Innovative Instructor

Article Compendium

Center for Educational Resources

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The Innovative Instructor

Best Practice

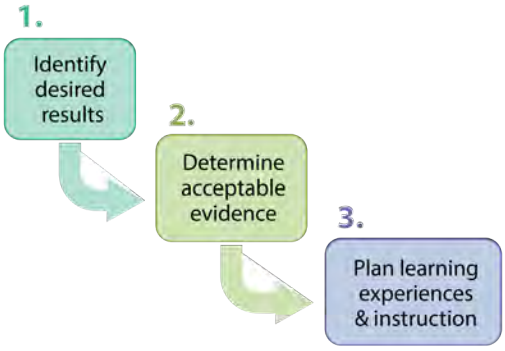
Vol. 18 | August 2018

Using Backward Design for Course Planning

Macie Hall, Senior Instructional Designer, Center for Educational Resources

What it is

Backward Design is a framework for course design. With Backward Design an instructor starts course planning by identifying desired learning outcomes with the articulation of course goals and learning objectives. Assessment of those goals and objectives is determined, and finally, appropriate learning activities and instruction are developed.



Course development flow with Backwards Design.

Traditionally, faculty have approached course design by considering teaching the content first, striving to fit material into a set number of lectures and/or in-class activities, then developing assignments and tests, and finally grading students. This approach focuses on what the teacher wants to do, so it is instructor-centric.

The term Backward Design comes from starting course planning by thinking about what the instructor wants students to know and be able to do at the end of the course and working backward from there. In spite of the name, Backward Design is forward thinking—promoting intentional planning to create assessments and course activities that support the desired learning outcomes. Backward Design is student-centric in that the process starts by thinking about what students should be able to do.

Why does it matter

Backward design focuses on the process of learning, encouraging the instructor to think intentionally about how in-class activities and assessment will ensure that the course goals and learning objectives are met. Faculty may find it challenging to think about the learning process instead of course content. They are experts in the latter, but may not be comfortable with the former. Backward Design helps instructors determine what material is necessary for students to meet the stated learning objectives. This makes it easier to decide what content to include and what is not as important. It is more efficient as well. When an instructor is clear about the desired student learning outcomes, assessing those outcomes, and determining the class activities and related course materials needed to obtain those outcomes will be clearer as well. Another benefit of using Backward Design is that students appreciate the inherent transparency. When an instructor shares course goals and objectives, their students know what is expected of them. The alignment of learning objectives and learning assessments gives students clarity.

How to use it

Instructors planning a course should ask themselves three questions:

1. What do you want students to be able to do? (Course Learning Goals and Objectives)
2. How will you measure if students can do that? (Aligned Assessment)
3. How will you prepare students for assessments? (Design Instruction)

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I. Course Learning Goals and Objectives

Writing good course learning goals (expectations of what students should be able to do by the end of the course) and effective learning objectives (explicit statements that describe what the students will be able to do at the end of each class or course module) is the first step in the Backward Design process. (See "Writing Course Learning Goals" and "Writing Effective Learning Objectives" in the Innovative Instructor series.)

II. Aligned Assessment

Next, what evidence is needed to determine that students have met the course goals? The performance tasks or assessments chosen should be appropriate to the level of the course. Bloom's taxonomy is a useful tool for aligning the level of the course with appropriate assessment. (See "Bloom's Taxonomy: Action Speaks Louder" in the Innovative Instructor series.) For example, for an introductory level course, course goals are more likely to focus on remembering and understanding. Tests/exams that focus on asking students to identify, define, label, list, order (remembering) or calculate, describe, discuss, summarize, explain (understanding) will be appropriate. In a senior level seminar or design course students might be assigned papers, comprehensive projects, or creative tasks where they must argue, assess, debate, evaluate, defend (evaluation) or compose, construct, design, hypothesize, show, write (creation). Learning objectives, related to units or modules within the course, may be assessed by quizzes, homework assignments, problem sets, or short papers depending on the level of the course. Self-assessments and student reflections may also be useful.

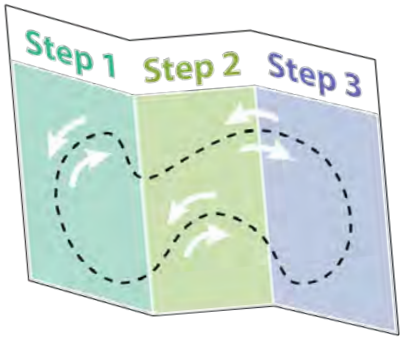
III. Design Instruction

Finally, appropriate instruction can be designed for the course. Instruction should be tailored to ensure that students are prepared for assessments. Keep in mind that the more engaged students are, the more likely it is that they will learn. Active learning strategies help ensure student engagement.

IV. Review and Refine

Backward Design can be an iterative process. As you develop your assessments you may find you need to refine your objectives. Similarly, as you design your instruction you may generate creative ideas on how to assess students that lead you to change your original assessment plan.

Course instruction may take a number of different formats—lectures, seminars, labs, discussion sessions, studio and design classes, research or project-oriented studies to name a few. Other variables include class size and room arrangements. For courses with large enrollments scheduled in auditoriums, lecturing tends to be used more frequently.



Course development should be an iterative process.

But lectures that include active learning strategies such as the effective use of clickers, think-pair-share activities, and peer learning will more likely engage students. For labs and smaller courses, consider using strategies such as authentic learning, case studies, team-based learning, community-based or project-based learning to engage students

Final thoughts

Adopting a new strategy for course design may seem daunting, but Backward Design offers a more efficient, transparent, and effective approach for instructors and their students. By focusing on learning outcomes rather than course content, instructors using Backward Design may improve both student learning and their teaching.

Additional Resources

- Supporting Innovative Instructor articles,
  "Writing Course Learning Goals", https://cer.jhu.edu/ii#writing-course-learning-goals
  "Writing Effective Learning Objectives", https://cer.jhu.edu/ii#writing-effective-learning-objectives
  "Bloom's Taxonomy: Action Speaks Louder", https://cer.jhu.edu/ii#blooms-taxonomy-action-speaks-louder

Author's Background

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Macie Hall is a senior instructional designer in the Center for Educational Resources. She works with faculty to hone their pedagogical expertise and is the editor of The Innovative Instructor Blog.

The Innovative Instructor

Pedagogy

Vol. 18 | August 2018

Meaningful Grades with Specifications Grading

Rebecca E. Kelly, Assoc. Teaching Professor, Earth and Planetary Sciences, JHU

The issue

What do course grades mean? What do they actually measure? In this age of grade inflation and widely varying standards, both teachers and students struggle to define what an A, B, or C in a course really means in terms of student learning and achievement. At the same time, many teachers are overwhelmed by their grading load and are looking for ways to reduce and simplify it without trivializing their course assignments.

Why does it matter

When course grades are perceived by students as a largely arbitrary measure of a hodge-podge of attendance, participation, tests, and assignment scores, they tend to focus more on earning points than on the quality and quantity of what they are learning. Grades are seen as subjective and negotiable rather than a clear-cut measurement by a predefined standard. Using grading rubrics can help establish clearer standards for scoring and make grading easier, but they do not preclude students from wheedling teachers for extra points to try to bump that A- up to an A. To motivate students to focus on learning instead of point values, a different grading system is needed that directly links course grades to achievement of learning goals in a way that is unequivocal.

Faculty solution

Specifications grading, or "specs grading" for short, is just such a system. Although there are many variations on the ways in which the method can be implemented, the fundamentals are as follows.

- Course learning goals are clearly spelled out.
- Achievement of the learning goals is measured by specific assignments.
- Assignments are graded on a pass/fail or satisfactory/unsatisfactory basis depending on whether or not the student demonstrates mastery of the learning goal(s) being measured. For rigor, the pass threshold should be the equivalent of a B or better under the regular grading system.
- Students are given multiple opportunities to achieve each learning goal, either by re-doing failed assignments or by attempting different assignments linked to a particular goal.
- Course grades are determined by how many learning goals a student masters during the term, as measured by passing a particular bundle of assignments. More learning equals a higher grade.

Assignments can be short and simple or long and complex, but in all cases the specifications for achieving a passing grade must be clear. Commonly, a rubric is used that spells out exactly what a student must demonstrate or accomplish and the quality standards that must be met satisfactorily in order to pass. While the prospect of potentially failing major assignments can be daunting, most specs grading courses include some sort of system for retakes, such as providing a number of tokens to each student at the beginning of the term that allow them to re-do an assignment or turn it in late without penalty.

The up-side of this approach for the student is that failing an assignment does not count against their grade; it simply does not count. There is no course average to keep track of, just a count of the number of passed assignments as they work toward completing

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the grade bundle for their desired course grade. With multiple opportunities to demonstrate mastery of the learning goals, they can focus on learning from their mistakes and achieving the goals set before them.

From the teacher's perspective, grading is greatly simplified because a student's work either meets the stated specifications or it does not. No more agonizing over how many points to take off for a particular error. As a general rule, the quality of student work is higher because students know that they will receive no credit for work that does not measure up to standards. The specs grading method thus simultaneously increases the rigor of a course while saving faculty time.

Results

In the spring 2018 term, I taught an introduction to geographic information systems (GIS) course using specs grading. The course is a mix of lecture material and hands-on computer lab work that teaches students to use a GIS software package proficiently to design maps and analyze spatial data.

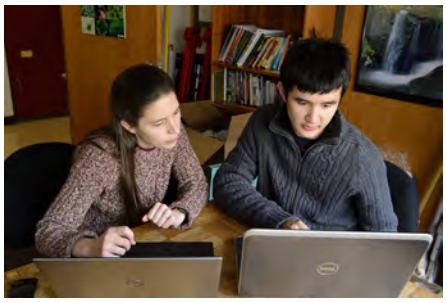
In redesigning the course for specs grading, I developed a set of eight learning goals ranging from basic to high-level and linked each graded assignment, project, lab test, and lecture exam to a particular goal. I then determined which learning goals had to be achieved to earn a C, B, or A in the course, with an A requiring mastery of all eight. Earning a higher grade thus involved completing more graded work successfully.

All student work was graded on a pass/fail basis except for the two lecture exams, which were graded on a regular percentage point scale. To incorporate these scores into the specs grading scheme, I required a 90% or better average on the two exams for the A grade bundle, an 80% average or better for the B bundle, etc.

Course Grade	A	B	C
Assignments (total #)	*# Completed Satisfactorily*		
Exams (average of 2)	≥90%	≥80%	≥70%
Lab Tests (2)	2	2	1
Lab Projects (3)	3	2	1
Lab Tutorials (18)	18 (Ch. 3-20)	14 (Ch. 3-10, 15-20)	10 (Ch. 3-10, 15-16)
Map Critiques (2)	2	1	1
Reading Responses (3)	3	2	1
GIS Articles (3)	3	2	1
Material Responses (14)	11	9	7
Learning Objectives Achieved	#1-8	#1-6, 8	#1-4, 8

Summary of final grade rubric

Most assignments did not have set due dates, but the two exam dates were fixed and several deadlines for completion of the minimum number of assignments were set throughout the term. I provided a detailed pacing guide for each grade bundle to assist students in planning their weekly workload. This approach allowed students to develop lab software skills at their own pace, while the class moved through the lecture material at a steady tempo. I did not anticipate the extent to which some students would procrastinate on assignments like lab tests, and in



future, I plan to include more fixed due dates to avoid this problem.

Benefits

I was extremely pleased with the high quality of work that students turned in. Their attention to detail was very high, and they frequently sought my input on projects before turning them in. That gave me the opportunity to provide the individual attention that really makes a difference in student learning. Grading was also a snap because it is easy to recognize quality work when you see it. Formal and informal surveys throughout the term indicated that the vast majority of students were happy with the new grading system and appreciated working at their own pace and having clear learning objectives to aim for in earning their course grade. I call that a success.

Many professors in disciplines across higher education are experimenting with specifications grading to increase student focus on learning and make grades more meaningful. Consider giving it a try in one of your courses!

Additional resources

- Nilson, L. B. (2015). *Specifications grading: Restoring rigor, motivating students, and saving faculty time*. Sterling, Virginia: Stylus Publishing, LLC.
- Article by Linda B. Nilson in Inside Higher Education "Yes, Virginia, There's a Better Way to Grade": https://www.insidehighered.com/views/2016/01/19/new-ways-grade-more-effectively-essay
- CER blog "What is Specifications Grading and Why Should You Consider Using It?": https://ii.library.jhu.edu/2018/04/11/what-is-specifications-grading-and-why-should-you-consider-using-it/
- Article and comments "Experimenting with Specifications Grading" at The Chronicle of Higher Education: https://www.chronicle.com/blogs/profhacker/experimenting-with-specifications-grading/61912

Author's background

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Rebecca Kelly teaches in the Earth and Planetary Sciences Department and is the director of the Environmental Science and Studies undergraduate program. She has eighteen years of teaching experience in a wide range of courses and enjoys sharing her love of teaching and learning with her students and colleagues.

The Innovative Instructor

Technology

Vol. 18 | August 2018

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New Google Sites

Reid Sczerba, Multimedia Developer, CER

What it is

New Google Sites is an online website creation platform. It doesn't require web development or design experience to create sites that work well on mobile devices. The New Google Sites application is included with the creation tools offered in Google Drive, making it easier to share and integrate your Google Drive content.

Who produced it

In 2006 Google purchased JotSpot, a software company that had been creating social software for businesses. The software acquired from that purchase was used to create the first iteration of Google Sites, now known as *Classic* Google Sites. Ten years later, Google launched a completely rebuilt Google Sites, which is currently being referred to as *New* Google Sites.

Why it was made

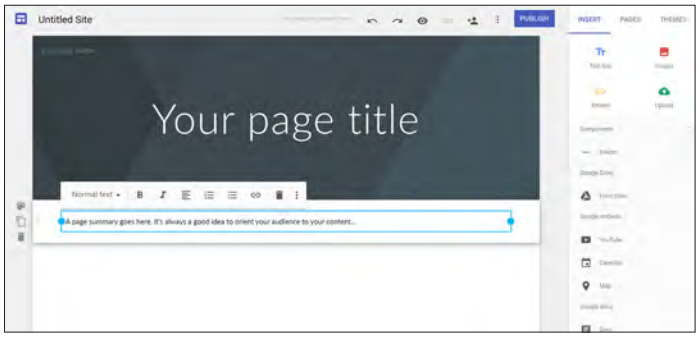
New Google Sites hasn't replaced Classic Google Sites so much as it offers a new and different experience. The focus of New Google Sites is to increase collaboration for all team members regardless of their web development experience. It is also integrated with Google Drive so that teams working within the Google apps environment can easily associate shared content.

This new iteration of Google Sites is designed with mobile devices in mind. Users are not able to add special APIs (Application Programmable Interface, which extends functionality of an application) or edit HTML directly. This keeps the editing interface and options simple to ensure that whatever you create will work consistently across all browsers and devices. While this may seem limiting, you still have the option to use Classic Google Sites if you want a higher level of control.

Why it matters

In a classroom setting, instructors are often cautious about assigning students projects that require them to learn new technical skills that aren't directly relevant to the course content. Instructors must balance the time it will take students to achieve technical competency against the need to ensure that students achieve the course learning goals. With New Google Sites, students can focus on their content without being overwhelmed by the technology.

In addition to ease of use, collaborative features allow students to work in teams and share content. Group assignments can offer students a valuable learning experience by providing opportunities for inclusivity, exposure to diverse viewpoints, accountability through team roles, and improved project outcomes.



Example of the New Google Sites editing interface.

How it can be used

New Google Sites makes it easy for the causal user to disseminate new ideas, original research, and self-expression to a public audience. If the website isn't ready to be open to the world, the site's editor has the ability to keep it unpublished while still having the option to collaborate or share it with select people. This is an important feature as student work may not be ready for a public audience or there may be intellectual property rights issues that preclude public display.

Professors at Hopkins have used New Google Sites for assignments. In the History of Science and Technology course Man vs. Machine: Resistance to New Technology since the Industrial Revolution, Assistant Professor Joris Mercelis had students use New Google Sites for their final projects. Teams of two or three students were each asked to create a website to display an illustrated essay based on research they had conducted. Images and video were required to support their narrative arguments. Students had to provide proper citations for all materials. Mercelis wanted the students to focus on writing for a lay audience, an exercise that encouraged them to think broadly about the topics they were studying.

History of Art Professor Stephen Campbell used a single Google Site where student teams collaborated to produce an online exhibition—Exhibiting the Renaissance Nude: The Body Exposed. Each student group was responsible for supplying the materials for one of five topic pages. The content developed from this project was accessible only to the class.

In both cases, students reported needing very little assistance when editing their sites. Typically, giving an introductory demonstration and providing resources for where to find help are all students need to begin working.

Where it is going

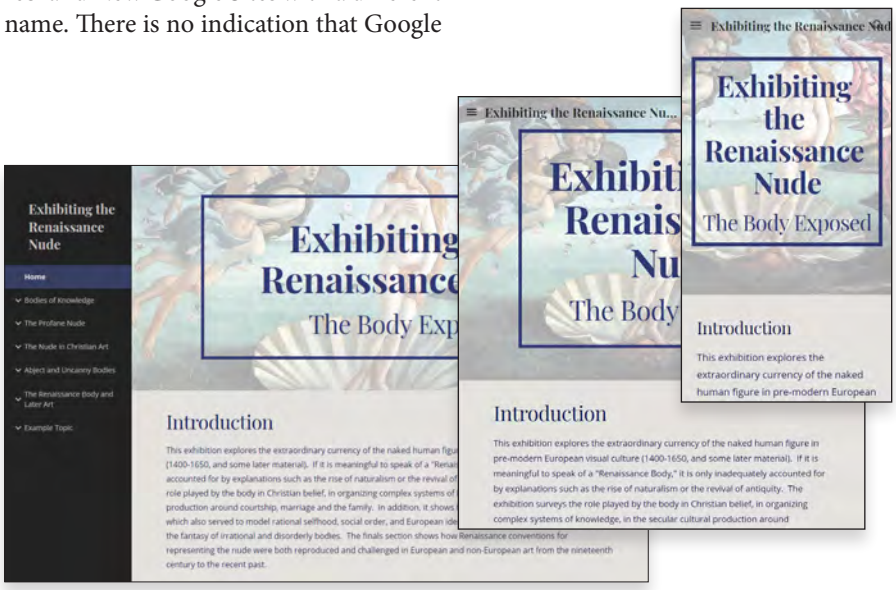
Recently, Google has created the ability to allow other Google Drive content to be embedded in a site. This means that you can embed a form or a document on a webpage to elicit responses/feedback from your audience without them having to leave the site. This level of integration further supports the collaborative nature of Google applications.

Currently, this iteration of Google Sites uses the New in its title. There may come a time when Google will drop the New or rebrand New Google Sites with a different name. There is no indication that Google will stop supporting Classic Google Sites with its more advanced features.

How to get started

Use of both versions of Google Sites is free and accessible using your Google Account. You can create a new site by signing into Google and going to the New Google Sites page (link provided below). You can also create a site from Google Drive's "New" button in the creation tools menu.

It is recommended that students create a new account for class work instead of using their personal accounts. While this is an additional step, it ensures that they can keep their personal lives separated from their studies.



A Google Site displayed on a desktop, tablet, and smartphone.

Additional Resources

- New Google Sites: https://sites.google.com/new
- New and Classic Google Sites comparison: https://support.google.com/sites/answer/7176163

Author's Background

Reid Sczerba,
Multimedia Developer, Center for Educational Resources

A staff member at the Center for Educational Resources, Reid provides training on a variety of programs, aids in educational resources development, and shares expertise on information and graphic design with faculty at the Homewood campus. He holds a BFA in Illustration and a MA in Digital Arts from Maryland Institute College of Art.

The Innovative Instructor

Best Practice

Vol. 17 | February 2018

Writing Effective Multiple Choice Questions

Amy Brusini, Instructional Technology Specialist, Center for Educational Resources

What it is

Writing test questions is a daunting task for many instructors. It can be challenging to correctly assess students on the comprehension of course objectives. Multiple choice questions are no exception; despite being very popular, instructors often struggle to create well-constructed questions.

Why does it matter

Multiple choice questions have several advantages. They lend themselves to covering a broad range of content and assessing a wide variety of learning objectives. They are very useful when testing a student's lower level knowledge of a topic, such as factual recall and definitions, but if written correctly, they can be used to assess at the higher levels of analysis, evaluation, and critical thinking skills. Multiple choice questions are scored efficiently (even automatically, if an electronic test is used), therefore, they are frequently the evaluation method preferred by instructors of large courses.

There are some disadvantages, including the fact that this type of question can be time-consuming to construct. Multiple choice questions are made up of two parts: the stem, which identifies the question, and the alternative responses which include the correct answer as well as incorrect alternatives, known as distractors. Coming up with plausible distractors for each question can be a difficult task. And, while some higher level thinking skills can be addressed, multiple choice questions cannot measure a student's ability to organize and express ideas. Another thing to consider is that student success when answering multiple choice questions can be influenced by factors unrelated to the subject matter, such as reading ability, deductive reasoning, and the use of context clues.

How to use it

The following guidelines are offered to help streamline the process of creating multiple choice questions as well as minimize the disadvantages of using them.

I. Writing question stems

A. When possible, prepare the stem as a clearly written question rather than an incomplete statement.

Poor example:	Better example:
Psychoanalysis is…	*What is the definition of psychoanalysis?*

B. Eliminate excessive or irrelevant information from the stem.

Poor example:	Better example:
Jane recently started a new job and can finally afford her own car, a Honda Civic, but is surprised at the high cost of gasoline. Gasoline prices are affected by:	*Which of the following are factors that affect the consumer price of gasoline?*

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C. Include words/phrases in the stem that would otherwise be repeated in the alternatives.

Poor example:

Which of the following statements are true?
- *Slowing population growth can prevent global warming*
- *Halting deforestation can prevent global warming*
- *Increasing beef production on viable land can prevent global warming*
- *Improving energy efficiency can prevent global warming*

Better example:

Which of the following techniques can be used to prevent global warming?
- *Slowing population growth*
- *Halting deforestation*
- *Increasing beef production on viable land*
- *Improving energy efficiency*

D. Avoid using negatively stated stems. If you must use them, highlight the negative word so that it is obvious to students.

Poor example:

Which of the following is not a mandatory qualification to be the president of the United States?

Better example:

*Which of the following is **NOT** a mandatory qualification to be the president of the United States?*

II. Writing alternative responses

A. Make sure there is only one correct answer.

B. Create distractors that are plausible to avoid students guessing the correct answer.

Poor example:

Who was the third president of the United States?
a. *George Washington*
b. *Bugs Bunny*
c. *Thomas Jefferson*
d. *Daffy Duck*

Better example:

Who was the third president of the United States?
a. *George Washington*
b. *Benjamin Franklin*
c. *Thomas Jefferson*
d. *John Adams*

C. Make sure alternative responses are grammatically parallel to each other.

Poor example:

Which of the following is the best way to build muscle?
a. *Sign up to run a marathon*
b. *Drinking lots of water*
c. *Exercise classes*
d. *Eat protein*

Better example:

Which of the following is the best way to build muscle?
a. *Running on a treadmill*
b. *Drinking lots of water*
c. *Lifting weights*
d. *Eating lots of protein*

D. When possible, list the alternative responses in a logical order (numerical, alphabetical, etc.)

Poor example:

How many ounces are in a gallon?
a. *16*
b. *148*
c. *4*
d. *128*

Better example:

How many ounces are in a gallon?
a. *4*
b. *16*
c. *128*
d. *148*

E. Avoid using 'All of the above' or 'None of the above' to prevent students from using partial knowledge to arrive at the correct answer.

F. Use at least four alternative responses to enhance the reliability of the test.

Other thoughts

If you are interested in using technology to create a test in an online environment, there are several programs available to help with this task. Blackboard, the university's course management system, has a robust test creation tool, which includes automatically graded multiple choice questions, as well as sixteen other types of questions to choose from. Respondus is an exam authoring program that allows you to create tests that can be imported into Blackboard or printed out on paper. Panopto, the university's video presentation and hosting platform, has recently introduced an interactive quizzing feature which includes multiple choice and other types of questions. CER staff are available to discuss the test creation process and/or help with any of these tools.

Additional Resources

- Brame, C., (2013) Writing good multiple choice test questions. Retrieved December 14, 2016 from https://cft.vanderbilt.edu/guides-sub-pages/writing-good-multiple-choice-test-questions
- Burton, S. J., Sudweeks, R. R., Merrill, P.F., and Wood, B. (1991). *How to Prepare Better Multiple-Choice Test Items: Guidelines for University Faculty*. Provo, Utah: Brigham Young University Testing Services and The Department of Instructional Science.
- "Multiple Choice Questions." *The University of Texas at Austin Faculty Innovation Center*, 14 Dec. 2016, https://facultyinnovate.utexas.edu/teaching/check-learning/question-types/multiple-choice.

Author's Background

Amy Brusini, Instructional Technology Specialist, CER, JHU

Amy Brusini works at the Center for Educational Resources (CER), a teaching and learning center for Homewood faculty. Amy provides support and training for Homewood faculty on Blackboard, the university's current course management system, as well as instructional design support. Amy has a Master's Degree in Education from Johns Hopkins University.

The Innovative Instructor

Pedagogy

Vol. 17 | February 2018

Grading in the Fast Lane with Gradescope

Scott Smith, Professor, Computer Science, JHU

The issue

Grading can be one of the most time consuming and tedious aspects of teaching a course, but it's important to give prompt and meaningful feedback to your students. In large courses, aligning grading practices across multiple teaching assistants (TAs) necessitates a level of coordination that includes scheduling grading meetings, reviewing materials for correct answers, and calibrating point evaluations, all of which can take up valuable time during the semester.

In courses that teach programming, we typically assign students projects that require them to write programs to solve problems. When instructors grade this type of assignment, they not only have to observe the program's results but also the student's approach. If the results are not correct or the program doesn't run, we have to spend time reviewing hundreds of lines of code to debug the program to give thoughtful feedback.

In the past, my method for grading assignments with my TAs may have been arduous but it worked. However, last year, no TAs were assigned to my Principles of Programming Languages course. Concerned that I wouldn't have enough time to do all the work, I looked for another solution.

Why does it matter

Consistent grading and providing meaningful feedback for student's every submission, especially with multiple teaching assistants (TAs) can be challenging. Typically when grading, I would schedule a time to sit down with all of my TAs, review the assignment or exam, give each TA a set of questions to grade, pass the submissions around until all were graded, and finally calculate the grades. When a TA had a question, we could address it as a group and make the related adjustments throughout the submissions as needed. While this system worked, it was tedious and time consuming. Occasionally, inconsistencies in the grades came up, which could prompt regrade requests from students. I kept thinking that there had to be a better way.

Faculty solution

About year and a half ago, a colleague introduced me to an application called Gradescope to manage the grading of assignments and exams. I spent a relatively short amount of time getting familiar with the application and used it in a course in the fall of 2016, for both student-submitted homework assignments and in-class paper exams. In the case of the homework, students would upload a digital version of the assignment to Gradescope. The application would then prompt the student to designate the areas in the document where their answers can be found so that the application could sort and organize the submissions for the ease of grading. For the in-class exams, I would have the students work on a paper-based exam that I set up in Gradescope with the question areas established. I then would scan and upload the exams so that Gradescope could associate the established question areas to the student submissions automatically. The process of digitizing the completed tests and correlating them to the class roster was made easy with a scanner and Gradescope's automatic roster matching feature. Gradescope became a centralized location where my TAs and I could grade student work.

The real power of Gradescope is that it requires setting up a reusable rubric (a list of competencies or qualities used to assess correct answers) to grade each question. When grading, you select from or add to the rubric to add or deduct points. This keeps the grading consistent across multiple submissions. As the rubric is established as a part of the assignment, you can also update the point values at any time if you later determine that a point

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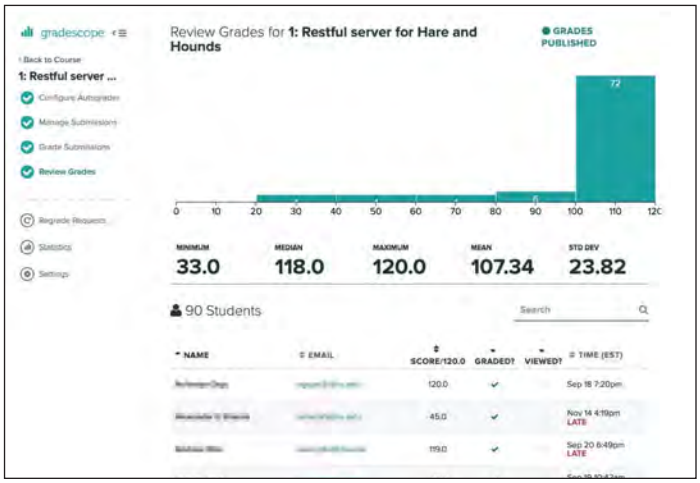
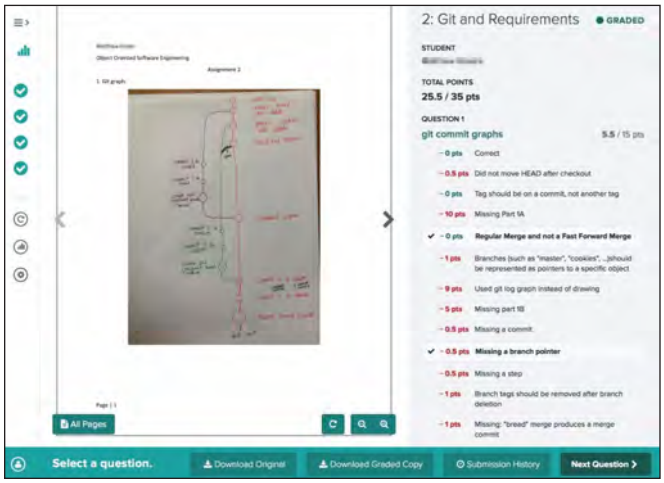


Screenshot of Gradescope's Review Grade for an assignment



Student's submission with rubric items used in grading

adjustment is advisable, and the grade calculations will update automatically.

After being informed that I wouldn't have any TAs for my Principles of Programming Languages course the following semester, I was motivated to use one of Gradescope's [features, the programming assignment auto-grader platform. Being able to automatically provide grades and feedback for students' submitted code has long been a dream of instructors who teach programming. Gradescope offers a language-agnostic environment in which the instructor sets up the components and libraries needed for the students' programs to run. The instructor establishes a grading script that is the basis for the analysis, providing grades and feedback for issues found in each student's submitted program.

Results

Overall, the use of Gradescope has reduced time spent grading and improves the quality of feedback that I am able to provide students. For instance, when I release grades to the students, they are able to review each of the descriptive rubrics that were used when grading their submissions, as well as any additional comments. Autograder was really the star feature in this case. Students were able to submit their code, determine if it would run, and make corrections before the deadline to increase their chances of a better grade. There are features to reduce the number of allowed submissions, but I choose not to set a limit so that the students could use an iterative approach to getting the right solution.

Gradescope is only effective if your rubrics and grading criteria are well thought out, and the auto-grading scripts require some time to set up. Creating the grading scripts for the programming assignments may seem time intensive, but by frontloading the work with detailed rubrics and test cases, more time is saved in the grading process. The value of this preparation scales as enrollment increases, and the rubrics and scripts can be reused when you teach the course again. With more time during the semester freed up by streamlining the grading process, my TAs and I were able to increase office hours, which is more beneficial in the long run for the students.

The process for regrading is much easier for both students and instructors. Before Gradescope, a regrade request meant determining which TA graded that question, discussing the request with them, and then potentially adjusting the grade. With the regrade feature, students submit a regrade request, which gets routed to that question's grader (me or the TA) with comments for the grader to consider. The grader can then award the regrade points directly to the student's assignment. As the instructor, I can see all regrade requests, and can override if necessary, which helps to reduce the bureaucracy and logistics involved with manual regrading. Additionally, regrade requests and Gradescope's assignment statistics feature may allow you to pinpoint issues with a particular question or how well students have understood a topic.

Other thoughts

I have found that when preparing assignments with Gradescope, I am more willing to create multiple mini-assignments. With large courses, the tendency would be to create fewer assignments, larger in scope, to lessen the amount of grading. When there are too few submission points for students who are deadline oriented, I find that they wait till the last few days to start the assignment, which can make the learning process less effective. By adding more assignments, I can scaffold the learning to incrementally build on topics taught in class.

After using Gradescope for a year, I realized that it could be used to detect cheating. Gradescope allows you to see submissions to specific questions in sequence, making it easy to spot submissions that are identical, a red-flag for copied answers. While not a feature, it is an undocumented bonus. It should also be noted that Gradescope adheres to FERPA (Family Educational Rights and Privacy Act) standards for educational tools.

Additional resources

- Gradescope site: https://gradescope.com
- Innovative Instructor Blog post with additional information: http://ii.library.jhu.edu/2018/02/15/grading-in-the-fast-lane-with-gradescope
- The institutional version of Gradescope is currently available to JHU faculty users through a pilot program. If you are interested in learning more about how Gradescope might work for your courses, contact Reid Sczerba in the Center for Educational Resources at rsczerba@jhu.edu

Author's background

Scott Smith,
Professor, Computer Science, JHU

Scott Smith has been a professor of Computer Science at Hopkins for almost 30 years. His research specialty is programming languages. For the past several years, he has taught two main courses, Software Engineering, a 100 student project-based class, and Principles of Programming Languages, a mathematically-oriented course with both written and small programming assignments.

The Innovative Instructor

Technology

Vol. 17 | February 2018

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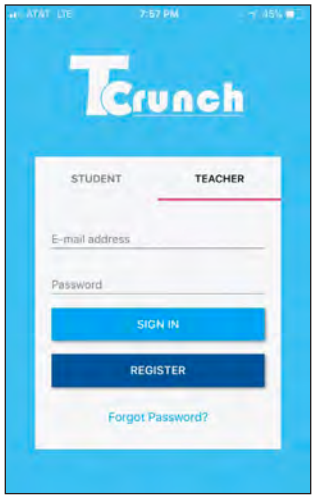
TCrunch

John Hickey, PhD Candidate, Biomedical Engineering, JHU

What it is



Tcrunch is a mobile application that enables more efficient and frequent instructor-student communication. You can think of it as an electronic version of the teaching strategy called an exit ticket. A traditional exit ticket is a 3x5 index card given to students at the end of class; the instructor asks a question to solicit formative feedback from the students. With Tcrunch you can do the same thing, but the app eliminates the paper, performs all collecting and analyzing activities in real-time, and emails the results to you.

As an instructor you can create a question to get feedback on your class structure, teaching techniques, or student comprehension. The app format decreases administration and analyzation time enabling more frequent implementation. Designed specifically to improve recurrent feedback, a question bank is available to assist you in prepopulating the question field.

Who produced it

The app was developed by John Hickey, PhD candidate, department of Biomedical Engineering at Johns Hopkins University. Coding was done largely by two JHU undergraduates, Tony Jiang and Gabriel Fernandes. Significant guidance and support was given by JHU's Center for Educational Resources (CER).

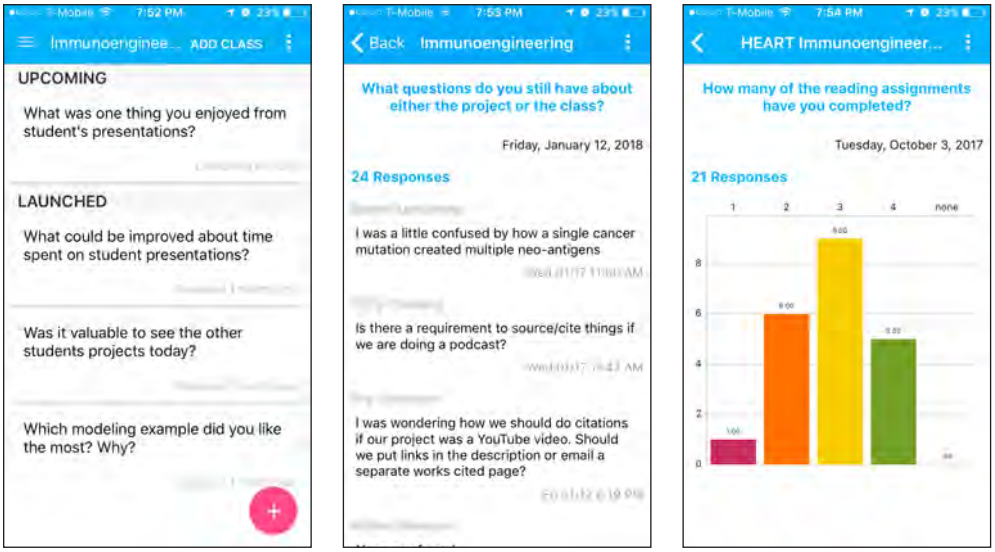
Why it was made

John developed Tcrunch due to his own struggles with improving learning in the classroom while facing time constraints. He understood the value of regular feedback on his teaching style, classroom activities, and student comprehension, but knew he didn't have the time to hand out, collect, read, and analyze dozens of exit tickets or other formative assessments for each class. While there are existing classroom polling apps, they proved not as useful for gathering and analyzing the more complex formative assessments he wanted to implement. John introduced the Tcrunch concept at the CER's first Educational Shark Tank event at Johns Hopkins in 2016, and was awarded seed funding to start the project.

Why it matters

Finding time to implement effective teaching strategies can be challenging, especially for professors whose teaching is only one of their many responsibilities. The app can save instructors time in the following ways:

a. **Question creation** - There are many preset questions that can be selected.
b. **Elimination of paper** - All processes are consolidated in the mobile app.
c. **Easy Access** - Instructors can create questions or analyze results anywhere and results can be accessed anytime.
d. **Consolidation of class accounts** - Instructors can go to one place for all their classes, avoiding the need to create unique codes or accounts.
e. **Simple analysis** - The graphical/chronological interface makes it easy to see results quickly.
f. **Complex analysis** - Results can be downloaded to Excel to further analyze.



Various screenshots showing question listings, submissions, and analytics.

The real value of Tcrunch is not having to wait until the end of the semester to find out that your students think you spend too much time lecturing and not enough time promoting group work, or that students are not doing the course reading. It allows for a dynamic evolution of teaching and learning throughout the term.

How it can be used

There is both a teacher and student portal for Tcrunch. Instructors can create and manage multiple courses, labs, and sections. Within a course, teachers can create a question or prompt and release it to their students through Tcrunch. Students see this question, click on the question, and answer it. Student answers come into the instructor's app in real-time. Instructors can evaluate the results within the app or email themselves the results in the form of an Excel spreadsheet. Other functionalities include multiple choice questions, a bank of pre-existing questions to help improve teaching, and an anonymous setting for the students.

Tcrunch can be used to get feedback both in and outside of class. For example, a question that pertains to the lecture could be asked to solicit responses in class, to evaluate if further explanation of a concept is needed. Or a question can be created outside of class time to help instructors plan their teaching, such as, "What is one question you have about the assigned reading for our class discussion tomorrow?" With just-in-time student responses, instructors can analyze the answers before the next class to make adjustments. Assessments can be made as often as the instructor deems useful.

Who is using it

Both instructors and students report that they have found Tcrunch valuable. They like being able to create and answer questions on the go and having a platform for all their classes in one place. Ease of use has been noted as a big plus. John has personally found that Tcrunch helped him restructure classroom time and assignment load, and to determine why students were missing class. Professors at Towson University have used Tcrunch and faculty at Johns Hopkins have expressed interest in trying out the app.

Where is it going

In the short term, the push is to extend the reach of Tcrunch to more faculty. Additionally, development efforts will be focused on adding a web-based platform that would connect users without a mobile phone. In the long term, the aim is to partner with larger edtech organizations to establish this as a supported solution for instructors who want direct student feedback.

How to get started

To find and use this free app, search for Tcrunch in the Apple or Google App stores and download. If you have questions about the app, or would like to contribute ideas, John Hickey can be contacted at jhickey8@jhmi.edu

Additional Resources

- Apple store link: https://itunes.apple.com/us/app/tcrunch/id1287291189?mt=8
- Google Play Store link: https://play.google.com/store/apps/details?id=com.toniebalonie.tjiang11.tcrunch&hl=en

Author's Background

John Hickey, PhD Candidate, Biomedical Engineering, JHU

John Hickey is a PhD candidate in the Biomedical Engineering Department at Johns Hopkins. He completed the *Preparing Future Faculty Program* and developed the curriculum for two *Immunoengineering* courses while at Hopkins. He currently participates in *Teaching as Research* and is developing an online Masters level class. He was one of the winners of the first *Teaching Shark Tank* event at Hopkins to be able to develop *Tcrunch*.

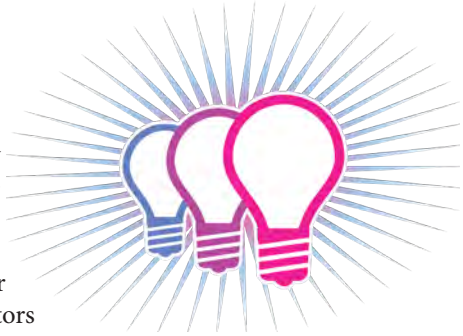
The Innovative Instructor

Best Practice

Vol. 16 | July 2017

Writing Course Learning Goals

Richard Shingles, Lecturer, Biology Department
Michael J. Reese Jr., Director, Center for Educational Resources



What it is

Effective teaching starts with thoughtful course planning. The first step in preparing a course is to clearly define your course learning goals. These goals describe the broad, overarching expectations of what students should be able to do by the end of the course, specifically what knowledge students should possess and/or what skills they should be able to demonstrate. Instructors use goals to design course assignments and assessments, and to determine what teaching methods will work best to achieve the desired outcomes.

Why does it matter

Course learning goals are important for several reasons. They communicate the instructor's expectations to students on the syllabus. They guide the instructor's selection of appropriate teaching approaches, resources, and assignments. Learning goals inform colleagues who are teaching related or dependent courses. Similarly, departments can use them to map the curriculum. Departmental reviews of the learning goals ensure prerequisite courses teach the skills necessary for subsequent courses, and that multiple courses are not unnecessarily teaching redundant skills.

A syllabus usually includes a learning goals section that begins with a statement such as, "At the end of this course, students will be able to:" that is followed by 4-6 learning goals clearly defining the skills and knowledge students will be able to demonstrate.

Once defined, the overarching course learning goals should inform the class-specific topics and teaching methods. Consider an example goal: "At the end of the course, students will be able to apply social science data collection and analysis techniques." Several course sessions or units will be needed to teach students the knowledge and skills necessary to meet this goal. One class session might teach students how to design a survey; another could teach them how to conduct a research interview.

