Inquiry, Evidence, and Scholarly Teaching:

Using Technologies to Improve Student Learning

Introductions

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Session overview

Part 1:

Identify a teaching and learning **challenge**.

Part 2:

Identify **data sources** and **design instruments** that will help address that challenge.

Part 3:

Respond to findings by selecting and employing an **instructional strategy**.

Part 4:

Analyze and **reflect** on the results of your approach.

Tell us about you!

pollev.com/gseit

Group Activity

Please get into teams of 5-6 people

Part 1

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Overview: Identify a teaching and learning challenge

Step 1: Identify a teaching and learning challenge (problem) that:

- is meaningful and significant to you,
- is possible to investigate with the time, resources, and students you have, and
- is deliberate, narrow, and focused, so that your project will adequately address your research question

Vanderbilt University Center for Teaching. (2013). SoTL Guide How to Start: Thinking of a Problem and the Questions It Raises. https://my.vanderbilt.edu/sotl/files/2013/09/1SoTLProblem4.pdf.

Overview: Identify a teaching and learning challenge

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Challenge: My students are having trouble with X.

Vanderbilt University Center for Teaching. (2013). SoTL Guide How to Start: Thinking of a Problem and the Questions It Raises. https://my.vanderbilt.edu/sotl/files/2013/09/1SoTLProblem4.pdf.

Overview: Identify a teaching and learning challenge

Step 2: Form a Question.

Four Types of Teaching and Learning Questions

1. “What works”
2. “What is”
3. "Visions of the possible”
4. “Theory building”

Hutchings, P. (2000). Opening Lines: Approaches to the Scholarship of Teaching and Learning. Carnegie Publications, the Carnegie Foundation for the Advancement of Teaching.

Overview: Identify a teaching and learning challenge

Four Types of Teaching and Learning Questions

1. “What works”

- Seeking evidence about the relative effectiveness of different approaches.
    - e.g. Assessment of student learning.

Hutchings, P. (2000). Opening Lines: Approaches to the Scholarship of Teaching and Learning. Carnegie Publications, the Carnegie Foundation for the Advancement of Teaching.

Overview: Identify a teaching and learning challenge

Four Types of Teaching and Learning Questions

2. “What is”

- Here the effort is aimed not so much at proving (or disproving) the effectiveness of a particular approach or intervention but at describing what it looks like, what its constituent features might be.
    - e.g. Examining the dynamics of a class discussion around a difficult topic.

Hutchings, P. (2000). Opening Lines: Approaches to the Scholarship of Teaching and Learning. Carnegie Publications, the Carnegie Foundation for the Advancement of Teaching.

Overview: Identify a teaching and learning challenge

Four Types of Teaching and Learning Questions

3. "Visions of the possible”

- Questions related to goals for teaching and learning that have yet to be met or are new to the faculty members asking the questions.
    - e.g. Mona Phillips, “I want to understand more about how I can help students see themselves as part of the wonderful process of understanding the world around them and their position in it.”

Hutchings, P. (2000). Opening Lines: Approaches to the Scholarship of Teaching and Learning. Carnegie Publications, the Carnegie Foundation for the Advancement of Teaching.

Overview: Identify a teaching and learning challenge

Four Types of Teaching and Learning Questions

4. “Theory building”

- These are questions designed to build theoretical frameworks for Scholarship of Teaching and Learning (SoTL) similar to frameworks used in other disciplines.

Hutchings, P. (2000). Opening Lines: Approaches to the Scholarship of Teaching and Learning. Carnegie Publications, the Carnegie Foundation for the Advancement of Teaching.

Maricopa project example: Identify the problem

- “Patchwriting”
  - Unsuccessful attempts at paraphrasing.
- Text Engagement
  - Lack of engagement with source text.
  - Insufficient comprehension of text sources.
    (*Citation Project,* Jamieson, S. & Howard, R.M.,2011)
- Plagiarism
  - Misreading or partial reading of text.
  - Lack of comprehension.
  - Overemphasize of stylistic conventions & lack of guidance/teaching how to analyze information.
    (*Project Information Literacy,* Head, Alison, 2011)

Technologies: Identify a teaching and learning challenge

- Student response systems (PollEverywhere, i>clickers)
- Survey tools (GoogleForms, Qualtrics, Survey Monkey)
- Technologies that analyze student artifacts (plagiarism detection software, engagement analytics/tracking)
- Instructional technologies that are already being used
- Online standardized and diagnostic assessments

Your turn: Identify a teaching and learning challenge

1. 3 minutes: In pairs, identify and reflect on a recent teaching and learning challenge you've encountered.

