professor, but first started developing ideas for my study abroad course around mid-tenure. At that time I mentioned it to my Chair, who discouraged me from pursuing this offering pre-tenure. I was so excited about the trip but I followed his advice and put it on hold until I had tenure. When I look back, due to the time and effort involved in creating a study abroad course, he was spot on and it was one of the best pieces of advice I was given regarding the study abroad course. Be prepared; it does take a significant amount of time to prepare for it.

Another major consideration is whether you want to work with an outside travel company such as CIS Abroad. I went with one of those companies, but there are several advantages and disadvantages that you should consider. First, you still have to do a lot of the logistical arrangements since you, as faculty, know what academic content that you want to cover and arrange. Therefore, especially for a study abroad field trip where the group is moving around, one still has to consider what sites you want to visit and how close you wish to stay to each. You also need to consider the laws in different countries. For example, in the UK, a bus driver can only drive 9 hours a day and needs so many required stops at certain times, therefore as faculty you need to plan all this to see if you will reach your site in time. To hire an outside travel party like CIS Abroad is very expensive and increases the cost of the trip significantly for the participants, which may limit your ability to recruit a sufficient number.

The advantages of an outside travel company are that typically they will book the hotels, but again, you have had to do the leg work telling them where you need the hotels. Not all travel companies will pre-pay for these and they end up paying more for those hotels than what you could have paid if you had pre-booked. The advantage of them sending their staff on the trip is that there are additional professional staffers to handle unforeseen circumstances, such as greeting students who arrive separately, arranging for delivery of late or lost luggage, and other emergencies. Typically the staff member they send will be young. This has the advantage that the students will likely bond with them, but at the same time has some disadvantages in that

they are inexperienced at certain things, and the bond that they create with some students can actually work against the program goals. Some students lean on the staff person as a crutch to run the interface between them and the professors. One advantage of the outside company representative is that she had control of the budget and some flexibility with spending money. This is particularly useful for a study abroad course like this, when plans may have to change for a variety of reasons, such as inclement weather. My advice would be to pay for another colleague to come on the trip, or a grad student who knows the details of the trip well, to assist on all logistical issues. This will be much cheaper than the option of an outside travel company.

When should you start preparing for your course? At least over a year ahead of time. If you plan to offer a summer course, you want to aim to submit the proposal to the USF Study Abroad office by the end of the spring semester or early summer of the previous year. With that time frame, you will be able to have recruitment materials prepared in time for the fall Week of Welcome (WOW), and in time for the study abroad recruitment fair in the fall. You could put a lot of preparation time into the course and it may still not be offered if an insufficient number of students commit. So, by submitting your proposal early, opportunities to recruit are maximized.

Finally, the last piece of advice I will provide is never consider a study abroad field course with fewer than two faculty members. My first study abroad experience was very eventful. If you have to spend days in a hospital with a participant (in my case, it was an unforeseen medical emergency, unrelated to activities on the field course), you will need another faculty member to take over your role as instructor, logistics coordinator, mentor to the students etc.

The advantage of all the effort you put into a study abroad course is that if you provide a similar offering in subsequent years, while there may be some changes, you will have a great deal of work completed from the previous offering. Choosing the same location in subsequent years will minimize your time spent on logistics in future years, but even if you choose a different location, you will still spend less time developing the experience since you will have learned so much from your first experience.

Jennifer Collins is an Associate Professor of Geography. Her research focuses on weather and climate.



Using Social Media for Classroom Exercises—Twitter



C. David Frankel, Instructor & Assistant Director

TWEET: Today’s article brings social media into the classroom. #ATLE #Really?

TWEET: Students like familiar things, and most know Twitter. #notallstudentstweet

TWEET: Learning social media tools takes time, but not as much as you might think. #quickanddirty #teachandlearn

Many faculty know and even use Twitter, but not all do, so perhaps a brief explanation might be in order. Twitter is an online service that allows the user (@user – so my Twitter name, for instance, is @cdfrankel) to send short messages (140 characters) out into what’s called “the Twittersverse.” What makes Twitter social is that you can “follow” other users (you can also send tweets to them using their @user name and mention them in your tweets)—and, therefore, see their tweets. Of course, if no one follows you, than your tweets will remain unknown. As Twitter developed, the service provided a way for users to “tag” their tweets, using a hashtag (#), as in the first tweet above, “#ATLE #Really?” The first hashtag demonstrates the original use: to create a kind of index of tweets. Anyone tweeting something related to ATLE could tag it #ATLE. Other users interested in ATLE could search for the tag and all tweets thus tagged would appear in the search results. The second hashtag in that tweet shows how users often transform social media (and other things) to new ends—the hashtag became a way to provide metacommentary on the tweet. Of course, it can still be searched for, but doing so would bring up a sequence of tweets unconnected by anything except the #phrase.

