Mar 10th, 5:00 PM - 6:15 PM

Multidisciplinary Pogil - A Faculty Learning Community

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Presenters
Laura Frost, Abbie Gail Parham, Trent W. Maurer, Joanne Chopak-Foss, Rose Mary Gee, Alison Rushing,
Dena Hale, Linda Mullen, Cathie Johnson, and Don Slater

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Multidisciplinary POGIL - A Faculty Learning Community

Laura Frost (Chemistry)
Abbie Gail Parham (Accounting)
Trent Maurer (HTFCS)
Joanne Chopak-Foss (Health and Kinesiology)
Rose Mary Gee & Alison Rushing (Nursing)
Dena Hale & Linda Mullen (Marketing, Management & Logistics)
Cathie Johnson (Foreign Languages)
Don Slater (Construction Management)
What do we know about teaching and learning?

• Teaching by telling does not work
• Students learn more when they construct their own understanding
• Discussion with peers is crucial
Goals of a Guided-Inquiry Approach

• Students are actively engaged and thinking in class
• Students discover concepts (rather than memorize facts)
• Students learn course content & key process skills
What is POGIL?

Process Oriented Guided Inquiry Learning

www.pogil.org
What is POGIL?

Process Oriented
( Cooperative Learning)
Conscious commitment to development of important process skills

Process Oriented
Guided Inquiry Learning
Key Process Skills in Learning

• Cognitive
  – Information processing
  – Critical thinking
  – Problem solving
  – Research

• Social
  – Communication
  – Teamwork
  – Management

• Affective
  – Value development
  – Personal development
  – Esthetic development
What is POGIL?

Process Oriented Guided Inquiry Learning

Guided Inquiry (Constructivism) Learning Cycle Activities

www.pogil.org
Learning Cycle Activities

1. Exploration
2. Concept Invention
3. Application
What is POGIL?

**Process Oriented** (Cooperative Learning)
Conscious commitment to development of important process skills

**Guided Inquiry** (Constructivism)
Learning Cycle Activities

**Process Oriented**
**Guided Inquiry**
**Learning**
Information Processing Model


---

Instructor

Events
Observations
Instructions

Perception

Working Memory

Storing

Retrieving

Long Term Memory

Students

- previous knowledge
- preferences
- misconceptions

- biases
- likes
- dislikes

www.pogil.org
Guided Inquiry Approach

- Students work in groups
- Students construct knowledge
- Activities use Learning Cycle paradigm
- Students teach/discuss/learn from students
- Instructors facilitate learning
How POGIL can work in different disciplines
POGIL
Intro. Chemistry Course

• Nonmajors
  – Nursing
  – Nutrition
  – General Education

• 48 students per section and rising

Laura Frost
Department of Chemistry
POGIL Implementation

• Organization of Class
  – POGIL every class period
  – Daily Folders: Daily activity, graded materials, reflection sheet
  – Roles – Manager, Recorder, Presenter, other roles as needed.
  – Daily Quizzes
POGIL Implementation

• Instructor as facilitator
  – Timekeeper
  – Interact, any student
  – Class guided inquiry / information
    • Driven by GI Activities
Introduction to Matter and the Periodic Table

Part 1. Classifying Matter

Information
Chemistry is the study of matter and its changes. There are two main types of matter: pure substances and mixtures of substances. A mixture that is mostly water is called an aqueous solution. Matter can exist in several different phases or states, the three most common being solid, liquid, or gas.

Model

MATTER

Pure Substances

Mixtures

Elements
Gold, Au(0)
Hydrogen, H(0)

Compounds
Water, H₂O(l)
Table sugar, C₁₂H₂₂O₁₁(s)
Aspirin, C₉H₈O₄(a)

Homogeneous
Sugar water, (H₂O) and C₆H₁₂O₆(sugar)
Aspirin tablet, C₁₉H₁₄N₂O₄(sugar), cornstarch (as binder), water, stearic acid (as lubricant)

Heterogeneous
Fish tank, (H₂O), pebbles, fish, and other stuff
Vegetable soup, (H₂O), vegetables, and other stuff

Questions
1. Consider the examples on the flow chart. How does the formula of an element differ from that of a compound?