How to use it

I. Brainstorming Goals

Faculty should start with a general list of course learning goals and then refine the list to make the goals more specific. Edit the goals by taking into consideration the different abilities, interests, and expectations of your students and the amount of time available for class instruction. How many goals can your students accomplish over the length of the course? Consider including non-content goals such as skills that are important in the field.

Content goal: Analyze the key forces that influenced the rise of Japan as an economic superpower.

Non-content goal: Conduct a literature search.

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II. Writing Goals

The following list characterizes clearly-defined learning goals. Goals should have the following S.M.A.R.T. attributes.

Specific - Concise, well-defined statements of what students will be able to do.

Measurable - The goals suggest how students will be assessed. Start with action verbs that can be observed through a test, homework, or project (e.g., define, apply, propose).

Non-measurable goal: Students will understand Maxwell's Equations.

Measurable goal: Students will be able to apply the full set of Maxwell's Equations to different events/situations.

Attainable - Students have the pre-requisite knowledge and skills and the course is long enough that students can achieve the goals.

Relevant - The skills or knowledge described are appropriate for the course or the program in which the course is embedded.

Time-bound - State when students should be able to demonstrate the skill (end of the course, end of semester, etc.).

III. Verb Choice

For many instructors the most difficult aspect of writing learning goals is ensuring the goals are measurable and attainable. In an introductory science course, students may be expected to recall or describe basic facts and concepts. In a senior humanities course, students may be expected to conduct deep critical analysis and synthesis of themes and concepts. There are numerous aids online that suggest action verbs to use when writing learning goals that are measurable and achievable. These aids are typically structured by Bloom's taxonomy – a framework for categorizing course goals by their challenge level. (See "Bloom's Taxonomy: Action Speaks Louder" in the Innovative Instructor series). Below are examples of action verbs aligned with Bloom's taxonomy.

Remembering (level 1)	recall identify define repeat match name order arrange select label list reproduce
Understanding (level 2)	calculate convert describe discuss recognize summarize estimate explain associate
Applying (level 3)	interpret show sketch make practice solve dramatize apply manipulate show use illustrate
Analyzing (level 4)	articulate categorize classify contrast infer diagram differentiate distinguish examine
Evaluating (level 5)	argue assess choose conclude criticize debate decide defend evaluate justify propose
Creating (level 6)	compose construct create design hypothesize develop devise show write

Avoid vague verbs like "understand" or "know" when writing learning goals because it can be difficult to come to consensus on how they can be measured. Think more specifically about what students should be able to demonstrate.

Examples

Here are examples of learning goals for several different disciplines using a common introductory statement.

"By the end of this course, students will be able to do the following...

"Propose a cognitive neuroscience experiment that justifies the choice of question, experimental method and explains the logic of the proposed approach." (Cognitive Science)

"Articulate specific connections between texts and historical, cultural, artistic, social and political contexts." (German and Romance Languages and Literature)

"Design and conduct experiments." (Chemistry)

"Design a system to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability." (Biomedical Engineering)

Additional Resources

- Bloom's Taxonomy article. https://cer.jhu.edu/files/InnovInstruct-BP_blooms-taxonomy-action-speaks-louder.pdf
- Blog post on preparing a syllabus. http://ii.library.jhu.edu/2017/02/23/lunch-and-learn-constructing-a-comprehensive-syllabus

Author's Background

Richard Shingles
Lecturer, Biology Department, JHU

Dr. Richard Shingles is a faculty member in the Biology department and also works with the Center for Educational Resources at Johns Hopkins University. He is the Director of the TA Training Institute and The Teaching Institute at JHU. Dr. Shingles also provides pedagogical and technological support to instructional faculty, postdocs and graduate students.

Michael J. Reese Jr.
Associate Dean and Director, CER

Mike Reese is Associate Dean of University Libraries and Director of the Center for Educational Resources. He has a PhD from the Department of Sociology at Johns Hopkins University.

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Pedagogy

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Ancient Spaces in a Digital World

Marian Feldman, Professor, Art History and Near Eastern Studies

The issue

One of the more challenging aspects in developing a new course is choosing an appropriate educational technology to achieve my learning goals. The material in my course "Creating Sacred Space in the Ancient and Medieval World" lent itself to a visually focused approach to help students understand these sacred spaces and interpret the intents of their creators and builders. The course engaged students with undertaking their own research about ancient spaces and the culture that surrounds them by studying floor plans, technical drawings, photographs, and other relevant images. Ideally, the way to explore broad questions about what makes a place sacred and how it differs from other spaces is to include visual references to provide spatial context that can be aligned with material meaning.

My goals for the students' learning outcomes were to be able to define a variety of different sacred spaces from the ancient world, to identify architectural, decorative and other physical features that created a sense of sacredness, and to articulate the unique ways in which each feature contributed to this sense. It was difficult to find a solution that not only met these course goals but also didn't hinder the student's ability to achieve them. Learning to use a new educational tool can be overwhelming and distracting for students as they attempt to engage with the course content to prepare and present final projects.

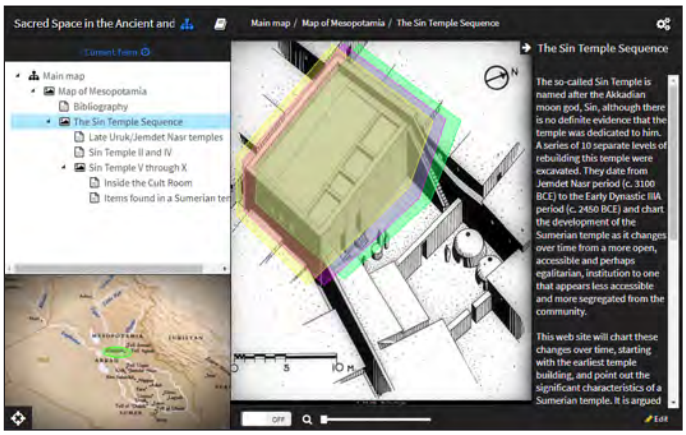
Why does it matter

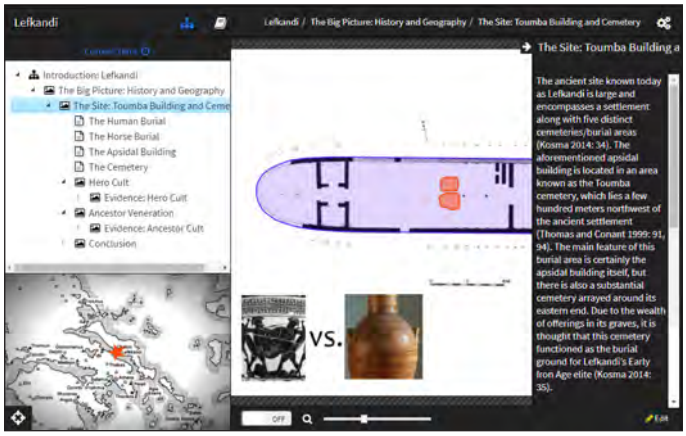
Finding an appropriate educational technology application or tool for a course can be difficult but there are benefits to consider. For example, students may learn new skills applicable to their future careers, building their confidence, and potentially, their resumes as they enter the workforce. Furthermore, educational tools can be used by students to produce interesting and creative final projects such as professional presentations, development of a website, or a custom design solution. These alternatives to a research paper allow students to take creative ownership of the form or the structure of the project. Providing students with alternatives to a research paper can foster a richer and more memorable student learning experience.

Faculty solution

I wanted the students to directly express their research about these sacred spaces by creating a digital representation of one of the scared spaces for their final project. They were asked to research a site, provide a written argument as to what made that space sacred, and support it with visual evidence. This necessitated exploration into a technical solution that would allow for a deeper understanding of these ancient sites and a means for students to present their research visually.

Initially, I thought the students could create a website for their final projects, so I began investigating platforms offered at Hopkins. After a consultation with the Center for Educational Resources (CER), I discovered that they had developed an image annotation program called "Reveal" that would allow students to create contextual notes on images of sites they were researching. In order to better understand the program, my teaching assistant and I met with the CER staff. The details of the final project were adjusted to make sure the goals for the course would be met with students using Reveal.





Case study of the Sin Temple in ancient Mesopotamia and student project site in Reveal showing contrasting view points of a subject

In preparation for the course, a case study was developed for the students to give them an idea of how Reveal could be used. Floorplans depicting the sequence of reconstructions of an ancient Mesopotamian temple were selected and references were made as to where entryways and significant objects were located.

Class time was allotted to have the CER present a workshop on how to use Reveal. There was a follow up session to answer any questions that students had after using the application. We also had the students meet with Visual Resources Center staff to learn about how to use ArtStor to source their visual content.

To give the students guidance as the course progressed, we created project scaffolding—a series of incremental assignments and steps—to make the final project less daunting. Students first submitted a proposal in the form of a thesis statement for a sacred site that they wanted to research. After the project topic was accepted, they began their research and organized their content by using an outline format that served to inform site creation in Reveal. Students developed a bibliography and provided image citations for the resources used. Providing scaffolding for their learning ensured that before they moved on to more complicated tasks, they had the main foundations of the project in place.

Results

Overall, I felt the students achieved higher-order learning outcomes than they might have with a traditional research paper, and the course received positive evaluations. The majority of the projects met the learning objectives required for the assignment; there were several exemplary examples. One of the main aspects of the project evaluation was whether students had included a clear argument and conclusion—perhaps the biggest challenge that faced the students. Students did find the scaffolding exercises, particularly the outline, to be helpful in developing their arguments.

When it came to grading, both my teaching assistant and I benefited from using a grading rubric I created for us to follow. This aligned our thinking and normalized our grading across the student projects. This is particularly important with projects that have a creative or expressive form as it helps to reduce bias and stick with evaluating performance.

Another factor that eased the grading process was how Reveal itself is built. The application doesn't allow for users to change the layout or styling as building a website would have. Because the students didn't have to select from an overwhelming number of optional features, they were able to focus on organizing their content, and the elements we were looking to grade were in a consistent form. Students came to realize that in the end, their viewers would have control over how to navigate through a site and discover connections and relationships on their own terms. This, and Reveal's implicit hierarchical content display, pushed students to think about organizing their content in a manner that would allow for exploration, whether governed by topics, categories, physical space, or otherwise.

Other thoughts

When looking into educational tools to use in a course, it is important to consider the time factor for both the students and the instructor. For the students, the time investment in learning to use the tool should be weighed carefully against the potential for learning gains. Time should to be factored into the syllabus to provide appropriate training and support.

Today, humanities students need to be digitally literate in preparation for their post-academic life. Understanding how to work with images, knowing some basics about intellectual property law, learning to source and cite visual materials are important skills for 21st century career. Next time I teach this course I will consider inviting staff to present on these concepts as a way to add more skills-based training to the course.

Additional resources

- Reveal, image annotation tool: http://cer.jhu.edu/tools-and-tech/reveal

Author's background

Marian Feldman,
Professor, Art History and Near Eastern Studies

Marian Feldman teaches the art and archaeology of ancient Mesopotamia, the Near East, and eastern Mediterranean from approximately 3500 BCE to 500 BCE. Her classes stress the social context of ancient art and the arts' contribution to our knowledge about ancient civilizations.

The Innovative Instructor

Technology

Vol. 16 | August 2017

SketchUp

Reid Sczerba, Multimedia Developer, CER

What this is

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About the CER

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Center for Educational Resources

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What it is

SketchUp is a three-dimensional rendering application that uses a sketch-based approach for creating models. It may be beneficial to anyone looking to visualize three-dimensional structures, spaces, or objects. With a free-to-use version available for download, SketchUp is an affordable way to develop 3D models. It is easy to learn compared to professional 3D graphic software packages.

Who produced it

The application was created in 2000 by @Last Software. Google purchased SketchUp in 2006. Under Google's ownership, the program was developed further and integrated with Google Earth to allow importing models for geo-location. In 2012, Google sold SketchUp to Trimble Inc., a mapping, navigation, and surveying equipment company. Trimble continues to develop the application and support SketchUp's growing community of users.

Why it was made

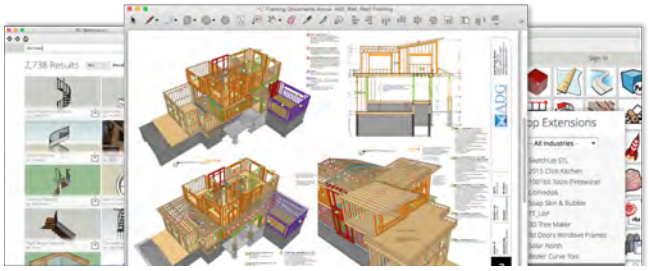
Three-dimensional rendering software is typically complex and requires a significant time investment to learn and use. SketchUp was developed to be intuitive and easy to learn with the intent to bring "3D modeling to the masses." It was used early on by architectural firms to provide quick concept renderings of buildings and environments. Today, the application is used by interior designers, landscape architects, civil and mechanical engineers, and film and video game creators. There are use cases for the program ranging from exploring building structures, conceptualizing mechanical objects, teaching complex structures, and remodeling houses.

Why it matters

Using your imagination to conceptualize physical spaces is difficult. Communicating ideas and concepts that involve spatial and volumetric relationships in space, such as comparison of size and distance between objects, is often more effectively accomplished by sharing visualizations and renderings of the subject. This allows viewers to have a common point of reference in which to talk about details.

Three-dimensional models offer immersive and engaging aspects that are potentially exciting to viewers. For example, sharing a virtual walkthrough of an ancient city or a 360-degree view of a design prototype can make the experience memorable for your students, which helps them retain the information presented.

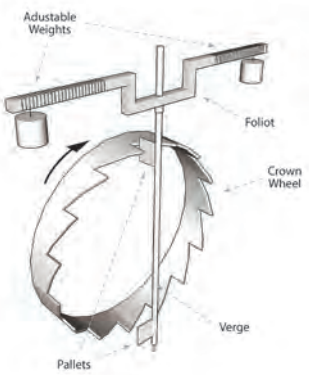
Creating three-dimensional models for pedagogical purposes has traditionally required the use of expensive professional modeling applications and highly skilled staff. SketchUp's free modeling tools make the process of creating models an intuitive experience. This can be a great starting point for faculty to produce three-dimensional models and environments. Moreover, your students may not have developed the ability to think spatially. Assigning a course project that involves the use of SketchUp creates an opportunity for learning these skills.



How it can be used

SketchUp provides accurate tools for the rendering of objects and spaces. As an easy entry point for CAD (Computer Aided Design) software, SketchUp can be used in disciplines that require technical drawings and diagrams. For example, SketchUp can be used to conceptualize urban planning initiatives to think through the impact of proposed changes to a community. Resulting models can be shared with stakeholders complete with walk-through animations and annotations to provide additional information.

SketchUp can be particularly useful for design projects in engineering disciplines that require the development of prototypes, such as a design project to develop a radio transmitter and receiver within a size specification that could withstand an impact of 100 pounds of force. Team-members could use SketchUp to map out the circuitry for the electrical components and develop the housing. There are methods to use a SketchUp model to create a physical prototype with a 3D printer.



Example diagram of verge and folio mechanism created in SketchUp

At Hopkins, Bill Leslie, a professor of History of Science and Technology, had in the past required students to build a shoebox diorama of a museum exhibition featuring a topic of their choice. After discovering SketchUp, he offered students the option to create their exhibition space in 3D. The students were unanimous in choosing SketchUp, which improved both the consistency of the projects and the logistics of presenting them to class. Students demonstrated creativity and engagement in the project.

Where it is going

Interest in virtual and augmented reality has increased in recent years. Companies have developed new technologies and methods to offer opportunities for people to experience virtual environments. Universities have been investigating technologies such as Google Cardboard, Oculus Rift, and Microsoft HoloLens. Currently, there is a lack of content available to make use of these emerging technologies. SketchUp could find itself in a position to be a starting point for the creation of 3D spaces that can be experienced in a highly immersive environment.

How to get started

Trimble offers a free version of the application called SketchUp Make. It includes all of the basic features for modeling. SketchUp Pro is a full featured version that includes features such as solid modeling tools, importing terrain and satellite imagery, dynamic components, and importing and exporting file formats necessary for use in other applications. If you are an educator and plan on teaching with SketchUp, you can request a free one-year license to use the full-featured SketchUp Pro. Students are also able to get a discount on a one-year license with proof of enrollment.

There are video tutorials available for learning SketchUp. These tutorials are often the most efficient way to learn the application and get a quick start on a project.

Other Thoughts

One of the best resources from the SketchUp community is the 3D Warehouse, an online repository for sharing user-generated models. The models found in the 3D Warehouse can be a starting point for your own projects. There are a number of companies that have uploaded professionally created models of their products so if you are looking for a specific model of say, a household appliance, you may find it there.

SketchUp is highly extendable, giving users the ability to develop plugins with the Ruby programming language. The Extension Warehouse is a repository of plugins you may install in your instance of SketchUp. Not all plugins are free, but if you need to have a photo-realistic polish or find a way to streamline a modeling process, the Extension Warehouse may have the answer.

Additional Resources

- Sketchup website: https://www.sketchup.com
- Information about educational licensing: https://www.sketchup.com/buy/resellers?type=education
- Repository of models: https://3dwarehouse.sketchup.com/?hl=en
- Repository of plugins and extensions: https://extensions.sketchup.com/en

Author's Background

Reid Sczerba,
Multimedia Developer, Center for Educational Resources

A staff member at the Center for Educational Resources, Reid provides training on a variety of programs, aids in educational resources development, and shares expertise on information and graphic design with faculty at the Homewood campus. He holds a BFA in Illustration and a MA in Digital Arts from Maryland Institute College of Art.

The Innovative Instructor

Best Practice

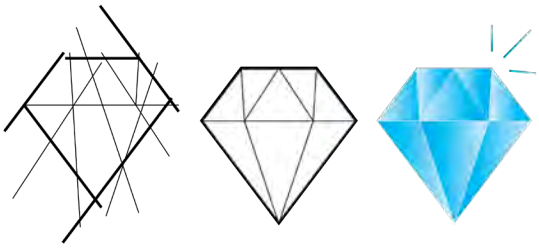
Vol. 15 | May 2017

Visual Clarity

Reid Sczerba, Multimedia Developer, CER, JHU

What it is

Visual design, in the form of advertisements, entertainment, functional signage, etc., can be seen everywhere. You are constantly processing visual information to make sense of the world and, often unconsciously, you place value judgements on what you see. It is important to consider this when designing or creating visual content for presentation, as there are a number of design strategies that will make that content clear, persuasive, perhaps even beautiful. Visual clarity will help to improve the delivery of the message. This article provides principles that will help you to create clear and concise visual design.



Why does it matter

Truth/Professionalism

Whether you consider what you see as beautiful, ugly, discordant, complex, or otherwise, it will affect your opinion on that subject. When seeing displays of research, data, or ideas, there is tendency to distrust content that is overly complex or difficult to read. These perceptions may cause you to think the presenter is obscuring information or doesn't have a consistent message. Poorly crafted visual content may also communicate that the presenter is not professional, thus reducing the authority or trustworthiness of the content.

Learning/Memory

The main objective is to ensure that your content is as easy to understand as possible. This is achieved by organizing and arranging ideas so that they can be read with minimal effort. If the viewer can perceive the content without the frustration brought on by poor design, they are more likely to be engaged. Well-designed visual displays are more accessible, easier to comprehend, and more memorable, even if the viewer disagrees with the ideas expressed.

How to use it

The strategies offered in this article apply to all forms of design including PowerPoint presentations, conference posters, brochures, and graphics for products, advertisements, or promotional videos:

I. Visual hierarchy/Emphasis

Visual hierarchy is about controlling the flow of information you want your viewers to see and remember. This is accomplished by emphasizing the design elements (text, graphics, images) to establish the order of importance, guiding the viewer to an understanding of your message. Importance is implied by adjusting the element's characteristics to increase its visual contrast and setting it apart from other elements.

Example showing visual order starting from the center callout, followed by the most emphatic header to the least

There are many ways to emphasize the visual elements in your message. You can make the text font larger, bolder, or choose a color that is brighter or darker than the colors that surround it. To highlight a visual element, such as an image, icon, or chart, consider making it larger or adding more space around it to set it apart. You can also consider placing the most important content prominently, in the center or at the top of the display.

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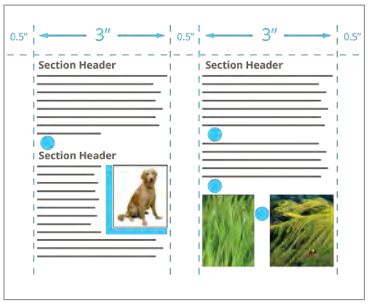
II. Spacing/Alignment

White space is a design concept that refers to the empty space found in a document, illustration, or other visual display. When laying out content, consider how the elements fit together. Being aware of the empty space can help you to align your content consistently and comfortably and clarify the information relationships in the visual hierarchy you have established. Use consistent units of measure to separate title headers, blocks of text, and graphic elements so that the content isn't randomly placed within the layout.



Gridlines and other guides can help you visualize empty space

III. Contrast/Color

Attract attention to your most important messages by using color and contrast. The best approach is to create a color scheme with one bold shade to be used selectively to maintain its impact. Colors that stand out are more vibrant in hue and either brighter in value against dark colors or darker in value against light colors. Use color to codify and categorize information (be mindful of the color blind). Color can direct a viewer to specific data relationships in maps, diagrams, and charts.

Corporate and sophisticated

Earthy and relaxed

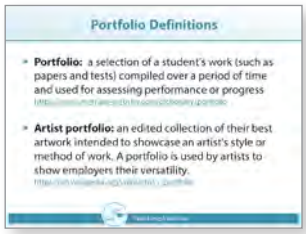
Aquatic and calming

Bold and playful

Colors can be suggestive of mood, positive and negative feelings, and levels of energy. Consider using the connotative meaning of colors to communicate ideas quickly and set a tone. For example, neon-bright colors suggest energy and excitement, a muted, neutral palette can convey sophistication.

IV. Repetition/Branding

An important aspect of design is the repetition of visual elements in headers, outlines and footers. Develop a unique style that will be your visual voice. Your color scheme, font, bullets, borders, and other graphic elements, including icons and symbols, should be used consistently throughout your design to give it a unique and memorable appearance or brand. Using conflicting elements, such as multiple color schemes or changing the way you outline images, reduces the impact of your visual voice. The distinctiveness of your style—your brand—helps people remember your message.



Example of two PowerPoint slides with a consistent appearance to express a uniquely "branded" presentation

V. Fonts

There are thousands of fonts to choose from and it can seem overwhelming to find the right one. A well-selected font can help set a tone but the best choice is a font that is easy to read. There are two main types of fonts each with their own advantages.

A serif font has graphic characteristics adorning each letter, called serifs, that are reminiscent of a chiseled edge or a calligraphic brush stroke. These give the serif font a classic appearance. Serif fonts are best for large sections of body text because your eyes are able to identify the unique shape of each word quickly. This is why most print publications use serif fonts.

The san-serif font does away with the serifs leaving the basic letterform, which is more modern looking. San-serif fonts are easier to read from a distance because the letters don't have the graphic complexity of a serif font. San-serif fonts are used in street and directional signs because they need to be read from a distance. Consider using san-serif fonts for titling and headers to make them easy to read.

Other thoughts

One of the most difficult tasks when preparing content for presentation is constructing a concise and engaging narrative. Start by choosing a narrative structure (e.g., narrative arc, process analysis, compare and contrast) that will assist your viewers in understanding your content. With a clear focus on your intended message, you will be able to cut out extraneous information. Then you can make the best design decisions to support your narrative.

Additional Resources

- Reynolds, Garr. *Presentation Zen: Simple Ideas on Presentation Design and Delivery*. New Riders, Berkeley, CA. 2012
- Dabner, David. Stewart, Sandra. Vickress, Abbie. Zempol, Eric. *Graphic Design School*. John Wiley & Sons, Inc. Hoboken, NJ. 2017
- Malamed, Connie. *How Visual Clarity Affects Learning*. http://theelearningcoach.com/learning/visual-clarity-and-learning

Author's Background

Reid Sczerba, Multimedia Developer,
Center for Educational Resources, JHU

A staff member at the Center for Educational Resources, Reid provides training on a variety of programs, aids in educational resources development, and shares expertise on information and graphic design with faculty at the Homewood campus. He holds a BFA in Illustration and a MA in Digital Arts from Maryland Institute College of Art.

The Innovative Instructor

Pedagogy

Vol. 15 | May 2017

Empowering students with simulated negotiations

Elizabeth Mendenhall, PhD Candidate, Political Science, JHU

The issue

In the global environmental politics classroom, the problem of student attitude is often acute: students of global environmental governance are particularly prone to negative emotional reactions, including feelings of helplessness and hopelessness, which can engender apathy and cynicism.

Why does it matter

Students come to believe that the complexity and depth of problems like climate change make effective action impossible. Students who do not believe a problem can be solved are unlikely to seek solutions to that problem in their post-college careers.

As college educators we want our students to acquire more knowledge and be better critical thinkers, but also to feel empowered and energized about their future contribution to society. Students who are motivated and ambitious are more likely to pursue personal opportunities and inventive ideas. Although a positive attitude often comes from within the student or outside the classroom, the structure of learning also has an impact.

Solution

Using active learning techniques like simulations (situational role-play) can combat negative attitudes by giving students the opportunity to collectively investigate and tackle barriers to international action.

I designed a simulation for the last week of my fall 2016 "Politics of the Ocean" class, because I noticed that the students often left class in despair. Solutions to over-fishing, plastic pollution, dead zones, ocean acidification, coral bleaching, and other ocean issues seemed out of reach because of political and economic barriers. The number and complexity of ocean issues seemed overwhelming. Yet we knew that the United Nations was gearing up to negotiate a new treaty to govern the high seas. This provided me with the opportunity to design a politics simulation that hewed as close to the real world as possible, where students could practice negotiating a treaty that addressed many of the problems they had learned about in class.

I started by assigning students to polity teams in the week before the simulation began. I chose countries that have had the most influence on ocean governance historically, and groups that would likely have influence in the upcoming negotiations: The United States, China, Russia, the G77 coalition, Singapore, and NGOs. I asked students to do the assigned readings for the next week—each of which contained a specific proposal for ocean governance—with their team in mind.

The basic structure of the course influenced the simulation design. I had 15 students, and we met twice a week for a total of 2.5 hours. The simulation was divided into two days. On day one, students worked within their teams to answer a series of questions like "Who are the primary ocean interest groups in your country?" "What are your priorities for ocean governance?" and "What treaty design best serves your interests?" Students were instructed to work with their teammates, and to do supplementary in-class research to help flesh out their positions. Additionally, the Singapore team had to determine how the negotiations ought to be run, because of Singapore's historic role as a leader in organizing past Law of the Sea negotiations.

On day two, students entered the classroom to discover groups of tables designated with small flags. Singapore ran the negotiations

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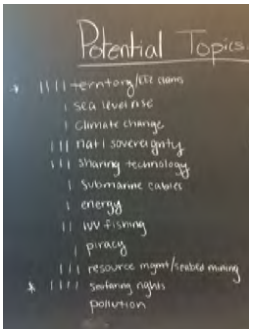

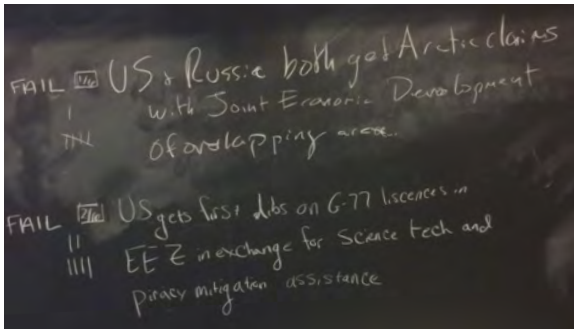

List of potential topics and example of discussion results from class

while I took notes, with some minor interventions. Each team started with an opening statement about their key interests and main concerns, with short rebuttals following. Then Singapore asked each team to submit a list of priority topics, and chose the top four. While the original plan was to address each in turn through speeches and open discussion, the students ended up deciding to address all the issues simultaneously. In the last ten minutes, Singapore collected specific treaty language proposals. Each of six new proposed rules was voted on individually, and those with a majority of teams affirming became the agreed upon treaty.

Results

I designed this simulation to achieve attitudinal goals in three ways. First, role-playing required students to formulate policy proposals from the ocean problems and governance models they had learned about in class. The idea is that practicing advocacy will help students recognize that they have informed opinions about ocean issues, and see themselves as agents of change. Second, the format shows students that complexity is not the same as intractability. The two-day design allows group work to break down the structure of a collective action problem, construct a policy agenda and negotiation strategy, and consider various policy models described in the literature. Third, the negotiations allow students to directly encounter barriers to consensus formation. Confronting obstacles to agreement this way may illustrate the utility of issue-linkages, and demonstrate that there are coalitions willing to move forward.

I assessed the achievement of attitudinal learning outcomes using a short pre- and post-simulation survey, which asked students to rate their level of agreement with statements like "All relevant parties can get what they want from the oceans" and "The situation in the high seas is too complicated for effective management." The survey also asked students to rank the importance of different conditions for an international treaty, like "political will" and "public education." The final questions were open-ended, and asked students to use one word to describe the state of the ocean and how they feel about it. While the survey results showed a slight improvement in optimism, the students started out more optimistic than I expected.

Benefits

This type of simulation is relatively easy to design and implement, and there exists a broad literature relating game design to specific cognitive and attitudinal goals. Even though this simulation was imperfect, students reported on their course evaluations that they appreciated doing something different, and having the chance to work through obstacles to consensus as a group. This type of simulation can be used with a larger class size by adding more teams.

Other thoughts

The biggest mistake I made in the design of this simulation was asking the Singapore team to take a leadership role by designing the basic structure of the negotiations, and leading the class on day two. Although I chose two students with obvious leadership qualities, they found it difficult to command authority among the teams, and to push for efficiency in negotiations. They also seemed displeased that they had a "special" role, and more interested in participating as a regular team. Most of the students reported wanting to start the simulation earlier in the semester, so they could have more time getting into the details of constructing a workable solution to collective problems in the ocean.

Additional resources

- Asal, Victor, and Elizabeth L. Blake. "Creating Simulations for Political Science Education." *Journal of Political Science Education 2*, no. 1 (January 2006): 1–18.
- Smith, Elizabeth T., and Mark A. Boyer. "Designing In-Class Simulations." *PS: Political Science and Politics 29*, no. 4 (December 1996): 690.
- Baranowski, Michael K., and Kimberly A. Weir. "Political Simulations: What We Know, What We Think We Know, and What We Still Need to Know." *Journal of Political Science Education 11*, no. 4 (October 2, 2015): 391–403.
- Glazier, Rebecca A. "Running Simulations without Ruining Your Life: Simple Ways to Incorporate Active Learning into Your Teaching." *Journal of Political Science Education 7*, no. 4 (October 2011): 375–93

Author's background

Elizabeth Mendenhall, PhD Candidate, Political Science, JHU

Elizabeth Mendenhall is a PhD candidate in International Relations. Last fall, she taught "Politics of the Ocean" as part of the Dean's Teaching Fellowship program. After defending her dissertation in summer 2017, Elizabeth will begin as an assistant professor at the University of Rhode Island in the Department of Marine Affairs.

The Innovative Instructor

Technology

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ArcGIS

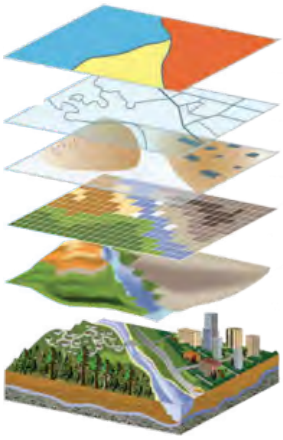
Bonni Wittstadt, Geospatial Service Librarian, MSE Library

What it is

ArcGIS is a powerful data mapping application that helps you visualize, analyze, and understand spatial data mapped to a coordinate system. Used in the sciences, engineering, and the humanities ArcGIS can reveal relationships, patterns, and trends related to physical spaces in ways that may not have been initially apparent. In addition to mapping objects on the Earth's surface, there are 3D solutions that allow above and below surface examination. It is also possible to work on expansive scale, e.g., the universe or on a small scale, e.g., the human body. In essence, if it can be mapped, ArcGIS is the tool to use.

Why it was made

ArcGIS was developed by ESRI (Environmental Systems Research Institute), a company formed in 1969 with a focus on land use and urban planning. ESRI has since helped cities worldwide with their redevelopment plans, in addition to assisting with emergency management efforts. ArcGIS has become a professional grade Geographic Information System (GIS) that allows researchers to investigate distributions across existing environments, identify clusters or randomly dispersed data points, and analyze the significance of the distributions.



Why it matters

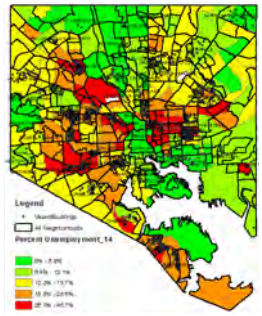
With an ever-growing number of valuable datasets being created, applications are needed that are capable of performing extensive calculations to make sense of the data. Applications such as ArcGIS have become a necessary tool for researchers to make informed decisions about interactions with complex geographical situations. ArcGIS can be an excellent educational tool for students who wish to explore spatial datasets in the context of existing environments. The skills that students gain from using a GIS application will give them a foundation for how to use similar applications in their own research (or simply for their intellectual curiosity) in the future.

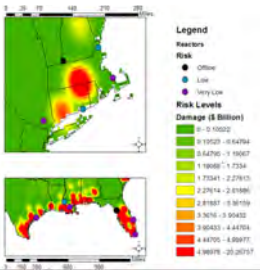
How it can be used

A popular use of ArcGIS is mapping the wide variety of demographic information available from the decennial census. For example, students in an introductory Sociology course overlay poverty, racial, disability, unemployment, and gender variables by census tract with vacant buildings to determine whether there are correlations among different Baltimore City neighborhoods.

Data sets that might not otherwise seem to be related may be found to have commonalities based on geographic location. Engineering students use GIS to analyze meteorological patterns and create models that predict the destructive results of weather occurrences by calculating who (people) and what (buildings and natural structures) would be affected. Using the same weather pattern data, GIS could model alternate power sources by analyzing energy-needs data to determine which energy source would be most efficient and sustainable based on a location's conditions.

illustration, http://doc.arcgis.com/en/arcgis-online/reference/geo-info.htm



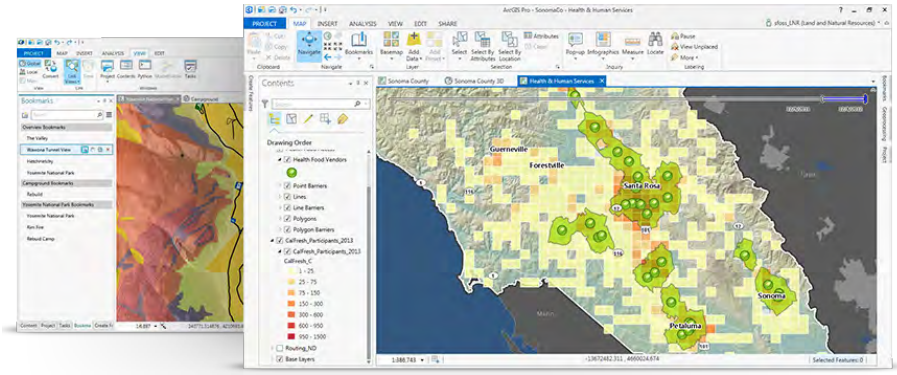


Examples of ArcGIS uses, unemployment in Baltimore with vacant housing overlay, an a historical analysis of U.S. natural catastrophes

Who's using it

Examples of how GIS is being used in the classroom:

- Public Health students and staff in the Center for a Livable Future, part of the Bloomberg School of Public Health, have surveyed multiple times all food outlets within Baltimore City to determine Healthy Food Availability Indexes (HFAI) in hopes of informing residents where the Food Deserts are located. Exposing the food environment in this way gives policy makers the necessary information to prioritize areas that are in need of attention. Public Health students also survey businesses with tobacco ads to correlate their location to areas with high populations of juvenile residents in order to launch public service efforts in those same locations.
- Anthropology students published a map in ArcGIS Online, which allowed crowd-sourcing data to determine whether the safety perceptions concerning the neighborhoods around the Homewood campus were where crimes were actually occurring. They then delved deeper to see if they could change the community's view of the areas falsely deemed unsafe.
- Business students (and those in related fields) can access business data from an ArcGIS extension, Business Analyst. Business Analyst allows a user to locate favorable markets for business expansion, evaluate marketing efforts, compare sites, and create impressive business infographics that show demographic, financial, and other relevant data.



image, http://desktop.arcgis.com/en/apps

Additional resources

- The Library's GIS guide - http://guides.library.jhu.edu/gis
- ESRI's Resources website - http://resources.arcgis.com
- ArcGIS tutorials - https://learn.arcgis.com
- Everything about Pro - http://pro.arcgis.com
- Example of ArcGIS, MD Food Systems Map - http://mdfoodsystemmap.org

Author's background

Bonni Wittstadt,
GIS Specialist, Geospatial Service Librarian, MSE Library

Bonni Wittstadt works in the Data Services group specializing in GIS research consultations. Having over 15 years of GIS experience, Bonni provides GIS support and training along with advanced consultation to faculty, students, and staff within the Hopkins community. Bonni has a Master's Degree in Library and Information Science from Drexel University and a Master's Degree in Geographical Information Science from Johns Hopkins University.

Where it is going

ArcGIS has a full featured desktop version and an online version that can be accessed using a web browser. While features in ArcGIS Online may be more limited, you can create maps using your own data, share them with the world, and collaborate with others. Recently, ESRI combined the versatility of both versions in one application, ArcGIS Pro. Through its online integration, this latest release provides a user with greater functionality for high-end computing using desktop power, as well as the ability to collaborate with others.

How to get started

There are a variety of options for learning ArcGIS offered not only through the MSE Library but also from ESRI.

Workshops - GIS staff provide training on the Homewood campus and on the East Baltimore campus in association with the Welch Medical Library's regularly offered classes. http://welch.jhmi.edu/welchone/welchcourses

Web-Based Training - Johns Hopkins users can request authorization to take web courses at no cost via ESRI's Self-Paced E-Learning https://www.esri.com/training

Classroom Training - GIS staff offer customized classroom instruction sessions so that faculty can focus their efforts on the way they use GIS rather than the "how to" of the various GIS tools.

Research Consultations - GIS staff provide individual and group consultations and can help you find the best tools and resources to fit your research needs.

Other thoughts

Collecting the right data is half the battle in any GIS project. In addition to helping users with a GIS application, GIS & Data Services staff help users find the right data sets and provide advice for making informed decisions.

The Innovative Instructor

Best Practice

Vol. 14 | July 2016

Formative Assessment

Richard Shingles, Lecturer, Biology Department

What it is

Traditionally instructors have used assessments such as midterm exams, final projects or papers, or recitals to measure how much students have learned up to a particular point in time. These are referred to as summative assessments; the goal is to evaluate student learning at the end of an instructional unit. However, many instructors use assessments throughout the semester to help students identify their strengths and weaknesses. These activities are called formative assessments and are generally low stakes, meaning that they have low or no point value. Formative assessments focus on learning and teaching, rather than on evaluation or grading. It has been shown that both students and instructors benefit from regular, ongoing assessment when it is used to "promote and diagnose" learning (Huba and Freed 2000). Students can see which topics that they need to focus on and are motivated to work harder in those areas. Faculty can identify both students who are struggling and topics that the class may be struggling with.

Examples of formative assessment include asking students to

- summarize and reflect on what they have just heard, seen or read.
- organize information through lists.
- produce a visual representation of information through concept maps or posters.
- collaborate and communicate with other students to demonstrate their understanding of a topic.
- turn in a research proposal or draft of a paper for early feedback.

Why does it matter

Formative assessment can be used to monitor student learning, but has the additional role of providing feedback, not only to the student learners, but also to the instructors. Instructors are able to assess the effectiveness of their teaching methods and to make mid-course corrections to their course delivery. When formative assessment is integrated into the learning process, students begin to differentiate between what they already know and what they need to learn.

Employing frequent formative assessments in class is not meant to punish students but rather, to guide where instruction goes next. Instructors often pause at a point in their class and ask for any questions. After a short silence with no hands going up, they are likely continue to the next topic, and then may be surprised on the midterm exam that students didn't understand the concepts taught. Using formative assessments in class may slow down the pace of instruction as instructors find they need to re-teach material that students did not grasp with the first introduction.

For both students and instructors, the low-stakes aspect of iterative formative assessment sets up a positive feedback process wherein students are made aware of the gaps in their learning and instructors of the gaps in their teaching. Both are motivated to make timely corrections.

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About the CER

The Center for Educational Resources partners with faculty, postdocs, and graduate students to extend instructional impact by connecting innovative teaching strategies and instructional technologies

Center for Educational Resources

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How to use it

Here are a few ways to check for understanding:

I. Active learning exercises

Active learning exercises often have a formative assessment component associated with them. For example, using clicker questions after teaching part of a lesson provides immediate feedback to instructors and students as to how well they understand a concept.

II. Short in-class quizzes

Short in-class quizzes with little or no point value.

III. Admit/Exit slips

Use admit/exit slips (written responses to a question or questions an instructor poses at the beginning or end of a class) to ask students to answer a question that targets a main idea of the lesson. The determination of whether to use at the beginning of class or the end should be based on learning objectives and activities planned for the class.

IV. One-Minute or Three-Minute Paper

One-Minute or Three-Minute Paper in which students take out a piece of paper and write for several minutes describing what they learned so far about the topic.

V. Behavioral attitudes

Behavioral attitudes can be assessed through in-class surveys using a Likert scale as shown below. Possible questions and statements:

- Do you like the way I use Clickers in class?
- How is the pacing of the class?
- Class time is being used effectively.
- How satisfied are you with the in-class discussions?

