CENTER FOR ACADEMIC INNOVATION
SAGINAW VALLEY STATE UNIVERSITY

Teaching & Learning
Symposium
February 17, 2017

INNOVATE   COLLABORATE   CONNECT

THE CENTER
FOR ACADEMIC
INNOVATION

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Welcome to the Center for Academic Innovation's (CAI) 3rd Annual Teaching and Learning Symposium. The Center's mission is to support the campus community in enhancing and creating innovative practices that advance pedagogical excellence and support the University's commitment to teaching. We hope this Symposium will provide you with a platform for discussions on teaching and learning issues and inspire you to try new pedagogies. We plan to do this in the following ways: First, we have the privilege of having Dr. Todd Zakrajsek present the Keynote Address, and the subsequent workshop. Dr. Zakrajsek is an Associate Professor in the Department of Family Medicine and Executive Director of the Academy of Educators at the University of North Carolina, Chapel Hill. Second, in three consecutive Showcases, ten SVSU faculty, including the 2016-2017 recipients of the Herbert H. and Grace A. Dow Professor Award, will showcase the creative work they are currently implementing in their classes. Finally, following this Symposium, the CAI Team looks forward to continuing the conversations and collaborating on creating engaging learning experiences using promising pedagogical practices.

- CAI Team

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KEYNOTE SPEAKER

Todd Zakrajsek

Associate Professor at the Department of Family Medicine and Executive Director of the Academy of Educators at the University of North Carolina, Chapel Hill.

Todd Zakrajsek is an Associate Professor in the Department of Family Medicine and Executive Director of the Academy of Educators at the University of North Carolina, Chapel Hill. Todd served as a tenured associate professor of psychology at Southern Oregon University before directing three teaching centers over the past 15 years. Todd currently serves in leadership roles for several educational efforts, including board membership at Lenovo Computer and Microsoft. He has published and presented widely on the topic of effective teaching and on student learning.

Keynote Address Breakfast: 8:30 - 9:15 a.m.
Rethinking Current Educational Trends: Balancing Faculty Expertise, Innovative Pedagogy, and Student Learning.

In the movement to embrace and adopt active learning strategies, we have ignored some important evidence: some passive learning is good, lecturing can be helpful, and sometimes introverts learn best working alone. Faculty are often encouraged to: "include more active learning and lecture less," "stop encouraging passive learning," and "create classes where introverts feel comfortable talking." Much research, time, and monetary support has gone into moving teaching strategies in these directions over the past 25 years. But we should ask if we missed something important along the way.

Keynote Workshop: 10:15 - 11:45 a.m.
Good Teaching, Scholarly Teaching, and SoTL: Applications from Today's Keynote Address

Join Todd Zakrajsek to continue the conversation started during the Keynote and apply the Scholarship of Teaching and Learning to address some common teaching challenges. In this session we will consider that some passive learning is good, lecturing can be helpful, and group work may actually be disadvantageous (at times) to introverts.

This session examines the other side of current trends in higher education pedagogy and examines the pitfalls of dichotomous thinking.

Session Objectives: (1) Explain why dichotomous thinking jeopardizes student learning. (2) Describe when passive learning is beneficial to the learning process. (3) Defend at least one teaching strategy that is counterpoint to current educational trends.

Keynote Address Breakfast:

Rethinking Current Educational Trends: Balancing Faculty Expertise, Innovative Pedagogy, and Student Learning.

Keynote Workshop:

Good Teaching, Scholarly Teaching, and SoTL: Applications from Today's Keynote Address

Deli Luncheon:

Showcase Session I:

Emily Beard-Bohn & Patricia Cavanaugh

Gamification to Enhance Comprehension, Retention, and Motivation in General Education Courses

Stephanie Brouet

Improving Motivation with a Plan…that is to say, a Study Plan!

Adam Warhausen

Creation of a Customized Laboratory Safety Video Specific to SVSU's Needs

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Showcase Session II:

Bonnie Harmer

Kahoot! and Quizlet Live: Gaming for Assessment and Collaborative Learning

Mike Mosher

An Online Comics Course

David Nichols

Constructing an Online Course—Simple, Cool, and Effective

Showcase Session III:

Tony Crachiola

Development of a Multi-Purpose Micro-Teaching Math Video Library

Warren Fincher

Unpacking Practical Knowledge and Tacit Skills: Teaching the Nuances of Research Methods in a Scaffolded Term Project

Jan Hlavacek

Use of R-Studio and WeBWorK in an Introductory Statistics Course

Emily Beard-Bohn
Associate Professor
Department of English

Emily Beard is an Associate Professor of English and First Year Writing Coordinator at SVSU. She earned her Doctorate degree from Bowling Green State University. Her research focuses on game-based pedagogy in the writing classroom.