2. Can an element be a pure substance? Can a compound be a pure substance?

3. Using the information given, how might you define a pure substance? How does a pure substance differ from a mixture?

4. Would you classify the following substances as (a) an element or compound (b) atom or molecule?

<table>
<thead>
<tr>
<th>Matter</th>
<th>Element or Compound</th>
<th>Atom or Molecule</th>
</tr>
</thead>
<tbody>
<tr>
<td>He</td>
<td></td>
<td></td>
</tr>
<tr>
<td>N₂</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CH₃O (formaldehyde)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CH₂COOH (vinegar)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

5. As a group, devise a definition for a compound.

6. In your own words describe the difference between a homogeneous and heterogeneous mixture.

7. Would you classify the following matter as element, compound, or mixture? If you classify it as a mixture, classify it as homogeneous or heterogeneous.
   a. table salt, (NaCl)
   b. nickel (Ni)
   c. chocolate chip cookie dough
   d. air

8. What do you think the labels (s), (l), (g), and (aq) on the formulas in the flow chart mean?
Assessment: CHEM 1140
Student Learning
  Course Grades
  Final Exam Grades
  Similar Final Exam Questions
    Cognitive Analysis
    Topic Analysis

Student Perceptions
  Formative Evaluations
  SALG survey
Final Grade Distribution
CHEM 1140

Before
(N=285 students)

A 20%
B 40%
C 25%
D 7%
F 8%

After
(N=361 students)

A 31%
B 36%
C 23%
D 7%
F 3%

Laura Frost
Department of Chemistry
Final Exam Score

Control Average (N=274)
60% ± 16

Guided Inquiry Average (N=348)
66% ± 14

Significant 99.999% confidence level
DWF Rates

Control
DWFs: 24%, 7% were W

POGIL 1\textsuperscript{st} time
DWFs: 24%, 9% were W

POGIL 2\textsuperscript{nd}-6\textsuperscript{th} time combined
DWFs: 14%, 8% were W
Summary

- Students are more engaged in the classroom
- Students are demonstrating greater knowledge on final exams
- Students perceive that they made gains in working in groups

Laura Frost
Department of Chemistry
POGIL in Managerial Accounting

PRESENTED BY
Abbie Gail Parham, MBA, CPA, CMA, CFM
Assistant Professor of Accounting
College of Business Administration
Accounting Meets POGIL

- Attended a three-day workshop
- “It might work in accounting, too!”
- POGIL setting:
  - Taught three sections of ACCT 2102 in Fall 2009
  - Classes: two days a week at 75 minutes each day
  - Implemented POGIL into one section
  - Traditional lecture in other two sections
  - Two days for each chapter in the textbook
Traditional Lecture Section

**DAY ONE – TRADITIONAL LECTURE**
- Students take notes over lecture
- Sample problems demonstrated in class
- Homework assigned for next class

**DAY TWO (Same in all sections)**
- Review assigned homework
- Individual quiz over material
The POGIL Section

• NO LECTURE

• Students placed in 4 member teams
  o Work on each activity for 10 to 15 minutes
  o Each team responds to questions in the activity
  o Forced teams to work on the activity

• POGIL Activity Worksheet
  o 3 to 4 activities/ concepts
  o Discuss and complete in class
Cost Behavior and Analysis

Learning Goals:

- Understand how fixed and variable costs behave and how to use them to predict costs.
- Analyze a mixed cost using the high-low method.
- Prepare an income statement using the contribution margin format and understand how it differs from a traditional income statement.
Cost Behavior and Analysis


discussion of the following:

- The changes in costs as the level of activity changes.
- Managers who do not understand how costs behave can predict how costs will change in various situations.
- Managers who attempt to make decisions without a thorough understanding of cost behavior patterns can create disastrous consequences.

Examples of cutting back production of a particular product line might result in a loss of sales instead of lower costs.

- Managers who confuse fixed costs with variable costs—leading to a decline in profits.

To avoid such problems, managers must be able to accurately predict what costs will be at various activity levels.

Learning goals:
- Understand how fixed and variable costs behave and how to use them to predict costs.
- Analyze a mixed cost using the high-low method.
- Prepare an income statement using the contribution margin format and understand how it differs from a traditional income statement.

Critical Thinking Questions:
1. Which cost would change (variable) in total based on the number of units produced and sold?
2. Which cost would not change (fixed) in total based on the number of units produced and sold?
3. Write a sentence that describes the behavior of total variable costs.
4. Write a sentence that describes the behavior of total fixed costs.