In the classroom, Twitter provides a great way to help students focus on essentials. In my Introduction to Theatre class, for example, I use Twitter in a group exercise involving Sophocles’s play, Oedipus. One of the goals of the course is for students to recognize and articulate the differences between story (generally considered to be the more or less chronological ordering of all the events important in the lives of the characters) and plot (the particular arrangement of events in any telling of the story).

An important distinction in theatre is that plot refers to those things that occur during the course of the play. So, in Oedipus, the play begins when Oedipus is the leader of Thebes, long after his birth, the slaying of his father, the killing of the sphinx, and a bunch of other things that have occurred in his past. For this assignment, I split the class into groups and each group has to tell the story of the play in five tweets. The results from one class are in Table 1.

Once the groups have finished, we share the results as a class and talk about the process of selection. As each group has selected different things to include and exclude, we talk about what guided those choices. (Another goal of the course is for the students to understand the difference between examining the play as an artefact—a made thing that exhibits the choices of its maker) and as a world in itself (where we look, for instance, at characters as if they were people). The next class period, I bring in a table (see Table 2) that combines the tweets into one story order—also indicating the tweet that comes closest to the beginning of the play. Using Table 2, we can continue the discussion of the difference between story and plot, which also prompts further inquiry into the other dramaturgical elements of the play.

Students enjoy this exercise for several reasons—it allows them to use something they already (mostly) know (Twitter) and to apply it to something foreign (the play). They’re able to comment creatively, yet all their metacomments, whether comic or serious, do get at something about the play and the characters. Finally, they appreciate the collaborative (that is, social) aspect of the group work in class—and working together to create a five-tweet play gives them a sense of accomplishment.

C. David Frankel teaches and serves as Assistant Director of Theatre in the USF School of Theatre and Dance. He is also the Artistic Director of The Tampa Repertory Theatre.

Table 1. Student groups’ tweets

Group 1	Group 2	Group 3
Herdsmen: I was driving the king's caravan and cut someone off. He killed everyone with me. #onlySurvivor #roadRage #YOLO	1. Searching for @KingLaiasYo 's killer...#whodamurderer #whereheat	Plague taking over.. #ThouArtScrewed
ThebesPerson: My son died today of plague. I hope Oedipus figures this out. #deadSon #depressed	2. @Tiresiasdaprophet is accusing me of this crime! #whohethinkheis #suspicious #hetryinmylife	It's too early for these riddles... #MondayProbs #WheresMyCoffee #FutureKing
Tiresias: Oedipus totes freaked out on me 3day. #cantHandleTheTruth #blindLeadingTheBlind	3. Tried to ask @Jacostaataa for help figure out my past. She told me to stop...#wut #shetriflin	These crossroads got me all messed up.. Don't know who's right of way it is.. #GetOutMyWay
Oedipus: killed my dad, married my mom. FML #son&husband #brother&father	4. Asked the only witness to the crime. Turns out I killed my father and married my mama...#awk #didntseethatcoming #plottwist #dundundun	#PlotTwist Actually married my MOM. #AcaAwkward
Jocasta: Couldn't fight fate. #suicidal #foreverUnclean	5. @Jacostaataa just killed herself, I can't see, now I'm banishing myself...#thestruggleisreal #foreveralone #thefeels #shitwentdown	Mom's dead. No eyes. #YOLO #HakunaMatata