Patricia Cavanaugh
Professor of English
Department of English

M.P. Cavanaugh began teaching at SVSU in 1999. She began her professional career as a high school English teacher. She was the director of the Learning Resources Center at Michigan State University prior to coming to SVSU. She is currently a professor in the English Department.

Gamification to Enhance Comprehension, Retention, & Motivation in General Education Courses

Abstract

Gamification is a project in which two faculty introduce role-playing academic games in one of their courses for both academic insight and motivation. The games are now in their second round, so revisions and improvements have been made. The faculty members will offer a workshop in March to share with any interested SVSU faculty on the games themselves, some of the current research on gamification, and their insight on the value.

Introduction

Teaching general education literature offers unique challenges, and we know that motivation is key. We each came across the role-playing games uniquely, but we combined our interest in learning, literature, and motivation to further develop these academic games in our separate classes.

Instructional Challenge

Adding an innovation to a course is always a challenge. Even the element of time is a factor. Connecting the innovation to the current curriculum is important. Learning the innovation to begin with and preparing materials is also a challenge. We implemented rather different role-playing games, so our challenges are in some ways different, yet in some ways similar.

For me (Pat), the first challenge was simply learning all about role-playing games about which I had very little knowledge. I became aware of them as an instructional tool in a class in which a student used role-playing as an educational tool in a research project on the teaching of writing. I read his project with interest, and we discussed the idea of role-playing as a teaching tool. I became aware I had much to learn. So, I did. The plan was to teach students about role playing and story-telling. Then, I explained what we were going to do in my ENGL 203 class. Students would select one or two characters from any of the literature we read. The game master would provide an opening scenario, and students either in groups or individually would create a story using the characters from literature they had selected. They had to follow a story line and have the

characters act as those characters would. For example, if a student selected Macbeth, he would have to kill or have killed several other characters in their story because that is what Macbeth did in the play. Developing materials such as surveys and a rubric, reminding students of the tasks, reminding students to continue to add to the story line if they were working in a group, and maintaining everything else in the class was quite a task. The results, however, were worthwhile.

For several weeks of Honors 192 course, Emily's class played a Reacting to the Past game, The Threshold of Democracy. Class was held in ancient Athens (403 B.C.) where my students stepped into historical roles. Students researched, wrote, collaborated, and debated a variety of issues important to this time period using Plato's The Republic as their primary text. Many of the debated issues included government agency, social welfare, restoration of the Athenian Empire, and a trial of Socrates. Students primarily led class and facilitated their own learning with me serving as a Game Master.

Teaching Innovation

Adding games to academic courses at the university level is an innovation. Jordan Shapiro wrote in Games in the Classroom: What the Research Says that "It's becoming more apparent that teachers will need to do more than just embrace new technologies. They will also need to embrace the epistemological foundations of these new technologies. There are connected, networked ways of knowing that will dominate the digital future. Sharing and collaboration go hand-in-hand with integrating non-competitive and non-commodified ways of playing. The way students play and learn today is the way they will work tomorrow." Thus, we didn't simply add a game to our courses, we delved deeply into not only the games but also what the games should do with our students. We wondered about the effect—what change might take place. We wanted to add to our curriculum and motivate our students, especially in general education classes. "Game players regularly exhibit persistence, risk-taking, attention to detail and problem-solving, all behaviors that ideally would be regularly demonstrated in the classroom" (Grubb 2015).

We hope to publish an article on this experience, and we will offer a workshop for SVSU faculty. We noted during our review of the literature that Penn State, Dartmouth, MIT, and Emanuel College have instituted support and research in gamification.

Impact

Our goals were motivation and learning enhancement. Once we waded through the confusion of newness, we witnessed both. We also saw creativity among our students. Some more than others, of course. For one student in Pat's class, the role-playing experience was probably the best one she had in that class. The students were challenged to think and work outside of the typical academic demands. Those that met that challenge were rewarded with enhanced thinking and creating, meeting the challenges of group work, some degree of leadership, and fun. Yes, fun in a general education literature course. Not an expected outcome. In Pat's class the end product was a short story using as the protagonist and antagonist characters from the stories we read in class. These students may never write another short story, but they will be able to face a new and/or unique task with more confidence and ability. In Emily's class students took on the role of people in ancient Greece. They will probably never again assume the role of Socrates, but again they will be able to face a challenge with more confidence.