2. 10 minutes: At your table, share your teaching challenge. Also, share your challenge at **pollev.com/gseit**.

3. 2 minutes: Sessions leaders will review common teaching challenges.

Part 2

Part 1:

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Identify **data sources** and **design instruments** that will help address that challenge.

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Overview: Identify data sources and design instruments that will help address that challenge

- Effective assessment practices (see more detail here):
  - Use a combination of formative and summative measures
    - **Formative assessments:** low stakes, monitor student learning, provide ongoing feedback to students and instructors, see examples here
    - **Summative** (high stakes, evaluate student learning at the end of a unit)
  - Prepare students for summative assessments by providing formative tasks and explaining the structure of the assessment for their course
  - Design quality assessment tasks and items
  - Review data for accuracy
  - Find or create and use a detailed rubric for grading, where appropriate
  - Understand how to set standards and grade cut-offs
  - Give timely feedback to students

Overview: **Designing instruments**

- Qualities of good instruments:
  - **Objective** (data that any evaluator would identify and interpret similarly)
  - **Valid** (data that adequately represent the tasks that children need to accomplish to be successful readers)
  - **Reliable** (data will remain essentially unchanged if collected on a different day or by a different person)
  - **Systematic** (data that were collected according to a design of either experimentation or observation)

Overview: Designing instruments

- Qualities of good questions/assessment tasks:
  - Questions should be directly aligned to the teaching/learning challenge being addressed
  - Clearly articulated, precise, and complete (see this resource for guidance)
    - Common pitfalls for multiple choice questions include use of grammatical cues, logical cues, absolute terms ('never,' 'always'), and imprecise terms ('many,' 'seldom'), and for short answer questions include ambiguous wording or questions where the answer expected does not match the question in level of detail required.
  - Ask only 1 question at a time (for surveys, see this resource)
  - Use plausible distractors (wrong response options) that reflect common misconceptions or pitfalls (for comprehension/assessment questions)
  - Question format is appropriate for information being sought (see this resource for guidance)
  - Ensure fairness and equity: Language demands and cognitive levels are clear and appropriate to the assessment tasks and to the students

The pictograph below shows how many pounds of metal, glass, and paper the Earth Club collected to recycle this week.

Earth Club Recycling

Material	Number of Pounds Collected
metal	♻ ♻ ♻
glass	♻ ♻ ♻ ♻ ♻
paper	♻

Key
♻ stands for 6 pounds

How many more pounds of glass than pounds of paper were collected?

Ⓐ 4

Ⓑ 12

Ⓒ 24

Ⓓ 36

Stanford GRADUATE SCHOOL OF EDUCATION

Overview: Identify data sources

- National Center for Education Statistics (NCES)
  - NCES Integrated Postsecondary Education Data System (IPEDS)
- Institute of Education Sciences (IES)
- Census
- Educational Needs Index (ENI)
- National Science Foundation (NSF)
- Postsecondary Opportunity
- Measuring Up: The State-by-State Report Card for Higher Education
- Regional Higher Education Boards
  - Southern Regional Education Board
  - Western Interstate Commission for Higher Education
  - Midwestern Higher Education Compact
  - New England Board of Higher Education
- NCHEMS Information Center for Higher Education Policymaking and Analysis
- State Departments of Education
- Institution-level data and program-level data

Maricopa project example: **Data sources**

- Student Preparedness
  - Assumptions
    Student reading & writing engagement

- National Statistics
  - English
    66% ACT met 2010 benchmarks for college readiness
  - Reading
    52% met 2010 benchmarks for college reading (Condition of College and Career Readiness)
  - Remedial education
    37.6% of all college students took at least one “remedial” course at two-year public colleges; 44% took at least one “remedial” course (National Center for Education Statistics 2007-2008)

Maricopa project example: **Data sources** (cont'd)

- Citation Project
  - 2011 study of 174 student writing samples from 16 institutions
  - Partial/inaccurate reading leads to "patchwriting"

- Project Information Literacy
  - 2010 analysis of 191 college research writing assignments
  - Instructions focus on style vs. engagement with sources

Technologies: **Identify data sources and design instruments that will help address that challenge**

- Student response systems (PollEverywhere, i>clicker)
- Survey tools (GoogleForms, Qualtrics)
- Peer review or teacher rubric in GoogleForms (see examples here and here)
- GoogleSheets auto-grading tool, Flubaroo
- Technologies that analyze student artifacts (plagiarism detection software)
- Student engagement analytics (Google Analytics)
- Learning management system (Canvas, Piazza)

Your turn: **Identify data sources and design instruments that will help address that challenge**

1. 3 minutes: In pairs, identify data sources and design instruments that will help address that challenge.