Model 1(A) - Cost behavior of total costs

The following costs were incurred during a month when 2,000 units were produced and sold:
- Cost of goods sold: $12,000
- Rent: $5,000
- Sales Commission: $22,000
- Executive Salaries: $15,000
- Property Taxes: $900
- Depreciation: $1,100

Model 1(B) - Cost behavior per unit of activity

<table>
<thead>
<tr>
<th>Activity level</th>
<th>1,000 units sold</th>
<th>2,000 units sold</th>
<th>3,000 units sold</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sales</td>
<td>$100,000</td>
<td>$200,000</td>
<td>$300,000</td>
</tr>
<tr>
<td>Total Variable Costs</td>
<td>70,000</td>
<td>140,000</td>
<td>210,000</td>
</tr>
<tr>
<td>Total Fixed Costs</td>
<td>50,000</td>
<td>50,000</td>
<td>50,000</td>
</tr>
<tr>
<td>Net income (loss)</td>
<td>($30,000)</td>
<td>0</td>
<td>$30,000</td>
</tr>
</tbody>
</table>

Critical Thinking Questions:
1. Compute variable cost per unit at the different activity levels.
2. Describe the behavior of variable costs per unit sold?
3. Compute fixed cost per unit at the different activity levels.
4. Describe the behavior of fixed costs per unit sold?
5. Use Models 1(A) and 1(B) to complete the following chart to summarize variable and fixed cost behavior.

<table>
<thead>
<tr>
<th>Cost</th>
<th>Variable</th>
<th>Fixed</th>
</tr>
</thead>
<tbody>
<tr>
<td>in Total</td>
<td>△ for changes</td>
<td>△ for stays the same</td>
</tr>
<tr>
<td>Per Unit</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

6. Prepare a projected income statement for 2,800 units sold.

<table>
<thead>
<tr>
<th>Units Produced</th>
<th>2,800 units sold</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sales</td>
<td>$224,000</td>
</tr>
<tr>
<td>Variable Costs</td>
<td>$112,000</td>
</tr>
<tr>
<td>Fixed Costs</td>
<td>$50,000</td>
</tr>
<tr>
<td>Net Income (loss)</td>
<td>($30,000)</td>
</tr>
</tbody>
</table>

7. Complete Exercise 5 in the textbook.

STOP - BEFORE PROCEEDING TO THE NEXT MODEL.
POGIL vs. Traditional

Preliminary Results of One Ten-Point Quiz
(Average Percentages)

<table>
<thead>
<tr>
<th>Group</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>TRADITIONAL ACCT 2102 G</td>
<td>64.55%</td>
</tr>
<tr>
<td>POGIL ACCT 2102 H</td>
<td>75.56%</td>
</tr>
<tr>
<td>TRADITIONAL ACCT 2102 I</td>
<td>56.19%</td>
</tr>
</tbody>
</table>
POGIL vs. Traditional

Final Exam Distribution

Acct 2102 G (Traditional)
- As: 51.9%
- Bs: 37%
- Cs: 7.4%
- Ds: 3.7%
- Fs: 3.7%

Acct 2102 H (POGIL)
- As: 23.8%
- Bs: 38.1%
- Cs: 14.3%
- Ds: 3.7%
- Fs: 3.7%

Acct 2102 I (Traditional)
- As: 54.2%
- Bs: 8.3%
- Cs: 8.3%
- Ds: 29.2%
- Fs: 3.7%

27  30  29
POGIL vs. Traditional

Final Course Grade

ACCT 2102 G (Traditional)
- As: 17%
- Bs: 3%
- Cs: 9%
- Ds: 9%
- Fs: 9%
- Ws: 53%

ACCT 2102 H (POGIL)
- As: 7%
- Bs: 23%
- Cs: 27%
- Ds: 7%
- Fs: 3%
- Ws: 33%

ACCT 2102 I (Traditional)
- As: 14%
- Bs: 14%
- Cs: 7%
- Ds: 14%
- Fs: 7%
- Ws: 38%
Summary

- Overall improvement in grades for the POGIL section
  - Average quiz grade higher for POGIL section
  - Final exam – over 50% Fs in the traditional vs. 24% in POGIL
  - Course grade – Traditional sections had almost 2 times as many Ds and Fs as the POGIL section

- Benefits of POGIL pedagogy is consistent in effectiveness outside science discipline