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Teaching tip: Games in the classroom. (2013). Academic Technology and Innovation Group. Retrieved from atig. emmanuel.edu

Improving Motivation with a Plan...
that is to say, *a Study Plan!*

Stephanie Brouet
Associate Professor
Department of Chemistry

Since 2010, Dr. Stephanie Brouet has been in the department of chemistry at Saginaw Valley State University and teaches organic chemistry courses. Prior, she served as visiting faculty at Providence College and College of the Holy Cross. She was educated in chemistry at Wayne State University and the University of Michigan. She has worked as a chemist in the pharmaceutical, environmental and refinery industries.

Abstract

A study plan can be an excellent tool for students to plan their semester for success from the start. Study plans can be broadly applied to success in college as whole, but there is value in specific advice on a course-to-course basis. Students can benefit from guidance and advice from instructors regarding this effort. Giving students study strategies specific to your course could increase their motivation and performance. Evaluating successful strategies for student success is also a beneficial exercise for the instructor. Each field, likely, has an optimal approach to studying and assigned tasks unique to that discipline. Surprisingly, the strategies most impactful may be difficult to describe or determine until analyzed at great length by an instructor. The evolution of a "first day" strategy is described and student work examples will be shared as a part of this presentation.

Introduction

Organic Chemistry has a reputation by many as a difficult course. Students are aware of this preconception and instructors may worry about the impact on motivation before the student even walks into the door of the classroom. "Difficult" may be defined as time-consuming and challenging. If so, time management is a critical part of shaping motivation of students, since it will be a part of a "cost" analysis of task value. Giving students advice about field specific study approaches provides the instructor an opportunity to influence overall motivation, since past study habits may not translate to a new and challenging course. A graded study plan is a concrete way for the instructor to evaluate their student population's time commitments, advice assimilation and expectations about the course. Additionally, developing a well thought out presentation about successful approaches to learning course content helps instructors to deconstruct the material from a variety of perspectives. In some cases, revelations about the common strategies employed by successful students may come as a surprise to the instructors. The instructor also gains the opportunity to share unsuccessful strategies and/or misconceptions encountered over their years of teaching. Students have reported a positive impact of the study plan activity.

Instructional Challenge

Students often approach every course using the same learning tactics. Organic Chemistry is a course that has a reputation for difficulty. Students believe the material does not directly relate to their future goals. Additionally, the material is challenging and needs significant time and effort to master. If students approach the material using a strategy highly reliant on memorization their level of success vs. effort will be unacceptable and a source frustration. On the other hand, student that do not consistently work on the material, instead working in "binges", will quickly find themselves overwhelmed and unable to catch up. By the time the student realizes that their strategy is failing them, it is often too late and leads to a demoralizing experience. To avoid this, a small amount of class time and single assignment gives both parties a platform to communicate about this critical aspect of success at the beginning of the course.

Teaching Innovation

First day lectures often center on the syllabus and grade requirements. In this case, the first day of lecture is devoted to explaining study habits, a study plan and shaping motivation specific to organic chemistry. An assignment for students has also been designed and serves as an out-of-class assignment. The instructor gets an opportunity to review philosophies about successful learning strategies, learn about the student population and see patterns in the reported habits of students and actual success. This can even lead to changes in the teaching of topics within the course itself.

Impact

Students are able to assess their commitments for the semester. Students and instructors are able to reflect on expectations, successful strategies and motivations for participating in the course. The instructor learns more about their student population and students learn about other perspectives on the learning process. Students can adapt their approach to the material earlier in the semester if they assimilate the advice. Instructors can discuss common pitfalls and learn which messages seem to resonate best with students. The ultimate hope is for higher grades, higher perceived value and more satisfaction for students that enroll in the course.

Adam Warhausen
Assistant Professor
Department of Chemistry

Dr. Adam Warhausen is an
Assistant Professor of Chemistry
at SVSU. His background is in
inorganic chemistry. His primary
teaching efforts at SVSU are
general chemistry I and II lecture
and labs, and inorganic chemistry
lecture and lab. His primary
research focuses on the synthesis
and electrochemical investigation
of transition-metal complexes.