2. 10 minutes: At your table, share your ideas for a possible data sources and instruments. Share your work at **pollev.com/gseit**.

3. 2 minutes: Sessions leaders will review common data sources and instruments.

Part 3

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Overview:

Respond to findings by selecting and employing an instructional strategy

Table 11.1 Teaching Methods Found to Be Effective for Helping Students Achieve Different Learning Outcomes

Outcome Method	Knowledge	Comprehension	Application	Analysis	Synthesis	Evaluation	Cognitive Development	Shift in Models
Lecture	X							
Interactive lecture	X	X	a	a	a	a	a	
Recitation	X	X						
Directed discussion		X	a	a	a	a	a	a
Writing/speaking exercises		X	X	X	X	X		
Classroom assessment techniques		X	X	X		X		
Group work or learning		X	a	a	a	a	a	
Student-peer feedback		X		X		X		
Cookbook science labs		X	X					
Just-in-time teaching	X	X						X
Case method			X	X	X	X	X	
Inquiry based or inquiry guided	X[b]	X	X	X	X	X	X	X
Problem-based learning	X[b]		X	X	X	X	X	
Project-based learning	X[b]	X	X	X	X	X		
Role plays and simulations		X	X	X		X		X
Service-learning with reflection			X	X	X	X		X
Fieldwork/clinicals	X		X	X	X	X	X	X

NOTE: An X indicates this method can help students achieve this learning outcome if the method is properly implemented to serve this outcome. Poor implementation or implementation for other ends may mitigate against students' achieving the outcome.
[a]Depends on the lecture-break tasks, the discussion questions, or the group tasks assigned.
[b]The knowledge acquired may be narrowly focused on the problem or project.

Nilson, L. B. (2010). Teaching at its best: A research-based resource for college instructors. Page 107. John Wiley & Sons.

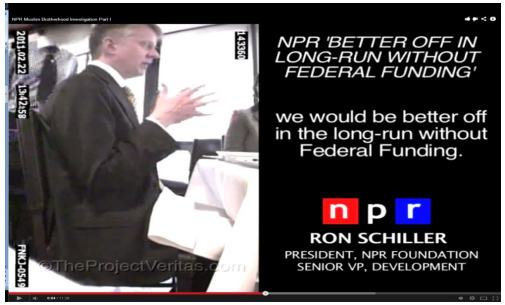
Maricopa project example: **Instructional strategies**

- Cross-disciplinary Approach
  - Reading and Composition Theory
    (*Reading as Rhetorical Invention: Knowledge, Persuasion, and the Teaching of Research-Based Writing,* Brent, D.,1992).
- Focused Assignment Sequence
  - Reading & Writing tasks:
    - Deepen students' reading comprehension.
    - Increase analysis & evaluation of source materials.
- Challenge assumptions about students' abilities
- Slow pace and give students more time
- Scaffold by assigning an in-person activity that would support students before they needed to complete work on their own, at home

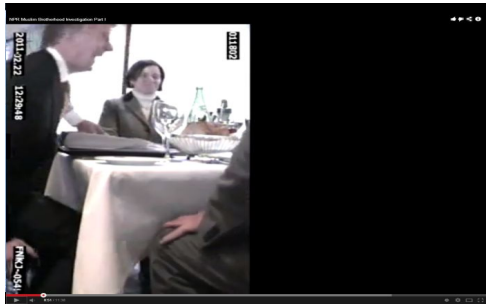
Maricopa project example: Instructional strategies (cont'd)

"One lunch: 2 versions"

NPR Investigation Part I: 11 minute video



NPR Investigation Part II: 44 minutes raw footage



View your assigned video and answer the following questions:

1. **Summarize** what happened at the lunch .
2. What is this video's **purpose**?
3. Who is its intended **audience?**
4. What legal/professional accountability, if any, do the NPR executives featured in this video have? Explain.
5. What legal/professional accountability, if any, do the individuals who collected and produced this video footage have? Explain.

Technologies: Respond to findings by selecting and employing an instructional strategy

- Online discussion boards
- Peer review/feedback tools
- Shared resource space (i.e. LMS, class wiki, class website or blog)

Your turn: Respond to findings by selecting and employing an instructional strategy

1. 3 minutes: In pairs, select an instructional strategy to address your teaching challenge.

2. 10 minutes: At your table, share your instructional strategy. Share your work at **pollev.com/gseit**.

3. 2 minutes: Sessions leaders will review common instructional strategy.