- May provide benefits within the accounting discipline
• Required Intro Course for CHFD Majors
• Groups of 4*
• Members assigned by quartiles
• 26 Content Days: 13 Lecture, 12 POGIL, 1 Intro to POGIL
• Both discreet and cumulative lessons
Avg. Scores by Question Type

<table>
<thead>
<tr>
<th>Question Type</th>
<th>Lecture</th>
<th>POGIL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recall</td>
<td>51%</td>
<td>69%</td>
</tr>
<tr>
<td>Applied</td>
<td>45%</td>
<td>61%</td>
</tr>
</tbody>
</table>

- Recall: Lecture 51%, POGIL 69%
- Applied: Lecture 45%, POGIL 61%
Avg. Final Exam Scores by Subsection

- Lecture: 71%
- POGIL: 58%
Avg. Scores on Applied Questions from POGIL Material

- Test Avg.: 50%
- Final: 58%
<table>
<thead>
<tr>
<th>MSRP</th>
<th>Invoice</th>
<th>Holdback</th>
<th>Dealer Cost</th>
<th>Dealer Profit $</th>
<th>Dealer Profit %</th>
<th>TMV</th>
<th>Area Sales Tax</th>
<th>Total Cost</th>
<th>Down Payment</th>
</tr>
</thead>
<tbody>
<tr>
<td>$70,000</td>
<td>$64,000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>$68,500</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Amount Financed</th>
<th>Interest Rate</th>
<th>Time</th>
<th>Monthly Payment</th>
<th>Total Payments</th>
<th>Total Cost with Financing</th>
<th>Cost of Financing</th>
<th>% Increase to Total Cost from Financing</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>7%</td>
<td>48 mo.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
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<th></th>
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</thead>
<tbody>
<tr>
<td></td>
<td>$200</td>
<td>$300</td>
<td>$15</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
**Table 1: Question #9**

<table>
<thead>
<tr>
<th>MSRP</th>
<th>Invoice</th>
<th>Holdback</th>
<th>Dealer Cost</th>
<th>Dealer Profit $</th>
<th>Dealer Profit %</th>
<th>TMV</th>
<th>Area Sales Tax</th>
<th>Total Cost</th>
<th>Down Payment</th>
</tr>
</thead>
<tbody>
<tr>
<td>$70,000</td>
<td>$64,000</td>
<td></td>
<td>$6,000 x 0.2 = $1,200</td>
<td>$62,720</td>
<td>$7,280</td>
<td>$11.6%</td>
<td>$68,500 x 0.07 = $4,795</td>
<td>$73,295</td>
<td>$14,659</td>
</tr>
</tbody>
</table>

**Amount Financed** | **Interest Rate** | **Time** | **Monthly Payment** | **Total Payments** | **Total Cost with Financing** | **Cost of Financing** | **% Increase to Total Cost from Financing** |
<table>
<thead>
<tr>
<th></th>
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<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>$73,295 - 14,659</td>
<td>7%</td>
<td>48 mo.</td>
<td>$1,404.33</td>
<td>$67,407.84</td>
<td>$82,046.84</td>
<td>$8,771.84</td>
<td>11.96%</td>
</tr>
</tbody>
</table>

**Monthly Payment** | **Monthly Gas** | **Monthly Insurance** | **Monthly Maintenance** | **Total Monthly Cost** | **Minimum Monthly Disposable Income** | **Minimum Annual Disposable Income** |
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>$1,404.33</td>
<td>$200</td>
<td>$300</td>
<td>$15</td>
<td>$1,919.33</td>
<td>$12,795.53</td>
<td>$153,546.36</td>
</tr>
</tbody>
</table>

**Total**

- **Total Cost - down payment**: $73,295 - 14,659 = $58,636
- **Monthly payment**: $1,404.33
- **Total payments**: $1,404.33 x 48 = $67,407.84
- **Total cost with financing**: $67,407.84 + $8,771.84 = $76,179.68
- **Cost of financing**: $8,771.84
- **% Increase to Total Cost from Financing**: $8,771.84 / $76,179.68 = 11.96%

**Minimum Monthly Disposable Income** = $1,404.33 + $200 + $300 + $15 = $1,919.33

**Minimum Annual Disposable Income** = $1,919.33 x 12 = $23,031.96

**MMDI x 12 = MADI**

$12,795.53 x 12 = $153,546.36
Comments from Course Evaluations

“POGIL was a great way to learn to teach us how to think for ourselves and it really worked.”