Creation of a **Customized** Laboratory Safety Video Specific to SVSU's Needs

Abstract

The goal of this project is to create a new laboratory safety video to be utilized in the lower level chemistry labs. This will be done in order to replace the very out dated Starting with Safety (1991) safety video that the American Chemical Society (ACS) created. A group of SVSU students will record the necessary safety procedures and lab skills that are pertinent to the laboratory experiments that are carried out here at SVSU. The ACS's video, which has been a staple at the majority of academic institutions, does not capture the attention of today's student. It is envisioned that the new video will be made available to the students online via Canvas in order to free up valuable teaching time during the lab meeting. In order to verify that the students are watching the video, an online quiz or possible "lab safety scavenger hunt"[1] will be utilized in order to evaluate the students' competency of laboratory safety. Anticipated outcomes of the students in these lab sections are to improve their retention of safety information, familiarize them with the actual lab space that they will be utilizing, and have them all using proper laboratory techniques.

Introduction

The aim of this work is to establish a customized laboratory safety video to be used in our lower level labs (100 and 200 level). There are several things that are covered in the current video that do not correlate to activities our experiments that our students at SVSU will carry out. Several safety-related demonstrations will be video recorded by SVSU students and faculty in the teaching labs here at SVSU. These demonstrations will deal with actual safety related issues that have the potential to occur for a particular laboratory procedure. This will make the video more relatable to the students by seeing the physical space and equipment that they will be using.

Instructional Challenge

Presently, the ACS's video Starting with Safety is being shown in our courses, during the first lab meeting of each semester. This video does an adequate job of covering safety information; however, it is very old and difficult for our current students to relate to. In fact, within the first few minutes of starting the video, the majority of the students' faces are aglow from the screen of their phone as they have completely stopped paying attention. This inability to convey the message of safety and proper lab skills is dangerous and unacceptable in our teaching labs.

Teaching Innovation

The current use of the flipped classroom method of teaching is perfect for getting students to actively learn and understand basic laboratory safety policies. This pedagogical method will allow the students to view the newly made safety video that is specific to their lab experience and experiments before they start their first lab experiment of the semester. To ensure that the students are watching the video, online quizzes will be given to determine completion of the assignment and a proficiency in required skills and knowledge. Terry Helser has reported the usefulness of a Lab Safety "Scavenger Hunt" and how it has impacted the students at S.U.N.Y. College at Oneonta, Oneonta New York. The hunt begins after a short lecture on lab safety and then a list of items, such as fire extinguishers, emergency phone, eye wash, and balances that the students need to find. It was reported that students had fewer questions with respect to where lab equipment and items were and if a question was asked, the instructor's silence resulted in a student's response of "Oh, that's right, I should know that shouldn't I, because of the scavenger hunt?" which showed that the students had mentally oriented themselves in their learning environment and were more comfortable and confident.[1] This allows the instructor to be more effective in teaching and supervising all of the students' experiments instead of stopping to demonstrate regular lab safety procedures or direct students to lab equipment to those individuals that do not remember from the basic and boring safety video that they did not watch The use of such a scavenger hunt as an in-class activity after the students have watched the video on their own will help to confirm their understanding of basic lab equipment and safety.

Impact

This project has a significant impact as it will be seen by approximately 1100 students in the lower level chemistry lab courses. It will allow lab instructors to be more effective in their lab meetings by focusing on the details of the experiment instead of reminding a small few of the necessary information that should have been received via the safety video at the beginning of the semester. It will actively engage the students in a more familiar manner as they will observe the specific equipment and lab space that they will be utilizing to carry out their own lab experiments which will help to ensure that all students are consistent and familiar with their learning environment and safety related policies specific to Saginaw Valley State University.

References and Resources:

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Bonnie Harmer
Associate Professor
Department of Nursing

Bonnie McKay Harmer,
PhD, MSN, MSEd, CNE, RN.
Bonnie earned her PhD in Higher
Education Leadership from
University of Nebraska, Lincoln
and has a Masters degrees in
Education and in Nursing. She is
a certified nurse educator who
teaches didactic and simulation
courses in SVSU's BSN program
plus three online courses in the
graduate nursing program's
education concentration. She
enjoys incorporating technology,
gaming and flipped classroom
strategies to enhance
collaborative learning.

Kahoot! and Quizlet Live: GAMING FOR ASSESSMENT AND COLLABORATIVE LEARNING

Abstract

Millennial nursing students frequently say they read the assigned textbook chapters but they struggle with the vocabulary and are unsure whether they sufficiently understand the content. Their perceived or actual lack of understanding subsequently affects their ability to fully participate during the in-class session. A quiz to assess their learning may be effective, but this frequently induces anxiety and negative reactions from students. Additionally, the instructor's lesson and learning activities are already planned based on the assumption that the students will arrive with certain requisite knowledge. This presentation focuses on how two free gaming response systems, Kahoot! and Quizlet-Live, are incorporated into several undergraduate nursing education courses to provide formative assessment and enhance student learning.