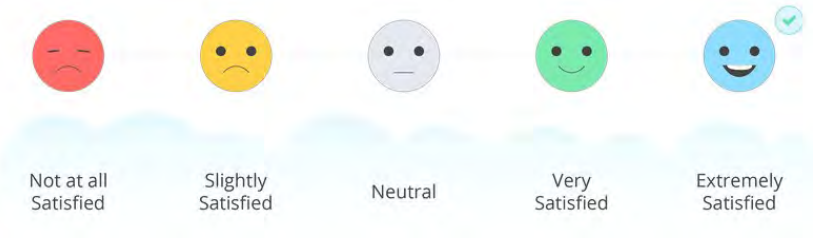
VI. Open-response Surveys

Open-response Surveys can be written on index cards that students hand-in at the end of class. Questions might include the following:

- What do you like about my teaching?
- What do you not like?
- What would you change?
- What would you keep the same?
- What was the least clear point about todays' lecture?

Final thoughts

Formative assessment provides a means towards differentiated instruction where the needs of all students can be addressed (Greenstein, 2010). This is an important consideration in the diverse university classrooms of today. Differentiated instruction allows for a more inclusive classroom environment in which the instructor is responsive to individual needs, plans purposeful instruction, and guides learning in the classroom. These strategies lead to student-focused instruction.



Example of a Likert scale

Additional Resources

- Huba, M.E. and J.E. Freed (2000) *Learner-centered assessment on college campuses: Shifting the focus from teaching to learning*. Needham Heights, MA: Allyn & Bacon.
- Greenstein, L. (2010) *What Teachers Really need to know about Formative Assessment*. ASCD, Alexandria VA.

Author's Background

Richard Shingles

Lecturer, Biology Department, JHU

Richard Shingles is a faculty member in the Biology department and works with the Center for Educational Resources at Johns Hopkins University. He is the Director of the Homewood TA Training Institute and the JHU Teaching Institute. Dr. Shingles provides pedagogical and technological support to instructional faculty, post-docs and graduate students.

The Innovative Instructor

Pedagogy

Vol. 14 | July 2016

A Low Tech Approach to Digital Literacy

Jennifer Kingsley, Lecturer and Assistant Director, Museums and Society

The issue

Humanities scholarship has made progress in examining the usefulness and effectiveness of digital tools for addressing core disciplinary questions and for launching inquiries that stimulate new interdisciplinary perspectives. Fewer models exist for integrating digital research approaches into teaching, particularly around objects. Yet digital technologies have transformed how we create knowledge about and how we experience things.

My objective was to engage students in the practice of making knowledge from and about objects available for the public, online, without having to learn coding. Each student was asked to research three objects found in artist Mark Dion's Archaeology of Knowledge, a cabinet of curiosities style installation of Johns Hopkins University collections in the Brody Learning Commons. The students collaborated to produce a web-based exhibition of their findings. I wanted students to work directly with primary materials in a wide range of media and approach them both conceptually and through practice.

Why does it matter

Digital tools provide rich resources for those engaged in humanistic studies. Learning how to evaluate online sources is a crucial skill for all students to develop, as is understanding the importance of data and metadata standards in managing information acquired in the research process. Despite their theoretical understanding that online sources vary in reliability and their intuitive use of the internet, undergraduate students are underprepared to evaluate sources and don't understand digital processes of creating, disseminating, and making discoverable information. These practices correlate with how we make sense of collections. Introducing students to the challenges of curating objects in a web-based environment can build their sense of how content is effectively developed and disseminated online.

Faculty solution

With the award of a Humanities and Social Sciences project grant from the Center for Educational Resources, I decided to use Omeka to develop a hands-on approach in this course for students to learn how to work with objects and collections using digital tools. Omeka is a free, open-source, web-publishing tool developed at George Mason University for creating digital collections and exhibitions that has been successfully used at museums and in academic contexts. The grant funding was used to hire programmers to customize our instance of Omeka so that students' interpretive work could be

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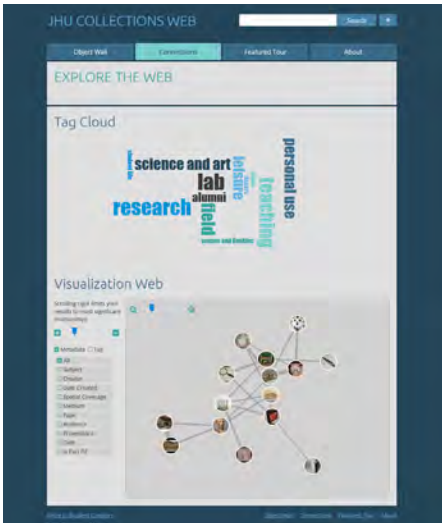
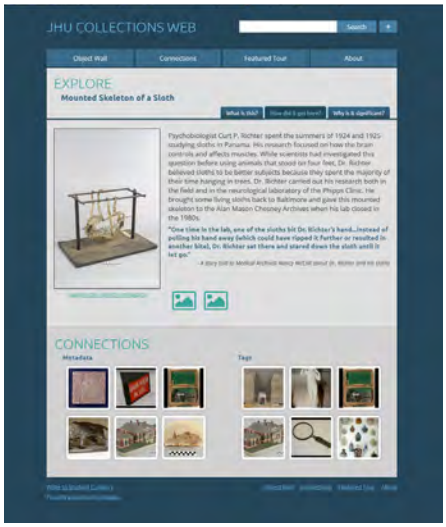


Screenshot from the Connections tab



An object's Explore page

confronted to computerized processes in real time with the aim of considering 1) the robustness of their conclusions and 2) the local and constructed nature of data. The site models in a microcosm the connectivity of knowledge the Internet provides by displaying linked relationships among the objects shown. The lessons this approach offers for students are threefold: how to describe and tell a story about material objects online, what happens to an object when it becomes digital, and how what we understand of an object changes as it is linked to other objects and related resources.

A series of templates and plugins were developed in Omeka to ensure that the process of cataloging and curating the objects was consistent across the student collaborators. Metadata and data standards were developed and made transparent in the platform itself. It was important that students not be burdened by the technology as they developed content, tested and revised it as necessary. Along with documentation on how to use Omeka, example content was created as part of the tool so that the students would have a basis for their own work.

Results

Using formative assessment is valuable in any course, especially so the first time it is taught. Midway through the semester I discussed expectations and challenges with the students and asked for feedback through an anonymous survey. Students felt the goals of the course for teaching digital concepts were being met, but were thirsty to learn more, and were finding lessons on university history overwhelming. I realized that the course had too many goals. This prompted me to refocus the end of the semester more exclusively on virtual museums. Students found these readings to be helpful after they had started to engage with Omeka as they then had access to additional scholarship to relate to what they were creating.

Over the course of the semester as students cataloged and interpreted their objects, they encountered a series of challenges that we discussed as a group. These discussions were a valuable component of the research and collaborative process. Sometimes after inputting data students would find that an object didn't have a linked relationship as they had expected. This would lead to questions about the accuracy of their interpretation of the evidence, the construction of their data, and about how their historical conclusions about their objects correlated to the findings and interpretations of their collaborators.

As an example of a challenge, one student researched a scale model of the Homewood House (located on the JHU campus), and found that multiple models had been created, each with a slightly different historical trajectory. The student had to re-evaluate her research to determine that she had identified the model and its story correctly, and then had to express her findings accurately at both the data and narrative levels.

These types of issues and questions are central to research practice in the humanities. Using Omeka to build an online exhibition collaboratively allowed my students to experience first-hand the process of undertaking research: critical evaluation of sources; using data and metadata standards; evidence-based cataloguing and interpretation of material culture objects; and sharing their findings as part of scholarly and public knowledge-scapes.

Other thoughts

Working with the developers to customize Omeka to meet the goals of the course allowed me to think broadly about the challenges and rewards presented by digital humanities projects. Creating the framework for this project provided insight on how to present information to my class about digital humanities work in general, and particularly on how to do so without overly burdening my teaching or the students with technical detail.

Additional resources

- Course site in Omeka "JHU Collections Web": http://collectionsweb.jhu.edu
- Omeka, web publishing for archives and collections from George Mason University: http://omeka.org

Author's background

Jennifer Kingsley,
Lecturer and Assistant Director, Museums and Society, JHU

Jennifer Kingsley is Lecturer and Assistant Director of the Program in Museums and Society. A specialist in medieval art history, her research and teaching interests center on image theory, memory-making, aesthetics and historiography. She teaches an array of courses about art in the museum context and about virtual museums.

The Innovative Instructor

Technology

Vol. 14 | July 2016

Reveal

Reid Sczerba, Multimedia Developer, CER

What it is

Reveal is a web application for annotating images with multimedia content. Using Reveal, you can create a website where highlighted areas, called hotspots or annotations, placed on an image link to other pages with images, audio, and/or video resources. Because the application allows you to build a hierarchical website, the individual pages created can be annotated further with hotspots that link to 'child pages', allowing you to express another level of information. For example, a map of the United States could have hotspots that provide links to pages of regional maps, which in turn may contain their own hotspots. The application is particularly useful for expressing visual relationships and spatial context.

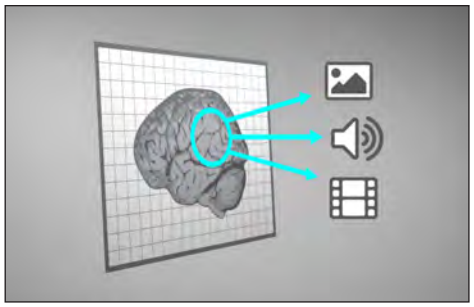


Illustration of Reveal's functionality

Who produced it

Reveal was developed at the Center for Educational Resources (CER) by a small group of dedicated undergraduate students from the departments of Computer Science, Computer Engineering, and Applied Math and Statistics, working with CER staff. An earlier version of the application, called the Interactive Map Tool, was built using Flash (a proprietary application for delivering rich media content on the web). As web standards evolved, expectations as to how content should be delivered online changed. Hence, Reveal was written using HTML5 and Javascript to improve access to mobile devices and browsers without the need for 3rd party plugins.

Why it was made

The application was originally developed for a general biology course to facilitate a collaborative digital field assignment for small teams of students in a large lecture class. The interactive environment used a map of the Johns Hopkins Homewood campus divided into approximately 60 mini-environments – called biomes – to which the teams of students were assigned for the academic year. The groups received assignments biweekly that required them to conduct field observations and collect data from their biome. They then entered that data through the application so that they could conduct analyses and make comparisons to other student groups' biomes. For example, students would be asked to identify the amount and type of lichen that grows in their biome and upload pie charts representing their biome's percentages of lichen types and then place them over their region on the campus map. After the data collection was complete, students could see which lichen type was more susceptible to the harsher conditions found nearer to the streets.

Why it matters

Reveal offers a more streamlined, intuitive interface for creating image annotations. No web development knowledge is necessary. Faculty seeking to assign engaging and creative course projects will find that Reveal is an ideal platform for students to explore visual context and spatial relationships.

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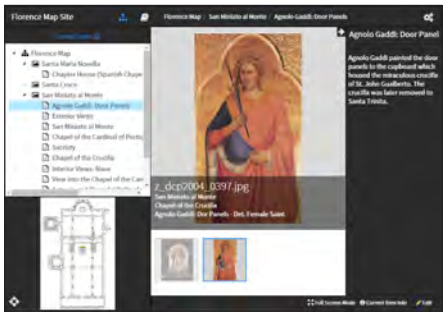
When projects require considerations of intellectual property rights, Reveal offers a solution where access can be restricted. Moreover, Reveal's server is housed and maintained by Johns Hopkins, not at a 3rd party company like Google or Apple that may have confusing or compromising terms of service agreements.

Who's using it

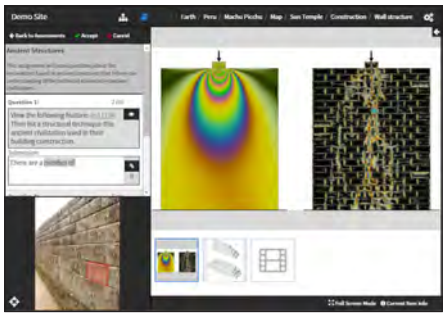
Since its first use in biology, other courses have benefited from using the application:

- A Neuroscience course developed an online study guide that mapped out the anatomical components of the brain and their functions.
- Sociology courses have used it to map the location of public murals painted by local artists in Baltimore and to document the varied cultures of Baltimore's neighborhoods.
- Students in a History of Science and Technology course used the application to design and curate a virtual museum on a topic of their choice. Another course used historical maps of Washington D.C. to illustrate the importance of the culture of the sciences as the city developed, focusing on scientific institutions.
- A Museums and Society course developed 15 museum case studies to explore the history of exhibition design. Students were offered the opportunity to use the application for a final project where they created their own case studies.

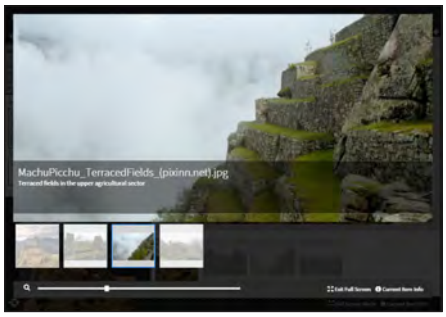
Example of navigation interface



Example of image display



Example assessment functionality



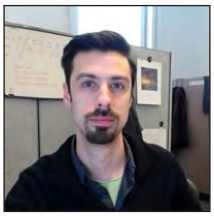
Example of gallery mode

Additional Resources

- Reveal info page: http://www.cer.jhu.edu/reveal
- Explore a demo site: http://maptooldev.cer.jhu.edu/reveal

Author's Background

Reid Sczerba,
Multimedia Developer, Center for Educational Resources



A staff member at the Center for Educational Resources, Reid provides training on a variety of programs, aids in educational resources development, and shares expertise on information and graphic design with faculty at the Homewood campus. He holds a BFA in Illustration and a MA in Digital Arts from Maryland Institute College of Art.

How it can be used

An instructor can create a Reveal site for students to view visual and/or spatial relationships or assign students to develop content within the course site or their own sites. As mentioned in the example of the biology course, there is an assessment feature that allows an instructor to assess student analyses of content within the site. Students can be graded on their projects, work collaboratively in groups within the tool, and view and compare content their peers have created.

All content uploaded to Reveal can be restricted to address fair use and intellectual property concerns. As an added benefit, all image, audio, and video content is converted to the proper format upon upload so that users don't have to worry about managing file types and formats.

Where it is going

Recently the CER has been considering releasing the code for Reveal as an open source project. This would allow others to develop additional tools and share them across a development community. Possible directions forward include categorical tagging of content in a site, text and icon overlays on an image, and the development of a mobile app. If you are interested in the prospect of Reveal being released as an open source project, contact Reid Sczerba at reid@jhu.edu.

Other Thoughts

Reveal, as a hosted service, is available to Hopkins faculty who teach in the Whiting School of Engineering and the Krieger School of Arts & Sciences on the Homewood campus. Although any Hopkins division can inquire about alternatives to the hosted service. To request a site or for more information, contact reid@jhu.edu.

The Innovative Instructor

Best Practice

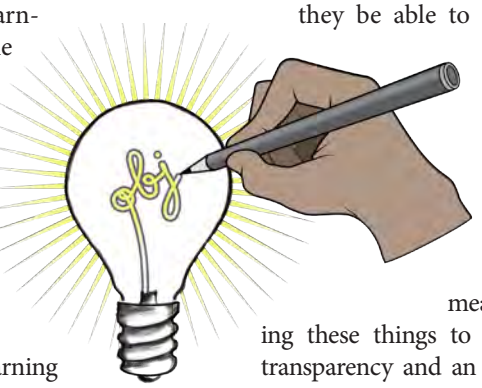
Vol. 13 | December 2015

Writing Effective Learning Objectives

Richard Shingles, Lecturer, Biology Department

What it is

Effective teaching depends upon effective planning and design. The first step in preparing a high quality course is to clearly define your learning goals, which are the broad, overarching expectations for student learning and performance at the end of your course. (See "Writing Course Learning Goals "in the Innovative Instructor series.) Next is to determine your learning objectives by writing explicit statements that describe what the students will be able to do at the end of each class or course module/unit. This includes the concepts they need to learn and the skills they need to acquire and be able to apply.



Developing learning objectives is part of the instructional design framework known as Backward Design, a student-centric approach that aligns learning objectives with assessment and instruction. (See "Using Backward Design for Course Planning" in the Innovative Instructor series).

Clearly defined objectives form the foundation for selecting appropriate content, learning activities and assessment plans. Learning objectives help you to:

- plan the sequence for instruction, allocate time to topics, assemble materials and plan class outlines.
- develop a guide to teaching allowing you to plan different instructional methods for presenting different parts of the content. (e.g. small group discussions of a common misconception).
- facilitate various assessment activities including assessing students, assessing your instruction, and even assessing the curriculum.

Why does it matter

Think about what a successful student in your course should be able to do on completion. Questions to ask are: What concepts should they be able to apply? What kinds of analysis should they be able to perform? What kind of writing should they be able to do? What types of problems should they be solving? Learning objectives provide a means for clearly describing these things to learners, thus creating transparency and an educational experience that will be meaningful.

How to use it

Following are strategies for creating learning objectives:

I. Use S.M.A.R.T. attributes

Learning objectives should have the following S.M.A.R.T. attributes.

Specific - Concise, well-defined statements of what students will be able to do.

Measurable - The goals suggest how students will be assessed. Start with action verbs that can be observed through a test, homework, or project (e.g., define, apply, propose).

Attainable - Students have the pre-requisite knowledge and skills and the course is long enough that students can achieve the goals/objectives.

Relevant - The skills or knowledge described are appropriate for the course or the program in which the course is embedded.

Time-bound - State when students should be able to demonstrate the skill (end of the course, end of semester, etc.).

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II. Use Behavioral Verbs

Another useful tip for learning objectives is to use behavioral verbs that are observable and measurable. Fortunately, Bloom's taxonomy provides a list of such verbs and these are categorized according to the level of achievement at which students should be performing. (See "Bloom's Taxonomy: Action Speaks Louder" in the Innovative Instructor series.) Using concrete verbs will help keep your objectives clear and concise.

Here is a selected, but not definitive, list of verbs to consider using when constructing learning objectives:

assemble, construct, create, develop, compare, contrast, appraise, defend, judge, support, distinguish, examine, demonstrate, illustrate, interpret, solve, describe, explain, identify, summarize, cite, define, list, name, recall, state, order, perform, measure, verify, relate

While the verbs above clearly distinguish the action that should be performed, there are verbs to avoid when writing a learning objective. The following verbs are too vague or difficult to measure:

appreciate, cover, realize, be aware of, familiarize, study, become acquainted with, gain knowledge of, comprehend, know, learn, understand

III. Leverage Blooms Taxotomy

Since Blooms taxonomy establishes a framework for categorizing educational goals, having an understanding of these categories is useful for planning learning activities and writing learning objectives.

Examples of Learning Objectives

At end of the [module, unit, course] students will be able to…

…identify and explain major events from the Civil War. (American History)
…effectively communicate information, ideas and proposals in visual, written, and oral forms. (Marketing Communications)
…analyze kinetic data and obtain rate laws. (Chemical Engineering)
…interpret DNA sequencing data. (Biology)
…discuss and form persuasive arguments about a variety of literary texts produced by Roman authors of the Republican period. (Classics)
…evaluate the appropriateness of the conclusions reached in a research study based on the data presented. (Sociology)
…design their own fiscal and monetary policies. (Economics)

Aditional Resources

- Bloom, B., Englehart, M. Furst, E., Hill, W., & Krathwohl, D. (1956). *Taxonomy of educational objectives: The classification of educational goals. Handbook I: Cognitive domain*. New York, Toronto: Longmans, Green.
- Writing learning objectives. http://sites.uci.edu/medsim/files/2015/03/Writing-learning-objectives.pdf

Author's Background

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Richard Shingles is a faculty member in the Biology department and also works with the Center for Educational Resources at Johns Hopkins University. He is the Director of the TA Training Institute and The Summer Teaching Institute on the Homewood campus of JHU. Dr. Shingles also provides pedagogical and technological support to instructional faculty, post-docs and graduate students.

The Innovative Instructor

Pedagogy

Vol. 13 | December 2015

Using a Course Blog as a Class Ice-Breaker

Anindya Roy, Postdoc, Department of Materials Science and Engineering

The issue

In the fall of 2014 I taught a course, *Stuff of Dreams: How Advances in Materials Science Shape the World*, in the new Whiting School of Engineering Hopkins Engineering Applications & Research Tutorials (HEART) program. The program introduces undergraduates to engineering research in specific disciplines in a small class taught by advanced graduate students or postdoctoral fellows. The classes meet once a week for two hours for six weeks. The challenge of teaching these one credit, pass/fail courses with no requirement of the students beyond class attendance, is getting the students engaged.

The students in my class were freshmen, sophomores, and one junior. Not all were engineers, there was one from the School of Public Health. The students had a mix of backgrounds, interests, ambitions. With a two hour class session, I did not want to lecture; I wanted the classes to be discussion based. With no requirements to do assignments, I had to rely on intrinsic motivation to get students to do reading outside of class and participate in discussion. My first priority was getting them engaged by relating materials science to their interests. I thought I could use a blog to determine what they wanted to learn.

Why does it matter

In general, blogging can be an effective way for students to respond to course readings or to work collaboratively in groups. Blogs can also be used to improve students' writing along while developing their critical and analytical thinking skills. In this case, I used blogs as a way to get to know my students and their interests, specifically those that intersect with materials science.

Faculty solution

Materials science is a very broad field. My research uses computational methods based on quantum chemistry not likely to be accessible to beginning students. Before the course started I polled the students using a Google survey to determine which social media platform they would be willing to use. Facebook and Twitter were among the choices that students rejected. I decided to use a blog based on their responses. There are a number of options for blogging platforms, including Blackboard, which offers both course and individual blogs. I used Blackboard for other course materials, but the blog tool didn't have some features I wanted, including making the blog available to the public, so that it would stand as a record and could be referred to after the course ended. WordPress is the free, easy-to-use option that I selected.

I introduced the blog in the first class session, asking the students to spend up to an hour outside of class to pick an area of interest, then research and post two links to resources on their topic on the blog. The students were then asked to do enough background reading on their topic to give a five minute presentation in class at what I called a Wikipedia level. When the students presented in the second class, I used the links they had provided to teach them how to think critically about information on the web. Students collected a wide range of content,

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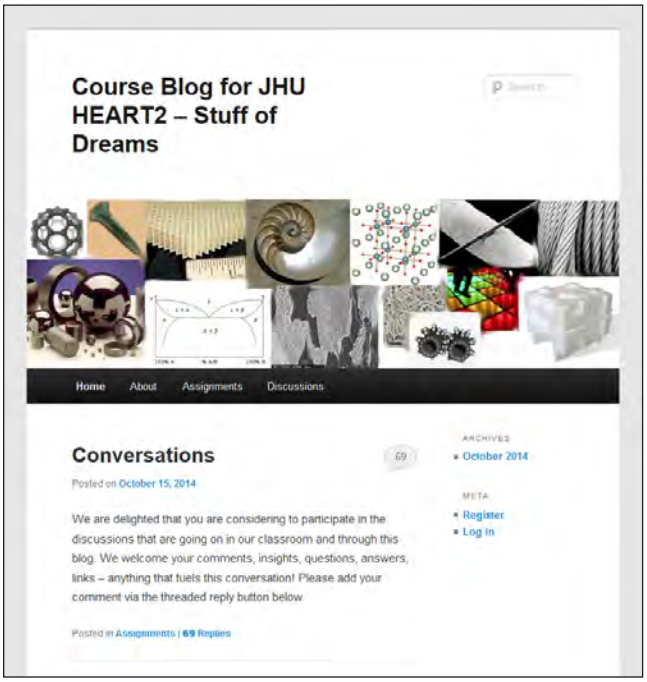
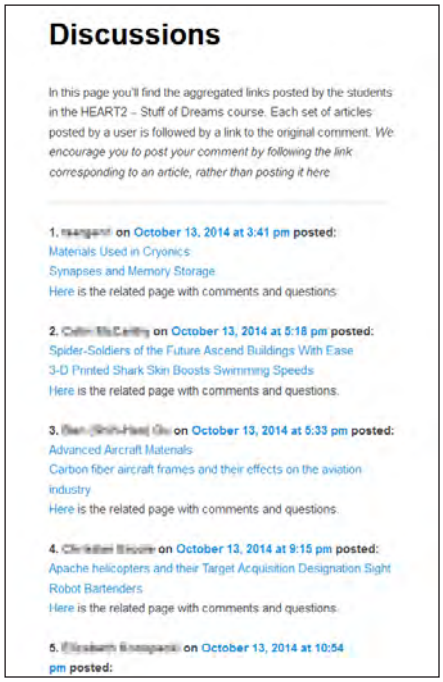


Course blog using WordPress



List of Discussions

everything from Buzzfeed lists to high-level research articles in scholarly journals. I asked the class how they could evaluate the materials. What claims were being made? Were sources cited? Were those sources credible? It was a good way to educate the students on evaluating content for research purposes, something they need to know as they move forward in their education. In this course, I didn't ask the students to go through the exercise a second time to find better or more appropriate materials, but in a more traditional course, this could be a two-part exercise.

For the second blog assignment, the students were asked to review the posts made by their peers, read some of the articles, and comment on them. This helped the students get to know each other and to see where their interests in materials science aligned. They engaged by commenting on each other's posts. Because the students were determining the topics for discussion in these first couple of weeks, it meant that I was teaching on my feet to some extent. If I didn't know the answer to a question, I would have the students do just-in-time research, using their laptops or other mobile devices right there in class to figure it out.

Results

The blog worked very well as an icebreaker, getting students interested in the course content and engaged in discussions. Student interaction outside of class was another challenge for me, with the course running only six weeks. The blog provided a way for students to continue their work outside of class collaboratively. As researchers and instructors our work doesn't stop at 5:00 PM; neither should class discussion be confined to the time students spend in the classroom. When students are reading they can immediately post what they are thinking, and their peers can respond with comments. This was the case even with the limited use of blogging in my HEART class, but this technique could be even more effective if used throughout a traditional course. I certainly will use a course blog in the future and have students write more extensively, perhaps in response to assigned readings. I like the idea of having them do peer review of classmates' posts. Students take pride in their writing, especially when it is open to the public and judged by their peers.

Being able to give formative feedback to students for the first assignment was a valuable teaching strategy. I think the students benefited from gaining an understanding of how to evaluate content on the web.

Other thoughts

From my perspective there were no disadvantages to using a blog. WordPress was easy to set up and the students found it intuitive to use. That said, there is a need to think about how you set up the WordPress or other blog instance. It is important to organize the pages so that students are clear about where to post each assignment. You will also want to consider what aspects of the blog to make public if that is applicable. As the site administrator you can make these choices. On my blog only the assignments, posts, and my comments are visible to the public; to view and post comments, users have to be registered. This prevents spam comments, which can be a problem. The blog can be seen at https://h2stuffofdreams.wordpress.com

Author's background

Anindya Roy,
Postdoctoral Fellow, Department of Materials Science and Engineering, JHU

Anindya Roy received his Ph.D. in 2011 from Rutgers University. As a computational physicist, Roy's primary research focus is on understanding materials important for energy harvesting, storage and management, using calculations based on quantum chemistry. Besides materials research, he is interested in teaching at the undergraduate level, and understanding the pedagogical aspects of physics and engineering education.

The Innovative Instructor

Technology

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CATME

Amy Brusini, Instructional Technology Specialist, CER

What it is

CATME, which stands for 'Comprehensive Assessment of Team Member Effectiveness,' is a set of tools designed to help instructors manage group work and team assignments more effectively. It was developed by a diverse group of professors with extensive teaching experience, as well as researchers and students from across the U.S. First released in 2005, CATME takes away much of the administrative burden that instructors face when trying to organize and manage teams, communicate with students, and facilitate effective peer evaluation. It is now used by over 1200 institutions in 63 countries.

Why it matters

Many instructors recognize the value of having students work collaboratively on team-based assignments. Not only is it possible for students to experience a greater understanding of the subject material, but several life-long learning skills can be gained through active engagement with team members. Managing team-based assignments, however, is not something most instructors look forward to; the administrative tasks can be quite cumbersome, especially with large classes. CATME can help instructors with this process.

How it can be used

'Team Maker,' one of two main parts of CATME, assists with the team creation process. First, it allows instructors to easily create and send a survey to students. The survey collects various demographic data, previously completed coursework, and student availability information. Instructors can also add their own questions to the survey if desired. Once the data are collected, instructors decide which criteria will be used to create the teams and then assign weights to each of the criteria. Team Maker then uses the weights in an algorithm to create the teams. Instructors are free to adjust the teams, if necessary, to their satisfaction. Once the teams are finalized, the instructor releases the results to students, who are provided with their team members' names, email addresses, and a schedule matrix showing member availability.

'Peer Evaluation,' the other core component of CATME, is used by students to evaluate their teammates' performance as well as their own. The web-based ratings page is presented on one screen, making it easy to fill out and submit results. Students select from a set of behaviors which most closely describes themselves and their peers. There is also a place where students can include confidential comments that are only seen by the instructor. Once completed, instructors can decide when to release the evaluation results to students. Peer ratings are anonymous to students, but are identified for instructors.

Another tool included in CATME is the 'Rater Calibration' tool, which helps train students in the peer evaluation process. Students are asked to rate a series of fictional team members and then receive feedback about their ratings. Other tools include the 'Student Team Training' tool, designed to

Join our group on LinkedIn CATME

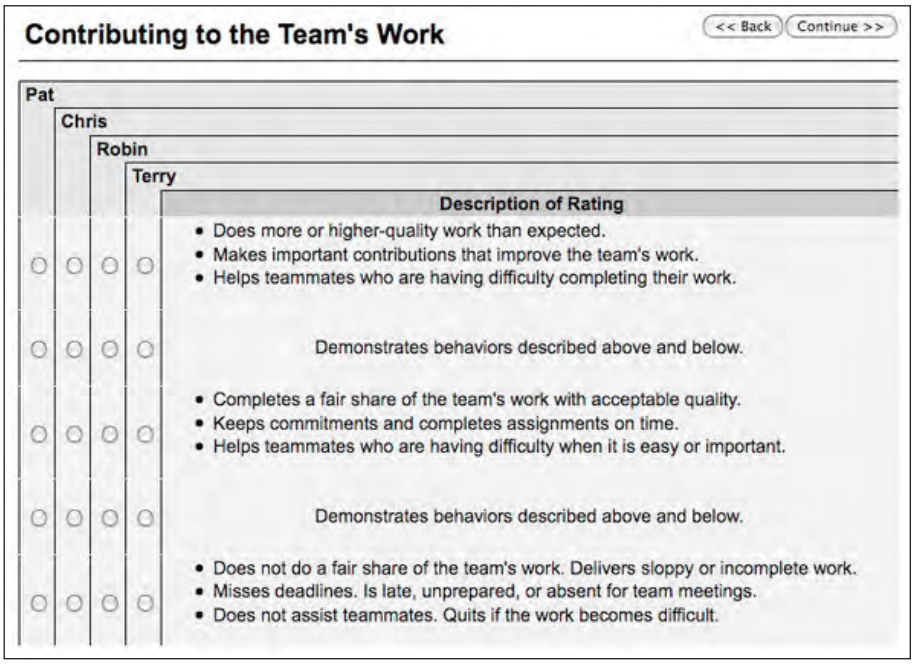
help students recognize effective team behaviors, and the 'Meeting Support' tool, which provides templates that students can use to plan and organize meetings, such as writing a team charter, taking minutes, etc.

Where is it going

The CATME team is continually improving existing tools with new features and enhancements. For students, they are currently working on 'Student Teamwork Training Modules.' These modules will consist of a series of video demonstrations designed to teach students proper team behaviors and skills. For instructors, they are in the process of developing 'CATME Faculty Team-Management Guidance' which will include information from the research literature about team member effectiveness, tips from instructors who have used CATME tools in their classes, and an FAQ list of commonly asked questions.

Also, in recent years the team has created a 'CATME Users Group' on LinkedIn, so that users around the world can connect and collaborate on the best ways to use the tools.

In July of 2017, CATME instituted a modest user fee to help fund the support of their tools. To learn more about their licensing options, please visit:
http://info.catme.org/licensing



Screenshot of CATME's Behavioral Rating Survey for Peer Feedback

How to get started

To view a video demo of CATME and learn more about the product, visit the CATME website (http://info.catme.org). Instructors interested in using CATME can go to the following page to register for an account.
https://www.catme.org/login/request

Additional Resources

- CATME Website - http://info.catme.org
- CATME video tutorial for instructors - https://youtu.be/cuNumaXE__tc
- CATME licensing information - http://info.catme.org/licensing

Author's Background

Amy Brusini,
Instructional Technology Specialist, Center for Educational Resources

Amy Brusini works at the Center for Educational Resources (CER), a teaching and learning center for Homewood faculty. Amy provides support and training for Homewood faculty on Blackboard, the university's current course management system, as well as instructional design support. Amy has a Master's Degree in Education from Johns Hopkins University.

The Innovative Instructor

Best Practice

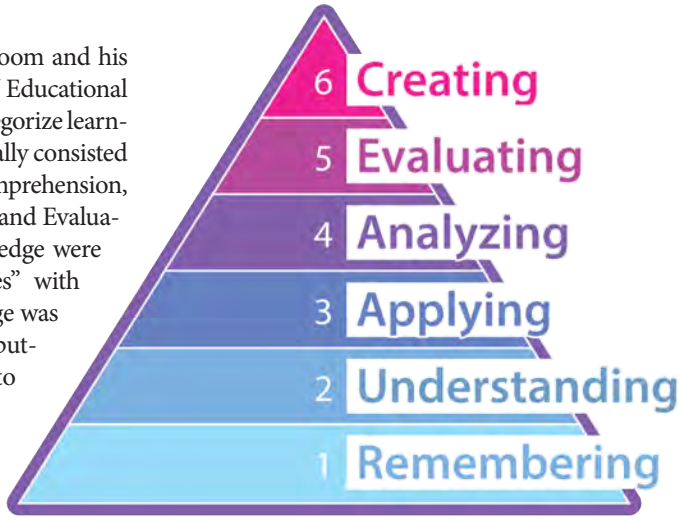
Vol. 12 | April 2015

Bloom's Taxonomy, Action Speaks Louder

Richard Shingles, Lecturer, Biology Department

What it is

Created in 1956 by Benjamin Bloom and his collaborators, the "Taxonomy of Educational Objectives" is a framework to categorize learning goals and objectives. It originally consisted of six categories: Knowledge, Comprehension, Application, Analysis, Synthesis, and Evaluation. The categories after Knowledge were presented as "skills and abilities" with the understanding that knowledge was the necessary precondition for putting these skills and abilities into practice.



The updated Bloom's Taxonomy of Educational Objectives

In 2001 Bloom's taxonomy was updated by a group of cognitive psychologists. The authors used verbs to relabel the six categories, and included "action words" to describe the cognitive processes by which learners encounter and work with knowledge. The figures accompanying this article reflect that work. The revised Bloom's taxonomy is a useful tool that can be used by all instructors.

Why does it matter

Bloom's taxonomy helps instructors align the level of the course with the level of their instruction and the types of assessments used to measure student learning. The framework represents a continuum from lower order thinking skills to higher order thinking skills. Instructors teaching an introductory level course may expect students to remember and understand content. Mid-level courses might require students to apply their knowledge or analyze data. In an upper level course, students may be asked to evaluate information or develop ideas or theories based on examination of evidence.

Bloom's taxonomy is a valuable aid in creating both learning goals and objectives and assuring that instruction and assessment are in alignment with these goals and objectives. (See "Writing Course Learning Goals" and "Writing Effective Learning Objectives" in the Innovative Instructor series). Many Bloom's taxonomy helping aids suggest verbs that can be used to write learning objectives at the appropriate level for a course. An Internet search on "Bloom's taxonomy verbs" will identify these helping aids.

6. Creating	*Assemble, Construct, Create, Develop*
5. Evaluating	*Appraise, Defend, Judge, Support, Value*
4. Analyzing	*Compare, Contrast, Distinguish, Examine*
3. Applying	*Demonstrate, Illustrate, Interpret, Solve*
2. Understanding	*Describe, Explain, Indentify, Summarize*
1. Remembering	*Cite, Define, List, Name, Recall, State*

Action verbs for the six categories of Bloom's Taxonomy

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How to use it

Following are examples of how to incorporate Bloom's taxonomy in your teaching.

I. Writing course learning objectives

In education, learning objectives are brief statements that describe what students will be expected to learn by the end of a course, unit, or class period. Instructors can benefit from using such a framework to construct and organize learning objectives for themselves and for students. Having an organized set of learning objectives helps instructors plan and deliver appropriate instruction, design valid assessment tasks and strategies, and ensure that instruction and assessment are aligned with the objectives. (See "Writing Effective Learning Objectives" in the Innovative Instructor series). For example, learning objectives following the revised Bloom's taxonomy could be constructed as follows.

Students should be able to:

1. **Cite** previously learned material by recalling facts, terms and basic concepts. (Remembering)
2. **Explain** understanding of facts and ideas by organizing, comparing, interpreting and giving descriptions and stating main ideas. (Understanding)
3. **Solve** problems by applying acquired knowledge, facts, techniques and rules in a different way. (Applying)
4. **Examine** and break information into parts by identifying motives or causes, making inferences, and finding evidence to support generalizations. (Analyzing)
5. **Appraise** information in a different way by combining elements in a new pattern or proposing alternative solutions. (Evaluating)
6. **Develop** and **defend** opinions by making judgments about information, validity of ideas or quality of work based on a set of criteria. (Creating)

II. Asking questions

In-class questioning can be varied from the simple to the complex. Questions can be categorized following Bloom's hierarchy of cognitive skills. Here are some examples of questions asked about the story *Goldilocks and the Three Bears*. Goldilocks visits the home of the Papa, Mama and Baby bear where she sleeps in their beds, eats their food, and sits in their chairs.

Remembering:
List the items used by Goldilocks while she was in the Bears' house.

Understanding:
Explain why Goldilocks liked Baby Bear's chair the best.

Applying:
Demonstrate what Goldilocks would use if she came to your house.

Analyzing:
Compare this story to reality. What events could not really happen?

Evaluating:
Propose how the story would be different if it was *Goldilocks and the Three Fish*.

Creating:
Judge whether Goldilocks' actions were good or bad. Defend your opinion.

III. Constructing test or exam questions

If the course is arranged around learning objectives defined using Bloom's taxonomy, those objectives can be used to construct test and exam questions. This process will ensure alignment between instruction and assessment and provide validity to the evaluation of students' knowledge and skills in your class.

Additional Resources

- Anderson, L. W., & Krathwohl, D. (Eds.). (2001). *A taxonomy for learning, teaching, and assessing: a revision of Bloom's taxonomy of educational objectives.* New York: Longman.
- Bloom, B., Englehart, M. Furst, E., Hill, W., & Krathwohl, D. (1956). *Taxonomy of educational objectives: The classification of educational goals. Handbook I: Cognitive domain.* New York, Toronto: Longmans, Green.
- Davis, B.G (2009). *Tools for Teaching,* 2nd edition, Jossey-Bass, San Francisco Southey, R.
- (1837) *The Three Bears.*

Author's Background

Richard Shingles
Lecturer, Biology Department, JHU

Dr. Richard Shingles is a faculty member in the Biology department and also works with the Center for Educational Resources at Johns Hopkins University. He is the Director of the TA Training Institute and The Summer Teaching Institute on the Homewood campus of JHU. Dr. Shingles also provides pedagogical and technological support to instructional faculty, postdocs and graduate students.

The Innovative Instructor

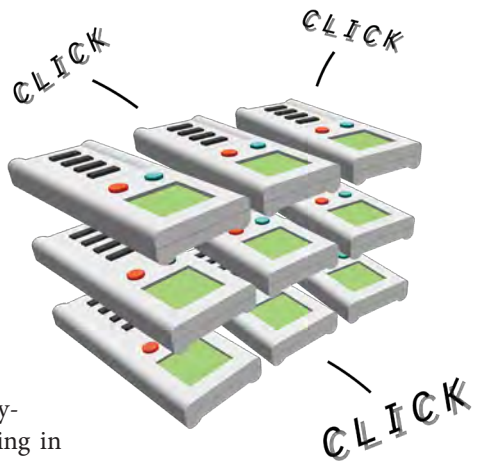
Pedagogy

Vol. 12 | April 2015

Making Learning Click

Kathryn Tifft, Lecturer, Biology Department

The issue



Clickers, also known as in-class polling or voting systems, can be used in large lecture courses as a way to promote active learning. Using a small hand-held device, students answer questions posed by the instructor. Their answers are recorded by a software application on the instructor's computer and can be shared with the class to provide immediate feedback. Recent educational professional development inspired my colleagues and me to leverage the benefits of clickers by improving, expanding, and diversifying clicker questions to increase student learning in our lecture courses.

Why does it matter

Clickers are a simple and versatile way to implement a variety of pedagogical best practices in a large lecture class, including active learning, formative assessment, and group learning. Clicker questions can be used individually, in related sets, or in combination with other types of classroom activities. Implementing clicker strategies effectively increases the educational impact of lectures.

Faculty solution

I team-teach two large (200 plus students) lecture courses – biochemistry and cell biology. In these classes, clickers are optional and credit is given based on participation, not correct answers. Students receive a small bonus at the end of the semester for clicker participation. Students can miss up to 20% of the lectures and still get full credit, so absences, dead batteries, and forgotten clickers are not a significant stressor for students or administrative burden for instructors. Following are some of our strategies for using clickers.

- Clicker questions can be used to **adjust the lecture content**. Clicker questions can evaluate what students know so that instructors can avoid spending lecture time explaining concepts that are already understood by the majority of the class. If a substantial number of students seem to be struggling with the answer, then the instructor can review the material. It's a good idea to include lecture slides that can be used for review if needed.
- Clicker questions can be used as an **alternative way of presenting information**. For example, ask a series of questions on interpretation of data to lead students to an understanding of the material. This is a more engaging method of content delivery than lecturing.
- Carefully designed incorrect answers to clicker questions can quickly, accurately, and specifically identify **common conceptual difficulties or misunderstandings** among all students in the class. Based on the clicker responses, the instructor can immediately make any clarifications or address unclear concepts.