“POGIL was great because of teaching to other students and learning from them allowing greater knowledge of subjects.”

“I learned more in this class than in all my others combined. POGIL was a welcomed change in the learning environment. It made me feel like I really knew what I was doing and made me better prepared for the test.”

“To be honest, I really disliked POGIL but as time went on, I realized that I had a deeper understanding of the material. The class really challenged me.”
POGIL in Health Education and Promotion

JOANNE CHOPAK-FOSS, PH.D., FASHA
ASSOCIATE PROFESSOR
DEPARTMENT OF HEALTH & KINESIOLOGY
Using POGIL in Health Education & Promotion classes

- The discipline of health education and promotion prepares students to plan, implement & evaluate health programs
- Health Educators have always incorporated a variety of interactive teaching methodologies into their lessons for the specific purpose of engaging students and improving/demonstrating behavioral outcomes.
  - Class size can often be a deterrent to employing group activities
- Using the cooperative group method has been a teaching technique demonstrated at professional conferences in health education for the past 25 years.
- While the didactic lecture method is effective in disseminating large quantities of information, educators have realized that students equipped with knowledge do not always use the knowledge because they lack the appropriate skills to apply the knowledge to practical or real-life situations.
- Furthermore, public health educators rarely operate in isolation; rather they are part of a collaborative network of social service, medical and sometimes, judicial professionals.
  - Therefore, learning how to work in a group cooperatively and collaboratively is paramount to their future success.
How POGIL was implemented

• HLTH 2130 – Foundations of Health Education and Promotion
  - Introductory course to the profession of HEP
    - Health Education and Promotion majors and minors
    - Elective for other majors: psychology, sociology, business, child and family development, exercise science, recreation

• Students randomly divided into groups of four
  - Groups were changed after each exam (approx. every five weeks)
  - Group activity – Mondays – Fridays; Wednesday used as recap and processing of worksheets.
Assessment: HLTH 2130

• **Student Learning**
  - First Exam Grades
  - Final Exam Grades
  - Quasi-identical exam content ± < 10 questions on each exam

• **Sample Activity**
  - Applying a well-known health behavior theory: The Theory of Planned Behavior to a specific health issue
First Exam Scores/50 points

- Fall 2007
- Fall 2010
Final Exam Scores/100 pts.

Final Ex.

Final Ex.
Process-Oriented Guided-Inquiry Learning (POGIL)
A New Paradigm In Nursing Education

Alison M. Rushing, RN, PhD
Rose Mary Gee, RN, PhD
School of Nursing
College of Health and Human Sciences
## COMPARISONS

<table>
<thead>
<tr>
<th>CORE COURSES</th>
<th>COURSES in a MAJOR</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Discipline-specific</td>
<td>1. Discipline-specific</td>
</tr>
<tr>
<td>2. Activities are designed to lead/guide students to answers that outline basic discipline-specific principles</td>
<td>2. Information learned in core courses must be transferred to a completely different field.</td>
</tr>
<tr>
<td>3. Learned/understood disciplinary principles can be applied in a variety of discipline specific situations</td>
<td>3. Core information must then be merged with knowledge from the specific major and applied into the context of that major. I call this cross-disciplinary learning and application.</td>
</tr>
<tr>
<td>4. Usually only one “right” answer</td>
<td></td>
</tr>
</tbody>
</table>
Implementing the POGIL model in Nursing

Adaptations had to be made that would begin to have students:

- Learn new material that was major-specific
- Integrate and apply both core and nursing knowledge into real-life patient situations
- Include considerable flexibility since there are usually no “right” answers

Currently used in two foundational courses in nursing
- Pharmacology
- Introduction to Professional Practice (“Fundamentals”)
Implementing the POGIL model in Nursing

**Pharmacology**

Patient-care specific, but with narrower application; incorporates lab data & alterations in body/system function—incorporates pharmacologic knowledge with chemistry, physics, microbiology, A&P, sociology, etc.