Introduction

The Millennial generation is the first to have spent their entire life immersed in technology. Even before starting kindergarten their thumbs tapped on Gameboys and PlayStation controllers. By middle school they were downloading and playing games on smart phones. Websites like Khan Academy were used by their K-12 teachers to make learning fun and entertaining. Students became accustomed to stimulating multimedia games that provided immediate feedback and encouragement. Gamification tools, such as achievement credits, points and badges rewarded and praised them for their perseverance, even when mastery was not yet achieved. Wiggins (2016) points out that this generation may struggle to adapt to the expectations and traditional instructional methods in college where game-based learning is not the norm.

Instructional Challenge

Creating higher education learning environments that appeal to Millennials can be challenging. Traditional instructional methods often rely on students completing textbook readings to prepare for class. Many students may never have been required to do this during their K-12 education. Furthermore, the motivation to read for the sake of learning may be underdeveloped. Students developed inductive and trial and error problem solving skills to succeed in their gaming world. A student who progressed through levels and accomplished their gaming mission in the Khan Academy may have gained knowledge as a serendipitous outcome of playing games. Incorporating game-based learning into higher education provides opportunities to re-engage students, but what can higher education faculty do when their content is not available on websites or already embedded in games? How can faculty incorporate formative assessment into the classroom routine without increasing their grading load or stressing the learners? What strategies can be implemented to ensure students gained requisite knowledge from their assigned readings and class preparation?

Teaching Innovation

Kahoot! and Quizlet-Live are free game-based learning platforms where instructors create password protected quizzes, discussions and polls. Students play in real-time, seeing the questions projected on a screen or distributed to the students' personal devices. Students, as Kahoot! contestants, compete individually or in teams and earn points by selecting the correct answer as quickly as possible. The correct answer and the percentage of learners selecting the correct and incorrect options is revealed after each question. This enables the instructor to immediately assess students' understanding of content and use this opportunity as a teachable moment before continuing to the next game question. A leaderboard shows the highest contestant scores after each question, which sustains interest and enthusiasm. Kahoot! games are also excellent for piloting potential new test and exam questions and to assist student in developing test taking skills.

Quizlet-live helps develop team communication skills since questions and answers are sent directly to the students' devices. They must work in groups of three to identify which of the team members has the correct answer on their device. An error by one of the team members affects all three. This promotes collaboration and teamwork.

Impact

Students really enjoy these games. Nobody knows who had the question correct or incorrect, plus students usually select a pseudo-name, so they are not preoccupied with making a mistake or being embarrassed by answering a question incorrectly. Some of the quieter students during traditional classes show another side of themselves as they gain confidence and peer recognition when they win a match. From a faculty perspective, these games do not take long to develop. They can be reused and modified as desired, kept private or made public. Most helpful is the ability to rapidly assess students' learning and to clarify and reinforce material while students are attentively engaged.

References and Resources:

Wiggins, B. E. (2016). An overview and study on the use of games, simulations and gamification in higher education. International Journal of Game-Based Learning, 6(1).

An Online Comics Course

Mike Mosher
Professor of Art/
Communication & Multimedia
Department of Art

Mike Mosher is a Professor
of Art/Communication Media
Administration. His publications
include David Smith's cartoon
biography George Orwell
Illustrated (Haymarket Books,
2017, forthcoming) and with
Roger Shepard, Creating Web
Graphics, Audio & Video
(2002, Prentice Hall).

Abstract

Art 390 Comics has been taught at SVSU since 2009. It includes lectures, graded
exercises, reading assignments, final comics project: history, theory, process and
a lot of drawing. The first online version of the course was generally successful,
promises further development.

Instructional Challenge

Can a studio art course be taught online? SVSU students have requested online
Art courses be available in the short Spring/Summer semesters, but can courses
that normally involve ongoing classroom critique by the professor work in online
format?

Teaching Innovation

The same content (lectures, graded exercises, reading assignments, final comics project process) as in 2009, 2011, 2013 and 2015 classes was delivered on Canvas in Summer 2016. Live chat sessions were held weekly, but not required.

Impact

Each class publishes a comics anthology, and this semester's went live at the end of the semester at https://issuu.com/mikemosher6/docs art390comic-su2016

David Nichols
Associate Professor
Department of Philosophy

David Nichols is an Associate
Professor of Philosophy at SVSU
with specializations in Greek
philosophy, Continental philosophy,
and world religions. His degrees,
each in philosophy or religious
studies, are from Boston University,
Michigan State University, and
University of Michigan. David
developed his first online course
for SVSU in 2016.