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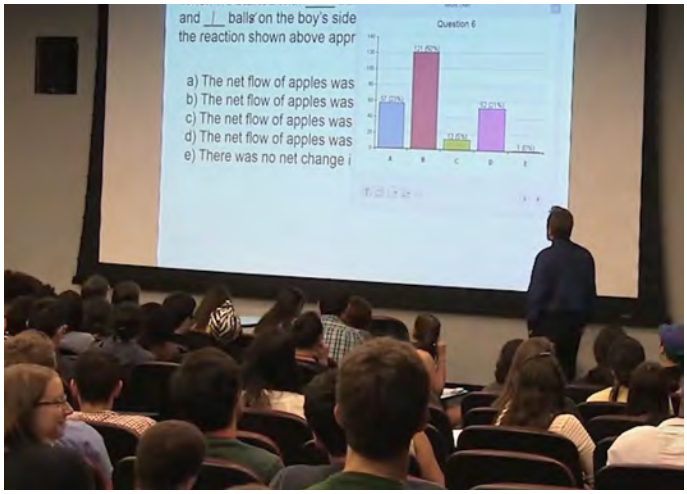
- Clicker questions provide an opportunity to give students practice **solving application-type questions**. An exam question from a previous semester can be broken down into several multiple-choice clicker questions. As follow-up, students can compare different approaches to solving the problems, and instructors can model expert-level problem-solving approaches.
- Clicker questions are a great way to **promote discussion**. If a vote on a question results in mixed answers, the instructor can ask students to pair up with the person next to them to dis cuss their answers and then re-vote. The instructor can eliminate specific answers or provide additional information to inform the discussion before a re-vote. Questions with multiple correct answers can be used as a launch point for productive discussions among students or the entire class.



In all cases, **appropriate follow-up** is crucial. If most students select the right answer on a clicker question, little or no follow-up is necessary. However, if a substantial number of students answer incorrectly, it is important to not only provide a correction, but review the reasoning or explanation. In addition, instructors can address the wrong answers and encourage students to examine their misconceptions.

Results

The student response to using clickers in our courses is overwhelmingly positive. Students work hard to answer the questions correctly during class, are engaged in discussions during voting, and study the clicker questions in preparation for exams. On the course evaluations for our courses, students often mention the clicker questions in the "best aspects of the course" section. In one section of the biochemistry class, 92% of the students ranked the use of clickers as "helpful" or "very helpful."

Our observations and class surveys suggest that many students are aware of the benefits of challenging clicker questions, including engagement, formative assessment, practicing problem solving, and working with peers. Students have requested more clicker questions and more challenging questions. In the words of one student: "The more clicker questions, the better! I noticed that if there were more clicker questions, I was more focused and willing to interact with my peers. It also highlighted what parts of the lecture I did not understand and would have to review carefully before the exam. The clicker questions were definitely helpful in preparation for the exam."

In striving to design and implement complex and diverse clicker questions, my personal approach to teaching and my experience in the classroom has changed in positive ways. During the process of designing a lecture, I start thinking about how clicker questions can be used as an integral part of the lecture, rather than as a last-minute addition. I design questions for knowledge assessment, content delivery, and application. I try to predict possible voting outcomes, prepare explanations for answers, and plan appropriate follow-up for various scenarios.

It is hard for students and instructors to stay focused in a traditional lecture. I appreciate the break from lecturing while students are answering clicker questions. I try to plan a clicker question (or other break from lecturing) every 15-20 minutes during class. Clicker questions keep *me* engaged during a lecture. I enjoy the excitement I feel in anticipation of seeing the answers to the clicker questions. I also like the challenge of spontaneously generating an effective and appropriate response to the voting results.

Other thoughts

In our experience, the current iClicker system used on the Homewood campus is easy to set-up, simple to use, and extremely reliable. Outstanding technological support is provided by Brian Cole in the Center for Educational Resources. Due to widespread campus use, students will likely have a registered clicker before arriving in your class. While implementing clicker use does present a range of challenges for the instructor – e.g., writing effective questions, responding appropriately to answers, and predicting the time allotment for each question – I have found that the benefits are worth the effort. Our team's success in incorporating sophisticated clicker questions in large lecture-based classes has inspired me to work towards a blended classroom experience that relies heavily on clickers. I encourage other instructors to do the same.

Author's background

Kathryn Tifft,
Lecturer, Biology Department, JHU

Katie Tifft has taught in the Department of Biology at Johns Hopkins since 2011. She currently co-teaches in the Biochemistry and Cell Biology courses as well as a seminar course for students in the Biology Master's program.

The Innovative Instructor

Technology

Vol. 12 | April 2015

Piazza

Reid Sczerba, Multimedia Developer, CER

What it is

Piazza is an online question and answer style discussion board that offers useful features for facilitating communication among students, teaching assistants, and instructors. It provides a means to gauge student understanding of course concepts and allows instructors to engage with the students in an intuitive way in real time.

piazza
Ask. Answer. Explore. Whenever.

Who produced it

Piazza grew around the idea of students sharing knowledge. The developer, Pooja Sankar, felt there could be a better way for students to share their knowledge with each other in an effort to understand complex course topics. As one of three female students in a majority male undergraduate computer science class, she found it difficult to reach out for help, and suspected this was a common problem. Piazza was created as way for all students to be able to crowd source their peers for assistance.

Why it was made

The power of anonymity in this application becomes a motivator for students who might otherwise be reluctant seek help. Instructor involvement is also an important aspect of this application. Since all of the questions and posts occur in one place, the instructor can review Piazza activity and provide support when needed.

How it can be used

Students start by posting questions about course topics. These could be questions about an assignment or a subject presented in lecture. If other students have answers to those question, they can provide preliminary responses. Just as with a wiki page, all of the students have the ability to edit answers to improve their clarity.

Students can continue the conversation by posting follow-up discussion threads to questions in real-time, giving others the immediate sense that they are not be struggling alone. Students who are having trouble with the same topic can "pin" a question to bring attention to it. At any point, the instructor can endorse a student's answer or answer a question directly if other students are having trouble providing correct information. Instructors can also gauge student participation by using the site's statistics. These analytics provide insights on how well the students are understanding course concepts. Piazza provides a formative assessment that allows instructors to adjust their teaching to clarify misunderstandings or confusion.

Piazza has a number of features that distinguish it from a standard discussion board tool. There is a clear scheme for organizing student posts and instructor feedback so that students can easily locate relevant material. This can reduce the number of duplicate emails sent to the instructor by students asking the same or similar questions.

While anonymity may be useful for some classes, instructors can allow students to submit anonymously or not. If the instructor chooses the latter option, students can still

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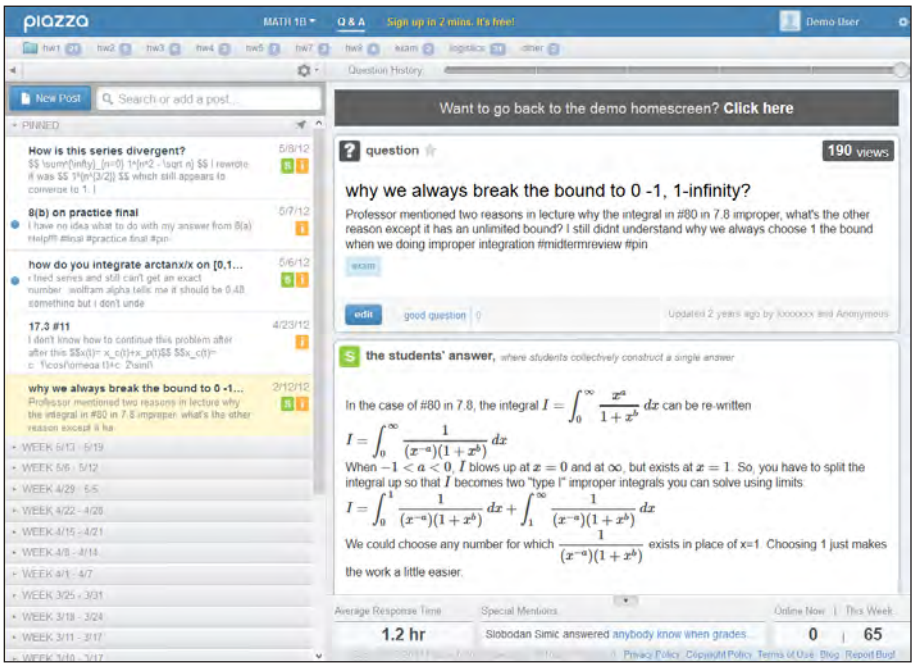
post questions privately, which will only be seen by the instructor. If students don't post anonymously, it is possible for an instructor to award extra credit to students who post particularly good questions or who provide answers of benefit to the whole class.

Another useful feature is the variety of formats for posting questions, such as code blocks and equations (using LaTeX). This allows questions to be detailed and specific. This is one of the reasons why Piazza has become a favorite application in programming and math courses.

Piazza has features similar to a learning management system such as Blackboard, in that instructors can post documents, images, videos, syllabi, office hours, and contact information. Piazza can be linked to a learning management system as an external tool so that instructors do not have to duplicate files in two environments and can use its rich features for discussion.



Who's using it

JHU faculty in computer science and applied mathematics and statistics have used Piazza over the past few years.

Where it is going

Piazza is committed to keeping the application free for educational use. To further this commitment, Piazza has developed tools for corporate use that provide a revenue stream.

How to get started

As Piazza is an online service, you will need to set up an account. This is done through the class creation process. You can review the instructions on the Piazza help page. Once the class is created in Piazza and the students are imported (via their emails), you can create a link in Blackboard to launch Piazza in another window. Please refer to the links below for directions on how to add a Piazza class and link to it in your Blackboard course.

Other Thoughts

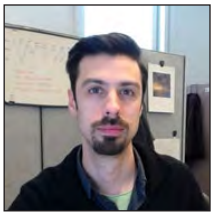
Piazza's website suggests that using Piazza can make you a better instructor. There are a number of reasons why this may be true. The real time updates of student activity allows instructors to evaluate the effectiveness of their instructional strategies. Also an instructor can prompt formal assessment by using "polls" so that students provide anonymous feedback about specific questions, assignments, lectures, or more general course concepts. This kind of formative assessment helps instructors make changes or provide additional support to foster greater student comprehension.

Additional Resources

- Piazza's help page:
  https://piazza.com/support/help
- Adding a link in Blackboard to Piazza:
  http://help.sset.jhu.edu/display/Bb/Add+a+Piazza+Link+to+Your+Blackboard+Course
- Helpful tips from Piazza:
  https://piazza.com/product/best_practices

Author's Background

Reid Sczerba,
Multimedia Developer, Center for Educational Resources, JHU



A staff member at the Center for Educational Resources, Reid provides training on a variety of programs, aids in educational resources development, and shares expertise on information and graphic design with faculty at the Homewood campus. He holds a BFA in Illustration and a MA in Digital Arts from Maryland Institute College of Art.

The Innovative Instructor

Best Practice

Vol. 11 | November 2014

Creating Rubrics

Louise Pasternack, Teaching Professor, Chemistry

What it is

Instructors have many tasks to perform during the semester. Among those is grading, which can be subjective and unstructured. Time spent constructing grading rubrics while developing assignments benefits all parties involved with the course: students, teaching assistants and instructors alike. Sometimes referred to as a grading schema or matrix, a rubric is a tool for assessing student knowledge and providing constructive feedback. Rubrics are comprised of a list of skills or qualities students must demonstrate in completing an assignment, each with a rating criterion for evaluating the student's performance. Rubrics bring clarity and consistency to the grading process and make grading more efficient.

Rubrics can be established for a variety of assignments such as essays, papers, lab observations, science posters, presentations, etc. Regardless of the discipline, every assignment contains elements that address an important skill or quality. The rubric helps bring focus to those elements and serves as a guide for consistent grading that can be used from year to year.

Why does it matter

Whether used in a large survey course or a small upper-level seminar, rubrics benefit both students and instructors. The most obvious benefit is the production of a structured, consistent guideline for assigning grades. With clearly established criteria, there is less concern about subjective evaluation.

Once created, a rubric can be used every time to normalize grading across sections or semesters. When the rubric for an assignment is shared with teaching assistants, it provides guidance on how to translate the instructor's expectations for evaluating student submissions consistently. The rubric makes it easier for teaching assistants to give constructive feedback to students.

In addition, the instructor can supply pre-constructed comments for uniformity in grading.

Some instructors supply copies of the grading rubric to their students so they can use it as a guide for completing their assignments. This can also reduce grade disputes. When discussing grades with students, a rubric acts as a reminder of important aspects of the assignment and how each are evaluated.

How to do it

Below are basic elements of rubrics, with two types to consider.

I. Anatomy of a rubric

All rubrics have three elements: the objective, its criteria, and the evaluation scores.

Learning Objective

Before creating a rubric, it is important to determine learning objectives for the assignment. What you expect your students to learn will be the foundation for the criteria you establish for assessing their performance. As you are considering the criteria or writing the assignment, you may revise the learning objectives or adjust the significance of the objective within the assignment. This iteration can help you hone in on what is the most important aspect of the assignment, choose the appropriate criteria, and determine how to weigh the scoring.

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Criteria

When writing the criteria (i.e., evaluation descriptors), start by describing the highest exemplary result for the objective, the lowest that is still acceptable for credit, and what would be considered unacceptable. You can express variations between the highest and the lowest if desired. Be concise by using explicit verbs that relate directly to the quality or skill that demonstrates student competency. There are lists of verbs associated with cognitive categories found in Bloom's taxonomy (Knowledge, Comprehension, Application, Evaluation, Analysis, and Synthesis). These lists express the qualities and skills required to achieve knowledge, comprehension or critical thinking (Google "verbs for Bloom's Taxonomy").

Evaluation Score

The evaluation score for the criterion can use any schema as long as it is clear how it equates to a total grade. Keep in mind that the scores for objectives can be weighted differently so that you can emphasize the skills and qualities that have the most significance to the learning objectives.

II. Types of rubrics

There are two main types of rubrics: holistic (simplistic) and analytical (detailed). Selecting your rubric type depends on how multi-faceted the tasks are and whether or not the skill requires a high degree of proficiency on the part of the student.

Holistic rubric

A holistic rubric contains broad objectives and lists evaluation scores, each with an overall criterion summary that encompasses multiple skills or qualities of the objective. This approach is more simplistic and relies on generalizations when writing the criteria. The criterion descriptions can list the skills or qualities as separate bullets to make it easier for a grader to see what makes up an evaluation score. Below is an example of a holistic rubric for a simple writing assignment.

Evaluation Score	Criterion
Proficient, 10pts	Writer expresses ideas clearly and provides logical references and citations. Attention is given to the audience and writer avoids the use of jargon or idioms. There are no grammatical or writing mechanic issues.
Adequate, 6pts	Writer's ideas are clear but lack suitable references for defense of the ideas. Jargon or idioms appear occasionally. There are a few grammatical or writing mechanics issues.
Inadequate, 3pts	The writer's ideas are muddled and few references or citations are given. Jargon or idioms confuse the audience. There are more than 5 grammatical or writing mechanic issues.

Analytical rubric

An analytical rubric provides a list of detailed learning objectives, each with its own rating scheme that corresponds to a specific skill or quality to be evaluated using the criterion. Analytical rubrics provide scoring for individual aspects of a learning objective, but they usually require more time to create. When using analytical rubrics, it may be necessary to consider weighing the score using a different scoring scale or score multipliers for the learning objectives. Below is an example of an analytical rubric for a chemistry lab that uses multipliers.

Objectives	Excellent (3pts)	Acceptable (2pts)	Needs work (1pt)	Missing (0)
Multiplier x1 **Identification of potential errors** • Solubility of product • Losses when filtering • Transfer losses from filter paper to vial	Recognizes all 3 of the major losses with no major errors identifying errors.	Recognizes 2 out of the 3 major losses but has a major error in understanding.	Recognizes 1 or 2 out of the 3 major losses with a major error.	Does not recognize any of the potential errors.
Multiplier x2 **Procedures used to minimize errors** • Amount of water minimized • Acetone was added • Care taken to minimize transfer loss	Recognizes at least 2 of these techniques with no major errors in techniques.	Recognizes at least 1 with no major errors in identifying procedures or 2 with 1 major error.	Recognizes 1 procedure, but has other errors in identifying procedures.	Does not recognize any of these procedures.

Other thoughts

It is beneficial to view rubrics for similar courses to get an idea how others evaluate their course work. A keyword search for "grading rubrics" in a web search engine like Google will return many useful examples. Both Blackboard and Turnitin have tools for creating grading rubrics for a variety of course assignments. For more information, please contact cerweb@jhu.edu.

Best Practice

Author's Background

Louise Pasternack

Teaching Professor, Chemistry, JHU

Louise Pasternack earned a Ph.D. in chemistry from Johns Hopkins. Prior to returning to JHU as a senior lecturer, Louise Pasternack was a research scientist at the Naval Research Laboratory. She has been teaching introductory chemistry laboratory at JHU since 2001 and has taught more than 7000 students with the help of more than 250 teaching assistants. She became a teaching professor at Hopkins in 2013.

The Innovative Instructor

Pedagogy

Vol. 11 | November 2014

Getting to the Source of the Problem

Bill Leslie, Professor, Department of History of Science and Technology

The issue

Even the smartest undergraduates need to be taught that everything worth knowing won't be found on a smart phone. Luckily, the Homewood campus offers endless opportunities for teaching from primary sources. The Hamburger Special Collections and Archives has everything from rare books, official university records, and historic photographs to films and artifacts, including a growing collection devoted to undergraduate life. Beyond the library there's another world of primary documents to discover—artwork, memorials, even the very buildings where our students live and learn. With the right tools, and some help from the Center for Educational Resources (CER), I tried to bring these sources to life for the students and get them out of the classroom to experience the campus in an entirely new way.

Why does it matter

Using new media, our students can interpret and showcase these primary documents in ways that are exciting, relevant and accessible. For students accustomed to Google searches and textbooks, confronting a primary document, on paper or on site, can be a real eye opener. Reading about chemist Ira Remsen is one thing. Putting your hands on his original letter to Daniel Coit Gilman seeking employment at the new Johns Hopkins University is another. So is poring over his original laboratory notebooks and student lectures. Suddenly his ashes and the accompanying memorial plaque in Remsen Hall look very different. You can walk by the Greenhouse and the President's Garden for four years and hardly notice. Spend some time with the photograph collection and the records of the McCollum-Pratt Institute and you realize that here was the first laboratory on the Homewood campus, a working botanical garden, and the birthplace of molecular biology at Johns Hopkins. Follow a freshman student during his or her first year at the university through a film, and you appreciate how much has changed since then, and how much has not.

Faculty solution

For my course *Johns Hopkins: The Idea of a University*, I wanted the students not only to master new research skills, but to learn from one another and to present their findings in a novel way. There were sixteen freshmen in this writing intensive course, co-sponsored by the Program in Museums and Society. The students came from the sciences, social sciences, engineering and the humanities; some were tech savvy and others not. The students selected 'hot spots' on the Homewood campus, places where something significant had happened. We discussed their initial choices collectively, did further research to assess existing primary sources, then narrowed the list to eight, with two students assigned as a team to tell the story of each 'hot spot'.

I wanted an environment where students could share their research using a collaborative, web-based platform. In consultation with the CER, we selected Google Sites, which provided robust functionality with a low learning curve and short setup time. Since the projects had a strong spatial component, we also included Google Maps so that the students could identify the location they were researching on the campus map and have it embedded in the Google Site. As the students began discovering sources they wanted to include (video, historic documents, photographs and their own interviews), they would upload them to

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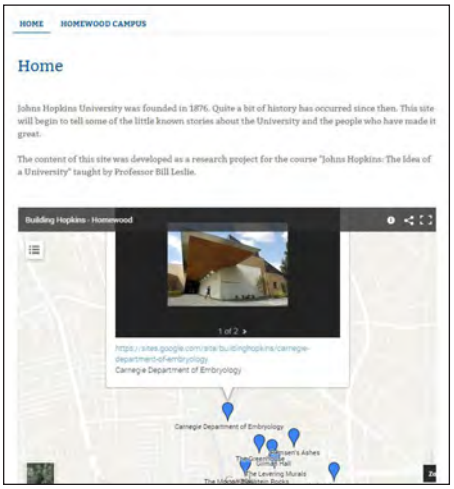

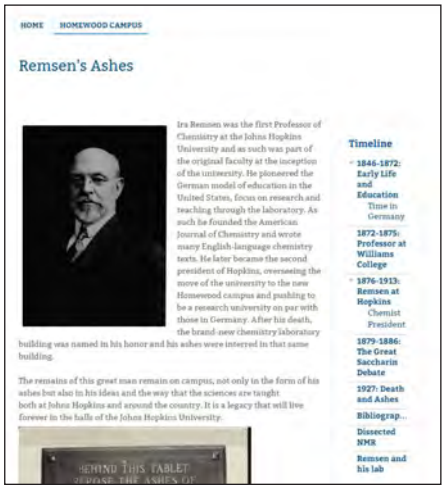

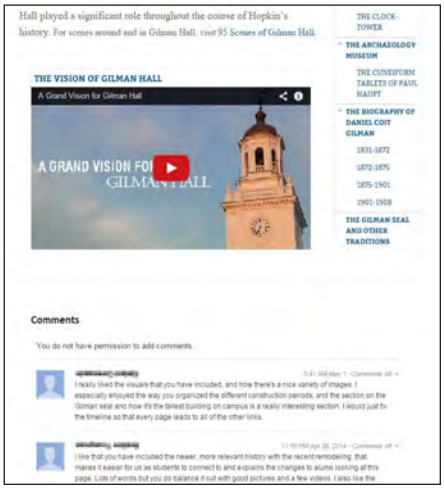

a class folder in Google Drive, which integrates well with Google Sites. Over time, each team amassed an impressive collection of primary materials.

Early on, I told the students that the site would not be public so that they could focus on learning without feeling the whole world was looking over their shoulders. To foster a collaborative atmosphere, I had the students critique one another's work each week and provide written feedback right on the project pages. Did this image work well? Was that document clear? Could you edit down the interview without losing anything important? What kinds of primary material did you still need to tell the story more fully? The students also gave each other valuable technical tips on how to use the site efficiently. Working together, the class had almost no difficulty learning how to post content and design the layout.

Results

The student reaction to the project was overwhelmingly positive, judging from class evaluations and personal discussions with individual students. Several of the students asked to continue working on their projects after the class had ended. Students often discovered hidden talents and developed new skills. One student did such a fine job interviewing a faculty member that I asked if he'd ever considered a career in filmmaking. Not until now, he answered! All of the students learned how to tell stories in words, images and sounds, and a few turned out to be gifted web designers. Working with tight word limits also honed their writing skills.

The three Google applications worked extremely well together. The students almost immediately felt comfortable with the technology and could draw on a "how-to" workflow developed by the CER for this course. CER staff met with the class early in the term and answered student questions over the course of the semester. Initially, we used the Google Site storage allotment. The sheer amount of material collected by the students quickly overwhelmed it. With the help of CER, we changed the workflow for uploading material by setting up a private class folder in Google Drive. This proved to be an efficient solution since embedding resources from Google Drive into the Google Site was simple, allowing all of the resources to be stored in one place. An additional advantage was being able to archive what the students had collected.

This was my first class project using Google applications, but it won't be the last. Next semester we'll look at 'hot spots' in the history of Johns Hopkins medicine. For the first assignment, I will have the students take a look at what their predecessors have done and critique it. We could scale up the applications for a larger class, but for now I'm more comfortable with the seminar format. I just returned from a professional society meeting where I shared my experiences with the Google Sites tools. My colleagues showed as much enthusiasm for the approach as the students, so we may see similar 'hot spot' maps popping up at other universities in the near future. Stay tuned.

Author's background

Bill Leslie
Professor, Department of History of Science and Technology, JHU

Bill Leslie has taught at Johns Hopkins since 1981. His favorite courses include "Monuments and Memory", "Las Vegas: The Eight Wonder of the World" (with field trip), and "Science on Display". He is currently writing a history of the university. His upcoming spring course, a freshman seminar on Johns Hopkins medicine, will build on the innovations discussed in this article.

The Innovative Instructor

Technology

Vol. 11 | November 2014

Prezi

Macie Hall, Instructional Designer, CER

What it is

Prezi is a free, cloud-based, presentation tool that allows users to place content on a screen in non-linear order. Prezi uses a Zooming User Interface (ZUI) to enable navigation and display of content. ZUI is a term used in computing to describe a graphical environment wherein users can change the size of a viewing area by enlarging or reducing it, navigate by panning across a surface, and zoom in and out of content.

Why it matters

Prezi presentations are inherently dynamic and this feature can be used with advantage to keep audiences engaged.

Prezi offers lots of options for design. You can choose a preset template, which in Prezi is used to refer to a background, or use a blank canvas. The templates include two different types of world maps, either of which would work for geographic content. Another template is a subway map-style schema that would be useful for demonstrating workflows or processes. With either the blank canvas or a template, you have a choice of about 20 themes you can use. Further customizations are possible, including uploading an image file to serve as your background and creating your own theme. For advanced users, there is a CSS editor. Like PowerPoint or Keynote, preset layouts are available for the framed content areas.

Images can be embedded and YouTube videos can be inserted in a Prezi. You can insert the following video file formats—FLV, MOV, WMV, F4V, MPG, MPEG, MP4, M4V, and 3GP. Other videos found online can be linked from the presentation. Sound can be an important component and Prezi supports voice-over narrations and music as a background track or applied to specific path steps. Supported audio files include: MP3, M4A, FLAC, WMA, WAV, OGG, AAC, MP4, and 3GP.

One of the best features of Prezi is the ability to zoom out to see the big picture—the layout of the entire canvas. This kind of visualization can be very powerful in a presentation.

Since Prezi is cloud-based, you can present from your browser, desktop, iPad, or iPhone and always have the latest version of your work at your fingertips. Create or edit on the go, then auto-synchronize across all your devices with ease.

Who produced it

Prezi was in 2008 created by three Hungarians: Péter Árvai, Szabolcs Somlai-Fischer, and Péter Halácsy. They wanted to provide an alternative to the linear, slide-based formats of PowerPoint and Keynote. The word prezi is the Hungarian short form of presentation.

The Prezi website describes the application as "…a virtual whiteboard that transforms presentations from monologues into conversations: enabling people to see, understand, and remember ideas."

Why it was made

Prezi takes a different approach to presentations. Instead of slides that advance in linear order, Prezi gives the user a blank canvas with flexibility in determining the order in which content is presented. Think of the canvas as a blank background waiting for content. Content is placed in bracket-style, rectangular or circular frames. The content can be placed on the canvas in any order. The user can then create a set path to allow for a planned progression through the material or focus on specific topics as desired. Overall, the interface for adding and customizing content is easy to understand and use. Because the content appears to float on the Prezi canvas, there is a sense of spatial perspective, or a three dimensional effect.

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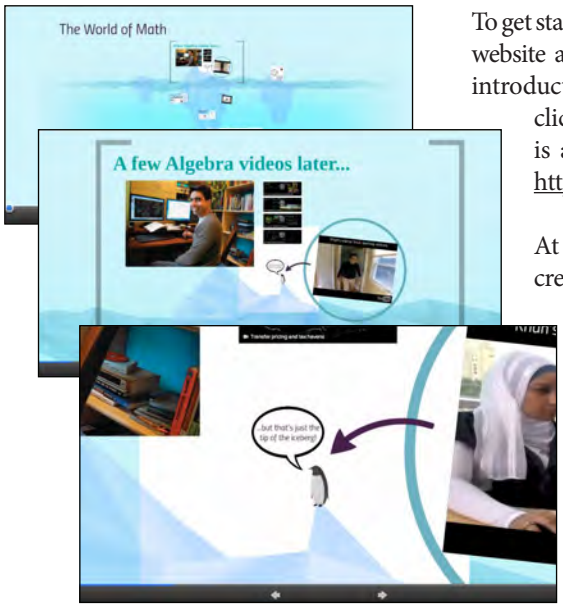
How it can be used

Because Prezi is cloud-based, it is possible to have multiple users collaborate on a presentation. With Prezi, you can co-create in real time with up to ten other users. Each user must have a Prezi account. This feature allows students to work together on a class assignment. When using the free version of the application, presentations are public by default. Users should be aware of this when creating content and care should be taken when using material that may have rights protection. Due to the ability to move from big picture to small detail, Prezi presentations are particularly suited to assignments that allow student to explore and reflect.

If you would like to reuse existing content, it is possible to import PowerPoint slides to Prezi, one at a time or as an entire presentation, with or without a pre-determined path. You can save a Prezi as a PDF, print your Prezi, or export it as a portable Prezi if you need to present in a venue without Internet access.



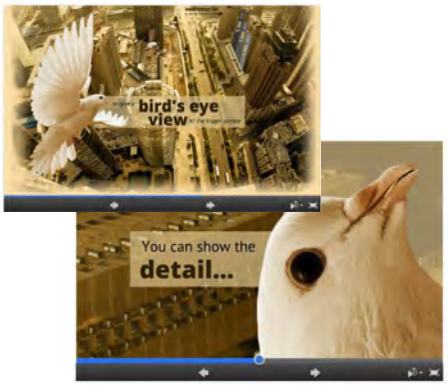
Where it is going

Prezi is always adding new features and improving existing ones. The application has its admirers and detractors. While it is unlikely to unseat PowerPoint or Keynote in popularity, it does have advantages for certain situations as mentioned above. Prezi should be seen as another tool to add to your teaching kit. The low learning curve makes it easy to get up and running, so experiment to see where it might meet your instructional objectives.

How to get started

To get started, create an account on the Prezi website at http://prezi.com. Watch a short introductory video or just plunge in by clicking the Get Started button. There is a Support page if you get stuck. https://prezi.com/support.

At the free end, all content that is created is public and users are given 100 MB of storage. For a small monthly fee, users have the option to keep presentations private and receive 500 MB of space. There is also a desktop version of the program available for an annual fee. This comes with additional editing features and unlimited storage space.



To get a better sense of what Prezi is and can do, take a look at some of the examples provided on the Prezi website.

Other Thoughts

Prezi was developed using Adobe Flash and as such, is not considered fully accessible by users with disabilities requiring the use of screen readers. Since July 2014 viewing Prezi is possible using only JavaScript. While this does not fully address accessibility, Prezi appears to be moving to correct these issues. Meanwhile, educators should be aware that Prezi is not ADA/508 compliant. An accessible PowerPoint version of the presentation can be provided for students requiring screen readers.

Some viewers find the ZUI to be distracting, even motion-sickness inducing. Careful use of the ZUI by the creator can minimize this consequence and turn it into an effective tool. With a little practice you will master the balance between dynamism and disruption.

Additional Resources

- Prezi offers a tutorial on transitions: http://prezi.com/wf7mxfwgec8n/official-prezi-transitions-tutorial
- No matter which presentation tool you use, thinking about best practices will be of benefit. Here are two good resources available in the JHU Sheridan Libraries catalog:
  - Duarte, Nancy. Slide:ology: The Art and Science of Creating Great Presentations. Beijing: O'Reilly Media, 2008.
  - Reynolds, Garr. Presentation Zen: Simple Ideas on Presentation Design and Delivery. 2nd Edition. Berkeley, CA: New Riders Publishing, 2012.

Author's Background

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Macie Hall (macie.hall@jhu.edu) has provided instructional technology support to JHU faculty since 1987. She edits and writes for the blog, *The Innovative Instructor* (http://ii.library.jhu.edu). In addition to working with faculty to implement best practices for teaching, she is interested in visual literacy and effective presentation techniques.

The Innovative Instructor

Best Practice

Vol. 10 | April 2014

Preparing an Effective Syllabus

Richard Shingles, Lecturer, Biology Department

What this is

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What it is

A course syllabus can be more than a list of class topics and readings. It can give students an immediate sense of what the course will be about, what they will learn, and how they will be evaluated. A syllabus can provide students with an clear understanding of expectations, course support, and proper conduct in class. It is a students' "first impression" of your course, which will resonate through the semester and excite them about the course content they will soon learn.

Why does it matter

Students on the first day of class are highly observant of the tone you set for the course. The syllabus is a great tool for listing assignments and readings, but it can also provide students with a clear set of expectations about other elements of the course. These can be an attendance policy, the grading protocol, and even behavioral considerations. Think of the syllabus as an implicit teaching-learning contract to help the students avoid any misunderstandings as the semester progresses.

At the beginning of the semester students often visit multiple classes to decide which courses will best fit their schedule, seem to be the most exciting, and may be the easiest fit for their class schedule. The syllabus works well as vehicle to excite your students and convince them that your course will be well worth their time. The more attention you put into your syllabus, the more your students will acknowledge your own passion for the subject.

How to do it

The following are ideas that have come from conversations with faculty about their syllabi and from other resources:

I. General strategies

- **Try to anticipate and answer student questions** with information provided in the syllabus. This will help reduce confusion and lessen its impact on your inbox and office hours.
- **Keep the schedule flexible** when possible by listing broad topics for the week versus specific topics per class.
- **Consider putting more content in your syllabus rather than less.** Whatever is not covered can be useful as supplemental material.

II. Topics overview

- **Provide basic information and brief background for a topic.** This can help orient the students to what will be involved when you begin the topic.
- **Restate the course prerequisites.** Prior courses' content help frame the new content of your course.
- **Give an overview** of the purpose of your course.
- **State general learning goals or objectives.** These are important to include as they give insight on what students need to know and how they will be assessed.

III. Course structure/materials

- **Describe your course format** - e.g., lecture-based, active learning, writing intensive, etc. You can also consider listing percentages of how much one format will be used over others.
- **Specify textbook(s) and readings.** These could be divided between mandatory and further reading sections.
- **List supplementary materials for course,** which can include information resources, tools, blogs, etc.
- **Provide a course calendar,** listing due dates for assignments and papers and exam dates. This will help students anticipate the workflow for your class.

IV. Policy

- **Describe grading, grade distributions and evaluation.** You can state the method of grading that you will use, whether you plan to use a bell curve, clumping, quota system, or criterion-referenced grading method. For more information on these methods, refer to the "To Curve, or Not to Curve" linked below.
- **Stipulate course policies.** Here is where to state your attendance policies, late submission grade adjustments, methods for extra credit, etc. To avoid confusion and arguments with students, your policies should be clearly stated.
- **Consider including a formal covenant or code of conduct** for your students to sign. A formal commitment from the students fosters mutual understanding and respect between the students and you concerning chatting, emailing, and other disruptive activities. For more information, refer to the "Creating a Covenant with Your Students" article listed below.
- **List any departmental or university policies,** such as ethics policies, classroom accommodations for students with disabilities, and a statement of diversity accommodation and inclusion.

V. Additional support info

- **Provide a list of university support offices,** such as the Counseling Center, the Office of Student Disability Services, the Writing Center, the Library's Research Librarians, etc.
- **List important dates for the academic year,** such as add and drop dates and grade appeal deadlines. This is convenient for both you and the students to be aware of.
- **Indicate supplementary study aids,** such as mentors, online resources, tools, etc.
- **Don't forget to include your office hours**.

Additional Resources

- *Syllabus*, An online, peer-reviewed journal that displays syllabi
  http://www.syllabusjournal.org
- *Open Syllabus Project*, An online database of university syllabi
  http://opensyllabusproject.org
- Article on grading methods, *To Curve, or Not to Curve*:
  http://www.cer.jhu.edu/ii/InnovInstruct-BP_toCurveOrNotToCurve.pdf
- Article on formal student agreements, *Creating a Covenant with your Students*:
  http://www.cer.jhu.edu/ii/InnovInstruct-BP_pforni1.pdf
- Related Innovative Instructor blog post
  http://ii.library.jhu.edu/2013/11/01/rebooting-your-syllabus

Using the syllabus

For the instructor, use of the syllabus doesn't end with distributing it to your students. Keep a copy handy and annotate it as the semester progresses. Perhaps you find you need to spend more time on a particular topic, or that the first assignment might work better if it came a week later. It's good to have a copy on hand to remind students that yes, you did state that you have a no make-up policy for quizzes. You should also post the syllabus online to your Blackboard (or other LMS) course site.

Syllabus design

How your syllabus looks can have an effect on how your students perceive your passion for teaching this class. Since a bulleted list can be uninspiring, consider adding meaningful images to your syllabus to intrigue your students and make it more visually appealing. Also, most word processing programs have built-in design templates that can not only enhance the appearance of your syllabus, but also help structure/layout your content. Thinking about a syllabus as a brochure for your class can help you break free from the typical bulleted list and persuade students to choose your class over others. Being thoughtful about how you present your syllabus is a great opportunity to show your students how much you care for the subject. Give them confidence in your professorial professionalism.

Final thoughts

Looking at related course syllabi may help provide insight into what content to include and how to structure your own syllabus. Check with other faculty in your department who might share their syllabi. There is no harm in using other instructors' ideas to improve the educational experience of the students in your class.

Author's Background

Richard Shingles,
Lecturer, Biology Department, JHU

Dr. Richard Shingles is a faculty lecturer in biology and teaches undergraduate and graduate courses at JHU. Dr. Shingles also works as a Senior Instructional Designer and Pedagogy Specialist with the Center for Educational Resources. He supports and counsels faculty, graduate students, and course developers. Dr. Shingles has been the director of the TA Training Institute at Johns Hopkins University since October 2006 and he also instructs in the Preparing Future Faculty Teaching Academy (PFF TA) program at JHU.

The Innovative Instructor

Pedagogy

Vol. 10 | April 2014

Interactive Collaboration Using Facebook

Dr. Alexios Monopolis, Lecturer, Earth and Planetary Science

The issue

When I started teaching at Hopkins, Blackboard was offered as the course management system and most faculty seemed to be using it as their primary means of communication with students. Although Blackboard has some useful functions, I was looking for a different set of utilities – ideally, a class communication solution that students would find intuitive, easy to use, and interactive. Facebook is an application that most students are already quite familiar with and have incorporated into their daily lives. It became the obvious choice to help connect and engage my students outside of our formal in-class hours.

Why does it matter

I wanted an online application that would facilitate communication and collaboration between faculty and students, allowing for interaction and the sharing of information beyond the confines of our formal classroom. It needed to be asynchronous so that students could easily access and use it at any time. I also wanted a way for students to reflect on the content learned in the classroom, as self-reflection is an important means of reinforcing learning. With Facebook, when one student offers an observation or posts an article, video or link, others can respond by commenting on the post. Although Blackboard offers a discussion board tool, Facebook has the advantage of being instantly familiar to students, and they have no hesitation using it. Its interface is also simpler and more intuitive.

Faculty solution

To be more specific, I created Group pages in Facebook for the students in my fall courses, *Environmental Photojournalism & Filmmaking in the Era of New Media* and *Designing Sustainable Wellness*. Using a Group solved potential challenges that might immediately occur to faculty when considering using Facebook. You don't need to have a formal, online connection with students for them to access the site, thus ensuring their privacy and your own. But you can still keep course communications open only to students by adjusting the Group privacy settings and requiring students to "request to join." The faculty administrator then approves each request ensuring that none but registered students can access the Group content.

Facebook allows the creation of *Pages* and *Groups*, which at first glance may appear similar. *Pages* allow organizations, businesses, celebrities, and brands to communicate broadly and can be created only by official representatives. *Groups* provide a closed space for small groups of people to communicate about shared interests; they can be created by anyone. For my purposes, a group was the best solution. Groups include the following features:

- **Privacy**: In addition to an open setting, a group can be made closed or secret (not searchable). Making the group secret or closed will mean that student posts are visible only to you (the instructor) and to the other students in the group.
- **Audience**: Group members must be approved or added by the creator/administrator of the group. When a group reaches 250 members, some features, such as group messaging, are limited. The most useful groups will be ones you create with small numbers of students.
- **Communication**: In groups, members receive notifications by default when any member posts in the group. Group members can participate in chats, upload photos to shared albums, and collaborate on group documents.

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As the creator of a group, you will be the administrator and can control who joins the group. You can invite students to join the group by clicking *Invite by Email* in the top right of your group settings or by selecting a unique, easy to remember web address that you then share with the class.

Facebook provides detailed Help on setting up groups. To create a group:

1. After logging in, go to the Groups section on the left side menu and click Create Group.
2. A window will appear where you'll be able to add a group name, add members, and select the privacy setting for your group. Click Create when you're done.
3. Once the group is created, you'll be taken to the group. To get started, click the "gear" button at the top right of the group and select Edit Group Settings. From here you can add a group description, tags, set a group email address, add a group picture, and manage members.

The Facebook groups allowed students in my classes to continue discussions that began in class and to initiate new ones outside of class. Students are able to post links, articles, and videos, and to comment on other students' postings. They can also upload and share their created content – in the case of my *Environmental Photojournalism & Filmmaking* class, their photo essays and video rough cuts – to receive preliminary or additional faculty and peer feedback before finalizing their work/projects.

At the beginning of the semester, I made students aware that their participation grade would not be based solely on attendance and making a prepared comment during each class session. Rather, their grades would reflect the degree to which they actively engage in well-informed discussions, both in the classroom and on Facebook. For Facebook activity, I take into account both the number of posts and the level of engagement and interaction with other students' posts in assessing a portion of each student's final participation grade.

Results

So far, I have not experienced any significant disadvantages to using Facebook. Students in the two classes were actively engaged both in class and on Facebook. Of course, it certainly helped that these classes were limited enrollment. In a larger class setting it could be challenging to track and assess students' participation in the group discussions. I have been fortunate that all of my students were Facebook users and did not object to using Facebook for academic purposes. In the future, if a student does not already have and does not want to open a Facebook account to join the group, an accommodation would be necessary.

Considering the high levels of participation, I believe students enjoyed using Facebook as an additional communication platform and found it useful during the course of the semester. In addition, many of the students continue to use the Facebook group and contribute to it periodically, even though the semester is long over and their course work is completed.

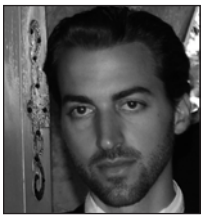
I don't believe my teaching has changed in any specific or dramatic way – Facebook has simply added an additional space through which I can facilitate learning, engagement, reflection, and interaction beyond the classroom.

Additional resources

- Groups in Facebook
  https://www.facebook.com/help/162866443847527

Author's background

Dr. Alexios Monopolis,
Lecturer, Earth and Planetary Science, JHU



Dr. Alexios Monopolis teaches in the Global Environmental Change & Sustainability (GECS) program at Johns Hopkins and serves as the program manager for JHU's Sustainability & Health doctoral program (currently being developed through the Provost's Ph.D. Innovation Initiative). Dr. Monopolis has completed 6 degrees in a variety of fields from Harvard University, Oxford University, Dartmouth College, and the University of California. His current research focuses on the psychological dimensions of sustainability. In addition to teaching Hopkins students, Dr. Monopolis serves as the strength and conditioning coach for the JHU Men's and Women's swim teams.

The Innovative Instructor

Technology

Vol. 10 | April 2014

Panopto

Brian Cole, Information Technology Specialist, CER

What it is

Panopto is a service that enables easy video capture, streaming, and sharing. While traditionally categorized as a lecture capture service, Panopto can do much more.