Table 2. Combined student groups’ tweets in story order

Group and Tweet	Story Order (combined from groups – boldfaced row indicates where play starts)
1.1 Herdsmen: I was driving the king's caravan and cut someone off. He killed everyone with me. #onlySurvivor #roadRage #YOLO	1.1 Herdsmen: I was driving the king's caravan and cut someone off. He killed everyone with me. #onlySurvivor #roadRage #YOLO
3.3 These crossroads got me all messed up.. Don't know who's right of way it is.. #GetOutMyWay	3.3 These crossroads got me all messed up.. Don't know who's right of way it is.. #GetOutMyWay
3.2 It's too early for these riddles... #MondayProbs #WheresMyCoffee #FutureKing	3.2 It's too early for these riddles... #MondayProbs #WheresMyCoffee #FutureKing
3.1 Plague taking over.. #ThouArtScrewed	3.1 Plague taking over.. #ThouArtScrewed
1.2 ThebesPerson: My son died today of plague. I hope Oedipus figures this out. #deadSon #depressed	1.2 ThebesPerson: My son died today of plague. I hope Oedipus figures this out. #deadSon #depressed
2.1 Searching for @KingLaiasYo 's killer...#whodamurderer #whereheat	2.1 Searching for @KingLaiasYo 's killer...#whodamurderer #whereheat
2.2 @Tiresiasdaprophet is accusing me of this crime! #whohethinkheis #suspicious #hetryinmylife	2.2 @Tiresiasdaprophet is accusing me of this crime! #whohethinkheis #suspicious #hetryinmylife
1.3 Tiresias: Oedipus totes freaked out on me 3day. #cantHandleTheTruth #blindLeadingTheBlind	1.3 Tiresias: Oedipus totes freaked out on me 3day. #cantHandleTheTruth #blindLeadingTheBlind
2.3 Tried to ask @Jacostaataa for help figure out my past. She told me to stop...#wut #shetriflin	2.3 Tried to ask @Jacostaataa for help figure out my past. She told me to stop...#wut #shetriflin
2.4 Asked the only witness to the crime. Turns out I killed my father and married my mama...#awk #didntseethatcoming #plottwist #dundundun	2.4 Asked the only witness to the crime. Turns out I killed my father and married my mama...#awk #didntseethatcoming #plottwist #dundundun
3.4 #PlotTwist Actually married my MOM. #AcaAwkward	3.4 #PlotTwist Actually married my MOM. #AcaAwkward
1.4 Oedipus: killed my dad, married my mom. FML #son&husband #brother&father	1.4 Oedipus: killed my dad, married my mom. FML #son&husband #brother&father
1.5 Jocasta: Couldn't fight fate. #suicidal #foreverUnclean	1.5 Jocasta: Couldn't fight fate. #suicidal #foreverUnclean
3.5 Mom's dead. No eyes. #YOLO #HakunaMatata	3.5 Mom's dead. No eyes. #YOLO #HakunaMatata
2.5 @Jacostaataa just killed herself, I can't see, now I'm banishing myself...#thestruggleisreal #foreveralone #thefeels #shitwentdown	2.5 @Jacostaataa just killed herself, I can't see, now I'm banishing myself...#thestruggleisreal #foreveralone #thefeels #shitwentdown

Supplementing Face to Face Classes with Quizzes and Online Discussions

Floyd Ballard, Learning and Development Facilitator

Something that has worked very well for me in facilitating my students' learning is to supplement my face to face classes with an interesting and challenging combination of quizzes and corresponding online discussions. I have found that offering my students essential questions on quizzes coupled with an open forum type of online discussion promotes quite a bit of enthusiasm, synergy and noticeably better achievement of my course objectives.

Here is a little bit more of how I typically set this combination up. The first thing I do is set the quiz to be a multiple attempt quiz, typically two tries. I noticed our current learning management system Canvas allows one to pick the final grade to be either the last quiz attempted or the highest quiz score. I think either can be effective, but I found the highest quiz score seems to provide a bit more motivation for my students, so I normally select the highest quiz score to be the final quiz grade.

The next thing I do is to create essential questions that directly align with the learning objectives for the module that I am currently teaching. These questions are involved and can incorporate not only text but also websites, pictures, diagrams, and even videos. Further, the questions I create can be of any question type I think is important—even questions that ask my students to load a computer file as part of their answer.

Now that my questions for the quiz are created, the final step I take is to create a dedicated Open Forum style online discussion that allows my students to ask and discuss any question(s) that are on the quiz. Naturally, I instruct my students to not indicate the correct answer, but then again, one can set the Quiz settings

in our Canvas Learning Management System to randomize the questions as well as the answers. What I am after is an actual discussion of why the correct answer is the best answer or why a student submission of a computer file would be a great answer. By the way, it is interesting to moderate this type of an online discussion, as what I often see is that my students really bring about the most intelligent discussions and benefits to their fellow students. Sometimes though, like any other online discussion, I see the need to provide some guidance as the students can be a bit stuck on a given question.