Constructing an Online Course
Simple, Cool, and Effective

Abstract

My presentation outlines the steps I took to create an online course for my
cross-listed PHIL/HIST 213 South Asian Civilizations course. I organized the
Canvas website with the goals of being easily accessible, highly interactive, and
visually stimulating. I will share some tips for how to accomplish those goals.
At first I was apprehensive about whether I could make an online philosophy
course work for me. How would I simulate philosophical dialogue? How would
I keep the attention of students without face to face contact? How would I make
sure that they are invested in the material? I found effective ways to deal with
these challenges. But I also learned that the online version of the course afforded
opportunities that I did not so easily have in a conventional classroom setting.
The more I allowed myself to explore these avenues, and work with the
technological possibilities, the more excited I became about the creative process.

Introduction

I am going to talk about my recent experience of creating an online course
for the first time. I want to show you how even a simple grasp of the technology
can be used to create a dynamic online site. The key is to organize your online
course according to some simple, logical steps. In many ways it is a simplification
of your regular classroom experience. In other ways it is a creative opportunity
to take students into an interactive learning experience.

Instructional Challenge

The challenge is to learn how to create an online course that is easily accessible, interactive for learning purposes, and visually attractive. We can accomplish this by thinking about how to organize the material for an online course and by learning various tips for how to make the site more exciting for students.

Teaching Innovation

I like to think of the ideal online website as one that takes students into different "worlds" for learning. By making use of video recorded lectures, requiring video uploads by students, connecting to other websites, creating online assignments, engaging in online dialoguing and posting, etc., you can encourage students to explore for themselves and even interact with one another.

Impact

The aim of this presentation is to help other faculty overcome apprehensions they may have about planning an online course, and to equip them to create more vibrant learning opportunities for their students.

Tony Crachiola
Professor of Mathematics
Department of Mathematical
Sciences

Tony Crachiola is a professor of
mathematics. He recieved his
Doctorate degree from Wayne
State University. He joined
Saginaw Valley State University
in 2005.

Development of a Multi-Purpose
MICRO-TEACHING MATH VIDEO LIBRARY

Abstract

This project will create an online library of math micro-videos to be available for all SVSU faculty and students and for use in multiple math and math-based courses across multiple departments. As many students have different, isolated gaps in their algebra skills, faculty can customize their usage of these videos to individual students. The videos will also support the goals of other university functions such as math tutoring and teacher certification test preparations. The anticipated outcomes are improvement in student learning, reduction of class time spent on review topics only needed for select students, and more targeted individualized feedback and instruction.

Introduction

The project will create an online library of math tutorial micro-videos at the beginning-to-intermediate algebra level (Math 082 and Math 103). Students will be hired to create the videos under the guidance of the faculty member. These videos will be made available for all SVSU faculty and students. For faculty teaching developmental courses (Math 081 and Math 082), these videos will provide an additional resource to support student success. The main goal is to create a single teaching resource for use in multiple math-based courses across multiple departments. The broader project goals are to improve student success in mathematics at SVSU; to provide carefully curated supplemental learning materials in mathematics for faculty and students; to provide modular learning materials in mathematics that can be customized to individual students and that will be useful for multiple academic departments.

Instructional Challenge

As a regional university which aims to be an institution of opportunity, SVSU admits students with a wide range of preparation in mathematics. Many students begin college in developmental math courses and struggle with mastering routine algebraic skills taught in high school. Other students in general education math courses are sometimes surprised to discover gaps in their preparation from high school. Even at higher levels it is not unusual for talented, skilled students in STEM programs (or, for example, economics, etc.) to need review explanations of isolated math topics that somehow slipped by through their education. Faculty who teach higher-level math courses or math-based courses (such as physics and engineering) often find that students need remediation in specific algebraic skills. Each student in these courses might have different, isolated gaps in their algebra skills.

For such faculty and students, these videos can address the challenge of helping students patch these gaps in prerequisite material in a way which can be customized for individual students and does not take away from valuable class time. While the project targets these specific challenges, it also serves as the foundation and first step in a larger goal as explained under "Impact" below.

Teaching Innovation

Online math videos already exist. The most prominent provider of free content is Kahn Academy. The project does not aim to imitate this content. First, Kahn Academy and its competitors aim to teach from scratch. The videos are relatively long, 7-10 minutes for a single algebraic topic, and include lengthy (often unnecessary) explanation of each step, sometimes deviating from the main point. Students at SVSU don't need this. They already receive quality instruction and have access to office hours and free tutoring. The project will create "micro-videos" which are 1-2 minutes long and focus on specific topics. They will fit more naturally into the context of our existing courses. The videos will be recorded by SVSU students and the content will be supervised by the faculty member to assure a close match with the expectations of our faculty. Students can access these videos as desired, but perhaps more importantly they will be a resource for faculty, providing quick review on isolated topics for individual students.