**Fundamentals**

Patient-care specific, incorporates pharmacologic knowledge with chemistry, physics, microbiology, A&P, sociology, etc. but adds lab data, pathophysiology, clinical skills/competencies, physical assessment techniques, planning of care, and use of clinical concepts to effect desired patient outcomes.
POGIL Adaptations in Nursing

Case studies/Simulations that can incorporate and apply both intra- & cross-disciplinary learning

Use of as real-life concepts as possible
✓ Team format
✓ Roles (when used) are adapted to reflect real-life practice situations
✓ Group communication

Class sessions meet only once a week, so a larger amount of material is covered and case scenarios must be structured to take this factor into consideration
POGIL in Marketing

The Case of Professional Sales Training

Dr. Dena Hale
Dr. Linda Mullen
MKTG 3133

• Professional Selling
  – 20-25 students per section/3 Sections
  – Designed as a corporate training program
    • With splash of academia (Theory)
  – Examined POGIL, LECTURE, COMBINATION
  – Identical final exams for all sections
FALL 2008 Results – Final Course Grades

POGIL
- Average: 83.0%

LECTURE
- Average: 85.7%

COMBO
- Average: 84.5%
SPRING 2009 Results – Final Course Grades

POGIL
- Average: 82.4%
- B's: 59.3%
- C's: 22.2%
- A's: 14.8%
- F's: 3.7%

LECTURE
- Average: 84.5%
- B's: 67.9%
- C's: 10.7%
- A's: 21.4%

COMBO
- Average: 88.5%
- B's: 56.3%
- C's: 34.4%
- A's: 9.4%
- F's: 9.4%
FALL 2009 Results – Final Course Grades

9 am
- A's: 43.5%
- B's: 30.4%
- C's: 26.1%
- D's: 8.3%
- F's: 4.2%
- Average: 84.6%

10 AM
- A's: 47.6%
- B's: 38.1%
- C's: 14.3%
- D's: - NONE
- F's: - NONE
- Average: 88.5%

NOON
- A's: 50%
- B's: 37.5%
- C's: 8.3%
- D's: 4.2%
- F's: - NONE
- Average: 87.0%
Our Take-A-Way

• Some topics are better suited for POGIL
• Student attendance increased when POGIL was utilized
• POGIL activities allow for instant feedback
• Students stated preference for POGIL
• POGIL DOES ENHANCE LEARNING/RETENTION in the sales course
POGIL in the Foreign Language Classroom
Does POGIL Increase Student Learning?

Test Averages

- 1002 Final Exam Avg. Fall 2010
- 1002 Final Exam Avg. Spring 2010
- 2001 Final (Open Answer) Fall 2010
- 2001 Final (Matching) Spring 2010
The Roles

- **Leader**: Keeps everyone on task. Periodically checks for group comprehension.
- **Reader**: Reads all instructions to the group.
- **Writer**: Records the group’s answers on the activity sheet.
- **Time Keeper**: Informs group how much time is left to complete the activity.
Objective: Students will demonstrate the ability to accurately describe pictures with complete sentences using “der,” “die”, “das” and “den.”
Students View the Model

Der Mann hält den Hund.

Das Hundefutter frisst den Hund.

Den Mann hält der Hund.

Die Frau kauft den Kühlshrank.

Das Hundefutter frisst den Hund.

Den Jungen tritt die Katze.

Die Frau kauft den Kühlshrank.

Das Hundefutter frisst den Hund.

Das Hundefutter frisst den Hund.

Die Maus hält den Elefanten.

Der Elefant hält die Maus.
The Guided Inquiry

- Grammatik
- Maskulin Wörter  Feminin Wörter  Neutral Wörter
  - der Mann  die Katze  das Hundefutter
  - der Hund  die Frau  das Mädchen
  - der Junge  die Maus  
  - der Kühlschrank  die Blume  
  - der Elefant

1. Schauen wir Bild #1 an. Ist “Hund” maskulin, feminin, oder neutral? ________________
2. Ist “Mann” maskulin, feminin, oder neutral? __________________
3. Schreibt man der, den, die oder das für “Mann” in Bild #1? __________________
4. Schreibt man der, den, die oder das für “Hund” in Bild #1? __________________
5. Wer/Was macht etwas in Bild #1? _____________________________
6. Schauen wir Bild #2 an.
7. Schreibt man der, den, die oder das für “Mann” in Bild #2?____________________
8. Schreibt man der, den, die oder das für “Hund” in Bild #2?____________________
9. Wer/Was macht etwas in Bild #2? _____________________________
Sample Activity #2

- **Objective:** Students will demonstrate the ability to make inferences after reading a text.
- **Students read the model:**

  A street in the capital city of Sezuan. It is evening. Wang, the water-seller introduces himself to the audience. “I am Wang the water-seller here in the capital city of Sezuan. My job is very difficult. When there is not much water, I have to walk far to find it. And when there is a lot of water, I earn nothing. But our province is very poor anyway….