The payoff for my students is that each student has the chance to engage with me and his/her fellow students regarding important topics and questions on the quiz and then to retake the quiz to enhance their knowledge. Being successful on the quizzes can further lead to students being successful on their other tests and assignments. I found this to be frequently true with regard to my students' achievements. If you have any questions or would like to discuss this technique further, please feel free to contact me at the Academy for Teaching and Learning. My extension is 4-1841 and my email is fballard@usf.edu.

Floyd Ballard is the Learning and Development Facilitator in the Academy for Teaching and Learning Excellence (ATLE). Floyd earned a Bachelor of Science degree in Social Work and a Master's of Science degree in Instructional Systems and has provided instructional design and educational technology services to faculty in higher education for nearly 10 years.



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What's All This About "Competency-Based Education" and "Performance Based Funding"?

Cynthia Patterson, Associate Professor

Unless you just returned from sabbatical or buried your head in the sand for the past six months, you've probably encountered in communications from department chairs, deans, and other administrators terms such as "critical thinking," "global citizens," "community engagement" and "applied skills" – all terms from USF's 2013-2018 Strategic Plan. Or, you may have seen the Florida Board of Governors new proposal for "performance funding" for the State University System.

You may wonder what these vaguely noble-sounding concepts have to do with you and your day-to-day teaching concerns. Actually, quite a bit—or at least they should! Each of these terms can be traced to a widespread movement in education—both at the K-12 and university level—known as "competency-based education."

Skills-based learning certainly isn't new in higher education. However just "google" the terms "competency-based education" or "performance funding" and "higher education" and you'll discover that increasingly, student competencies and performance-based funding have dove-tailed, particularly in a national environment where ROI ("return on investment") drives decision-making in funding public education.

The current competency-based movement dates to the 1970s—and many trace it to an initiative launched by Alverno College (Milwaukee, WI) in 1973 touting "competency based learning." Alverno's original "eight abilities" included:

- 1) communication
- 2) analytical/critical thinking
- 3) problem-solving
- 4) valuing
- 5) social interaction
- 6) global responsibility
- 7) effective citizenship
- 8) aesthetic response

To this, some universities (like my alma mater, George Mason University's "New Century College") have added a ninth competency: "information technology" (now called "digital literacy").

You may protest, "But my job is to teach course and programmatic content!" Well, certainly that is PART of our jobs. However, if students cannot APPLY that content to new contexts and if they come away with heads stuffed full of content but no connection to how this content might be used in their everyday lives (jobs, personal lives, as citizens in a democracy), have we really done our jobs as educators? I think not!

And like it or not, our new Board of Governors agrees with me. The newly-released "Performance Funding Model" aligns a university's future funding with a series of 10 performance metrics that focus on each university's Strategic Plan. So, if the USF plan calls for "critical thinking," "global citizenship," and "community engagement," then we're going to need to demonstrate to the State of Florida that our students are graduating with these skills and finding jobs in their fields. And we better do a better job of figuring out how to teach these competencies and measure our student's attainment of these skills.

Few of us will be able to incorporate all eight or nine competencies into a single course, or even into a single program of study. Moreover, certain competencies quite naturally align with specific course offerings: when one hears "communication," COM courses come to mind. "Problem-solving" suggests math and the sciences; "effective citizenship" political science and other social sciences, and so on. But, if we really understand the skill sets involved, we can build MOST of these competencies into MOST of our courses—allowing our students to practice developing these skills across a wide range of disciplines and specific course content.

It may mean re-thinking how we deliver the "content" in a course, and how we assess mastery of that content. It likely will mean incorporating more "project-based learning" into our courses—that is, creating assignments that require students to study real-world problems and create tangible products to attempt to solve those problems. And it likely will also involve "reflective learning practices"—that is, following up a project-based learning activity with student written reflection on how completion of that project enhanced mastery of course content and concepts.

Our colleagues from the College of Education have known about and embraced these concepts for decades. Isn't it time we incorporated competency-based education into our own teaching and learning? My next article will focus on the use of eportfolios in higher education, and how to use the Canvas eportfolio tool in your own course to enhance student content-based and competency-based learning.

Cynthia Patterson is an Associate Professor of and the incoming Undergraduate Coordinator for the English department. She completed the Faculty Technology Integration Institute (FTII) on the USF Lakeland/Polytechnic campus and served as an FTII faculty mentor for four years before joining the Tampa campus faculty.