Impact

The project can be used to impact student learning in a wide variety of situations. Here are a few examples:

1) A student in a self-paced section of beginning algebra is studying a computer module for solving quadratic equations. He keeps a separate browser tab open to view relevant videos as he works.

2) An algebra instructor posts a Canvas assignment on simplifying rational expressions. She includes hyperlinks to the relevant videos in the description of the assignment.

3) A physics instructor is surprised to find that some of his students cannot find the vertex of a parabola. He encourages those students to review the relevant videos.

4) A calculus instructor assigns a problem which requires solving a nonlinear inequality. She tells students to review the relevant videos if they have forgotten how to to do this.

Other impacts include offering a resource to the Math & Physics Resource Center, to students preparing for placement exams or professional exams, and to SVSU faculty preparing new online/hybrid courses. Furthermore, the video library can serve as a catalyst for developing more online materials, and usage data can be analyzed to better understand our students and improve course design.

Warren Fincher
Assistant Professor
Department of Sociology

Dr. Fincher earned his Ph.D. in Sociology from the University of Texas at Austin in 2001. After holding various teaching posts and earning a Master of Architecture, he joined the Department of Sociology at SVSU in 2012. His research interests focus on changes to the medical and architectural professions in South Asia, and he frequently travels to India and Nepal.

Unpacking Practical Knowledge & Tacit Skills: Teaching the Nuances of Research Methods in a Scaffolded Term Project

Abstract

Teaching students nuanced skills can be difficult in that the expertise of the instructor may include not only knowledge they have gained through formal education but also the nuanced and complex tacit knowledge gleaned from years of practice. The pedagogy I've developed to scaffold a semester-long research project for students in an upper-division Research Methods course asks students to develop their projects through thirteen stages, providing me the opportunity to observe the students' thoughts and choices more closely and creating multiple opportunities to make my own tacit practices explicit. Though only employed across two semesters so far, evidence from the students' final research projects, student evaluations of the class, and follow-up work with several students in subsequent semesters indicates that the format is conducive to providing the tailored instruction required of communicating tacit knowledge to students.

Introduction

Since I began teaching "Research Methods" two years ago, the two weeks after Thanksgiving have taken on an intense tone. This is the window of time in which my students must move their semester-long research projects from the data collection phase to having interesting findings to present in their papers and presentations. I spend hours in the computer lab working with my students: discussing index construction, detecting and making explicit implications from nested regression models, backing out of blind alleys and finding innovative solutions to seemingly impassable dead ends. Formal instruction over proper research techniques is necessary, but there's a point in which a side-by-side mentoring over their projects must occur in order to convey the subtitles of building a statistical narrative.

I find mentoring an important part of my pedagogy in Research Methods, but in order to make sure that I'm supplementing the student's education rather than supplanting it with my involvement, I have carefully scaffolded the semester-long assignment. This serves to help the students work methodically and ensures that I have multiples points at which I can engage the student in dialogue about the specific challenges of their projects.

Instructional Challenge

Though researchers originally learn skills through a formal education process, our practice of methodology can provide a more nuanced and fluid skill set than our own original classroom education offered us. Through the weight of experience, our formal knowledge passes into tacit knowledge, described by Elliot Freidson as "knowledge largely free of formal concepts and theories, learned by experience, and instrumental for performing concrete tasks in concrete settings" (2001, 31). For the longpracticed researcher, the calculus behind methodological choices gains a sense of intuitive practice. The development of tacit knowledge may serve us well as we advance our research careers, but it may also create an impediment when attempting to convey the complexities of our methodological choices to our students. To address this challenge, I carefully scaffold the instruction a 15-week research project in such a way that it:

• offers our students the needed structure for a start-to-finish research project,

• provides multiple points at which I can build on the formal curriculum to provide tacit instruction, and

• addresses and responds to the student's specific research concerns as the project matures.

Teaching Innovation

In order to knit together formal instruction and opportunities to communicate tacit knowledge, I broke the survey research project into thirteen assignments:

1) a memo identifying the research topic
2) a formal letter to a faculty member requesting the opportunity to survey one of their classes
3) a one-page memo stating the research question and identifying relevant prior sociological studies
4) CITI certification
5) a memo identifying key variables and the text of questionnaire items
6) the survey instrument in its final form
7) a codebook for the questionnaire
8) data collection for which each student collects 100 questionnaires
9) a spreadsheet in which the coded data from the questionnaires has been recorded
10) a packet of descriptive statistics for all variables and indices
11) a packet analyzing relationships between key variables using the appropriate test for association
12) a 10-minute oral presentation
13) a 24-page research article, complete with abstract, literature review, relevant graphs and tables, and full bibliography.