Who produced it

Panopto is headquartered in Pittsburgh, Pennsylvania. It was founded by two Carnegie Mellon University professors as an extension of lecture capture/presentation software developed there. Johns Hopkins has a contract with Panopto to provide hosting, storage, and streaming of media.

Why it was made

Panopto simplifies the complex task of recording lectures and presenting pre-recorded lecture information. Before Panopto (and similar current competitors), recording lectures required a hodgepodge of cameras, microphones, and screen capture software as well as many hours of post processing. Panopto, on the other hand, will run on any Windows or Mac computer and can record anything the computer can "see" – screen shots, presentation slides (PowerPoint, Keynote), and video and audio sources. It packages all of these elements automatically and presents them in an easy to view format.

Why it matters

Panopto is important for several reasons. Lectures are often dense and packed with complex information. It is not always possible to stop the lecture, repeat sections, or review. By capturing the lecture, students can review specific segments at their own pace after class. Panopto makes it easy to jump to a specific point in the recording and play that segment as many times as needed. Panopto also easily pre-records entire lectures or modules. This is useful in the context of online courses, flipped courses, or when the faculty member must miss a class.

A common concern among faculty when students request lecture recordings is that students will stop coming to class. Though this is always a possibility, our experience is that using Panopto does not negatively affect attendance, and often increases student satisfaction with lectures.

Who's using it

More than 1200 recordings have been posted to the Panopto service by JHU faculty members and students from disciplines as diverse as physics, humanities, biology, and computer science, to name a few. These recordings have been viewed over 50,000 times with 4,000 hours of viewing in the last six weeks alone.

How it can be used

Panopto can be used in several ways:

- **Lecture Capture**: Panopto can capture audio, video, slides, or screen activity. It can also capture just audio, just video, etc.
- **Live Streaming**: These same elements can be streamed live, with some restrictions.
- **Existing Audio/Video Files**: Panopto can be used to host and stream existing audio or video files. This alleviates storage and format issues.

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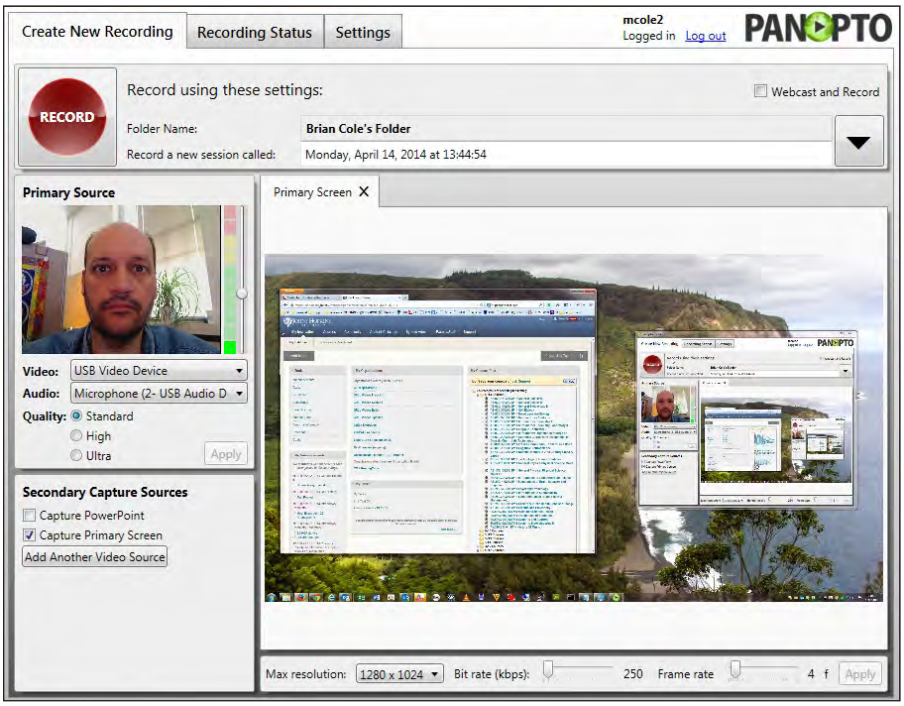


Screenshot of Panopto's recorder interface in Windows (Mac is similar)

Some faculty are using Panopto simply to capture the audio from lectures (replacing the podcasting service). Most faculty use it to capture audio+slides or audio+screen activity. Faculty have used it as a quick way to pre-record a lecture for a class they will miss, or to create a module for a "flipped" class. Some faculty record short segments that explain and illustrate core concepts so that students can review them on their own time. Panopto is being used to record student presentations for review by peers. Some departments are recording Graduate TA instructors to serve as a basis for providing teaching critiques.

Lecture capture and streaming technologies are often complex and hard to use. This limits their potential. By lowering these barriers, Panopto allows instructors to focus on the best way to accomplish their pedagogical goals, rather than how to format or where to store a file.

Where it is going

Each school will make its own decisions about supporting the JHU Panopto license. For the immediate future (2014-2015), there is a commitment from the Krieger School of Arts and Sciences and the Whiting School of Engineering full-time programs to support all faculty and students who wish to use Panopto. Based on use and feedback, this decision will be revisited during contract renewal periods.

Panopto developers are focusing on streamlining the entire process from recording to viewing. They are also putting resources into enhancing playback on mobile devices, supporting HTML 5 for browsers, and creating more robust Blackboard integration.

How to get started

To get started with Panopto, consider the following:

- Should the recordings be publicly viewable or should they be visible to only your class?
- Do you want to integrate Panopto with Blackboard?
- What do you want to record (audio, video, PowerPoint, screenshots)?

Capturing a lecture or otherwise creating a recording requires the Panopto recorder software. This software application is small and simple, and it runs on Windows and Mac. A Panopto account is required.

Nicole Pagano is the primary administrator for Panopto stand-alone accounts: npagano1@jhu.edu

If you want to integrate Panopto with Blackboard, contact Brian Cole: bcole@jhu.edu

Once you have an account or have integrated Panopto with Blackboard, you can log in, download the recorder software, and begin capturing. After capturing, the recording is uploaded to our hosted account and processed by the Panopto server. Upon completion of processing, you will be notified by email. At that point, you can set permissions to determine who can view and distribute the link. Many of these steps can be automated.

Other thoughts

Our Panopto license allows for an unlimited number of recorders and an unlimited number of recordings. It is no longer necessary to find a server with enough space for video files, format the video correctly for all viewers, or worry about network bandwidth. You can focus on recording and capturing what will best serve your students, and leave the rest to Panopto.

Author's background

Brian Cole,
Information Technology Specialist, Center for Educational Resources, JHU

Brian Cole works in the Center for Educational Resources as an Information Technology Specialist. Brian provides support and training for Homewood faculty on a number of instructional technologies. His background is in liberal arts and enterprise IT.

The Innovative Instructor

Best Practice

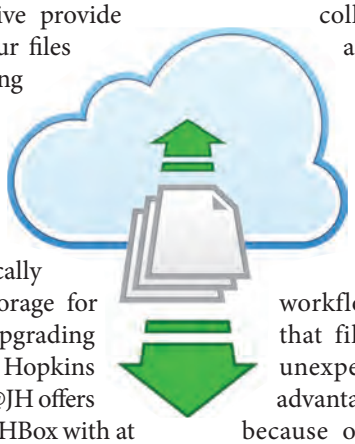
Vol. 9 | September 2014

To the "Cloud" and Back Again

Reid Sczerba, Multimedia Developer, Center for Educational Resources

What it is

The term 'cloud' refers to storing files on a remote server. Services such as Dropbox, Google Drive, and OneDrive provide cloud storage that keeps your files secure and backed up, ensuring that they are available when you need them. Access to your files will require an internet connection on your computer or mobile device. Such services typically offer a small amount of storage for free with fees charged for upgrading the services. Fortunately for Hopkins faculty, students, and staff, IT@JH offers a cloud storage service called JHBox with at least 25 gigabytes of storage per user at no cost.



Why does it matter

Most people have encountered the issue of having a file that is too large to email to a colleague. Some may have had a portable drive fail or a corrupt file wreak havoc with a presentation at a conference. These problems can be solved by 'using the cloud' for file storage. Using a file sharing/cloud service like JHBox reduces workflow delays and guarantees that files are available when the unexpected happens. JHBox has advantages over non-JHU services because of its integration with the JHED authentication system.

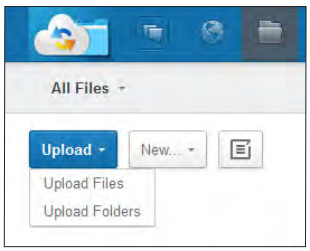
How to do it

Here is a set of instructions for uploading your files and sharing them in JHBox.

Accessing JHBox

JHBox can be found in the JHU portal menu (my.jh.edu) or accessed directly from https://jh.app.box.com. When using the direct link, be sure that you are placing your Hopkins credentials in the JH authentication screen only. Before using JHBox, you must agree to the Terms of Service.

JHBox has a preview feature that will display images, documents, and even stream media such as videos and audio.



Uploading files

All of your files are found in the *Files* tab at the top of the page.

From the *Files* tab click the Upload button, found at the top left of the screen, to upload files to JHBox. The button presents two options for uploading files - *Upload Files* and *Upload Folders*. When choosing the *Upload Files* option, your computer's file browser will appear allowing you to select multiple files, but not folders, by holding down the *Shift* key.

The option for uploading folders requires the use of JHBox's Java file upload application. A popup window will appear with the Java uploader. Your browser's Java plugin may not be enabled, so you may have to click on the plugin to enable it. A dialog box will appear asking if you would like to run the Java application. Clicking *Run* or *Allow* will start the Java uploader. You can drag and drop folders or click *Add Files* to use the Java file browser. The advantage to uploading folders would be to maintain an existing folder structure without having to create folders as you upload.

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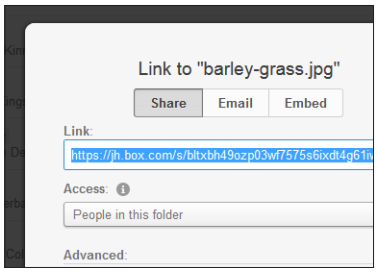
If the process of using the file browser seems too tedious, you can drag and drop files into JHBox's file listing window. You can even navigate to a folder in your JHBox to drag and drop files directly into that location. This feature only works for files and any selected folders dropped into the window will be omitted.

Deleting files and folders in JHBox moves the content to the *Trash* folder. Deleted content will remain there for 3 months before it is permanently deleted.

Sharing

You can share individual files or entire folders, allowing anyone who has the link to view the content. For files uploaded to the top-most folder, named *All Files*, the files are automatically private unless individually shared. Private in this case means that only you can view the content. Content in JHBox cannot be found by search engines such as Google or Bing. It is important to know that when sharing a folder, all of the files contained within that folder will be shared as well. This also includes files uploaded to a previously shared folder.

To change the sharing settings for files and folders, click on the *Share* link on the item in the file listing. A popup will appear with a URL link for sharing and an access setting selector with the following 4 options:



- **Anyone with the link:** This will be defaulted to "People in this folder" because of JHU's sensitive information policy.
- **People in your company:** All Hopkins affiliates who have a JHED-ID. These users will be prompted for their JHED credentials when accessing content. This is the default permission setting when choosing to share the content.
- **People in this folder:** Individuals you selected to have access or permissions in this folder. See below for collaboration/folder settings. This is the highest restriction level when sharing. Users may need a Box account to access.
- **Remove link**: If you no longer want to have a link or folder shared, simply remove the link which will make it private again. If you re-share the item, a new link will be generated.

Also in the row that appears when sharing content is an *Advanced Settings* button. This will bring up an options box that allows you to set a custom link, set link expirations, disable the download button for content, and to create a direct link to the resource for embedding.

Collaborating

JHBox has more elaborate settings for collaboration in folders. You can set up a list of collaborators to work on or view files within a folder by clicking the *More* button and choosing *Invite Collaborators*. An options box will appear with a field for adding email addresses, setting permissions such as Editor, Viewer, Uploader, etc., and setting a welcome message.

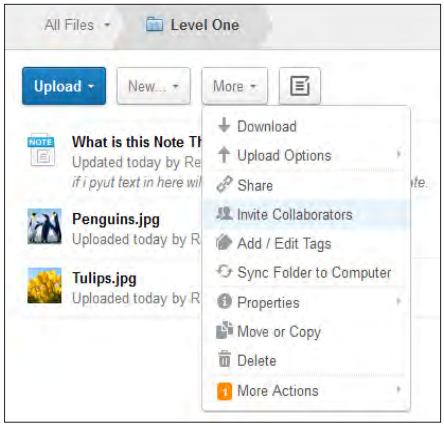
Additional Resources

- IT@JHU info pages on JHBox:
  http://www.it.johnshopkins.edu/services/collaboration_tools/jhbox

Author's Background

Reid Sczerba,
Multimedia Developer, Center for Educational Resources, JHU

A member of the Center for Educational Resources, Reid provides training on a variety of programs, aids in educational resources development, and shares expertise on information and graphic design for faculty at the Homewood campus. He holds a BFA in Illustration and a MA in Digital Arts from Maryland Institute College of Art.



Creating folders makes it easier to manage permissions and organize content. The option for creating a new folder is found in the *New* button in the top left of the window. There are additional folder settings found in the *More* button, which include syncing with your computer, setting notifications, and additional security settings.

Other thoughts

JHBox has many more features worth exploring. In the *New* menu at the top of the screen, you can create notes, bookmarks to other webpages, and even documents such as Google Docs/Spreadsheets or Word/Excel files, each of which can be private or shared among colleagues. Comments and tasks can be set for files as well, allowing for greater communication with your collaborators. File versioning is on automatically and there is a way to review usage statistics on your files and folders so that you know who saw your content and how frequently.

JHBox also has free supplemental programs, for access and editing features. For mobile access, JHBox has apps for iOS and Android. For improved workflows, the desktop application called Box Sync allows you to easily manage files on your computer, and the application Box Edit allows you to work on files in the browser and save edits directly to JHbox.

JHBox has replaced JShare as Hopkins file sharing system. While JHBox has many convenient features, it will not be able to host webpages. For more information on other options for hosting webpages, please visit:

http://www.it.johnshopkins.edu
/services/webservices

The Innovative Instructor

Pedagogy

Vol. 9 | September 2013

Leveraging Peer Instruction

Michael J. Reese, Associate Director, Center for Educational Resources
Dr. Julie Schell, Educational Researcher, Harvard University

The issue

Instructors often seek student-centered, active-learning teaching practices. These teaching methods are intended to increase student retention and engagement but the ways in which they are implemented is important for success.

Why does it matter

Professor Todd Hufnagel, Department of Material Science and Engineering (MSE), was interested in pedagogical techniques that are potentially more effective than the traditional lecture-based format for the course, *Structure of Materials*.

Professor David Neufeld, Department of Physics and Astronomy, planned to change his teaching approach in a 100-level, large lecture physics course in an effort to identify students' misunderstandings and improve comprehension of the course content.

These courses - *Structure of Materials* and *General Physics* - are gateway courses. Students' mastery of the course learning objectives is critical to success in subsequent, advanced courses. Research demonstrates that the use of active-learning strategies can lead to increased student retention in science and engineering majors.[1, 2]

Faculty solution

Independently, the two professors adopted the Peer Instruction method pioneered by Eric Mazur in his physics courses at Harvard University in the 1990s. Peer Instruction is a popular, research-based pedagogical tool among physics faculty; it is being used increasingly in other disciplines as well. "The basic goals of Peer Instruction are to exploit student interaction during lectures and focus students' attention on underlying concepts," using ConcepTests - short conceptual questions on the topic being discussed.[3]

In Mazur's implementation of Peer Instruction, students first gain exposure to content before class by reading texts, watching videos, or completing other activities. Instructors then solicit pre-class feedback on that content, usually in the form of questions about what students found difficult or confusing.

The in-class cycle is as follows: after a brief presentation on the topic, the instructor presents a question (i.e., ConcepTest) to the class. Students individually respond after briefly reflecting on the question. The instructor then asks students to discuss their answer, with 1-2 other students who have different answers before responding again. The instructor always debriefs the question by discussing with the students the rationale behind the correct answer and providing a short lecture on the underlying concept, depending on the percentage of students who answer correctly.

Professor Hufnagel's use of Peer Instruction starts with the introduction of a ConcepTest with four multiple-choice answers, often including an illustration. He asks the students

[1] Felder, R., G. Felder, and E.J. Dietz. (1998) "A Longitudinal Study of Engineering Student Performance and Retention. V. Comparisons with Traditionally-taught Students." Journal of Engineering Education, 87(4), 469-480.

[2] Springer, L., M. Stanne, and S. Donovan. (1999). "Effects of Small-Group Learning on Undergraduates in Science, Mathematics, Engineering and Technology: A Meta-Analysis," Review of Educational Research. 69(1), 21-5.

[3] Mazur, E. (1997). Peer Instruction: A User's Manual. Upper Saddle River: Prentice Hall. Page 10.

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to think about the question individually before voting using clickers. He then uses the iClicker software to show a histogram of the results. Students talk with their neighbors for a few minutes and then vote again. Professor Hufnagel shows the new results, explaining which answer is correct and why. The depth of explanation depends on how well the class is mastering the concept. If, based on the histogram, the class has not mastered the concept, he will ask another question on the same concept, repeating as necessary.

> Sodium chloride and magnesium oxide have the same crystal structure. Which one has the higher melting temperature?
>
> (a) NaCl
> (b) MgO
> (c) They're about the same
> (d) No way to tell without more information.
>
> (Note: This would be accompanied by a periodic table.)

Example question

In Professor Neufeld's physics course, students watch online content before class as a replacement for the traditional lecture. By flipping the lecture, Professor Neufeld can spend class time using ConcepTests. If there is general agreement about the correct answer after the first vote, he moves on to the next question. If there is substantial disagreement, then students are directed to discuss their answers for 1-2 minutes with those sitting around them. After a second vote, Professor Neufeld asks students who changed their answers to explain why they did so. This often leads to further class discussion.

Results

In Professor Hufnagel's course, students were administered a concept inventory at the beginning and end of a semester during which he lectured and the semester during which he employed Peer Instruction. The concept inventory included 20 questions measuring student mastery of the course learning objectives. During the semester in which he used Peer Instruction, student gains were twice those of the students in the semester in which he primarily lectured. Additional assessments will be conducted in the future to see if these gains are replicated.

Professor Neufeld used the Force Concept Inventory (FCI), a standard assessment instrument used in university-level Newtonian physics. Student learning gains measured by the FCI tend to be higher in courses with active-learning strategies compared to traditional lecture courses. In Professor Neufeld's class, results were similar to those reported by faculty at other universities using traditional lecture methods. The gain was not what he hoped, but this is not uncommon. Sometimes the method requires a few tweaks. While disappointed, he suspects the results reflect the fact that it was his first time using Peer Instruction. He is committed to teaching with Peer Instruction again, and the FCI will be used in future semesters to determine if gains increase as he acquires more experience.

Other thoughts

One of the challenges of using Peer Instruction is that instructors cannot script class time as they can with a lecture. It is difficult to estimate how many ConcepTests can be completed during class because the length of follow-up student discussions varies. Despite some concerns about how to structure class time, both Hufnagel and Neufeld were pleased with how engaged students were during class discussions.

The first time you try Peer Instruction can be challenging, especially when creating or selecting ConcepTests. To assist instructors, Julie Schell and Eric Mazur established The Peer Instruction Network (https://www.peerinstruction.net), a database of Peer Instruction users with links to their available ConcepTests.

Peer Instruction can be used as one of several active-learning strategies during class time. For example, at several stages in Professor Hufnagel's course, groups of students spent class time working out detailed problems that traditionally might have been presented as part of a lecture. Professor Hufnagel mentors student groups as needed during these exercises.

Additional resources

- Mazur, Eric. *Peer Instruction: A User's Manual*. Prentice Hall, 1997
- *Turn to Your Neighbor Blog*. The Official Blog of Peer Instruction: http://blog.peerinstruction.net
- Article on "flipping the classroom", *Lectures On Demand*: http://www.cer.jhu.edu/ii/InnovInstruct-Ped_LectOnDmnd.pdf
- Article on "clickers", *In-Class Voting ('Clickers')*: http://www.cer.jhu.edu/ii/InnovInstruct-Tech_Clickers.pdf

Author's background

Michael J. Reese,
Associate Director, CER

Mike Reese is the associate director of the Center for Educational Resources and a doctoral student in the Department of Sociology.

Dr. Julie Schell
Educational Researcher, Harvard University

Dr. Julie Schell is the senior educational researcher within the Mazur Group at Harvard University and an instructional designer at the Center for Teaching and Learning at the University of Texas at Austin. She is an expert in innovative flipped teaching and Peer Instruction. She co-founded the Peer Instruction Network and authors the official Peer Instruction blog, *Turn to your Neighbor*.

The Innovative Instructor

Technology

Vol. 9 | September 2013

Turnitin

Brian Cole, Senior Information Technologist, CER

What it is

Turnitin is a web-based service for detecting plagiarism and improper citations in student-submitted work. Johns Hopkins University has a multi-year subscription to Turnitin. All instructors in the Whiting School Engineering and the Krieger School of Arts & Sciences are covered by this subscription. There are no limits on the number of classes or number of student papers checked. Over 450 JHU faculty are registered Turnitin users, and in the past year, over 12,000 papers have been submitted to Turnitin to check for originality.

Why it was made

Turnitin has gained popularity and subscribers in the higher education community easily available online source material was proliferated. Students now have unparalleled access to online content. Often they do not have a good understanding of proper quotation and paraphrasing techniques or when and how to cite borrowed material. It is cumbersome for instructors to check submitted papers for originality against online sources. At a certain point, particularly in courses with large enrollments, the process of checking suspect papers using a Google search becomes unmanageable, and some content will not show up using standard search engines. That's where Turnitin can help. Moreover, knowing that their papers will be checked sends the message to your students that they need to be mindful of proper citation practices.

> Tunitin's value as a tool goes beyond identifying plagiarism. The reports allow faculty to address students' misunderstandings of proper paraphrasing, quotation, and citation practices.

Why does it matter

Integrity is a core value for the academic community, and Johns Hopkins begins training students on ethical behavior, including plagiarism, at freshman orientation. However, the importance of proper citation and use of paraphrasing and quotations are not learned in a single session. Turnitin's value as a tool goes beyond simply identifying plagiarism in student papers. The reports produced (see below) allow instructors to flag misunderstandings as to proper usage of borrowed content and direct students to remedial resources. Turnit in is an excellent teaching tool.

How it can be used

The process of checking a paper in Turnitin is straightforward and efficient. Once you have created an account using one of the methods below, you define an assignment. Note that if you are not using Blackboard, you will first have to define a class. When you define an assignment, you set a due date, provide a description, and select the sources against which you would like to check the assignment for plagiarism. You can choose from three categories:

- The Internet (current and archived web sites)
- Previous student submissions (from JHU and schools using Turnitin)
- Periodical and Journals

Turnitin also checks paper mills and many pay-for-essay sites. It checks some, but not all, academic journals.

After an assignment has been created and released, students can submit their papers in any common format (Word, PDF, plain text file, etc.). Once the papers are submitted, the instructor has access to an Originality Report, which shows any matches to the selected sources, and provides a link to matching material.

What this is

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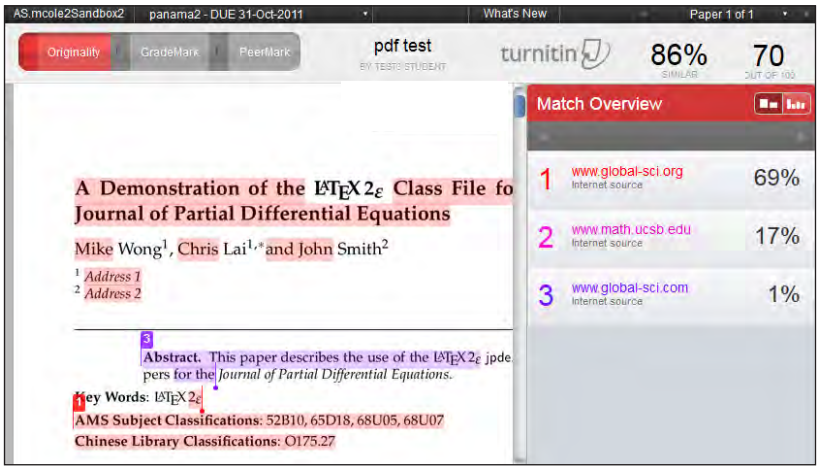
Center for Educational Resources

Johns Hopkins Sheridan Libraries



Screenshot of Turnitin's Originality Report

The Originality Report does not judge whether a student has plagiarized. Rather, it shows what percentage of a paper's text matches a source and what source it matches. It is then up to the instructor to decide whether the matches are acceptable, whether they are the result of improper citations, or if they constitute inappropriate use of others' works.

Instructors can decide on many variables for each assignment, such as whether students can see the Originality Report and resubmit papers. Writing classes often use these options to teach proper citation.

Because student submissions are saved year-to-year, it is also possible to detect paper "recycling," by which students try to save time by adapting papers submitted to the same class in previous years.

If you don't wish to define a class and an assignment, Turnitin can also be used to check individual papers, though this method may be considered less fair as all students are not subject to the same scrutiny.

JHU's Turnitin subscription also includes GradeMark, is a paperless grading system that permits instructors to add comments (including voice comments) and corrections to assignments submitted electronically. It provides flexibility in marking up assignments, increased consistency in grading, and clear feedback that replaces scribing in the margins. Students can be pointed to resources with clickable links. With its drag and drop functionality, GradeMark has the potential to save instructors a great deal of time when grading online assignments. There is no need to download assignments – everything is web-based and stored online. It is also easily integrated with Blackboard. If the instructor is using Blackboard, when the assignment is graded, the grade is automatically transferred and recorded into the Blackboard Grade Center.

Where it is going

Turnitin has released an iPad app, which supports viewing paper submissions and Originality Reports and grading on the tablet, even in offline mode.

How to get started

To get started, you need a Turnitin account. If you use Blackboard and wish to use Turnitin within the context of Blackboard, this step is easy. You won't need a separate account or login. Follow the instructions linked at the end of this document to connect your Blackboard account to a Turnitin account. Turnitin can also be used outside of Blackboard – simply email a request for an account to turnitin@jhu.edu. Instructors from the Whiting School Engineering and the Krieger School of Arts & Sciences can request training on Turnitin from the Center for Educational Resources.

Other thoughts

There have controversies surrounding the use of Turnitin in the past. Students have contended that it is illegal for the company to keep their papers in its database and accused Turnitin of improperly deriving profit from student submitted work. Turnitin has weathered these controversies and prevailed in court challenges, mainly because they do not publish the student submissions but only use them for matching.

Additional resources

- Enabling Turnitin in Blackboard and Creating Assignments: http://help.sset.jhu.edu/download/attachments/10485887/Turnitin_Assignments_SP9.pdf
- Request an account outside Blackboard: email turnitin@jhu.edu
- Instructor Training from Turnitin: http://www.turnitin.com/en_us/training/instructor-training

Author's background

Brian Cole,
Senior Information Technologist, Center for Educational Resources

Brian Cole is the Turnitin Account Administrator for Johns Hopkins University He works in the Center for Educational Resources as an Information Technology Specialist. Brian provides support and training for Homewood faculty on a number of instructional technologies. His background is in liberal arts and enterprise IT.

The Innovative Instructor

Best Practice

Vol. 8 | April 2013

To Curve or Not to Curve

Michael J. Reese, Associate Director, Center for Educational Resources

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Center for Educational Resources

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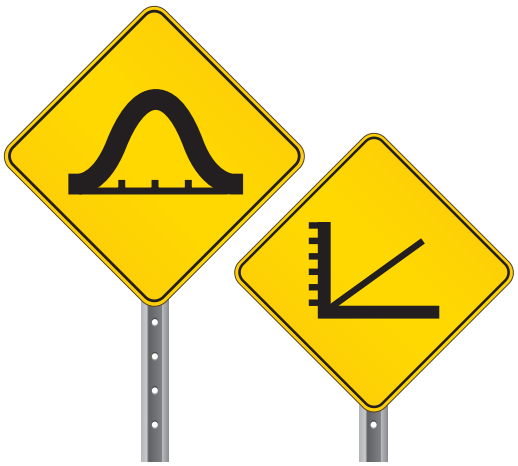
What it is

Instructors choose grading schemes for a variety of reasons. Some may select a method that reflects the way they were assessed as students; others may follow the lead of a mentor or senior faculty member in their department. To curve or not to curve is a big question. Understanding the motivations behind and reasons for curving or not curving grades can help instructors select the most appropriate grading schemes for their courses.



Curving defines grades according to the distribution of student scores. Grades are determined after all student scores for the assignment or test are assigned. Often called norm-referenced grading, curving assigns grades to students based on their performance relative to the class as a whole. Criterion-referenced grading (i.e., not curving) assigns grades without this reference. The instructor determines the threshold for grades before the assignment is submitted or the test is taken. For example, a 92 could be defined as the base threshold for an A, regardless of how many students score above or below the threshold.

Why does it matter

Choosing to curve grades or use a criterion-referenced grading system can affect the culture of competition and/or the students' sense of faculty fairness in a class. Curving grades provides a way to standardize grades. If a department rotates faculty responsibility for teaching a course (such as a large introductory science course), norm-referenced grading can ensure that the distribution of grades is comparable from year-to-year. A course with multiple graders, such as a science lab that uses a fleet of graduate students in the grading, may also employ a norm-referencing technique to standardize grades across sections. In this case, standardization across multiple graders should begin with training the graders. Curving grades should not be a substitute for instructing multiple graders how to assign grades based on a pre-defined rubric (see link below to related *Innovative Instructor* article on rubrics).

In addition to standardizing grades, norm-referenced grading can enable faculty to design more challenging assignments that differentiate top performers who score significantly above the mean. More challenging assignments can skew the grade distribution; norm-referenced grading can then minimize the impact on the majority of students whose scores will likely be lower.

A critique of curving grades is that some students, no matter how well they perform, will be assigned a lower grade than they feel they deserve. Shouldn't all students have an equal chance to earn an A? For this reason, some instructors do not pre-determine the distribution of grades. The benefit of using a criterion-referenced grading scheme is that it minimizes the sense of competition among students because they are not competing for a limited number of A's or B's. Their absolute score, not relative performance, determines their grade.

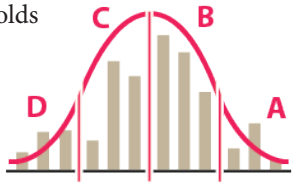
The Innovative Instructor: "Calibrating Multiple Graders"
http://www.cer.jhu.edu/ii/InnovInstruct-BP_CalibratingGraders.pdf

How to do it

There are multiple ways to curve grades.

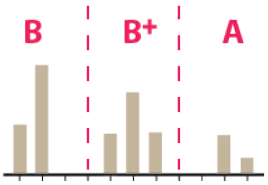
I. The Bell Curve

Normalizes scores using a statistical technique to reshape the distribution into a bell curve. An instructor then assigns a grade (e.g., C+) to the middle (median) score and determines grade thresholds based on the distance of scores from this reference point. A spreadsheet application like Excel can be used to normalize scores. CER staff can assist instructors in normalizing scores.



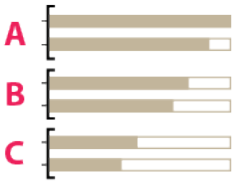
II. Clumping

The instructor creates a distribution of the scores and identifies clusters of scores separated by breaks in the distribution, then uses these gaps as a threshold for assigning grades.



III. Quota Systems

Often used in law schools, the instructor pre-determines the number of students who can earn each grade. The instructor applies these quotas after rank ordering student scores.



IV. Criterion-reference grading

Using a pre-determined scale, assessments are based on clearly defined learning objectives and grading rubrics so students know the instructor's expectations for an A, B, C, etc.

100% - 91% = A
90% - 81% = B
80% - 71% = C
70% - 61% = D

Other thoughts

During the 2011 Robert Resnick Lecture at Johns Hopkins, Carl Wieman, Nobel Laureate and Associate Director for Science at the President's Office of Science and Technology, argued that most instructors are not trained to create valid assessments of student learning. Curving can be used as a tool to adjust grades on a poorly designed test, but consistent use of curving should not be a substitute for designing assessments that accurately assess what the instructor wants students to learn by the end of the course. CER staff are happy to talk to faculty about defining learning objectives and/or strategies for designing challenging and accurate student assessment instruments.

"We have tried to standardize grading with rubrics and TA training, but we still see large differences from TA to TA. We know that this is the case because the grade distributions for given TAs who have taught multiple sections over multiple years are remarkably consistent and stable. The only fair and practical solution is distribution based grading."

– Morris Swartz, professor of Physics

"Curving grades ranks students relative to each other but tells me little about whether they have mastered the course material—it's entirely possible for a student to get an A yet not understand the material at all. Using criterion-based grading with specific learning objectives allows me to assess whether or not the students grasped what I am trying to teach. If everyone in the class has thoroughly mastered the material, why shouldn't they all get A's?"

– Todd Hufnagel, professor of Materials Science and Engineering

Additional Resources

- Campbell, C. (2012). Learning-centered grading practices. *Leadership*. 41(5), 30-33
- Jacobson, N. (2001). A method for normalizing students' scores when employing multiple graders. *ACM SIGCSE Bulletin*. 33(4), 35-38.
- Joe Champion's Grading Transformation Spreadsheet. This spreadsheet automatically curves students' scores after the instructor copies the scores into the spreadsheet and sets a variable defining the amount of curve. http://faculty.tamucc.edu/jchampion/grade-transform-excel

Author's Background

Michael J. Reese,

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Mike Reese is the associate director of the Center for Educational Resources and a doctoral student in the Department of Sociology.

The Innovative Instructor

Pedagogy

Vol. 8 | April 2013

What this is

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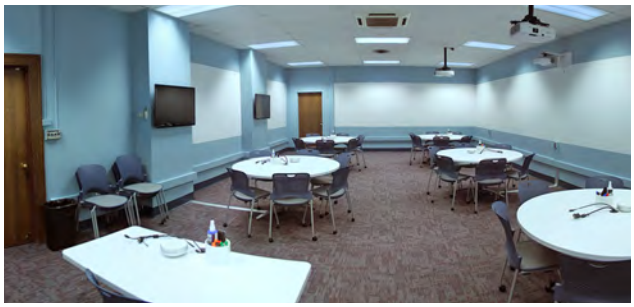
Bring on the Collaboration!

Rebecca Pearlman, Senior Lecturer, Department of Biology

The Issue



Getting students to participate in class discussions is a common challenge. Every instructor has faced the dreaded silence after posing a question. Active learning activities can stimulate student engagement, but they can be difficult to implement in classrooms that were designed for lectures — fixed seating inhibits opportunities for collaborative exercises such as group work and discussion.

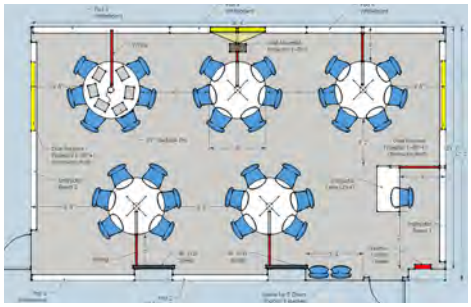
Why does it matter

Research has shown that active learning strategies can improve students' retention of content taught in class[1]. A variety of teaching methods — such as peer-instruction, discussion groups, and collaborative problem solving — can foster greater student engagement. Each of these methods requires students to connect, share information, and discuss possible solutions to posed problems, anticipating real life workplace situations.

Faculty who want to implement active learning strategies may find it challenging to manage in a space designed for lecture-based instruction. In the last decade, universities have introduced classrooms to address this challenge. Typically known as studio or collaborative learning classrooms (CLCs), such spaces often have round, movable tables for group work, ample whiteboard space, and large display screens for each group. This learning environment has a positive effect on students' engagement; it alters their roles in the classroom from passive recipients of knowledge to active participants in their own learning.

Approach

At a *National Academies Summer Institutes on Undergraduate Education* last summer, several Hopkins colleagues and I participated



in group work in a space designed for collaboration. We were impressed by the power of that learning experience. Shortly after the workshop, we learned that the Provost's Gateway Sciences Initiative would be underwriting the conversion of a traditional learning space (Krieger 309) into a collaborative learning classroom. I decided to offer my Biology Workshop course in the new CLC in the fall semester of 2012.

The course was designed as a guest lecture series with some meetings set aside for group discussions. Although we continued to offer the guest lectures in a large hall, we moved to the CLC for the group discussions and were delighted to take advantage of the features of this new space. During a typical class, I provided a 5 to 10 minute overview of the day's lesson plan, often using the instructor projectors to play a video or podcast highlighting a current event or controversial topic in biology. For the majority of the class time (30 minutes), students worked in groups using their own laptops to conduct research, discuss potential answers to questions, create charts and other graphics, and post content to the course Blackboard

[1] Michael Prince. *Does Active Learning Work? A Review of the Research*. Journal of Engineering Education, 2004. http://ctlt.jhsph.edu/resources/views/content/files/150/Does_Active_Learning_Work.pdf

site. For ten minutes at the end of class, groups took turns presenting their work to the entire class, using the instructor's projectors to display their work.

The room's design allows students towork comfortably in groups, using tools ideal for collaboration. Each group has a whiteboard adjacent to its table where students can jot down notes or conceptualize and work out problems. Students can easily project their individual laptop screens for viewing by the whole class. In addition, the instructor has control over two large screens, which is helpful when presenting materials to the entire class or sharing a group's display with the class. The room's layout facilitates instructor visits to each group while they work, something that is difficult in a lecture hall.

Results

One of the nicest things about teaching in the new CLC was that students seemed to know what was expected of them from the moment they entered the room. Students immediately sensed that this would not be a typical lecture. Moreover, the students responded positively as they engaged in the discussions and participated in their groups, producing a higher caliber of work than I experienced in this course previously.

Students were amazingly "on task" during group work, which speaks to their high level of engagement and enthusiasm. They clearly felt a strong sense of responsibility for their group's performance, particularly when presenting their findings to the class.

In comparison to previous iterations of this course, the students' grades were in the same range; however, the level of engagement was much higher and it was a significantly more enjoyable teaching experience. I know that the students appreciated the active learning aspect of the course because when I presented in lecture format for more than 15 minutes, I could see them squirming in their seats. They couldn't wait to get started on group work. It has been a challenge to limit my introduction to just a few minutes, and then post supporting material for the students to explore during class with their groups.

Because this class had more discussion and collaborative work than when I previously taught the course, I found that it helped to prepare learning objectives for each session. This kept the focus in place during class and ensured that the group work would meet the goal for the day. It also helped set the students' expectations for what they needed to accomplish and learn for tests.

Other Thoughts

A number of faculty have taught in the new CLC since its creation, ranging from the departments of Chemistry, French, Physics, Mathematics, to Civil Engineering. The room is flexible enough for a number of uses and can support classes from any discipline. The way I conducted my course for instance, is similar to the teaching approach for humanities courses in which class discussions are standard. Although the students in my Biology Workshop did not often use the whiteboards, other classes used them frequently.

There are many methods for generating effective group assignments in class. I found that when my 35 students first entered the CLC, the room's layout clearly suggested that they would be working together at the round tables, which seat seven. They gravitated naturally to self-defined groups around the tables. This proved to be effective way of forming lasting and productive groups for this class. Other instructors may wish to randomly assign groups or to purposefully break and re-form groups throughout the course.

Additional Resources

- A helpful book about effective ways to teach undergraduate science courses:
  Jo Handelsman, Sahar Miller, Christine Pfund. *Scientific Teaching*. W. H. Freeman, 2006
- Strategies for group work in class:
  http://www.cer.jhu.edu/ii/InnovInstruct-BP_MakingGroupProjectsWork.pdf
- To learn more about Krieger 309 and the variety of courses that use it, contact the CER: cerweb@jhu.edu

Author's Background

Rebecca Pearlman,
Senior Lecturer, Department of Biology

Rebecca Pearlman received a PhD in Biology from the University of Wisconsin. She has over fifteen years of teaching experience ranging from small laboratory courses at a two-year college to large lecture courses at Hopkins. She is delighted to be a lecturer in the Biology Department working with amazing colleagues who are dedicated to improving the undergraduate experience. Her past collaborations with the CER include work on creating videos of laboratory techniques and piloting in-class voting and course management systems.

The Innovative Instructor

Technology

Vol. 8 | April 2013

VoiceThread

Amy Brusini, Instructional Technology Specialist, CER

What it is

VoiceThread is web-based presentation software that allows users to create and share interactive multimedia slideshows. VoiceThread presentations are used to showcase audio, video, images, and documents while allowing users to comment on them in a variety of different ways. The result is a digital conversation that can be easily shared with individuals, groups, and/or embedded into different websites, including Blackboard, the course management system used here at Homewood.

Who is using it

Originally developed at the University of North Carolina, VoiceThread offers individual and group licenses to many higher education institutions; at Johns Hopkins, the Schools of Nursing and Public Health have been using the tool for several years. IT@JH recently obtained a university-wide license for all members of the Hopkins community; instructors and students from all JHU schools now have the ability to access VoiceThread free of charge.

Why it matters

In both face-to-face and online environments, instructors often search for ways to make their classes more interactive. VoiceThread offers one way to achieve this goal. By allowing participants to interact directly with visual media, VoiceThread provides an alternative to traditional text-based communication tools, such as online discussion boards and blogs. The flexibility and ease with which VoiceThread allows participants to contribute to online conversations encourages communication and collaboration among class members, leading to a richer experience overall.

How it can be used

At JHU and other institutions, instructors and students are using VoiceThread in creative ways. Comments can be made on any type of content using a microphone, a webcam, uploading a pre-recorded audio file, using the telephone, or by simply typing text. There is also a 'doodle' tool which can be used to annotate presentations with drawings while leaving a comment.

Here are some examples of how this tool is being used:

Assessment

- **Peer assessment** – Students can use VoiceThread to share assignments (papers, images, audio, video clips, etc.) with their peers for comments and critique.
- **Foreign language assessment** – VoiceThread is especially useful to foreign language instructors who would like to hear their students speak. For example, instructors can create a presentation (upload an audio recording, image, video clip, etc.) and have students translate, describe, or narrate.