Outside Voices Inside the Classroom: Engaging Our Community

Iraida Carrion, Associate Professor & Program Chair

Learning occurs when students are motivated to be active learners, to engage in critical thinking, and to participate in collaborative learning experiences. Therefore, it is essential to bring course content to life when teaching the social sciences. This is especially the case when teaching theory and practice competencies and their application to clinical practice settings. Teaching theoretical concepts in a manner that is relevant, contemporary, and applicable to the communities that students will serve is also of primary importance.

While teaching the Social Work Practice with Individuals graduate course in the School of Social Work, the integration of community participation, peer interaction, and technology is a valuable teaching method. Social work professionals are invited to role-play with graduate students using case scenarios that derive from their practice in community agencies. The community professionals “play” client, while the students “play” the social worker role. The goal of this interaction is to expose students to community-related issues and enhance the students’ clinical intervention skills. The following feedback from one student regarding her experience is characteristic of many of the students’ comments:

“This assignment was a wonderful opportunity to engage with a knowledgeable professional in the community. Working with a professional in the classroom allowed me to feel a sense of security and confidence while gaining insight and knowledge through the interaction.” (Maranda, first-year graduate student)

Each week, two students have the opportunity to utilize the “theory of the week” to intervene with the professional social worker “client” while their peers observe. In preparation for the assignment, the professional provides the instructor with a statement indicating the presenting problem that they will role-play. The statement is given to the students to enable them to prepare accordingly. Janet, a first-year graduate student, stated:

“This assignment was both challenging and rewarding. I learned a lot about myself and about the real-life application of theoretical perspectives.”

After the role-play, the professional and the instructor meet with the two students, using a grading rubric, to review and process the students’ interactions and application of the theory. It is the time during which the professional and the instructor provide the students with observations regarding their interventions. The remainder of the class is divided into small groups and meets outside of the classroom and conducts a review of their peers’ role-play, utilizing the same grading rubric. The process enables the students to gain immediate feedback and insights regarding their

demonstration of clinical skills and use of theory. Both role-plays are videotaped in class, uploaded, and sent to each student. The students are able to review the video recording of their role-play and the processing session. The entire class resumes and meets as a group. A representative of each group provides the students who have role-played with a summary of the group’s comments. Each group member is required to submit a completed grading rubric to the instructor who, after reviewing each grading rubric, gives them to the students who have role-played, along with the instructor’s completed rubric and final grade.

“Having an experienced professional play the role of client was a helpful addition, making it more realistic and allowing us to get very valuable insight.” (Samantha, first-year graduate student)

The students also have the opportunity to actively participate in an exchange with the professionals regarding job preparation and the overall expectations of social workers in community agencies. As an instructor, I have the benefit of discussing the skills of social work practice with students while emphasizing the integration of practical experiences and incorporating technology into the content of all my courses. My goal is to create optimal learning environments in my classes in order to enhance the intellectual and personal development of my students. A sense of confidence is developed via this teaching method. This is illustrated in Amanda’s response below:

“This excellent and unique learning opportunity showed me that if I am able to successfully tackle providing interventions in front of 25 people, I can do so with only a client present. Not only does the role-play allow a theory to be learned in depth and applied to a real-life situation, it also assists in gaining professional confidence.”

The students described the course as valuable, exceptional, and practical. My overarching goal is to mold students into independent, evidence-based practicing clinicians and evaluators of their own learning. This teaching method involves community engagement, which transforms learning environments and courses and brings “outside voices inside the classroom.” It provides professional social workers the opportunity to engage with students, impact their learning, and participate in developing future social work leaders and scholars.

Iraida Carrion is the MSW Program Chair & Associate Professor in the School of Social Work. She has extensive clinical practice experience in psychiatric, medical and in private practice settings in New York City, West Texas and in the Central Florida area.



Submissions

Faculty Voices is a scholarly publication that is written by and for faculty at the University of South Florida (USF). It is published by USF's Academy for Teaching and Learning Excellence (ATLE). Its purpose is to provide an exchange of ideas on teaching and learning for the university's community of teachers and scholars. It is envisioned that this publication will inspire more dialogue among faculty, whether in hallway discussions, departmental meetings, or in written articles. This publication represents an opportunity for faculty to reach their peers throughout the growing USF community. *Faculty Voices* invites you to contribute your ideas on teaching and learning in a short essay.

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