I grade each assignment before the next is due, allowing students to get formal feedback and providing me with an opportunity to speak with them about the direction of their projects, offering pointers as the need arises.

Impact

Because the students in the class are each working on their own projects, there is a natural obstacle to being familiar with each project, but by providing myself with the opportunity to check in with the students at eachstep of the process ensures that I am closely following the development of the projects. More importantly, though, scaffolding the semester-long project in this way has forced to make my own thoughts and practices about researching explicit. Teaching to each minute step of the process in lecture and engaging the students in conversation about each step in my comments about their work forces me to be reflective about my practices and my rationales behind particular recommendations to students for improvement. I further this process by devoting a number of the class sessions to workshopping the student's projects, giving me another opportunity to discuss openly the intuitions and complexities behind my recommendations.

This is clearly a labor-intensive approach to methods education, but in order to allow the students the freedom to conduct research projects of their choosing – consequently fostering a sense of ownership and investment – and also provide an educational experience that regularly addresses tacit knowledge, this approach seems effective.

References and Resources:

Freidson, Elliot. (2001.) Professionalism, the Third Logic: On the Practice of Knowledge. Chicago: University of Chicago Press.

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Use of R-Studio and WeBWorK in an Introductory Statistics Course

Abstract

Statistics courses using simulation based inference face two challenges: such courses require much heavier use of computational resources, and there is only asmall number of well developed homework exercises. Our project uses an online R-studio server to provide computational resources, and a WeBWorK homework server to provide a way to develop custom homework exercises.

Introduction

In modern statistics education, randomization and simulation based curriculum is increasingly taking place of more traditional normal-based inference, reflecting similar trends in statistical practice. Several studies (Rossman and Chance, DelMas, Garfield and Chance, Sterling and Gray) report improved understanding of key statistical concepts by students in simulation based courses.

Instructional Challenge

Simulation based methods require far greater use of technology in the form of computational resources compared to a traditional statistics curriculum. Many statistical packages commonly used in the classroom were developed with traditional normal-based inference in mind. Such packages usually present a graphical, point-and-click based interface to the user. We feel that such interfaces enforce a common mistake of viewing statistical procedures and formulas as some sort of opaque tools in which one enters appropriate numbers and mysteriously obtains a desired result. Some statisticians also often advise against the use of point-and-click software, as such software makes it harder to use a fully reproducible workflow (Harrell).

Teaching Innovation

In our introductory statistics course we use recently published textbook, Introductory Statistics with Randomization and Simulation, by Diez, Barr and Cetinkaya-Rundel. The textbook uses the R statistical programming language, with a text based interface that, in our opinion, encourages students to think deeper about the tools they use. One of the goals of the project is to provide our students with an easy access to a modern user friendly environment in which they can use the R language for statistical calculations. This will allow us to expose students to simulation and randomization methods that require heavy use of computation. The R-studio IDE is especially designed to allow and encourage reproducible analysis. The second part of the project will allow us to use the powerful WeBWorK server software to create custom homework exercises for our students.

Impact

In the Winter semester 2017, two introductory statistics classes, totalling 55 students, have an opportunity to take an advantage of the servers provided by the project, to study a modern statistics curriculum based on real life data, randomization and simulation.

References and Resources:

Rossman, A. J. and Chance, B. L. (2014), "Using simulation-based inferencefor learning introductory statistics". WIREs Comput Stat, 6: 211–221.doi:10.1002/wics.1302

Robert C DelMas, Joan Garfield, and Beth Chance. "A model of classroom research in action: Developing simulation activities to improve students statistical reasoning". In: Journal of Statistics Education 7.3 (1999).

Joan Sterling and Mary W Gray. "The Effect of Simulation Software on Students' Attitudes and Understanding in Introductory Statistics." In: Journal of Computers in Mathematics and Science Teaching 10.4 (1991), pp. 51–56.

Frank Harrell, Introduction to a his blog "Statistical Thinking", January 13, 2017, http://www.fharrell.com/2017/01/introduction.html

Reflective Notes

• Based on the Keynote Presentation, Workshop, and Showcase Sessions, what strategies might you use with your students to enhance their motivation and learning?

Reflective Notes

- **What ideas sparked your interest?**

Additional Notes

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