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Instruction

- **Online lecture tool** – Instructors can use VoiceThread to create online lectures for fully online classes or as a supplement to face-to-face classes.
- **Review Session** – Students can use VoiceThread to record a content review session in preparation for a test or exam.
- **Facilitate Discussions** – Students can present a topic and then facilitate a class discussion in VoiceThread about the topic.

Presentation

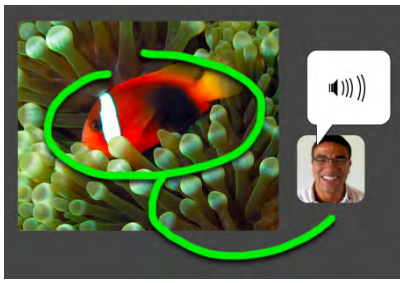
- **Student presentation tool** – Students can use VoiceThread to create individual or group presentations on any number of topics, which can then be shared with the class. An added advantage - students can watch and comment on each others' presentations outside of class, freeing up valuable class time.
- **Digital storytelling** – In groups or independently, students can use VoiceThread to create interactive digital stories using various media artifacts (audio, images, etc.).

Sharing

- **Student Introductions** – Especially helpful in a fully online environment, students and instructors can use VoiceThread to introduce themselves and build a learning community.
- **Brainstorming session** – Students and instructors can use VoiceThread to brainstorm ideas for project topics, group presentation strategies, etc.

Where it is going

Since it was first released in 2007, the popularity of VoiceThread has grown steadily, especially among educators interested in taking advantage of its collaborative and interactive nature. Last year, the company introduced a mobile version (free for JHU account holders) that has so far generated positive responses. One new feature still in development is a voice-to-text conversion tool to expand accessibility.



How to get started

JHU instructors and students can go to http://jhu.voicethread.com, login with their JHED IDs and passwords, and immediately begin creating a VoiceThread. Once created, instructors can easily share their VoiceThread presentations in Blackboard; each presentation contains an 'Embed' link that is used to cut and paste the presentation code into a content editor in Blackboard. The embedded VoiceThread is then displayed inside a Blackboard content area and is accessible by all students in the course.

All users are automatically set up with a 'Basic' account that allows for the creation of 50 VoiceThreads and up to 2GB of storage. Instructors can request to be upgraded to a 'Pro' account that allows for the creation of an unlimited number of VoiceThreads, 10GB of storage space, and the ability to create and manage groups. Send an email to cerweb@jhu.edu to request 'Pro' access as well as to learn more about manual and automatic group creation.

Additional Resources

- VoiceThread Overview:
  https://www.voicethread.com/about/features
- VoiceThread 'How-To' Basics:
  https://www.voicethread.com/support/howto/Basics
- More information about VoiceThread at Homewood:
  http://cer.jhu.edu/resources.html#voicethread

Author's Background

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Center for Educational Resources, JHU

Amy Brusini works at the Center for Educational Resources (CER), a teaching and learning center for Homewood faculty. Amy provides support and training for Homewood faculty on Blackboard, the university's current course management system, as well as instructional design support. Amy has a Master's Degree in Education from Johns Hopkins University.

The Innovative Instructor

Best Practice

Vol. 7 | August 2012

Making Group Projects Work

Pam Sheff, Senior Lecturer, Center for Leadership Education
Leslie Kendrick, Senior Lecturer, Center for Leadership Education

What it is

One measure of successful teaching is student engagement. Instructors often find that student engagement increases when active learning strategies are implemented in the classroom. One strategy is to assign problem-based collaborative learning projects. Well-conceived group projects help students develop critical thinking skills, learn how to work in teams, and allow them to apply theories learned in the course to real-life situations, producing an appreciation for how the knowledge gained will be useful once the class is over. The end result is a richer learning experience for the students.

Why does it matter

Students are more likely to appreciate and retain information when they see a correlation between what they hear in lectures (and read in their textbooks) and what they expect to experience as working professionals. They are likely to focus on fulfilling the course requirements as efficiently as possible and regurgitating facts for exams with little concern for long term retention of knowledge. Problem-based group projects typically require an array of cognitive skills, induce collaborative learning, and allow students to take ownership of the process. Moreover, students who learn to work in teams are better prepared for their future work environments. They come to value each other's strengths and learn to be teachers as well as students. These become valuable skills when they enter the workforce, regardless of their specific discipline.

How to do it

Developing effective problem-based group projects requires assignments that reflect your course learning goals and incorporate course information, permit management of the student groups, and facilitate assessment of student progress. Advance planning and thoughtful strategies will go a long way towards ensuring successful implementation. Below are some ideas to consider for easing your project development ensuring success.

I. Setting Student Expectations

- **Weight the project fairly.** You want your students to take the project seriously but you don't want to weight the project so heavily that experimentation or risk-taking is stifled. Consider dividing the project into parts and grading each separately, leaving the team with an understanding of which aspects of the project went well and what needs improvement.
- **Discuss student roles and what's needed.** Get the students thinking about what will be required of their team and how they can organize and manage the project. Emphasize that a team schedule is important. This is also a good opportunity to discuss the qualities of a good teammate so that students begin the project with mutual respect.
- **Start with small exercises as a warm up.** Before jumping into a large scale group project, consider doing a couple of smaller in-class team-based exercises so that students get used to the concept of working collaboratively.

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II. Group generation methods

- **Allowing self-selection of teams can create problems.** Students like to choose friends as teammates. Personal issues then carry over into the project, friendships may suffer, or the members may take the project less seriously. These factors can produce a poor group performance.
- **Random selection is a reasonable alternative to student choice.** This method is the fastest way to generate groups and more reflective of the real world where one is unlikely to have a best friend as a work colleague. While random selection is convenient, consider ensuring diversity in each group to the extent possible.
- **Skills based alignment is ideal for creating groups.** Identifying students' strengths and weaknesses through in-class exercises can help establish well-rounded teams. As a part of the preparation for the project, generate a list of the skills needed, have the students identify their strong and weak areas, then group the students accordingly.

III. Getting each student to contribute

- **Assign the students to roles.** The difference between a dysfunctional group and a successful team lies in assigning roles. Unless students are given a specific role in the project, they can avoid responsibility. If students are assigned tasks with deadlines, they are more likely to take ownership and the responsibility for completing their work as part of the team. Establishing roles should be done early and can be a part of the group creation process. Avoid having students pigeon-holed into doing the same task for the entire length of the project. Instead, make the skill requirements for the team more conceptual. Use abstract concepts (Researcher or Synthesizer; Gatherer of Data or Analyzer of Data) so that broad expertise is required for each role.
- **Require that a different student present the team's progress for each report.** Make sure that each student has an opportunity to do one of the in-class presentations. Presenting their work is a skill that all students will use in the future. As it involves an understanding of all the parts of the project, these presentations by each team member also help to ensure successful group collaboration.

IV. Assessing the team/individual in and outside of class

- **Have the students do evaluations.** This can be done both during and after the project. Evaluations serve as reflective exercises for the students, allowing them to comment on how the process could be improved. Evaluations are particularly useful for gauging the team and individuals' contributions for grading. Questions that require students to evaluate their own performance, the performance of each team member, and the team as a whole can provide insight into how the team functioned.
- **Schedule time for team work in class.** Scheduling group work outside of class is always a challenge for students. By allowing time during class for team work, not only will you accommodate students' busy schedules, you also will have an opportunity to monitor student progress. This is a great way to gauge whether or not the students are experiencing difficulties. It also gives the students an opportunity to ask questions, clarify assumptions, or get assistance with problems. Some of the best learning comes from spontaneous discussion in class, and peer-learning can be extremely effective when students are working together to solve problems.
- **Ask for regular status updates.** Starting class with a brief progress report from each team will bring up questions and concerns that can be addressed at once, eliminating redundancy and saving time. Asking "Did you follow your team schedule this week?" is a good way to uncover issues that other groups may be struggling with. This provides an opportunity for the class to offer solutions collectively.

V. Build in time for reflection

- **Reflection is key to learning from failure as well as success.** Make sure you build in time for students to reflect on their progress. Conducting team member evaluations (mentioned above) during the project will start the process, but the best time to get the students to reflect on their experience is after the project during a debriefing discussion. Questions such as "What went well or not so well?" and "What would you do differently?" will enhance the opportunity for learning from their failures as well as their successes.

Authors' Background

Pam Sheff
Senior Lecturer, Center for Leadership Education, JHU

Pam Sheff is an award-winning writer and marketing communications consultant, with a wealth of experience developing marketing, public relations and communications strategies for clients ranging from start-ups to large corporate, institutional and government organizations. Now a full-time lecturer in CLE, Pam has taught classes on business communications and entrepreneurship.

Leslie Kendrick
Senior Lecturer, Center for Leadership Education, JHU

Leslie Kendrick has taught in the CLE program since 2002 and developed the five core marketing courses. She has 12 years of experience as a marketing practitioner. Starting in sales, she worked for Harper & Row Publishers, then moved into marketing management at Londontown Corporation and later Lippincott Williams & Wilkins.

The Innovative Instructor

Pedagogy

Vol. 7 | August 2012

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Beyond the Classroom, Into the Community

Eric Rice, Lecturer, Center for Leadership Education
Dr. Peter Beilenson, Lecturer, Public Health
Eva Smith, Undergraduate Teaching Assistant, International Studies

The Issue

Although learning by doing has always been an important pedagogical tool, it may be difficult to implement in courses where the active learning takes place outside of the classroom or lab. Creating course projects that involve the community gives students a chance to affect positive social change, but working outside of a controlled environment involves unpredictable variables that can hamper the active learning experience.

In the course, "Baltimore and The Wire," taught by Dr. Peter Beilenson, students were asked to write about community issues framed in the HBO show, "The Wire." Eva Smith, a former student in that course, realized that by directly engaging the community, students would benefit from active and meaningful involvement. Ms. Smith proposed a new course, "Community Engineering: Interdisciplinary Problem-solving," which was created in spring 2012 with Ms. Smith as the teaching assistant. The course allowed students to undertake interdisciplinary problem solving around real issues in the community.

Why does it matter

Social problem solving necessitates resourceful solutions. Opening these discussions to a diverse group of thinkers, such as a class of students from a variety of disciplines, can lead to creative results. Moreover, incorporation of Community Based Learning (CBL) projects in cross-discipline courses increases opportunities for mutual benefit. CBL projects and cross-disciplinary problem solving can facilitate doing social good, supporting the environment, improving the economic climate, and providing educational experiences. There are two primary constituents in a CBL course: the students and the community organizations. The potential impact of community based projects is significant, but such projects can be difficult to balance. If successful, students will become more engaged in the course objectives, obtain real life experiences, improve their communication skills, and be more likely to continue to work in the community. The community organization will likely benefit from obtaining an outside perspective for addressing the issues they face without depleting resources.

The Challenges

In the past, courses focused on theoretical approaches to addressing community issues. Engaging the community is desirable, but real world challenges are likely to make it difficult to guarantee a positive outcome for both students and the community organizations.

Real world challenges can include the cultural differences between students and clients, which can hamper communication. A student can be fired by the client, or changes in the client's priorities can lead to abandoning the project. Timing presents another challenge for example, when the semester and the clients' implementation dates do not align or resources are not available when needed. There is also the difficulty of identifying a client to pair with a student's idea or a situation in which the client is not committed to the project outcome. From the instructional perspective, there may be inequitable work carried out by the various student groups or within a specific group. It may be impossible to ensure work hour/experiential equity across projects since the projects and clients will differ. Grading such disparate projects can prove challenging; management of and an understanding for group-based activities is essential.

Approach

"Community Engineering: Interdisciplinary Problem-solving" was cross listed between the Schools of Engineering and Arts & Sciences. Each student brought unique knowledge to class, ranging from engineering, sociology, public health, and other majors. This allowed for a diverse group of students with a variety of skill sets to help solve problems in the community.

To help frame the issues, President Daniels and members of different organizations were invited to discuss issues facing the Baltimore City community. For the first assignment, each student conducted an in depth analysis of a broad problem (e.g., health, food, crime, homelessness, poverty, etc.). This involved identifying the issue within its current context, investigating the evidence and instruments used for dealing with the problems, and conducting research on the institutions involved.

The class discussed these issues and worked together to identify a specific set of problems. Each student then presented to the class an innovative solution to a problem and identified organizations that would be interested in the idea. After considering their peers' ideas, students formed teams with compatible interests around a theme, such as nutrition or education. The teams then collaborated to tie their ideas to a project or program that they would eventually pitch to a community organization. As this was the first time the course was taught, finding the right formula for implementing the community-based class concept was challenging. Working with a single community organization would have resolved some of these challenges as it would have been easier to manage communication and have guaranteed organization/project pairings. Unfortunately, it was not possible to identify an organization that could accommodate eight different concurrent projects. Despite this, most student teams were able to find an organization interested in their projects. Some ideas required revision, so alternate projects and organizations were identified as a backup to ensure that each team had an organizational match.

After each team had successfully pitched its business plan to its selected organization, students spent the rest of the semester implementing their projects. As an example, one group worked on a nutrition curriculum for the public schools to improve students' knowledge of nutrition, producing pre- and post- knowledge assessments. Another group identified a "food desert" and presented a plan to start a grocery store providing healthy produce, adding liveable wage jobs for the area. They did a marketing analysis and community outreach to find ways to bring in customers.

Frequent meetings with clients are required to keep them abreast of the activities and encourage collaboration. This gives both the students and the clients a sense of shared ownership.

Results

It was encouraging to see students engaged in community problem solving. They applied the methods and skills learned in class to the real world to bring about positive change in the community.

Students gained an understanding of the roles and responsibilities involved in teamwork. Working with the community organizations increased their understanding of the role of empathy, understanding, and appropriate support for their clients.

The course provided an opportunity for students to become better communicators. They had to consider the best approach for delivering ideas to people they had never worked with before. Understanding their target constituencies and their community organizations was paramount for communicating their ideas.

While some projects may not produce long-lasting community programs, student experience outside the classroom is valuable. Students understand that they are gaining skills that they can take into the workplace. Moreover, students have the opportunity to see whether or not they want to work in a particular field. Additional benefits include the connections they gain in the community and potential for internships through these networks.

Additional Resources

- Center for Social Concern provides additional resources for developing CBL projects: http://www.jhu.edu/csc/cbl.shtml

Authors' Backgrounds

Eric Rice, Senior Lecturer
Center for Leadership Education, JHU

Eric Rice has 25 years of experience in consulting and teaching communication skills. Students in his classes have performed dozens of projects for organizations that have helped the organizations grow and the students find jobs.

Dr. Peter Beilenson, Lecturer
Public Health Studies, JHU

Dr. Beilenson is a former Baltimore county Health Commissioner and currently serves as Howard county's Health Officer. He has taught the course, "Baltimore and the Wire," in Public Health Studies, focusing on the major issues Baltimore and other urban centers.

Eva Smith, Teaching Assistant
International Studies, JHU

Eva Smith is an undergraduate in International Studies at Johns Hopkins University. She was the teaching assistant for the "Baltimore and the Wire" course. She co-developed the "Community Engineering" course and served as its teaching assistant.

The Innovative Instructor

Technology

Vol. 7 | August 2012

Apps for That: Smartphone

Reid Sczerba, Multimedia Developer, CER

What are they

As smartphones become more commonplace, the number of small, single-purpose applications (apps) grows. These apps are functional extensions of your smartphone's built in applications; they are powerful tools that do not require a laptop or desktop computer. While most apps are created to entertain, some are created for productivity, communication, and collaboration; all of which can enrich educational experience.

Why they were made

Apps are essentially smaller versions of applications with a limited set of features, often focused on a single task. Some tasks are more complex than others, for example, word processing versus simple note taking. App interfaces are optimized for smaller screens, simplifying a process for the mobile experience. Because they are simpler, apps can be created with less effort than traditional computer or web applications. This encourages independent developers to create apps for purchase.

Who produced them

Software development companies and independent developers may create apps for multiple device operating systems such as the iOS, Android, and Windows Phone (WP7.5 and WP8). Others devote their app development to one specific operating system, which can at times frustrate users who identify ideal apps that do not work on their devices. A device will often come with a few default apps that were created by the same company/developers that created the operating system. These default apps are usually very basic but perform well on the device.

Why they matter

Smart phones are small computers; think of them as pocket-sized laptops. These devices also have the advantage of turning on instantly. They provide access to the internet and computing tools wherever and whenever needed.

How they can be used

Productivity apps can be useful in a teaching or professional setting. Listed below are categories of productivity apps with brief descriptions of each.

Control

Apps like "Gmote" for Android and "Touch Mouse" for iOS allow you to control a computer's cursor from across the room using your smart phone. This can 'untether' instructors or presenters from podiums and allow them to walk about freely while controlling their presentations. The "Crestron Mobile" App allows iOS or Android devices to control lights, media, climate and projector controls remotely in any of the "Smart" classrooms at JHU. Contact IT@JH for information on using this app in specific classrooms.

File Management

Android has a convenient app for managing the files on your device: "ES File Explorer." With it you can move, copy, rename, make folders, and even unzip compressed packages. It also comes with a simple text/image viewer to give you a better sense of the content of a file.

File Transfer

When you need to make files available for multiple people (yourself included) to view later or on a different computer, "Dropbox" for iOS and Android lets you store your files in the "cloud" for sharing. Using "SkyDrive" with your Windows Phone affords a similar ever-present file repository.

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Note Taking

"Simplenote" and "Evernote" are very popular, easy to use programs that let you take notes, tag them, and sync them with your computer from an iOS device. The latter has more features, such as storing audio, images, and maps, and it is available for both Android and WP7.5. WP7.5 also comes with "OneNote Mobile," which gives you more features than the basic note taking app.

Photography

One of the most useful aspects of a smart phone is the ability to take photos. Each device comes with basic camera functionality, but apps like "Camera Zoom FX" for Android and "Camera+" for iOS will give you control of the camera's settings, increase the chances you'll take a good photo, and support postproduction editing/enhancing of the photos. "Thumba Photo Editor" for WP7.5 also allows you to extend your postproduction editing options and edit GPS data. If a single photo doesn't do your location justice, apps like "360 Panorama" and "PhotoSynth" for iOS and WP7.5 can stitch photos together for a panoramic experience.

Reader

The portability of a smart phone makes it easier to bring your normally heavy reading material with you wherever you go. Apps like "Instapaper" and "Read It Later" for iOS and Android allow you to save, sort, and share webpages with or without images for reading anytime, even if you don't have a cellphone signal or wireless internet connection. The "GoodReader" app for iOS is a robust reader that allows you to render just about any file, annotate PDFs, view videos and share what you've read with others. The "Kindle" app is available for every device; it allows you to sync and read all your purchased Amazon e-books.

Reference

With information at your fingertips anytime, reference apps like "Merriam-Webster's Dictionary" for iOS and Android will ensure you are never at a loss for words. And when your reference material needs to be translated to different languages, "Google Translate," also for iOS and Android, allows you to write or speak words for translation to over 20 different languages. "Wolfram Alpha", another great reference app available for iOS and Android, gives you robust answers to technical questions.

Task Management

Everyday tasks can be managed through your smart phone using apps like "Remember the Milk" on an iOS or Android device; Windows Phone has a task manager built in. Staying on schedule is made easier by the app's ability to sort, send notifications, and sync with your computer.

Additional Resources

- **iTunes App Store** (iOS): http://itunes.apple.com/us/genre/ios/id36
- **Google Play** (Android): http://play.google.com/store/apps
- **Windows Phone Marketplace** (WP7.5): http://www.windowsphone.com/en-US/store

Author's Background

Reid Sczerba,
Multimedia Developer, Center for Educational Resources, JHU

A member of the Center for Educational Resources, Reid provides training on a variety of programs, aids in educational resources development, and shares expertise on information and graphic design for faculty at the Homewood campus. He holds a BFA in Illustration and a MA in Digital Arts from Maryland Institute College of Art.

Where are they going

The number of app downloads from the iTunes App Store increased by about 30% from 2011 to 2012, totaling of over one-half million apps. Considering that Apple is currently the leader in smart phone sales and apps, this indicates that the production of apps will steadily increase, not only for iOS but also other operating systems through competition. More and more app developers are exploring ways to provide a rich human-computer experience with a smart phone.

How to get started

Online app stores are available for each device operating system (links provided below). Typically, the device's operating system has a default app that allows you to browse and purchase apps. Some developers offer their apps for free. In this case, you may find that they have advertisements (ads) that appear in the app to help support the developer. Paying for the full version of a free app usually excludes the appearance of ads. Some developers create apps for free and may ask for a donation, though this is rare. Apps for sale will sometimes offer a "free" or "lite" version so that you can experience the app's limited features before purchasing. Whether or not the app is free, sometimes signing up for a supplemental online service -such as storage/access of data or user account information- is necessary. So while you may have obtained the app for free, using the service it is tied to may incur a cost. Be sure to read the description and user reviews before purchasing apps.

Other thoughts

Your smart phone will obtain its internet connection either through a cellphone signal receiver (ex: 3G, 4G) or a WiFi receiver. The latter is highly dependent on the location of a WiFi hotspot, as opposed to cellphone signal towers. Most apps require a connection to the internet to function. Consider your intended use when purchasing your smart phone, data plan, and apps.

The Innovative Instructor

Best Practice

Vol. 6 | September 2011

Setting up Guest Access in Blackboard

Amy Brusini, Instructional Technology Specialist, CER

What it is

When Blackboard courses are created, access is restricted to members of the JHU community who are enrolled in each course (instructors, TAs, and students) and have working JHED IDs. But with the Guest Management application developed by IT@JH, it is possible to create and distribute guest login accounts that are open to anyone, including those outside of JHU.

Why it matters

In the old WebCT system, each course automatically included a guest student login feature. In Blackboard, because of the volume of courses created every semester and multiple roles that exist within each course, it is not possible to automatically create secure guest accounts for each course. But with this new application, instructors can create as many guest accounts as they need and assign them whatever role they would like.

Instructors might want to allow guest access to their Blackboard course sites for many reasons. For example:

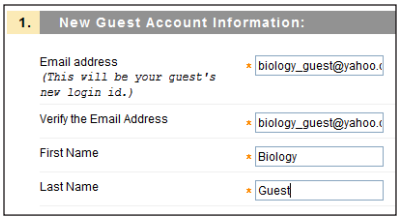
- Login as a guest student to see a "true" student view of the course. Blackboard provides a limited student view by clicking the Edit Mode button to the 'Off' position, but certain functions (viewing grades from My Grades tool, taking a quiz as a student, etc.) are not available unless you are logged in as a student.
- Share course layout and design with colleagues. Whether it's a fully online or hybrid course, many instructors value suggestions and feedback on course organization from their peers.
- Allow guest speakers to participate in online discussions with students. Interacting with students online is one way to further enhance the students' experience with the guest.
- Allow students who are waiting for JHED IDs to access course material. At the beginning of the semester, some students experience a delay in receiving their JHED IDs, which can prevent them from logging in to Blackboard. Logging in with a guest account would allow them access to course material without losing time during the semester.

How to do it

Before creating a guest account, an instructor must have a working external email address that is not a JHU address (e.g., Yahoo, Gmail, etc.). JHU email addresses cannot be used since they are tied to users' JHED IDs. If the guest account is to be used by guests of the site (as opposed to only the instructor), it is recommended that the instructor create a non-personal email address solely for this purpose. In this case, because more than one person can use the guest account, it is better to have a generic email address as it will become the user name of the guest account in Blackboard (for example, biology_guest@yahoo.com). The steps below describe how to create the guest account once the email address has been established.

I. Guest account information

After logging into Blackboard, click on the Faculty/Staff tab at the top of the screen, then click the Guest Mgmt button (These buttons only appear for instructors). Fill in the fields for the 'New Guest Account Information.' For the email address, enter in the external email address you created (as described above).



First and Last Name will be how the user will appear in Groups, Discussion Boards, etc.

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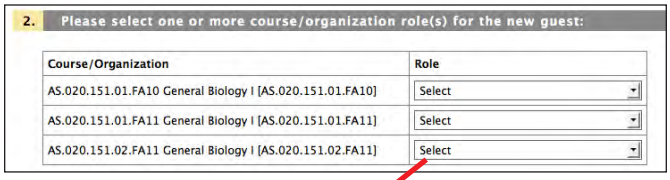
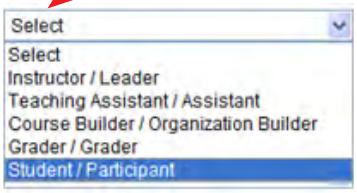
II. Choosing a role for the guest account

The next step is to choose the appropriate role for this guest account using the dropdown list next to the courses you are teaching. The role can be changed at any time.





Roles are listed in order of having the most access (instructor) to the least access (student). Keep in mind the level of access associated with each role. For example, if you decide to give the guest the role of 'instructor,' the person using the guest account will have access to everything in your course site exactly as you do, including editing capabilities and student grades. (For more detail about course roles, please see the Course Roles section in the Blackboard help materials: http://help.sset.jhu.edu/download/attachments/10485887/CourseRoles.pdf)

III. Confirmation message

Once the role is selected, a confirmation message in Blackboard will appear, informing you that login information has been sent to the email address you set up for the guest account:

> [March 25, 2011 04:00 PM]
>
> Your Blackboard guest account for biology_guest@yahoo.com has been successfully created and assigned the selected role(s). The initial login details for the guest account have been sent to biology_guest@yahoo.com. Any further management for this new account may be done through the Blackboard interface.

IV. Retrieving login information

Log in to the external email account (e.g., Yahoo, Gmail, etc.) using the guest user email address and locate the message containing the Blackboard login information. It will contain the user ID and password for the guest account:

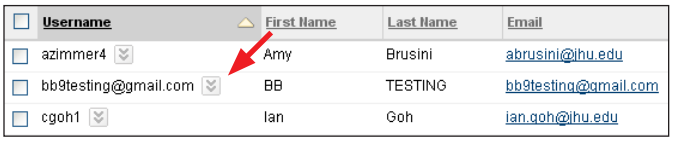
> Your username to login is: biology_guest@yahoo.com
>
> Your initial password is: gpgEEZbazTTnpeU6DvK

The initial password is very long and obscure. It can be changed by using a link included in this same email message.

V. Testing the guest account access

To test the guest account, go to http://blackboard.jhu.edu and log in using the 'Non-JHED Login' link in the upper right side of the screen. Once you're logged in as the guest, make sure that the assigned role is the appropriate access level for this account.

If you want to change the role, go to Users and Groups → Users in the Control Panel of the course (located in the lower left side of the screen). Find the guest user in the user list and click the action/options menu next to the guest's name (look for the double chevron button). Select 'Change User's Role in Course' and choose the new role. Click Submit and the new role should be displayed after the user's name.



Final Thoughts

The process mentioned above refers to adding to Blackboard guests who are outside of JHU and, therefore, do not have JHED IDs. There is a different way to add those with JHED IDs to Blackboard courses:

In the Control Panel, if you navigate to Users and Groups → Users, the 'Find Users to Enroll' button allows you to add a person using his/her JHED ID (username) and then assign a role to that person.

This might be useful for instructors who want to add teaching assistants, librarians, or co-instructors (all from JHU) to their courses.

Author's Background

Amy Brusini, Instructional Technology Specialist
Center for Educational Resources, JHU

Amy Brusini works at the Center for Educational Resources (CER), a teaching and learning center for Homewood faculty. Amy provides support and training for Homewood faculty on WebCT, the university's current course management system, as she is preparing for the upcoming Blackboard migration. Amy recently completed a Master's Degree in Education from Johns Hopkins University.

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Visualizing Population Data Geographically

Stan Becker, Professor of Population, Family and Reproductive Health
Nazish Zafar, 4th year Graduate Student in Sociology

The Issue

In most public health courses, statistical data are central to understanding population and health indicators as they relate to issues such as fertility and life expectancy. However, raw statistical data of one country do not usually illustrate that country's geographical relationship to other countries or reveal broader global public health patterns. Visualizing the indicators of the countries based on their locations on the map can be difficult, especially since current resources do not usually map the latest data within a global setting, which is essential for contextual and spatial analysis.

Why does it matter

In Population, Health and Development, we use the latest data from the Population Reference Bureau (PRB). It provides a spreadsheet of values for every country in the world, indicating variables such as population, mortality, HIV, and more. Viewing the raw numerical values for each country is not a convenient or effective way to extract meaning from the data. In previous semesters, students produced vertical "spike-and-cap" graphs to view the distribution of values for a given region. The students would then compare the graph of their region to other regional graphs - e.g., life expectancies for countries in Oceania compared to those of East Asian countries. Creating graphs for every region can be tedious, and it enables only a limited comparison of the data. Absent from such comparisons is how one country's public health indicators relate to those of other regions within the world system. It is difficult to have a global perspective of a country's indicator values without a clear visualization of the geographic information.

Solution

Understanding relational data based on neighboring regions, as well as topographic, climate and cultural considerations, can help explain the differences between indicator values. To synchronize all of the statistical and spatial data, we created a series of choropleth maps that display countries shaded in a range of color gradient values corresponding to indicator values. Created in ArcGIS, each map shows a dozen population and health indicators from the annual PRB. This project was made possible through a Technology Fellowship grant awarded by the Center of Educational Resources and with ArcGIS assistance from the Government Publications Maps and Law department of the library. Maps were made available to the students through ArcGIS Explorer, a presentation tool for maps created in ArcGIS. ArcGIS Explorer provided an easy way for students to visually compare data across geographical regions.

Using ArcGIS Explorer, students can turn on a specific choropleth map that represents an indicator's value (such as life expectancy or fertility) and compare those gradient values to other regions' values. Zooming into a region reveals new gradient values of the individual country data for the region. When students click on countries or regions, a popup box appears, detailing the data that define the choropleth map. This interaction provides an engaging way for students to experience the data in a variety of meaningful ways.

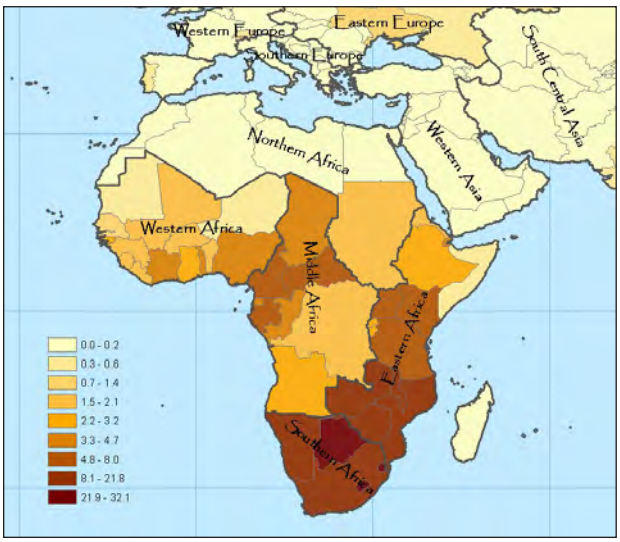
We use these maps during lectures, and we developed related homework assign-

ments to prepare the students for their final group presentation. Most students used ArcGIS to give their presentations; it provided a platform for interacting dynamically with the data and maps supplemented by other material such as images, topographic maps, and videos.

Results

For their final projects, student groups presented their regions (such as West Africa or Eastern Europe) to the class. They were asked to present PRB data for these regions and suggest the cultural, historical or geographical implications that could be derived from those data. Through the final projects, students developed subject area expertise.

Because of ArcGIS Explorer's ease of use and dynamic quality, all but one group chose to use it for final presentations. Students presented their research by 'traveling' virtually around the global map to focus on specific regions and countries. Research material on each country and region could be associated to the exact position on the global map to anchor student analysis in geographical context. Through their presentations students acquired a stronger sense of the world (the sights, sounds, climate, topography, and history) and the data that define each region. For example, they better understood not just specific regions' or country's infant mortality rates, but also the conditions that contributed to those rates.



Example of ArcGIS Explorer displaying the percentage of adolescent women with HIV in 2007/08 for each country within a region

Other Thoughts

We used ArcGIS initially to display our maps in class and created a few assignments to help students to interact with the application. The rather steep learning curve and Windows operating system requirement presented early challenges. During class, we demonstrated the program and performed exercises together to orient students to the program. We quickly realized that there was not going to be enough time to prepare the students adequately to work on their own outside of class because of the complexity of the program.

Fortunately, a new, user-friendly and stable release version of ArcGIS Explorer became available during the semester. Students were inspired by its ease of use and had made comments that ArcGIS Explorer would be their presentation tool of choice for final projects.

The only drawback to ArcGIS software is that it requires a Windows operating system. However, by using Parallels Desktop or VMware Fusion, Mac computers can accommodate the program. The Eisenhower library also has computers in the Maps & Government section with ArcGIS Explorer installed.

Additional Resources

- 2011 World Population Data Sheet: http://www.prb.org
- ArcGIS Explorer: http://www.esri.com/software/arcgis/explorer

Authors' Background

Stan Becker,
Prof. of Population, Family and Reproductive Health

Stan Becker is a professor in the Department of Population, Family and Reproductive Health at the Bloomberg School of Public Health (BSPH). In addition to the course, Population Health and Development, at Homewood, he teaches Couples and Reproductive Health and co-teaches Population Dynamics and Public Health and Methods and Measures in Demography at the BSPH. His research interests are interventions with couples in reproductive health and estimation of fertility and mortality in developing countries.

Nazish Zafar,
4th year Graduate Student in Sociology

Nazish Zafar is a 4th year doctoral student in Sociology who is studying social inequality from a cross-national comparative perspective. She has lived and worked in Singapore, Russia, and Brazil where she has worked on projects on social policy and welfare. She has been a TA for Population, Health, and Development for three years (2009, 2010, 2011).

The Innovative Instructor

Technology

Vol. 6 | September 2011

Wikis

Hérica Valladares, Assistant Professor of Classics
Macie Hall , Instructional Designer, CER

What it is

A wiki is a webpage or website that allows collaborative editing. A wiki invites participants to take part in the creation of the site content. Typically edits are tracked and a history of the contributions can be viewed.

The word wiki comes from the Hawaiian word for quick, which is descriptive of the ease of creating and editing content within a wiki site. Wiki sites foster open and collaborative group participation in a project. Wikipedia is a well known example of a wiki in which a community of editors revises and refines content for collectively accepted encyclopedia entries.

Who produced it

In 1994 Ward Cunningham, a computer programmer from Oregon, developed the first wiki, which he called WikiWikiWeb. Although there are many companies that offer free and licensed wiki site hosting with a range of features, a wiki site is more of a concept than a product.

Why it matters

As an active learning tool, wikis offer a means to help students develop writing, research, and critical and analytical thinking skills. Wikis can be a forum for class discussion and student collaboration. Groups of students can also use wikis to collect and document information for a research project that can aid their reporting or presentation of a topic.

How it can be used

JHU Classics faculty member Hérica Valladares decided to use a Wiki for students to create an online exhibition for her course The Authority of Ruins offered in the spring of 2010. She used Google Sites: http://sites.google.com. The project can be viewed here: https://sites.google.com/site/theauthorityofruins.

The seminar was structured around the close study of antiquarian books in the Eisenhower Rare Book Collection. For their final project, instead of producing individual research papers, the students in this class were asked to create an online exhibition based on these early modern publications. After they were divided into teams, the students' first task was to select images and themes for this exhibition. They were also responsible for writing informational captions and short interpretive "wall texts" to accompany the selected images. Curating and mounting an exhibition is, by nature, a collaborative and interactive endeavor. Although each member of the seminar was required to complete discrete, individual assignments in preparation for the final project, they were also expected to communicate with one another to produce a coherent exhibition. A wiki was the perfect medium for bringing this project to fruition.

After considering different options, the students and Professor Valladares, in consultation with Macie Hall in the CER, decided that Google Sites was the best platform for this project. It is extremely user-friendly; it allows for easy communication both among the students and between the students and Professor Valladares; and, last but not least, it allows students to share their work with a larger public. This last aspect of Google Sites was extremely important to the students. They were keen to make their online exhibition publicly accessible, and this motivated them to behave professionally and produce "publishable" texts.

As a whole, Professor Valladares felt that the experience of creating an online exhibition was extremely productive pedagogically.

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The students not only learned about the history and practice of antiquarianism in Italy, but also had a chance to work directly with primary source materials. Putting together an online exhibition also made them aware of the process involved in producing and disseminating accurate information on the Internet. Moreover, this experience gave them a clearer sense of the different stages of academic research, from analyzing primary sources to producing an informative, engaging scholarly text. The use of digital technology in this class also invested these "dusty, old" books with an aura of contemporaneity. Transforming these early modern volumes into the subject of an online project helped create a bridge between what might be perceived an arcane subject, and students were eager to make classical antiquity accessible to a present-day, non-academic audience.

How to get started

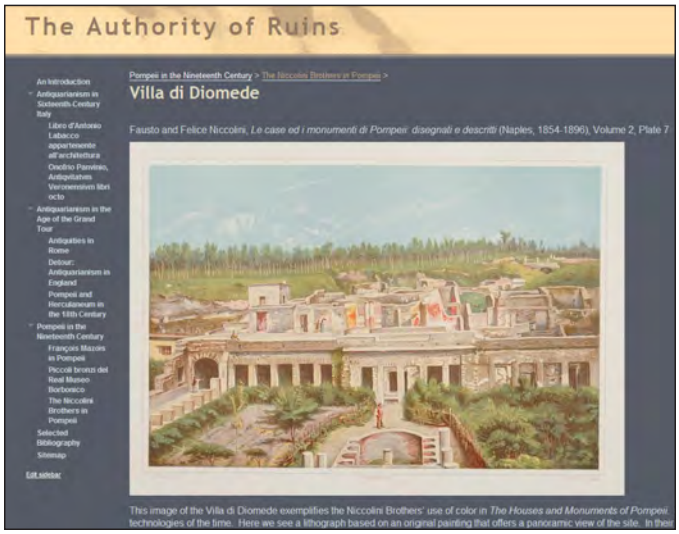
- Have a clear objective for use.
- Be specific about requirements. Have a grading strategy or rubric.
- Set up a clear timeline for the different stages of developing and completing a wiki (e.g., creation of content, selection of images, editing the text, etc.).
- Set rules for engagement: who can edit, what can be edited, what is acceptable and unacceptable. If groups are being created and a single wiki is used, students should be clear about the boundaries for each team – they should know which pages they can and cannot edit.
- Give specific assignments, topics.
- Students need to feel that they have "ownership" in the wiki; it is important to allow flexibility. However, it may be a good idea to set up a navigational structure in advance, depending on the nature of the assignment and whether or not there are several groups of students using the same wiki.

Other Thoughts

For the Krieger School of Arts and Sciences and the Whiting School of Engineering, course web sites in Blackboard (a course management system) are provided for all full time courses. The wiki application is one of many Blackboard features.

Advantages of Blackboard Wikis over commercially available online tools:

- Copyright concerns are reduced.
- Content is secured.
- Content is managed within JHU.
- Content is not public.
- Disadvantages of Blackboard Wikis over commercially available online tools:
- Content is not viewable by the public.
- Content is available only to students who are registered in the course. Guest accounts can be created to meet certain needs.
- Configuration of appearance is limited.



Screenshot of a Professor Valladares' class wiki

Additional Resources

Free Wikis (*Read the terms of use carefully. Some applications will have ads unless you pay for an account without them*):

- Google Sites: http://sites.google.com (Google apps are ad free by default)
- Wikidot: http://www.wikidot.com
- Wikia: http://www.wikia.com
- Wiki Spaces: http://www.wikispaces.com (see Higher Education Plan)

Authors' Background

Hérica Valladares,
Assistant Professor of Classics

Hérica Valladares (herica@jhu.edu) is assistant professor of Classics at Johns Hopkins University. Trained both as a classicist and an art historian, she teaches several interdisciplinary courses on Pompeii, early modern antiquarianism, Roman landscape art and the history of archaeology. She is especially interested in the role of digital technology in Classics pedagogy.

Macie Hall ,
Instructional Designer, CER

Macie Hall (macie.hall@jhu.edu) has provided instructional technology support to faculty since 1987. She is interested in visual literacy, effective presentation techniques, and Web 2.0 technologies.

The Innovative Instructor

Best Practice

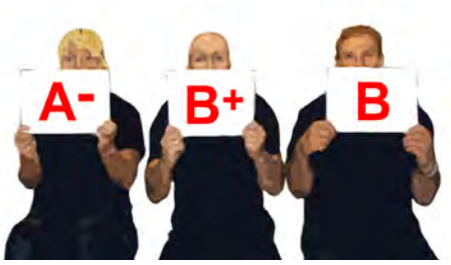
Vol. 5 | March 2011

Calibrating Multiple Graders

Pamela R. Bennett, Assistant Professor of Sociology
Andrew J. Cherlin, Professor & Chair of Sociology
Michael J. Reese, 5th Year Graduate Student in Sociology

What it is

Assessing student work in large classes can be complicated when several faculty or multiple teaching assistants share the responsibility. In a calibration exercise, multiple individuals work together to score a sample of student submissions before dividing and individually grading the remaining student work.



Why it matters

Calibrating multiple graders helps to standardize assessment of student submissions. The practice minimizes variation in interpretations of students' work across graders. It also allows instructors and teaching assistants to field questions regarding scores from any student, not simply those whose work they personally graded.

How to do it

The process of calibrating graders involves several steps that can be adjusted based on the course content, structure of the assignment, and individuals involved in grading. Below is the process used by the faculty and teaching assistants in an Introduction to Sociology course.

I. Create a Rubric

"A *rubric* is an explicit set of criteria for assessing a particular type of work or performance"[1] A rubric provides a common definition of what is right or wrong and standards by which to rate the quality of students' work. It clearly describes what students must include to receive points and/or why points should be deducted. Some rubrics even include example answers.

Sociology Exam Rubric

The following exam question was worth ten points. The answer key defines a basic answer that is to be awarded a maximum of 7 points, and provides examples of elaboration that are worth a maximum of 3 additional points.

1. *Give two examples of important changes in the American family over the past half-century.*

	Basic Answer	Elaboration
Answer Key	There are serveral "important" changes, any two of which would constitute a basic answer of **7 points**: rise in cohabitation, rise in divorce, the increase in single-parent families, postponement of marriage (and rise of early adulthood as a new life stage); movement of married women into the work force. Other responses could be acceptable – when in doubt, check with the instructor.	What will make the difference for the last **3 points** is whether students write something about each of their two examples that suggests that they understand the significance of the change, such as effects on children, changing roles of husbands and wives, increasingly long period of time before one becomes an "adult," etc. Many answers are possible, but they should go beyond generalities such as "caused great change."