Part 4

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Overview: Analyze and reflect on the results of your approach

- Use multiple sources of data
- Four approaches to educational evaluation:
  - **Student oriented:** Predominantly uses measurements of student performance (usually test results) as the principal indicator.
  - **Program oriented:** Compares the performance of the course as a whole to its overall objectives and often involves descriptions of curriculum or teaching activities.
  - **Institution oriented:** Aimed at grading the quality of teaching for comparative purposes.
  - **Stakeholder oriented:** Takes into account the concerns and claims of those involved and affected by the course or program of education.
- Student Assessment of their Learning Gains (SALG)
  - Customizable, web-based instrument consisting of statements about the degree of "gain" (on a 5-point scale) which students perceive they've made in specific aspects of the class.
- Evaluation should be used for continuous improvement

Maricopa project example: **Analysis and reflection**

- In-class/Online discussions
  - Context and arrangement affect textual interpretation
  - Reading/Writing are complex, recursive and chaotic
  - Instruction in information literacy aids research
- Final drafts
  - No misuse/misreading of sources evident
  - Higher number of style and grammar errors
- Student evaluations
  - Increased confidence with research and writing
  - Heightened awareness of ethical aspects of research

Technologies: Analyze and reflect on the results of your approach

- Voyant Tools (text analysis)
- Tableau Public (data visualization)
- GoogleDrive Revision History (writing/collaborative process)
- Student response systems (PollEverywhere, i>clickers)
- Survey tools (GoogleForms, Qualtrics, Survey Monkey)
- Microsoft Excel/Google Sheets
- Quantitative and qualitative research software

Your turn: Analyze and reflect on the results of your approach

1. 3 minutes: Individually describe how you will analyze your results.

2. 10 minutes: At your table, please share your plan. Also, share your work at **pollev.com/gseit**.

3. 2 minutes: Sessions leaders will review common teaching challenges.

How did it go?

pollev.com/gseit

Maricopa project resources

- American College Testing Program [ACT]. *The Condition of College and Career Readiness 2010.* Web. 27 Nov. 2010.
- Brent, Doug. *Reading as Rhetorical Invention: Knowledge, Persuasion, and the Teaching of Research-Based Writing*. Urbana, Ill.: NCTE, 1992.
- Edwards, Richard and Chuck Tryon. "Political video mashups as allegories of citizen empowerment." *First Monday*, Volume 14, Number 10. Web. 5 October 2009.
- Howard, Rebecca Moore, Tanya K. Rodrigue, and Tricia C. Serviss. "Writing from Sources, Writing from Sentences." *Writing and Pedagogy* 2.2 (Fall 2010): 177-192.
- Phillips, D. (Ed.). (2000). *Constructivism in education.* Chicago: University of Chicago Press.
- Rosenblatt, L. (1995). *Literature as exploration* (5th ed.). New York: The Modern Language Association of America.
- Smith, Frank. (1998). *The book of learning and forgetting*. New York: Teachers College Press.
- United States. Department of Education, National Center for Education Statistics. *Profile of Undergraduate Students*: 2007-08. Table 6.2: Percentage of first-and second-year undergraduates who reported ever taking a remedial course after high school graduation. 2010. Web. 27 Nov. 2010.
- "Unraveling the Citation Trail," *Project Information Literacy Smart Talk,* no. 8, Sandra Jamieson and Rebecca Moore Howard, The Citation Project, August 15, 2011.
- Alison Head, Lead Researcher for Project Information Literacy, conducted this email-based interview with Sandra Jamieson and Rebecca Moore Howard.

Additional Resources

- Ambrose, S. A., Bridges, M. W., DiPietro, M., Lovett, M. C., & Norman, M. K. (2010). How learning works: Seven research-based principles for smart teaching. John Wiley & Sons.
- Bain, K. (2011). What the best college teachers do. Harvard University Press.
- Bishop-Clark, C. and Dietz-Uhler, B. (2012). Engaging in the scholarship of teaching and learning: A guide to the process, and how to develop a project from start to finish. Sterling, Va.: Stylus Pub.
- Nilson, L. B. (2010). Teaching at its best: A research-based resource for college instructors. Page 107. John Wiley & Sons.
- Pacansky-Brock, M. (2012). Best practices for teaching with emerging technologies. Routledge.
- Stanford University. (2015). Teaching Commons. https://teachingcommons.stanford.edu/.
- Vanderbilt University Center for Teaching. (2015). Scholarship of Teaching and Learning Guide. https://my.vanderbilt.edu/sotl/.

Follow up

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