[1] http://www.tltgroup.org/resources/flashlight/rubrics.htm

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II. Preparing for the Calibration Session

1. Identify several student submissions to be scored by the group. To quickly identify a sample of submissions that will likely generate marks across the range of scores as defined by the rubric, target submissions based on previous grades for homework or in-class participation.
2. Make copies of the submissions for each grader without including student identifiers to minimize grader bias.

III. Calibration Session

During calibration, the group scores the sample student work either together or apart. If apart, the group reassembles and each person communicates how s/he interpreted the rubric and assigned a score. The group discusses differences in assigned scores and comes to consensus on a final score, using a standard interpretation of the rubric or a modification of it. (It is not unusual to modify the rubric; identification of weaknesses in the rubric is another benefit of the exercise.) Below is an example of how a session could be conducted.

1. The instructor who created the rubric reviews it with the group and explains the scoring criteria.
2. Graders individually read submissions and score the work based on the rubric.
3. Each person shares the score s/he assigned to the first component of the work (e.g., first question on an exam). If there is variation in assigned scores, then each grader explains how s/he arrived at the score assigned. The group then reaches consensus on a score based on a common interpretation of the rubric (or its modification). The group moves to the next component of the work. Graders should make notes on the rubric during this discussion to consult when scoring student work on their own.
4. Once calibration is accomplished, the remaining student submissions are divided among the group. Option: Assign student submissions to graders unfamiliar with the students to reduce bias based on previous interactions. This may be useful for large classes with small group sections assigned to TAs.

IV. Staying Calibrated

As graders review students' work, they should note submissions for which they found assigning a score difficult. This may result from uniqueness of a student's response or difficulties in interpreting the rubric. Graders should communicate with the group about how to address the issue before final grades are submitted, as the resolution may affect how other graders score.

To check grader calibration, the lead grader can spot check scores assigned by different graders. Another option is to compare the mean and standard deviations of the scores assigned by each grader. Some variation will naturally occur, but if extreme outliers are identified, those graders' scores can be reviewed.

Additional Resources

- Example rubric from California State University at Long Beach, Computer Engineering department: http://www.csulb.edu/colleges/coe/cecs/views/programs/undergrad/grade_prog.shtml

Authors' Backgrounds

Dr. Pamela R. Bennett
Assistant Professor of Sociology

Pamela Bennett is an assistant professor of Sociology. She teaches several courses related to her research on social inequality rooted in race, class, and residential location, in addition to co-teaching the Introduction to Sociology course. This course employs several graduate students who share the grading responsibilities with two faculty.

Dr. Andy Cherlin
Professor & Chair of Sociology

Andy Cherlin is professor & chair of Sociology and the Benjamin H. Griswold III Professor of Public Policy. He teaches courses about the family and statistical methods in addition to co-teaching the Introduction to Sociology course.

Mike J. Reese
5th Year Graduate Student in Sociology

Mike Reese is a 5th year graduate student in Sociology assigned as a TA in the Introduction to Sociology Course in Fall 2009. His research explores how teaching innovations spread through higher education. He is also the assistant director of the Center for Educational Resources.

The Innovative Instructor

Pedagogy

Vol. 5 | March 2011

Digital Labs: Drawing Ancient Inscriptions

Kyle McCarter, Professor, Near Eastern Studies Department

The Issue

In an epigraphy course students learn to decipher and analyze inscriptions and manuscripts using traditional philological tools. The ultimate goals are to translate and interpret texts, but before they can begin to do those things, students need to become familiar with the physical characteristics of the ancient documents we study, especially the shape and other features of the writing itself. So our first job is to enhance the students' ability simply to "see" ancient writing, and this can be a challenge when using traditional tools.

Drawing an inscription with Illustrator

Why does it matter

When you examine an ancient inscription, a number of variables affect your ability to interpret what you're looking at, such as the condition of the surface of the object, the darkness of the ink, or the depth of the incisions in stone or clay.

A document's appearance is affected not only by the ancient method used to create it and the state of preservation of the inscribed artifact, but also by the modern technologies employed in recording and preserving its image, such as the photographic techniques used to create the image and the computer programs used to manipulate it. All these factors affect the way modern scholars, including epigraphy students, understand ancient inscriptions. When students are familiar with both the ancient and the modern technologies at play in the creation and reproduction of epigraphs, they're better able to see the written characters and recognize what the ancient scribe intended.

Drawing an inscription most effectively connects the technical activity of seeing an inscribed object with the correct interpretation of its text. The publication of a newly discovered inscription should include not only one or several excellent photographs, but also a drawing. This drawing is not (or should not be) an object of study for other scholars, who should work from the photographs if not the original artifact. Instead, the drawing permits the epigrapher who is publishing an inscription to shows other scholars how he or she sees the inscription. At the most basic level, the drawing indicates which lines, in the epigrapher's opinion, are part of the inscription and which are the result of surface damage. But a good drawing also conveys a lot of sophisticated paleographic information, much of which is difficult to express adequately in a written description alone. So one of the most important things we teach epigraphy students is how to draw what they see when they examine an ancient inscription.

Faculty Solution

When epigraphy students are learning to draw inscriptions, technology comes into play in two principal ways. The first is through photography. Ideally, the epigrapher works from the object itself, but since this is often not possible, the creation of high quality photographic images is extremely important.

We are fortunate at Hopkins to be able to work closely with other research groups in this country and overseas where first-class epigraphic images are being created. This

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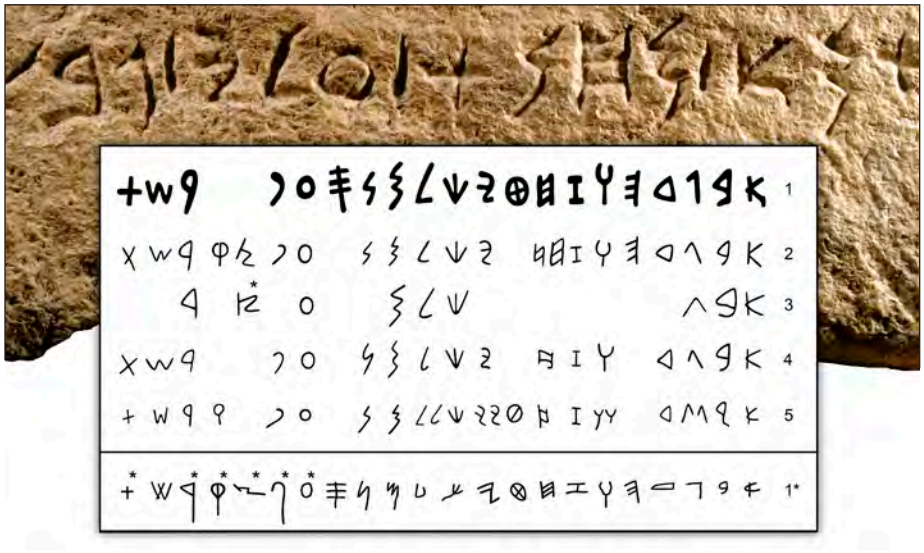

Script chart example with one of its sources

gives us the resources we need to focus on the second aspect of technology that comes into play, namely the drawing itself. Drawing technology has changed dramatically since the days I was taught to draw inscriptions using a light table, tracing paper, and India ink.

Last year, in the first semester of my year-long epigraphy course, we began to teach systematically with Adobe Illustrator for the first time. With Illustrator, the number and variety of editing tools available, along with the high degree of control they afford, provide a stark contrast to the unforgiving method of tracing with ink. The program has numerous other advantages. For example, it greatly simplifies an essential, but painstaking, part of our work in epigraphy: the creation of script charts. Script charts display the forms of the letters of inscriptions from various time periods, providing a graphic illustration of the evolution of ancient scripts. Working within Illustrator, an epigrapher can produce a script chart very quickly by cutting and pasting letter forms from previously drawn inscriptions and using basic editing tools to arrange the results to show typological development.

For a number of years, I've been designating part of the epigraphy seminar as a laboratory. During the three-hour class the first two hours focus on the reading and interpretation of inscriptions, while the last hour is devoted to technical study of the ancient scripts through drawing, now specifically using Illustrator.

Training in the use of Illustrator is necessary, since the program is new to most of our students. Soon after the start of the fall semester Reid Sczerba from the Center for Educational Resources conducted a hands-on workshop to introduce the program to the students. Teaching assistant, Heather Parker, who had primary responsibility for the lab portion of the class, continued to explain and reinforce the techniques.

Results

As the class reached an increasingly sophisticated level of comprehension of the epigraphs, reinforced by the use of technology and practice in the lab, the students began to combine what they were learning about the writing and spelling of ancient texts with skills and tools learned in language classes. The goal was to give them facility in the decipherment, translation and interpretation of ancient written materials.

Only a small number of our graduate students will go on to become epigraphers, but all of them must be familiar with inscriptions and the methods used to study them. With the training we give them, we expect that they will be able to make effective use of the publications of the specialists. They will have the tools for understanding what is being said, and they will know the limitations of epigraphic interpretation.

Other Thoughts

When teaching undergraduates about the ancient Near East, I'm aware that most of the class will not become professionals in the subject matter. I ask myself what is valuable to them about what I'm teaching. I know that ultimately it will not be the specific data, as much as the general historical principles at work and the larger cultural ideas that the material illustrates. To some extent the same is true for graduate students, though, in their case, they must retain a lot of the data as well.

Since most of my teaching is about things that have been important to people for millennia, I feel a special obligation to convey to students a sense of what has proved to be of enduring importance in human culture and perhaps even to prompt them to ask themselves why these things acquired such importance in the first place.

Author's Background

Kyle McCarter
William Foxwell Albright Professor, Near Eastern Studies Department

For over twenty-five years, Kyle McCarter has taught Johns Hopkins graduate and undergraduate students, focusing on the ancient world, the part of it that gave us the Bible and the alphabet. His published work is mostly philological, with an interest in material culture. He combines these interests by serving as epigrapher to a number of excavation projects. Why does he find it exciting to decipher ancient inscriptions? It's as if a telephone has been ringing unanswered for 3,000 years, and you pick up the receiver, and there's a connection.

The Innovative Instructor

Technology

Vol. 5 | March 2011

In-Class Voting ("Clickers")

Richard Shingles, Lecturer, Biology

What it is

In-class voting systems, also known as "clickers," allow instructors to rapidly collect and analyze student responses to questions posed during class. Clickers can make a class more engaging and encourage students, who often refrain from answering oral questions in class, to contribute to class dialog on questions posed by the instructor. Instructors can also obtain real-time feedback as to how well students understand concepts taught in the class.

Who produced it

The Homewood campus uses the i>Clicker Classroom Response System, and students can use the same "clicker" device in multiple courses. Faculty need a computer to use during class. The Center for Educational Resources (CER) will provide the i>Clicker software and an RF receiver if needed. Students simply purchase an i>Clicker voting unit and register their respective units one time.

Who is using it

In-class voting technologies were first piloted in classes on the Homewood campus in Spring 2003. Since then in-class voting has become ubiquitous in large enrollment classes at Homewood; over 2500 students per semester use the system. Clickers are used in courses such as biology, chemistry, physics, psychological & brain science, history of science and technology, and earth and planetary sciences.

How it can be used

Clickers allow faculty to enliven the classroom quickly and easily. They enable faculty to:

- Give and grade objective pop quizzes on readings or other assignments
- Conduct in-class polls in real time
- Stimulate class discussion by posing subjective questions, using either ad-hoc or previously developed questions
- Manage, record and run reports on all aspects of students' performance using the system
- Take attendance

In a typical example, an instructor poses a question, often multiple-choice, to the class. Then students think about the question and submit their responses using handheld wireless transmitters. Responses are beamed to a receiver plugged into the instructor's computer. Software on the computer processes the information quickly and displays a bar chart showing the distribution of student responses. Instructors can then use these responses to decide how to proceed in the class.

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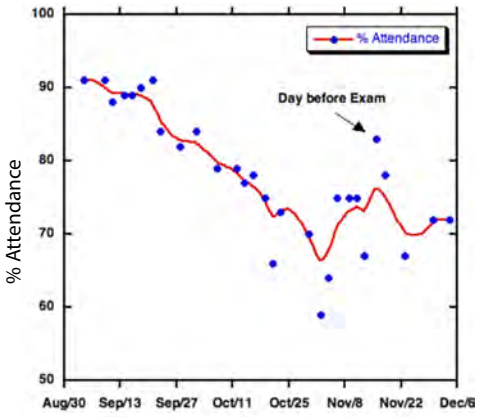
Instructors vary as to whether or not to use clickers for grading class attendance. Some simply use clicker votes to count as "participation points," just as they might grade students in discussions. For instructors who would like to monitor attendance over time, clickers can record attendance. In a real-world exercise, *General Biology* tracked student attendance in lectures during the fall semester of 2009 to monitor the impact of the swine flu epidemic, generating a mini public health study as the semester progressed!



A semester's attendance during the H1N1 (Swine) flu epidemic

Why it matters

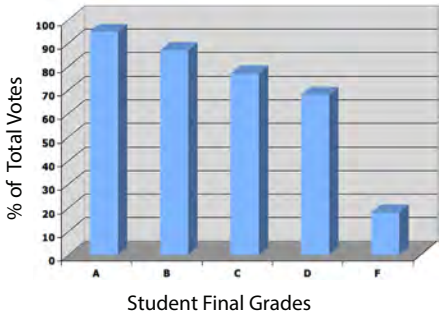
Instructors have found that using clickers has dramatically increased attendance in class, enhanced just-in-time teaching capabilities, increased classroom participation and simplified the deployment and grading of quizzes and exams. Data collected over several years in several courses show a direct correlation between clicker participation and final grades. Clickers are generally considered one of the foundations of an active learning.

How to get started

Faculty who are interested in learning more about the in-class voting system should contact Brian Cole (bcole@jhu.edu, 410-516-5418) or drop in to the Center for Educational Resources on Q Level in MSEL.

The i>Clicker system is integrated with Blackboard, the Homewood course management system. Faculty should contact the CER for details on the integration process. Students will also register their i>Clicker units using Blackboard. If instructors choose to use the Blackboard Gradebook, they can upload class votes directly from i>Clicker to Blackboard.

Faculty can borrow a loaner i>Clicker system to try out in a class up to 50 students.



Other thoughts

Former students offered their thoughts on the use of clickers in the *General Biology* course:

"It was a good test to see if we understood what was being talked about in the lecture. I found it to be really helpful."

"[Clickers] helped keep us focused and helped self-assessment regarding immediate comprehension of the material."

Another quote from Linda Gorman, teaching professor in the Psychology and Brain Sciences department, who has used clickers in a number of courses:

"The clicker system breaks up the monotony of a straight lecture class (no matter how good your lecture!) and is now a welcome addition to all of my lecture courses."

Additional Resources

- Center for Educational Resources
  http://www.cer.jhu.edu/clickers.html
- i>Clicker
  http://www.iclicker.com/
- Derek Bruff (2009) *Teaching with Classroom Response Systems*, Jossey-Bass

Author's Background

Richard Shingles,
Lecturer, Biology Department

Dr. Richard Shingles is a Faculty lecturer in Biology and teaches undergraduate and graduate courses at JHU. Dr. Shingles also works as a Senior Instructional Designer and Pedagogy Specialist with the Center for Educational Resources. Instrumental in the redesign of the General Biology course, he supports and counsels faculty, graduate students and developers of science courses. Dr. Shingles has been the director of the TA Training Institute at Johns Hopkins University since October 2006.

The Innovative Instructor

Best Practice

Vol. 4 | September 2010

Image Resolution

Reid Sczerba, Multimedia Developer, CER

What it is

Image resolution is a concept that always comes up when working with digital images. The resolution of an image has implications for the final output of the image, whether that output is a printed poster or an image on a website. An understanding of image resolution ensures that the end result is clear, crisp, and of an appropriate file size.

Why it matters

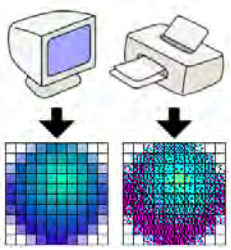
Choosing a resolution that is too low will produce images that appear blurry or fuzzy when printing. Printed products that are blurry will appear unprofessional, reducing their effectiveness. Understanding screen resolution is also essential when sizing images for both websites and PowerPoint presentations to ensure a fast load time. Fortunately, these complications can be accommodated if resolution is considered throughout the image preparation process.

How to do it

The term, "resolution," refers to the number of visual elements found within a physical unit of measure. Every image, digital or not, is made up of tiny elements of color. For print media, these elements are the grains in photographic film or the colored dots in a magazine. The same is true for digital images: they are made up of an array of colored square pixels, like tiles in a mosaic. The more pixels in an image, the greater the detail – and, consequently, the larger the file size.

I. Print Considerations

Typically, digital image resolution is measured in Pixels Per Inch (PPI), which indicates pixel density. (This is not to be confused with Dots Per Inch (DPI), a term reserved for printer resolution.) The PPI of a digital image matters most when printing, because a computer screen has a fixed number of pixels (usually only 72 pixels per square inch) and is not capable of displaying more detail per inch without zooming in (see below). Printers are able to represent a greater number of pixels within a square inch by using tiny ink dots (600, 1200 DPI or higher). When a digital image is printed, the printer considers not only the physical dimensions of the image (say, 4"x6") but also the pixel density within each inch (PPI) to know how much detail to print.



wikipedia.org/wiki/File:DPI_and_PPI.png

Tips on image resolution for print

- Photograph at the highest-resolution setting, to ensure that the image will be as detailed as possible.
- While it's possible to save a lower-resolution copy of a high-resolution image, there is no way to increase the resolution of a digital image photographed at a low resolution. (This is called "sizing up.") The result will always be blurry because the computer cannot create pixel information that is not there.
- When using a digital scanner, set the scan resolution to at least 300 PPI. (Increasing the PPI will make the scanned image a larger digital file.)
- 300 PPI is a safe resolution to produce a good quality print at the size of the original source.
- It is best to edit images at a high resolution, while they contain more pixel information.

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Center for Educational Resources

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II. Digitally Displayed Images

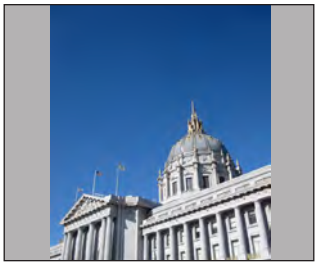
For images displayed on a screen, whether on a monitor or through a projector, pixel density per inch is irrelevant, since monitors have a fixed number of pixels (usually 72 pixels per inch). The only consideration is that of the pixel dimensions of the image (i.e., 640 x 480 pixels).

Photo editing programs, such as Photoshop, will allow the image to be viewed in detail by zooming into the image's pixel density, revealing hidden pixel information if the resolution is greater than 72 PPI. View settings in Photoshop will display the image at its Print Size or Actual Pixels. The Print Size view displays image in the units of resolution (i.e., inches) and represents the physical size of the image as it would appear when printed. The Actual Pixels view displays the image with a 1:1 relationship between the image pixels and screen pixels, representing the image at its highest detail. Zooming in past the actual pixels will produce a displayed image that is blurry; if you continue to zoom, you will see the individual pixels that make up the image.

Another consideration with screen-based images is the display device. Screens come in different shapes and sizes, from a 19" (measured diagonally) standard monitor to a 52" widescreen to ever-smaller mobile devices. Each screen can display a specific number of pixels. Since there is no universal size for screens, images may take up different percentages of each size screen. Moreover, a computer can allow its display resolution to be set at less than the monitor's maximum resolution, which would distribute less pixel information across the existing pixels of the monitor, distorting the image if the proportions of the screen to the selected display resolution are not the same.

Tips for screen-based images

- Always size down to 72 PPI and adjust the amount of pixels tall and wide for an image.
- 1024x768 is considered the smallest screen resolution set on most desktop monitors. Adjust your computer's display resolution to this, temporarily, to get a feel for the typical screen resolution when sizing images for the Web. Keep in mind that a browser window's size will often be smaller, because of toolbars and scrollbars.
- When working with image resolution for a PowerPoint or other digital presentation, it is best to know the resolution of the screen you plan to use.
- 1024x768 pixels constitute a good size for images that will cover an entire PowerPoint slide.



Zoomed out to entire image, 33% from Actual Pixels

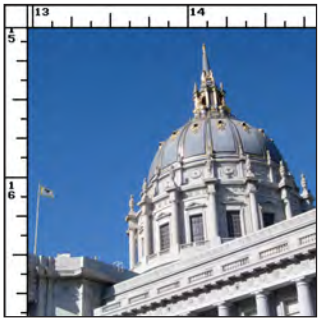
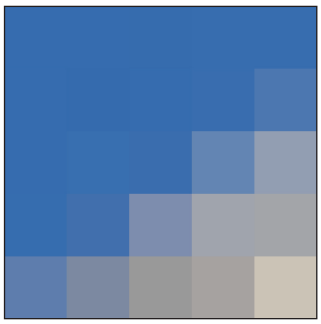


Image displayed at Print Size

Image displayed at Actual Pixels, 100% Actual Pixel detail

Zoomed in to image, 400% from Actual Pixels



Maximum zoom of image, 3200% from Actual Pixels

Additional Resources

The best way to understanding of resolution of images is to experiment with resizing an image in a software program. There are a number of programs other than Photoshop that can be used to resize images; Microsoft's Picture Manager and Mac's Previewer are two examples.

Author's Background

Reid Sczerba

Multimedia Developer, Center for Educational Resources

Reid works for the Center for Educational Resources. He provides training on a variety of programs, aids in educational resources development, and shares expertise on information and graphic design for faculty at the Homewood campus. He holds a BFA in Illustration and a MA in Digital Arts from Maryland Institute College of Art.

The Innovative Instructor

Pedagogy

Vol. 4 | September 2010

Civility in the Classroom

P.M. Forni, German and Romance Languages and Literatures

The Problem

Faculty profession of knowledge used to rest on the firm foundation of the principle of authority. Most students granted their teachers respect and sometimes deference as a matter of course. That foundation has been crumbling for at least three generations. The new digital technology has virtually razed it. As college teachers, it is imperative that we realize what this means for our relationship with our students and for the future of education.

For quite some time, we have observed that the disengaged, disrespectful, and unruly student behavior that used to be confined to secondary schools has reached higher education. In college classrooms across the U.S., tardiness, unfamiliarity with assigned readings, and unjustified absences are routine. So are chit-chatting, e-mailing, and instant-messaging. In large lecture halls where ringtones jar and jangle, students have been spotted reading newspapers and even watching television on their portable devices. Instructors routinely open their inboxes to find e-mail that is inappropriately informal, unreasonably demanding, or both. After receiving less-than-stellar grades, legions of students cry foul. The arsenal of the disgruntled includes profanities, threats, and sometimes even physical abuse. It may not be widely known, but university teachers are bullied, too.

Causes

How did we get to this? Many students are simply not prepared to engage in serious academic work and do not know how they are expected to behave on campus. Most of them bring a consumer mentality to school and very little concern about approval from the older generation. That their own generation was raised on oversized portions of self-esteem is part of the problem, not to speak of their massive exposure to coarse popular culture on television and the Web. Professors may be contributing to the problem as well. We can be unfair, unhelpful, disillusioned, disengaged, arrogant, and sarcastic. And sometimes, just as our new breed of students is not prepared for college, we are not prepared for them.

Solution

Establish a climate of relaxed formality

I have addressed all my students as Mr, Miss, and Ms throughout my teaching career and never had reason to regret it.

Train students to distinguish the trivial from the valuable

I believe that part of my job as a teacher is to convey the notion that, although the Internet may conceal it, a hierarchy of values does exist and does matter. Discuss Internet use with your students. Encourage a critical eye. Open a conversation on what makes information trivial or important. Make discussing values a recurring exercise. When your students become more invested in the notion of value, they will find value in a class that questions its own value and behave more respectfully and considerately in class. Respect takes root in the presence of perceived value.

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Sell your product and yourself

Explain the benefits of taking the class, and taking the class from you. Go over what your role will be in a journey of cognitive and emotional growth that will take your students from information to knowledge and from knowledge to wisdom. Students need to understand what they can get from attending your class that they would not from sitting in their dorms in front of a screen. We faculty should present ourselves as necessary and authoritative mediators between the Web and our students, as the credible knowledge professionals who can teach them how to think about the information they retrieve. Do not overpromise, however. Tell them what the class is not going to do for them. This is also the moment to touch upon the workload and discourage attendance by students who find it incompatible with their degree of motivation or availability of time and energy.

Many students are simply not prepared to engage in serious academic work and do not know how they are expected to behave on campus.

Stipulate a fair covenant

One way to improve the situation is to make your expectations explicit. For the past several years, my students and I have agreed upon codes of behavior – either oral or written – regulating our relationship during the term of classes. In the absence of compelling reasons not to do so, use a written covenant. Read the covenant to your students on the first day of classes and ask them whether they are willing to abide by it. You can certainly make it part of the syllabus, but if you prefer a more memorable option, bring copies on separate sheets. Then, after the students' approval, you will staple the sheets to the syllabi just before distributing them to your class. Either way, it is of utmost importance that you do not change the original stipulations during the course of the term.

Results

As you foster a learning environment where restraint, respect, and consideration are the norm, your students learn better and more. In turn, their success in learning will have a positive effect on their classroom behavior. Non-disruptive behavior reinforces learning, and vice-versa. This is the process you want to put in place in the everyday exercise of your profession. This is what defines a job well-done in the classroom.

Additional Resources

- The ideas presented here are examined in more detail in P.M. Forni's article *The Civil Classroom in the Age of the Net*, published in *The NEA Higher Education Journal*, Fall 2008:
  http://krieger.jhu.edu/civility/civil_classroom.pdf
- See also Professor Forni's Civility website:
  http://krieger.jhu.edu/civility

Author's Background

Professor P.M. Forni

German and Romance Languages and Literatures

P.M. Forni is a professor of Italian Literature at Johns Hopkins University, where he directs the Civility Initiative. The author of *Choosing Civility* (2002) and *The Civility Solution* (2008), he often speaks to college faculty, students, and staff.
Visit his website http://www.jhu.edu/civility.

The Innovative Instructor

Technology

Vol. 4 | September 2010

Facebook

Macie Hall, Instructional Designer, CER

What it is

Facebook (www.facebook.com) is an online social networking service, designed to enable users to build communities of people who share interests. Social networking services provide different ways for users to interact online through tools such as virtual bulletin boards, blogs, wikis, e-mail, and instant messaging. Users can also share content, such as photos and videos. The name "Facebook" comes from the term for printed directories of student pictures and information distributed each year to incoming college freshmen so that they can identify each other.

Why it was made

Facebook was started by a group of students at Harvard in 2004 in response to a need for an online space where students could share information and pictures, comment on each other's posts, and otherwise communicate in flexible ways. It was initially limited to use by college students. In September of 2006, it was opened to anyone over age 13 with a valid e-mail address. It now boasts over 500 million users.

Why it matters

Everyone from your grandmother to your co-workers to your teenage son is using Facebook to stay in contact with friends, relatives, former classmates, and colleagues. It is an easy way to get introduced to the Web 2.0 phenomenon. Web 2.0 is the term used to describe web applications that facilitate interactive information sharing and collaboration. For faculty members and academic departments, it offers a means of creating Groups and Pages (more below) for communicating with students and colleagues, providing information updates, and sharing announcements of events and news.

Who's using it

Over 1 billion people worldwide are using Facebook. There are nearly 50,000 fans of Johns Hopkins University Page and over 5,600 fans of the JHU Alumni Page.

Around JHU, the Johns Hopkins University, Johns Hopkins Alumni Association, Sheridan Libraries, Admissions, School of Engineering, and School of Medicine are using Facebook Pages and Groups to keep alumni, faculty, students, and staff updated on events and news.

Groups and Pages serve different purposes on Facebook. Pages are created to represent a real organization, business, celebrity, or band, and may be created only by an official representative of that entity. Pages are a promotional tool intended to foster public communication. Groups, on the other hand, can be created by any user on any topic, as a space for fellow users to share their opinions and interest in that subject. Groups can be closed to the public through the use of Facebook's controlled membership settings. For example, *Johns Hopkins University* and the *Sheridan Libraries* have Pages. So does Omar Little, a character from the HBO series *The Wire*. Anyone may become a fan of these pages, regardless of his or her connection to JHU, the libraries, or HBO. They are open to the public to read, but not to modify. Each of the current JHU undergraduate

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From *The Wire*, Omar Little's Facebook Page

Johns Hopkins University Facebook Page

classes has a Group, as do the JHU Band and a number of other student organizations. These Groups are open only to the members of the class or the organization, and all members may share information within the group.

Where it is going

Although technology pundits have been predicting for several years that Facebook's popularity has peaked and will begin waning, particularly among the cohort for whom it was created (college-age students), the evidence suggests otherwise. Faculty and staff are finding that creating Facebook Pages for programs, majors and minors, and departments is a great way to connect and communicate with students through a medium they are already using. Facebook Groups with access limited to students in the course are another way to facilitate collaboration communication in a class.

How to get started

http://www.facebook.com

Fill out the information under Sign Up. You will be asked to provide your name, date of birth, a valid email address, and to state whether you are male or female.

Additional Resources

- Facebook's Help Center, found under ***Account → Help Center***, has very good instructions on all aspects of Facebook use, applications and features.
- Keeping your information secure and sharing only with Friends is a concern for most Facebook users. Check ***Account → Help Center → Security → Protecting Account Security*** for information on Editing Your Privacy Settings to keep your information between you and your friends.
- You can make use of Friend Lists to determine which of your contacts can view pictures, posts, and other information. In the Help Center, do a search for "lists" to get instructions on how to do this.

Author's Background

Macie Hall

Instructional Designer, Center for Educational Resources

Virginia (Macie) Hall has provided instructional technology support to faculty since 1987, first as Curator of the JHU History of Art Visual Resources Collection, then as a Senior Information Technology Specialist in the Krieger School of Arts and Sciences, and more recently as a Senior Instructional Designer in the Center for Educational Resources (CER). Macie investigates the application and implementation of technology to the faculty scholarly and pedagogical issues in a wide variety of academic disciplines. She is interested in visual literacy, effective presentation techniques, and Web 2.0 technologies. (vhall2@jhu.edu)

The Innovative Instructor

Best Practice

Vol. 3 | March 2010

Teaching with Images

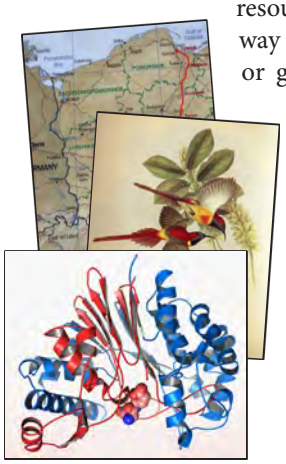
Adrienne Lai, Art Libraries Society of North America Intern

What it is

Strategic use of images in the classroom helps engage students who have grown up in a media-rich environment. Digital technology makes images more readily available and easier to incorporate into teaching and learning materials.

Why it matters

Today's students are surrounded by visual media in their everyday lives. With their heavy use of the Internet, they are accustomed to accessing information in both textual and visual forms.



While teaching with images has been at the core of disciplines like art history for decades, all courses can benefit from the use of visual materials in class lectures, assignments, exercises, and resources. Images can be an effective way of presenting abstract concepts or groups of data. Instructors have reported that their use of images in the classroom has led to increased student interactivity and discussion. Teaching with images can also help develop students' visual literacy skills, which contributes to their overall critical thinking skills and lifelong learning.

How to do it

I. Finding images

While a Google Image Search, which draws from the many images available on the Web, can be useful for finding a specific or obscure image, there are problems associated with this method. Google retrieves images based on the text appearing nearby or on the image file names. This often produces hundreds of unrelated results that have nothing to do with your subject. In addition, images posted to the Web may have incomplete or incorrect data attached, and the images may have insufficient resolution for classroom projection or printing.

High quality images can be found through the JHU Sheridan Libraries, which provide access to a number of specialized image resources. These databases provide downloadable, high-resolution images, include reliable information about the images, and allow advanced search capabilities. Resources include:

- **ARTstor**, a database of over one million images in the arts, humanities, and social sciences. http://jhsearch.library.jhu.edu/databases/proxy/JHU03382
- **Digital Image Database at JHU** (DID@JHU) provides JHU faculty and students with access to thousands of images in a variety of subjects. You can also request to add images for specific courses to the database. http://jhsearch.library.jhu.edu/databases/proxy/JHU05794
- **Accunet/AP Multimedia Archive**, a database of images, audio files, and texts from 160 years of news and world events. http://jhsearch.library.jhu.edu/databases/proxy/JHU04350
- **The Image Research Guide** contains search tips, information about copyright and publications, and subject-specific web recommendations. http://guides.library.jhu.edu/images
- The Center for Educational Resources has a list of websites containing freely available images and multimedia for educational use: http://www.cer.jhu.edu/mediaresources.html

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II. Copyright & Permissions

While technology has made it easier than ever to download, manipulate, and re-publish images, it has also made it easier to inadvertently violate the copyrights associated with them. The use of copyrighted images for educational purposes is allowed under the Fair Use exemptions to the US Copyright Act. Many image databases and websites stipulate the conditions under which educational use of their materials is permitted. To be safe, it is best to consult Fair Use guidelines, such as:

- University of Georgia's Guide to Understanding Copyright & Educational Fair Use: http://www.usg.edu/copyright
- Information about the different types of Creative Commons-licensed materials: http://www.creativecommons.org

In addition, there are some best practices to follow to facilitate the legal and ethical use of images. These include:

- **Restrict online access to images to class members only**. Post images to a password-protected website or space, such as WebCT (or other Learning Management System), or to a shared folder in ARTstor or the Digital Image Database (DID@JHU). If you're not sure how to do this, consult your Research Services Librarian or a CER staff member.
- **Use public domain or Creative Commons-licensed images** if you are posting or publishing images to a forum that is freely viewable by members of the public.

III. Uses of Images

Images will be more effective in the classroom if they are meaningfully integrated into course curricula. Think of ways images can support the delivery of content, illustrate class themes, serve as primary research materials, or be built into assignments. You can introduce images into your course materials through:

- Presentations in PowerPoint, Keynote, the ARTstor Offline Viewer, or the DID@JHU image viewer
- WebCT/Blackboard resources
- Other learning tools, such as the Timeline Creator or Interactive Map Tool
- Primary source materials: photographs as historic documents, maps to inform urban planning and site architecture, diagrams and technical drawings to show the evolution of bridge design, or medical images to practice diagnosis
- Class assignments: images can be powerful as illustrations, didactic materials, or stimulating starting points for structured writing exercises

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Additional Resources

- Harris, Benjamin R. "Visual Information Literacy via Visual Means: Three Heuristics." *Reference Services Review* 34.2 (2006): 213-221.
- *Click! Photography Changes Everything*, a Smithsonian project with essays on the impact of photographic images on human behavior, belief, memory, and more. Great for ideas on how to use images in the classroom. http://click.si.edu/Default.aspx
- If you would like to learn more about integrating visual materials into your teaching, contact Macie Hall, Instructional Designer, CER, at macie.hall@jhu.edu.

Author's Background

Adrienne Lai, *Art Libraries Society of North America 2008-9 Intern*
Sheridan Libraries and Department of the History of Art, JHU

Adrienne Lai recently completed Master's Degrees in Library Studies and Archival Studies at the University of British Columbia in Vancouver, BC, Canada. Adrienne also holds a Master's Degree in Fine Arts from the University of California, Irvine. She came to the library profession from several years of teaching art, art history, and cultural and media studies at art colleges in Canada and the US, and is interested in the possibilities of collaborative instructional efforts between libraries, faculty, and technology.

The Innovative Instructor

Pedagogy

Vol. 3 | March 2010

Lectures On Demand

Michael Falk, Associate Professor, Materials Science & Engineering

The Issue

Applied science programming courses (e.g., *Simulations of Materials and Biological Systems*) typically involve the instructor writing examples of code during class as students follow along at their computers. Students may occasionally work through simple examples on their own, but they spend most of class passively watching the instructor.

The Challenge

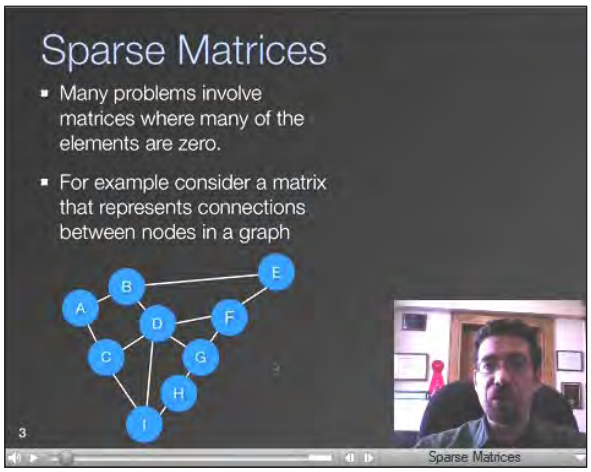
Students don't really learn a programming concept until they try to program a solution to an assigned problem. Typically, their attempts occur through homework and projects completed outside of class, when the instructor is not readily available. While self-paced, independent learning is an important step in mastering the content, active learning experiences during class provide an opportunity to challenge students in a collaborative, supportive environment with the instructor and peers available to help. Incorporating these active learning strategies into class, however, reduces the time available for the instructor to teach new content.

Faculty Solution

I restructured the course to make time for more in-class learning exercises, including taking full advantage of the computerized classroom we were using. First, I created video podcasts so students could watch the lecture before class. I used a program called ScreenFlow* to create the lectures by recording audio and video synchronized with my PowerPoint slides.

Because students watched my lectures before coming to class, I could assign exercises for them to work on during class time. While they tried to solve these problems, I floated around the room to offer help. I tried to set up the problems so they contained multiple, discrete tasks.

It was not always clear to me what aspects would be most problematic for the students. By watching them work, I could identify the students' conceptual problems. I stopped the class, from time to time, at opportune moments, to talk about aspects of the problems that appear to be most challenging for the whole class.



Screenshot of recorded lecture

Results

I've identified various advantages and challenges with the video podcasts, and will change some of them the next time I implement the course. However, the greatest challenge isn't making the video podcasts. I'm happy to put the time in, because I will not have to make them every year, and the students have reported that they like them. They watch the videos at their own pace, and they can review difficult topics as often as they want.

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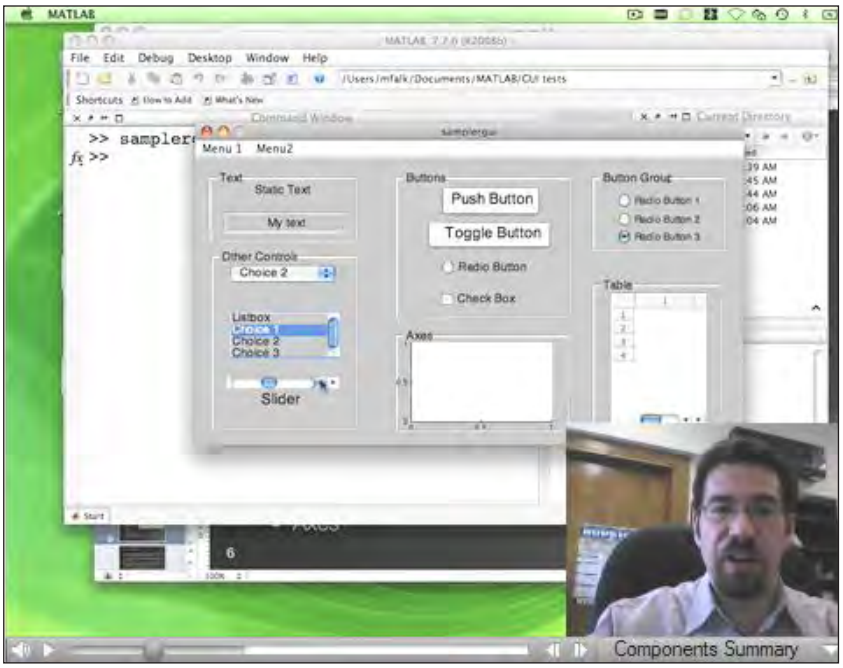
It turned out that designing the interactive activities was the bigger challenge. To figure out which activities would be effective, I had to accurately anticipate the skills students brought to the course. In addition, it's not always evident which conceptual issues will arise the first time you teach a course.

The Center for Educational Resources (CER) conducted focus groups with the students to collect feedback from the class. That's one way in which I am gauging students' reaction to the non-traditional class format. The results also helped me identify the challenges. They haven't necessarily always been where I expected. I have also used the standard ways to evaluate the course approach, such as tracking students' exam performance and directly soliciting comments from students.



The video lecture allows students to review couse materials anytime

Based on the student feedback, I'm breaking in-class activities into shorter segments, and including more of them. This gives me additional opportunities to stop and evaluate students' performance during the course of an exercise. It will also allow me to teach particular concepts sequentially, as opposed to using one or two activities that cover several topics. I'm also considering pairing students in the class since they have varying levels of experience and skill. In this way, the more experienced students can share their knowledge with the beginning programmers and can practice explaining what they know.

Other Thoughts

Former students offered these comments on Prof. Falk's new approach to teaching *Simulations of Materials and Biological Systems*.

"I like the format of the class - coming to class and working on programming rather than listening to a lecture and watching him do the work."

"We like this class very much!"

"This is the best programming class I've had!"

Additional Resources

- **Screenflow** is a screencasting software faculty can use to used to develop pre-recorded online lectures. It can capture a computer's desktop activity and synchronize it with the computer's video camera, microphone and audio inputs.
  http://www.telestream.net/screen-flow/overview.htm
- **Adobe Connect** is a IT@JH-sponsored collaboration tool that includes video conferencing, application sharing, live polling, chat, whiteboards, and presentations. Faculty can use their computer to host online classes or research meetings
  http://help.sset.jhu.edu/display/Connect
- **Impatica** can be used to convert PowerPoint files into narrated online presentations. It is a simple way to pre-record lectures online.
  http://www.impatica.com

Author's Background

Michael Falk
Associate Professor, Materials Science & Engineering

I am an associate professor of Material Sciences and Engineering. In addition to *Simulations of Materials and Biological Systems*, I also teach *Thermodynamics of Materials* for engineering graduate students. I am one of the faculty actively involved with the NSF-funded IGERT on Modeling Complex Systems.

The Innovative Instructor

Technology

Vol. 3 | March 2010

Blackboard

Amy Brusini, Instructional Technology Specialist, CER

What it is

Blackboard is a web-based course management system that allows instructors to present course material and interact with students in an online environment. Depending on the instructor's needs, Blackboard can be used either to supplement face to face courses or present courses entirely online. Blackboard features a broad collection of tools, including a calendar, announcements, discussion boards, blogs, chat rooms, tests and surveys, a grade center, and more, all of which can be customized and configured for each course.

Who's using it

In the fall of 2010, the full time programs of the Krieger and Whiting Schools migrated from WebCT to Blackboard 9. The School of Medicine, School of Nursing, Carey School of Business, Peabody, SAIS, and the part-time programs of the Krieger and Whiting Schools (AAP and EP) are also using Blackboard.

Who's managing it

Blackboard 9 is hosted on IT servers at the university and maintained by IT@JH staff. Faculty support for Blackboard is provided by individual divisions. The CER continues to provide instructional user support for Homewood faculty.

Why it matters

The continuous access to online resources and automated course management that Blackboard 9 provides is a benefit to both students and instructors. Students stay more organized knowing that they can go to one place on the web for all of their course materials, rather than trying to remember several websites. 24/7 access to course material online reduces the potential for excuses. When students miss class, the assignments and handouts are still available to them. Blackboard's communication tools, such as the blog or the discussion board, help to engage students actively in the course outside of class, encourage active learning, and help increase student-to-student and instructor-to-student communication.

Instructors can use Blackboard to assess student learning continuously throughout the semester. By reviewing discussion board and blog postings, faculty can see how well students are grasping course material and what areas may need to be reviewed. Blackboard also helps instructors to reach students with different learning styles. Lecture notes and images can be posted for visual learners, while podcasts can be posted for auditory learners. Blackboard also provides instructors with the ability to email the entire class, certain groups of students, or only TAs, all from within Blackboard. Other time savers for instructors include the ability to automatically grade online tests and to notify students of upcoming deadlines using the announcements tool.

What this is

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Article categories

Best Practice
How to use technologies and apply innovative instructional methods

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Hopkins professors share successful strategies for teaching excellence

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https://cer.jhu.edu/ii
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cerweb@jhu.edu

About the CER

The Center for Educational Resources partners with faculty, postdocs, and graduate students to extend instructional impact by connecting innovative teaching strategies and instructional technologies

Center for Educational Resources

Johns Hopkins Sheridan Libraries

How it can be used

The tools available in Blackboard present a host of opportunities for student collaboration and course management and time-saving strategies to help instructors manage their courses. Here are some examples:

- **Communicate with students** using the *Discussion Board*. Assign students weekly discussion questions. Grade students on the quality of their participation and responses to their peers. Graded discussions are automatically entered into the Blackboard *Grade Center*, which serves as a grade book.
- **Share information and thoughts** throughout the semester using a *Course Blog*.
- **Manage electronic file submissions** from students using the *Assignment Tool*. Instead of cluttering your email account, have students submit their papers (and other assignment files - ppt, jpg, mp3, etc.) through the assignment tool in Blackboard. Assignment grades are automatically entered into the Blackboard *Grade Center*.
- **Manage and post grades** using the Blackboard *Grade Center* (grade book). A number of functions, including averaging, weighting, and dropping highest and lowest grades, are available. Create custom grading scales based on assignment criteria. Download and upload grades to and from a spreadsheet file, such as Excel.
- **Create student groups for collaboration on team assignments** using the *Groups Tool*. Each group is assigned its own set of collaboration tools by the instructor. For example, a group could have its own blog and discussion board separate from the course blog and discussion board.
- **Post the syllabus, lecture notes, links, or other files** you want to share with students. Create *folders* within your site to organize your material. Use the *adaptive release feature* to automatically release items for specific periods of time.
- **Automatically alert students** to new items posted to the course, as well as institution-wide announcements, such as weather-related emergencies, using the *Notification System*.

Where it is going

Blackboard's tools and functionality bring greater enrichment to both traditional and online learning environments. Version 9 presents an updated user interface, including drag and drop capability, consolidated page layouts, contextual menus, and accessibility improvements. It also includes Web 2.0 functionality, such as social networking opportunities, throughout. Each fall and spring semester IT@JH updates Blackboard with the latest service packs. These service packs include bug fixes as well as product enhancements and new features. Upcoming enhancements include a test access log, an attendance tracking tool, and a revised portfolio tool.

Blackboard has developed and continues to expand the functionalities of its mobile app, Blackboard Mobile Learn. Using the app students can access content, read announcements, participate in online discussions, blogs, and journals, view and play media, take mobile tests, and check their grades. Future enhancements to the app include the instructor's ability to grade assignments and tests.

How to get started

All courses are automatically added to Blackboard from ISIS. Instructors will need to login to http://blackboard.jhu.edu with their JHED ID and password to view and access their courses. Courses will be listed in the 'My Courses Plus' module. (Note: If a course is not listed, please send an email to blackboard@jhu.edu. The registrar will be notified that the course needs to be 'flagged' for Blackboard.)

The CER has developed several online Blackboard tutorials that can be accessed at http://help.sset.jhu.edu/display/Bb/Home. We also offer training workshops each semester for beginning and advanced users. Please check our website (http://www.cer.jhu.edu/bb.html#training) to register for upcoming training sessions. Individual consultations are also available. Send an email to cerweb@jhu.edu if you'd like to make an appointment with a staff member.

Additional Resources

- Latest updates and information about Blackboard at the Homewood campus: http://www.cer.jhu.edu

Author's Background

Amy Brusini
Instructional Technology Specialist, Center for Educational Resources, JHU

Amy Brusini works at the Center for Educational Resources (CER), a teaching and learning center for Homewood faculty. Amy provides support and training for Homewood faculty on Blackboard, the university's course management system, as well as instructional design support. Amy has a Master's Degree in Education from Johns Hopkins University.

The Innovative Instructor

Best Practice

Vol. 2 | November 2009

Creating a Covenant with Your Students

P. M. Forni, German and Romance Languages and Literatures

What it is

If you have been dealing with student attitudes that mix disengagement with disregard, you are not alone. Millions of educators around the world are in your position. One way to improve the situation is to make your expectations explicit. For the past several years, my students and I have agreed upon codes of behavior -either oral or written- regulating our relationship during the semester. In the absence of compelling reasons not to do so, choose the written covenant.

Why it matters

For some time disengaged, disrespectful and unruly student behavior that used to be confined to secondary schools has penetrated higher education. In college classrooms across the U.S., tardiness, unfamiliarity with assigned readings, and unjustified absences are routine. So are chit-chatting, e-mailing, and instant-messaging. In large lecture halls where ringtones jar and jangle, students have been spotted reading newspapers and even watching television on their portable sets.

> If we want to slow down the continuing decline of traditional civil interaction on American college campuses, we must bring new strategies to the classroom.

We know that the Internet plays a major role in the shaping of the young, but how many of us have a strategy in place to cope with the challenge that this development poses to education? In the last decade, first-year experience programs have been sprouting at many two-year and four-year colleges. When expertly managed, they have been invaluable assets, helping students learn how to behave civilly with both peers and teachers. However, these programs are not enough. If we want to slow down the continuing decline of traditional civil interaction on American college campuses, we must bring new strategies to the classroom.

Many students are simply not prepared to engage in serious academic work, and they do not know how they are expected to behave on campus. Most of them bring a consumer mentality to school and very little concern about approval from the older generation. Professors may be contributing to the problem as well. We can be unfair, unhelpful, disillusioned, disengaged, arrogant, and sarcastic. And sometimes, just as the new breed of students is not prepared for college, we are not prepared for them. A written contract provides a solution for these problems.

How to do it

1. Writing your covenant

At the top of a sheet of paper, under the heading "What I Expect from You," list entries such as: "That you be punctual for every class." "That you do not receive or make telephone calls." "That you respect what I and your fellow students have to say." "That you come to class ready to ask and answer questions of substance on the day's readings." "That you are mindful of time constraints when making presentations." "That you concentrate exclusively on this course during class hours."

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Use the bottom half for your own list of commitments, "What You Can Expect from Me": "That I will be punctual for every class." "That I will give everybody a fair share of my attention." "That I will prepare you for your tests." "That I will grade the quality of your work rather than the amount of time and effort you spent on it." "That I will work to help you perform at your best."

2. Making your covenant known

Read the covenant to your students on the first day of classes and ask them whether they are willing to abide by it. You can certainly make it part of the syllabus, but if you prefer a more memorable option, bring copies on separate sheets. Then, after the students' approval, staple the sheets to the syllabi just before distributing them to your class. Either way, it is of utmost importance that you do not change the original stipulations during the course of the term.

3. Gaining respect

Your students are aware of their own edge over the older generation in the handling of all things digital. The smaller the gap between their competence and yours, the more respect you will receive, and the more in control of the class you will be. Take care of disruptions of any kind right away. Interrupt your class if necessary, and allow it to continue only after the disruptive behavior is corrected. It is unfortunate that teachers are reluctant to report egregious breaches in civility and ethics because they perceive them as personal defeats and fear that administrators will deem them unable to control their classes. This, of course, gives students the impression that they can act with impunity, which makes them repeat their behavior.

4. Standing firm

Keep exceptions to the rules to a minimum. If your syllabus says "No makeup tests," explain that you really mean it, out of fairness to the contingent of students respecting the rule. Place plenty of emphasis on the notion that it is not acceptable to come to class without having read and assimilated the assigned material. Help your students prepare for their tests. They will be more likely to do well, which means fewer grade challenges. When students come to class unprepared, it does not necessarily mean that they have not opened their books. It is easy to mistake inability to study for a lukewarm interest in the subject; teach them what it means to study in earnest. Inform them that study is just another form of work. Show no tolerance for the antics of the overbearing, the mean-spirited, and the narcissistic.

Final Thoughts

Never cease to be clear-headed, temperate, considerate, and compassionate. Never argue or raise your voice. In a particularly difficult encounter with a student, imagine that you are being videotaped and that the resulting video will be used to train other teachers in the handling of such situations. While remaining engaged, you will perceive the hostility directed at you less as a personal attack and more as a management task.

When students are clear about what you expect, they are more likely to meet those expectations. By creating a covenant with your students, you proactively define the roles and expectations for both sides. A paper document makes commitments tangible, and obtaining the students' agreement to the conditions gives them a meaningful stake in the class.

Additional Resources

- The ideas presented here are examined in more detail in P.M. Forni's article, "The Civil Classroom in the Age of the Net", published in *The NEA Higher Education Journal*, Fall 2008: http://krieger.jhu.edu/civility/civil_classroom.pdf

Author's Background

Dr. Pier Massimo Forni

German and Romance Languages and Literatures

P.M. Forni is a professor of Italian Literature at Johns Hopkins University, where he directs the Civility Initiative. The author of *Choosing Civility* (2002) and *The Civility Solution* (2008) he often speaks to college faculty, students, and staff. Visit his Web site http://www.jhu.edu/civility.

The Innovative Instructor

Pedagogy

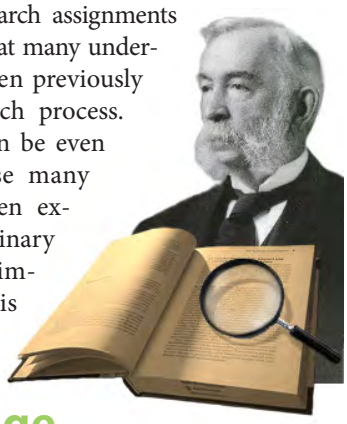
Vol. 2 | November 2009

Embedding Research into the Curriculum

Dr. Stephen Plank, Sociology

The Issue

The complementary relationship between teaching and research was integral to President Gilman's vision in establishing Johns Hopkins. Great researchers bring new ideas and practices into the classroom for the benefit of students, who can in turn contribute to new discoveries by engaging in the research process. The issue is how faculty implement Gilman's vision in today's university environment. The difficulty of incorporating true research assignments into the classroom is that many undergraduates have not been previously exposed to the research process. Engaging freshmen can be even more difficult because many of them have not been exposed to basic disciplinary knowledge which is important for hypothesis formulation.



The Challenge

Students learn how to research by doing research. This means that faculty must teach not only the material that the course covers, including basic knowledge needed to formulate hypotheses, but also the methodology of research. We have to teach students both what they are looking for and how to look for it. At the same time, faculty must also strike a balance between providing guidance and allowing students to make discoveries to preserve a sense of excitement in searching for something unknown.

Faculty Solution

Courses that require beginning students to perform research must be designed to include components of teaching the basic skills and processes of research. I designed Education in the Media, a freshman-level seminar, as a semester-long research project. While I was constructing the course, I tried to incorporate aspects of research methodology from the very beginning, rather than assigning a research paper that would be due near the end of the semester. This made for a more labor-intensive class, but I had a better sense of how the group was progressing. Since performing research was required from the start, if students had trouble understanding the process, I learned about it immediately.

Since the topic was education and its portrayal in the media, our source of data came from newspapers. Before diving into the data, we first performed background research. I guided the students more closely in this phase, as we read about the current state of media and print journalism, theories about education reform, and the history of education in the U.S. After this initial phase, the students used the LexisNexis database to identify and collect articles on education from 15 different newspapers for a specific three-week time period. The goal of the course was for them to take more initiative in this part of the process. Then we studied that coverage together, empirically.

It has been interesting for me to reflect on how the first and second years of the course progressed. The first year I taught the course, the exact plan for designing the students' projects and analyzing the data unfolded in real time; I helped formulate hypotheses and draw conclusions from the data alongside the students.

During the second implementation, I struggled with how much I should steer the class toward an exploration of certain questions and hypotheses that had been especially fruitful in the previous year's class versus how much should to leave the exploration in their hands. I wavered between presenting a route with fewer dead-ends or permitting a journey of student-led discovery.

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Faculty Solution (cont.)

I was able to accelerate the development process of this course when I received a Technology Fellowship grant from the CER. An engineering undergraduate and I developed an interactive, web-based database that helped students create their own dataset from the newspapers they sampled for articles. I could then create a larger dataset of articles nested in newspapers that the students could use for their hypothesis testing and inductive data mining. The technology helped all of us to focus on the substance and excitement of empirical research without spending a semester wrestling with the logistics of how to create and access a dataset.

Results

I've mentioned that I felt a pedagogical tension between a route including fewer dead ends and a more genuine journey of student-led discovery. Success of the course in its second year depended on my eventually realizing the new class should create the research agenda. It was difficult to mute my excitement or biases about certain topics that might influence the class's decisions, but I found that they learned far more by making their own spontaneous mistakes, or discoveries, with as little interference as possible from me. I had to remember that the course was designed to teach research methods as well as sociology; even mistakes or dead ends became opportunities for instruction.

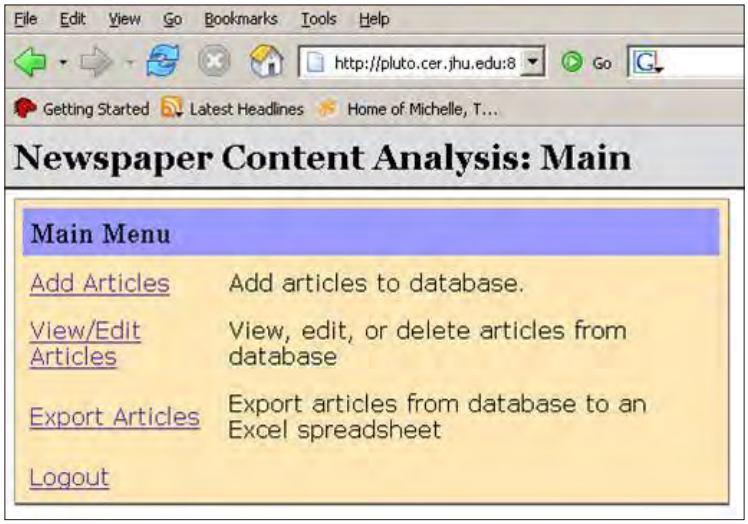
As I think about this freshman seminar I've now taught three times, I'm left with the thought that a course provides a basic framework, like a recipe. You can make the meal over and over again, but to keep things exciting, it's important to add new ingredients to the stew. The course investigated how print newspapers cover education, but it could be revised to explore equally well how new media -blogs, online journals- cover contemporary medical and health issues. I can reuse the basic approach for guiding freshmen to embark on an empirical exercise, but I can also change the topic and form of media they study. Finally, with the web-based database we created, other instructors could also present datasets to undergraduates with fewer logistical troubles.

Other Thoughts

Former students offered these comments on Prof. Plank's approach to embedding research experiences into his undergraduate teaching.

"I took the class my first semester of college and it was the reason I became a sociology major. Education in the Media allowed me to have a greater understanding of the qualitative research process. As a freshman in college I didn't think I would have the opportunity to do my own research, but Education in the Media provided that opportunity. It was extremely interesting to follow a newspaper from another part of the country for 3 weeks, it was also interesting to discuss with other students the issues and topics that were relevant to their newspapers as compared to mine."
-Kaitlin Flynn

"Professor Plank's *Freshman Seminar: Education in the Media* was both an enjoyable and a formative experience. During class sessions, Professor Plank encouraged exchanges that enabled us to formulate our own research agenda and a specific research hypothesis step by step. He guided us as we developed our research methodology, but allowed us plenty of room to find the right questions to ask. Professor Plank's instruction proved to be extremely helpful in my later years at Hopkins as I took higher level classes and had to carry out research projects on my own."
-Joseph Ho



Screenshot of the Database of Articles

Author's Background

Stephen Plank
Department of Sociology

I am an associate professor in sociology. In addition to Education in the Media, I also teach Regression Analysis and Social Organization and Social Control in Schools. I'm also co-director of the Baltimore Education Research Consortium - a partnership of the Baltimore City Public Schools, Johns Hopkins University, Morgan State University, and other civic and community partners.

The Innovative Instructor

Technology

Vol. 2 | November 2009

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Center for Educational Resources

Johns Hopkins Sheridan Libraries

ARTstor

Adrienne Lai, Art Libraries Society of North America Intern

What it is

ARTstor is a non-profit digital image library available through the JHU Libraries. It consists of over a million images, along with essential data, of subject matter relevant to many disciplines. Despite its name, ARTstor isn't just pictures of art or humanities-centric. It contains images that are of great value for didactic and illustrative purposes in the social sciences, basic sciences and engineering. ARTstor's mission is to provide resources to view, present, and manage images for research and pedagogical purposes.

Who produced it

It is a non-profit initiative founded by The Andrew W. Mellon Foundation.

Why it was made

ARTstor was created to address the needs of higher education institutions, which desired tools to properly create and maintain collections of digital images for the purposes of research, study, and teaching.

Why it matters

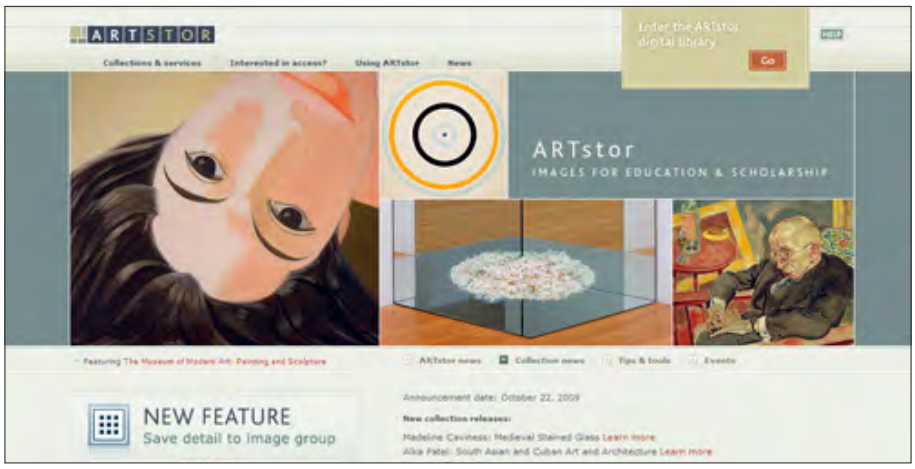
Images are a powerful teaching tool. They can be used as primary source materials in coursework or as a means to illustrate theoretical concepts. Images are also pedagogically valuable for engaging today's students, who are accustomed to absorbing information in formats that combine images with text. For faculty who wish to incorporate images into their teaching, it can be difficult to find reliable sources of high quality images on the Internet. In addition, online information has not always been checked for errors or vetted by scholars in the field. ARTstor provides high-resolution images with associated information written and edited by art and information professionals. ARTstor also has advanced searching capabilities which allow you to limit your search by time period, medium, geography, or any combination of these factors, giving much greater control than a Google Image search.

How it can be used

In addition to its extraordinary depth and breadth of content, ARTstor has a number of useful features to help manage and present images in educational contexts.

The following are a few of the ways in which you can tailor your use of the database to the needs of your class or your research:

- Search for specific images by name.
- Browse the database by geography,



classification, or collection.

- Download images to use in a PowerPoint, on a course page, or to spur an in-class discussion.
- Save images to image groups for future reference.
- Create shared folders within ARTstor for your students to access and study.
- Upload your personal image collections to ARTstor for integrated teaching with ARTstor images. (You can set permissions for folders.)
- Use the ARTstor Offline Image Viewer, a presentation software tool (like PowerPoint) that allows you to compare images side by side, and zoom in to see close detail, such as brushstrokes or fabric texture.

Where it is going

To date, ARTstor has amassed over one million digital images in a wide range of subjects, including: anthropology, architecture and design, classical studies, history, literary studies, music, religion, theatre, and women's studies. Due to copyright restrictions, coverage for modern and contemporary art is less comprehensive, but ARTstor is constantly negotiating to expand collections in all areas.

The images are contributed by museums, galleries, libraries, archives, colleges and universities, artists' estates, press photography agencies, and scholarly institutes. Without ARTstor some images can be viewed only by seeing the source material in person. Many images, although part of museum, library or archive holdings, are not on display or reproduced in books. This continuously growing database enables students to see and learn from these images without traveling thousands of miles.

How to get started

ARTstor can be accessed through the Sheridan Libraries home page. Look for it by name under "A" in the "Search a Database" box. You can also link to it from pages on the Art History or Images Research Guides. As with other licensed databases, you can access ARTstor only on campus or remotely through the library website at http://library.jhu.edu after logging in with your JHED ID and password.

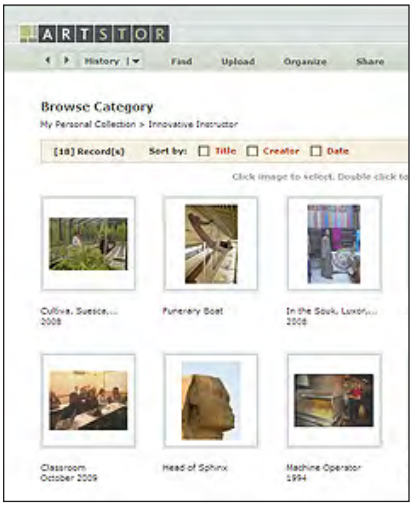
Anyone at Hopkins can search or browse through ARTstor and download images. If you want to access additional features, such as saving images to groups for future reference or using the Offline Image Viewer, you will need to log in, which requires that you register with an email address and password. (This is not the same as your JHED ID and password; you can use any email address to register with ARTstor.)

The ARTstor website contains numerous training materials, including downloadable handouts, videos, and online training sessions. To access these materials, just click on the "Help" button at the upper right of any ARTstor page, and look for the "Training" section on the Help home page.

To access additional faculty privileges, including the ability to store personal collections on ARTstor and to password-protect folders to share with students, contact Don Juedes at (410) 516-0605 or djuedes1@jhu.edu

Other Thoughts

ARTstor also offers some high-quality images suitable for inclusion in scholarly publications, free of charge, through the Images for Academic Publishing (IAP) program. To use the IAP images, you will need to provide some basic information and agree to the IAP Terms and Conditions of Use. To find IAP images in ARTstor, just add "IAP" to your search criteria. An IAP logo will appear beneath each available image.



Example of a collection

Additional Resources

- A list of ARTstor's interdisciplinary collections, arranged by subject. http://www.artstor.org/what-is-artstor/w-html/interdisciplinary.shtml
- Downloadable PDF training handouts to help you use ARTstor's many features. http://help.artstor.org/wiki/index.php/Materials
- ARTstor Images for Academic Publishing http://www.artstor.org/what-is-artstor/w-html/services-publishing.shtml

Author's Background

Adrienne Lai, *Art Libraries Society of North America 2008-9 Intern*
Sheridan Libraries and Department of the History of Art, JHU

Adrienne Lai recently completed Master's Degrees in Library Studies and Archival Studies at the University of British Columbia in Vancouver, BC, Canada. Adrienne also holds a Master's Degree in Fine Arts from the University of California, Irvine. She came to the library profession from several years of teaching art, art history, and cultural and media studies at art colleges in Canada and the US, and is interested in the possibilities of collaborative instructional efforts between libraries, faculty, and technology.

The Innovative Instructor

Best Practice

Vol. 1 | August 2009

Teaching Assistant Training Institute

Richard Shingles, Director of the TA Training Institute

What is it

The Teaching Assistant Training Institute consists of a team of professionals managed by the Center for Educational Resources to provide general instructional training for full-time graduate and undergraduate students with teaching assignments in the Krieger School of Arts & Sciences or the Whiting School of Engineering. The Institute works with Academic Dean's, teaching faculty, graduate teaching assistants, graduate academic coordinators and the graduate representative organization to provide the training and support that TAs need for effective instruction. The Institute has a multi-faceted approach to provide this training and support as outlined below.

TA Training Institute is located at the CER in the MSE Library

Why it matters

Quite simply, every graduate student has the opportunity to be a TA, or maybe even a course instructor, during their term of study at Johns Hopkins University. It is important that people who take on instructional responsibilities understand university procedures and policies and also know where to obtain instructional support for their course.

The Solution

The TA Training Institute has a range of offerings from broad-based programs to prepare over 200 graduate students for their immediate teaching assignments to specific programs to prepare individuals for their future academic teaching appointments. Currently there are four components to the TA Training program.

I. TA Orientation for First-time TAs

Fall Orientation Week (required session)

Over 200 graduate students attend this morning event TA Orientation. New TAs are introduced to the administrative landscape of the TA at Hopkins through a mandatory plenary session. The focus of this event is on preparing TAs for their immediate instructional teaching assignments.

II. Introductory Topics for First-time TAs

Fall Orientation Week (required session)

The plenary session is followed by an series of seminars covering a variety of issues for first-time TAs – e.g., Preparing for the First Day Supporting a Lab, Leading Effective Discussions, Identifying Resources for Struggling Students, Dealing with Academic Integrity Issues, Teaching with Library Resources, and Teaching with Technology.

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Article categories

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About the CER

The Center for Educational Resources partners with faculty, postdocs, and graduate students to extend instructional impact by connecting innovative teaching strategies and instructional technologies

Center for Educational Resources

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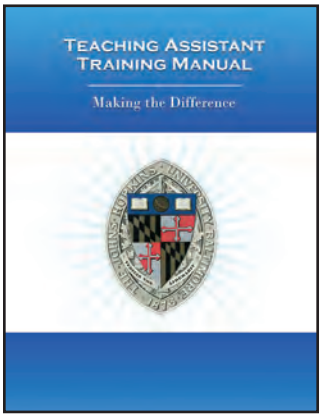

Teaching Assistant Manual

III. Academic Year Introductory Topics for All TAs
(optional)

A workshop series called "Eyes on Teaching" with repeating topics given at TA orientation plus some additional topics are offered during the academic year. These workshops enable TAs, who would be teaching for the first time in spring semester or teaching a course of their own, to prepare for their teaching assignments. Register at http://cer.jhu.edu/teaching-academy/events

IV. Academic Year Teaching Practicum
(elective course)

During the spring semesters a formal course for graduate students, "Preparation for University Teaching" is offered. Open to all graduate students this course engages in peer-to-peer teaching and video recording for critique of teaching practices. Emphasis is on course and lesson preparation, presentation skills, effective facilitation of discussion, and development of self-assessment techniques. The course is offered through KSAS (360.781) and WSE (500.781) and carries one credit.

TA Manual

The TA Training Institute maintains the graduate teaching manual "Making the Difference". This is a handbook of information on general teaching resources available at Hopkins – e.g., TA-specific services offered by the library, services offered to students with disabilities, faculty responsibilities in working with such students, etc. The manual also has some general teaching tips specific to the type of teaching they may encounter within their discipline. To obtain a copy of the TA Manual just drop into the Center for Educational Resources office just down the hall from Café Q in MSEL.

Teaching Associates

Support of TA training is important for the long-term sustainability and for the validation of the TA Training program. To enable this, we established a Teaching Associateship; a small group of graduate students who are models for good teaching practices within the university. The Associates worked on maintaining TA training materials, give workshops on teaching and help further their work in advancing knowledge about good teaching. The Associates are employed by the CER for one year starting in June. Applications for Teaching Associates positions are made available starting in April.

Consultations

The TA Training Institute will work with departments, graduate student groups and individuals to further the instructional training of students. Contact Richard Shingles at: TATI@jhu.edu to set up an appointment.

Additional Resources

- http://cer.jhu.edu/teaching-academy/tati

Author's Background

Richard Shingles,
Department of Biology,

Dr. Richard Shingles is a Faculty lecturer and Curriculum Specialist at Johns Hopkins University. Instrumental in the redesign of the General Biology course, he supports and counsels the faculty, students, and developers of science courses. Having taught undergraduate and graduate students as well as having earned a degree in science education after earning a Ph.D. in Biology, Dr. Shingles is well versed in innovative pedagogical approaches. Dr. Shingles has been the Director of the TA Training Institute at Johns Hopkins University since October 2006.

The Innovative Instructor

Pedagogy

Vol. 1 | August 2009

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Visualizing Museums

Dr. Elizabeth Rodini, History of Art, Museums and Society

The Issue

Many survey courses cover a lot of ground with little time available to probe individual topics in depth. A 200 level introductory course that provides an overview of 500 years of museum history with political, social, and cultural implications, for example, offers few opportunities to explore topics in depth.

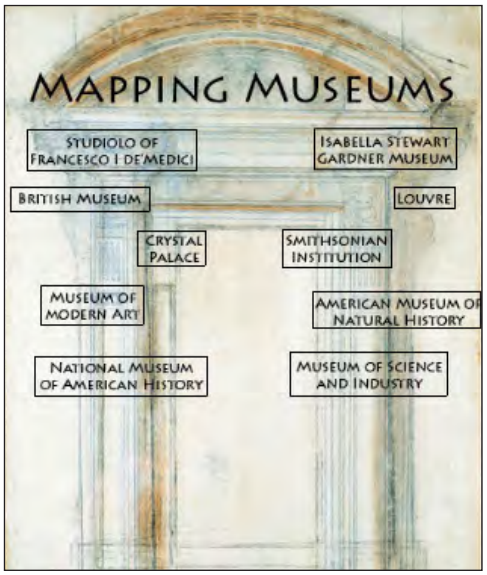
Why does it matter

The placement of objects in a museum suggests meaning that can be difficult to convey. A painting in all of its complexity can be shown in a slide with its meaning relatively uninhibited, but how do you convey the reasons for its installation in a particular museum, its relationship to the other items with which it shares exhibit space, or the changing nature of its importance over time and other exhibits in which it might be included? As any architectural historian would know, it's difficult to convey in a traditional lecture the complex meaning and structure of a museum building.

Faculty Solution

With the support of a Technology Fellowship grant from the CER, a student fellow and I created a site called "Mapping Museums," using the Interactive Map Tool developed in the CER. The tool allowed me to develop ten case studies that illustrate specific issues associated with the historical development of individual museums. Through a series of pages that included images, floor plans, and objects, each museum's map illustrates the spatial layout of objects, how they are presented in relationship to one another, and the impact of their arrangement on viewers.

For example, in class we discuss the rise of nation states in the 18th century and the impact that had on museum collecting and display. I have the students look at the



Screenshot of intro page

Louvre as a case study for this historical period. The Map Tool allowed me to bring images together giving spatial context to the Louvre's display of collected objects. This simply can't be done effectively using PowerPoint. Exploring the spatial dimensions of a museum facilitates understanding the relationship of the use of space and how objects are presented and the societal interests of the time.

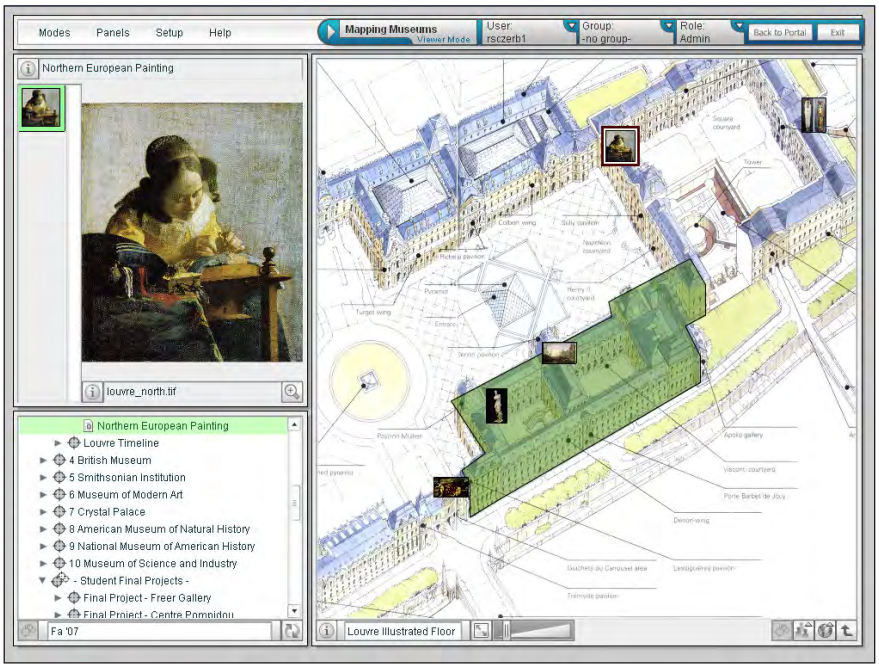
When students use this 'virtual pop-up book,' as I like to describe the Map Tool, they can see how people would have entered the main entrance of a museum and what they would have first encountered in a given time period. When curators moved those objects in subsequent years, their relocation had significant implications. Students can begin to think about why objects are moved from one period to another and how their relocation reflects the ideas and attitudes of the times.

Results

I give a lot of credence to general course evaluations at the end of the semester. I also create my own evaluation instruments with

Results (cont.)

more specific questions. When the Tech Fellowship project was completed [using the MapTool], the CER helped facilitate both a Map Tool-specific and an overall course assessment survey to gauge the impact of the project on the class. Initially there were no data to compare the assessment to a control group since it was the first time I had taught the course, but the students expressed enthusiasm for the class. Another indication of the Map Tool's usefulness was the number of students (10 out of 25) who opted to create a museum site in the Map Tool for their final project. The feedback was excellent. They said the Map Tool museum creation exercise made them think in new ways; they appreciated the variety it offered for class work. I was especially pleased with how they conceived new questions. Half of these student final projects have been further developed and incorporated into the course site. Having the Map Tool as a resource that students can access outside of class was helpful for students' preparations for tests and class discussions. Students can also explore the museums in more depth on their own outside of class.



Case study example, The Louvre

Other Thoughts

Sample student survey comments:

"I really liked using the digital map tool and the professor's utilization of images onscreen as a supplemental tool for the lecture. Offering a "map" project instead of a paper for a final project was a welcome change from other courses."

"The lectures and especially the map tool were really what made this course for me... I really appreciated having the chance to branch out and do a map project rather than just a research paper."

"The mapping option for the final project was a nice change of pace from the traditional paper. For me, it made the research more engaging and interactive, and it was nice to compile information and draw conclusions in a new way."

Additional Resources

- Mary Beth Regan (2007), "Museum World Tour, 2007"; Arts & Sciences Magazine, Fall/Winter 2007
  http://www.krieger.jhu.edu/magazine/fw07/t4.html
- The Interactive Map Tool's home page
  http://www.cer.jhu.edu/maptool.html

Author's Background

Elizabeth Rodini
Department of the History of Art, Museums and Society

I'm teaching a range of courses in the Museums and Society Program, which encompass undergraduate classes from the introductory 200 level up to 400 level undergraduate seminars on focused topics. The courses that I teach are mostly lecture and discussion- based, depending on the size and nature of the project.

The Innovative Instructor

Technology

Vol. 1 | August 2009

Timeline Creator

Mike Reese, Assistant Director, CER

What is it?

The Timeline Creator software allows instructors, students, and researchers without multimedia development skills to develop an interactive timeline for teaching or presentation purposes. The resulting timeline can be published on the World Wide Web, through BlackBoard or other content management systems, or presented directly from a computer. The interface can display up to six simultaneous timelines to compare and contrast various "events" with descriptive text and media such as digital images, audio, and video.

Who produced it?

The Center for Educational Resources developed the software through support from the Arthur Vining Davis Foundations.

Why was it made?

The idea for the software came from student feedback collected during the evaluation of an introductory art history class taught by Prof. Herb Kessler. The project team developed a number of new resources for the course and conducted focus groups with students to identify how they used them and how the resources could be improved. One student commented that an art history course should include a timeline that shows the historical context in which art of different eras was created so students could more easily understand the interaction between religious, political, and cultural movements. As the team developed an example, faculty in other disciplines –sociology, political science, history– asked for a timeline when they saw the prototypes. This led the team to develop a timeline creator software instead of a static art history timeline.

Why does it matter?

The tool can be used by faculty to easily create a web-based, virtual timeline as a supplementary instructional resource for a class. Faculty can also give the tool to students to use in course projects in which they develop their own timelines to demonstrate complex relationships between historical events sorted by different categories associated with one of the six bands.

The software uses a basic layout to display the events entered, but the author can customize all the colors and text shown on the timeline as shown in figure 1.

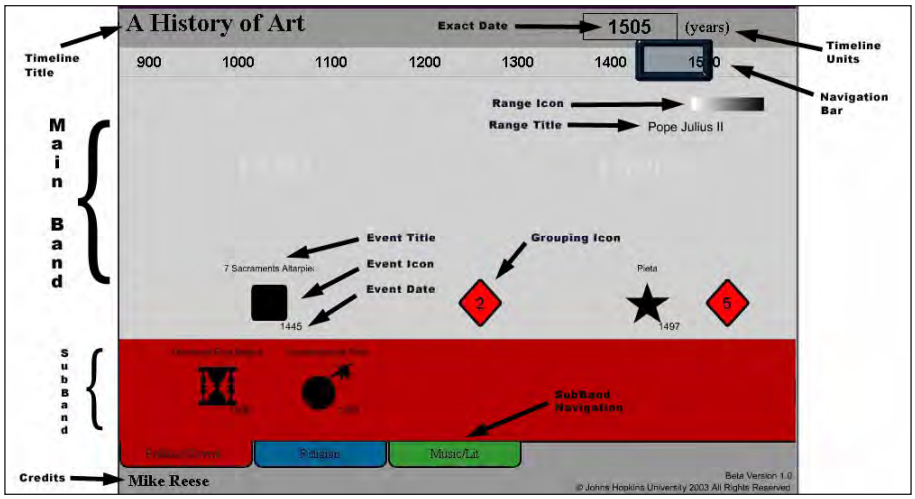


fig. 1 - Main Timeline Interface (elements are labeled in black)

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In addition, the tool can be more than a timeline creator because it displays information on a linear scale. Therefore, it can also be used to present information using other units than time. For example, using distance as the unit of measure a faculty could show point-pollution sources along a river with pollutant readings take at regular intervals.

Who's using it?

The software is freely available to the general public. To date, over 20,000 users have downloaded the software.

The first timeline was created for an art history course. Figure 1 shows the general navigation for the art history timeline. Figure 2 shows an example of the detail window which can display more information about the event along with audio, video, or images.

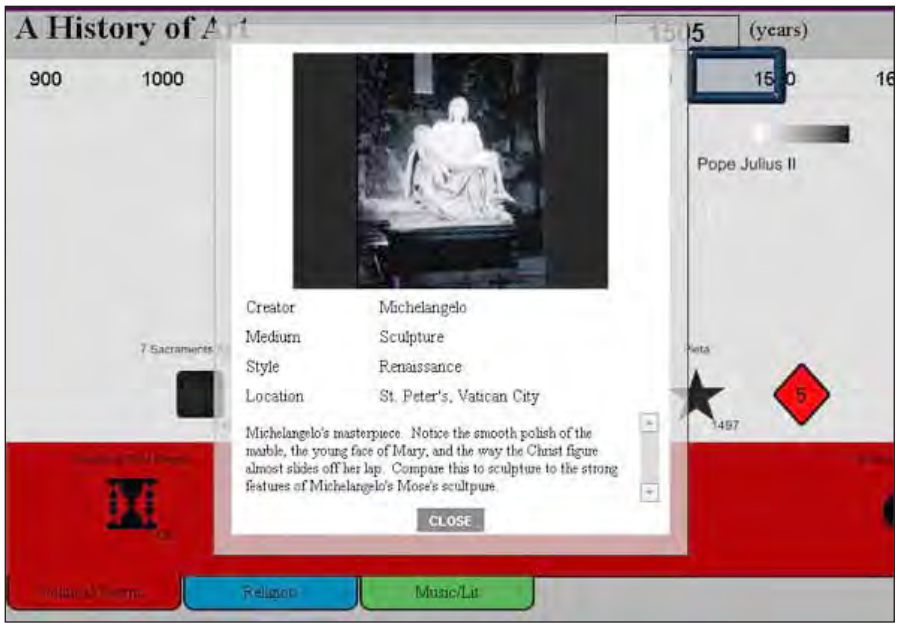

fig. 2 - Event detail example in a History of Art timeline

Where is it going?

The CER allows users to modify the source code through an open source license. The only stipulation is that anyone who makes modifications must send those changes back to the CER so improvements and new functionality can be shared with others.

Other Thoughts

The Timeline Creator won first place in the Fall 2003 Innovations Award from Macromedia in the category of Higher Education Academic Computing.

"We have been using this software for a History of Sport course for three years and can't thank you enough for making it available."

"I have been searching for this type of software and there are few choices in this area, but your software seems to have what we need for our homeschool project. I appreciate the free cost and I think it is a great product."

Additional Resources

- Timeline Creator Download - http://cer.jhu.edu/tools-and-tech/timeline
- Alternative Timeline Software:
  - MIT'S SMILE web-based timeline tool http://www.simile-widgets.org/timeline
  - TimelineJS from Northwestern University: https://timeline.knightlab.com

Author's Background

Mike Reese,
Assistant Director, Center for Educational Resources

Mike Reese is the assistant director of the Center for Educational Resources. He acted as the project manager on the redesign of the introductory art history course and oversaw the development of the Timeline Creator Software.