  *The Guided Inquiry*

  1. In what country does Wang live?
  2. What is Wang’s job?
  3. Do we think it rains a lot every day in Sezuan? Why or why not?
“I liked that there was a great deal of activities to help us learn material instead of just trying to learn it out of the book.”

“The group work is very effective but becomes very routine over the semester. Sometimes to break the routine every now and then would be refreshing.”

“Instead of group work the whole time, there should be times when it is us just looking at the board while she carefully explains to the class. She does this at times but it lasts very little.”

“Sometimes in class it felt like we were teaching ourselves when we were separated into groups. Maybe lecture a bit more before splitting us.”
POGIL Site Construction Course

- All Construction Management Majors
- Fourth year course
- From Fall 2009 through Fall 2010
- One lecture section per semester
- Up to 46 students per lecture section
- Two laboratory sections per semester
- Between 15 and 23 students per laboratory section
POGIL Implementation

• Organization of Class
  – POGIL during selected laboratories
  – Roles
    • President
    • CEO
    • CFO
    • Timekeeper
    • As required by student teams
POGIL Implementation

• Instructor as
  – Facilitator
  – Technical resource
## Objective

Construct
- Utility Locator
- Ground Water Locator

### General Instructions

This is a team project.

### Information Set

Lecture material from Topic 01.
Reference information on Georgia View.
Reference material from other sources.
Reference material from physics course.

### Materials Needed

- **Utility Locator**
  - Two steel coat hangers.
  - Pair of wire or bolt cutters or a pair of pliers.

- **Ground Water Locator**
  - A minimum of fifteen (15) feet of string.
  - Washers or fishing weight.
  - Large open-topped jar
  - Container of water

### Procedure

**Assemble/construct**
- A utility locator using the materials listed above
- Ground water locator using the materials listed above

### PART TWO

#### Procedure

- **Utility Locator**
  - Locate underground utilities adjacent to the Carruth Building.
  - Describe what occurs in technical terms (hint: physics course).
  - Identify the utilities located.

- **Ground Water Locator**
  - Simulate locating ground water in the classroom.
  - Describe what occurs in technical terms (hint: physics course).
POGIL Implementation

Can You Classify Soil?

PART ONE
Objectives
Classify soil using simple field tests.
One such test is a sedimentation test which measures and names the percentages of sand, silt, and clay in a soil sample.

General Instructions
This is a team project.

Information Set

<table>
<thead>
<tr>
<th>Material Settled In</th>
<th>30 Seconds</th>
<th>30 Minutes</th>
<th>Greater Than 30 Minutes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sand</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Silt</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Clay</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Materials Needed
One large bottle of water.
Eight samples of different soils sealed in zip-locked bags and numbered from one through eight.
Measuring tape.
Marker.
Tamp down.
Eggle or scale.
Eight jars with screw lids.

Procedure
Assemble eight test apparatus using the materials listed above.

Questions
Using the information in the table above perform a sedimentation test and list the percentages of sand, silt, and clay in each of the following soil samples.
1. Sample one
2. Sample two
3. Sample three
4. Sample four

PART TWO
The classification of soil states the primary constituent first in upper case letters, the secondary constituent second in sentence structure, and the tertiary constituent first in sentence structure. The color is also stated (e.g., Brown Sandy, Silty, CLAY).

Questions
Using the information in the table above and the information of Part Two, perform a sedimentation test and list the colors and the percentages of sand, silt, and clay in each of the following soil samples.
5. Sample five
6. Sample six
7. Sample seven
8. Sample eight

PART THREE
Assigned reading: Reference GeorgiaVIEW.
- Bureau of the classification method.
- FHWA classification method.
- ASTM classification method.
- OSHA classification method.
POGIL Implementation
POGIL Implementation

- Bioswale Site Investigation

**PART ONE**
Objective
- Evaluate a proposed Bioswale construction site by conducting a field investigation.

General Instructions:
- This is a team project.
- Reference information on GeoVista.

**PART TWO**
Investigation and Procedure
- Materials Needed For Field Investigation
  - Field tools and equipment to be issued by instructor (a sign-in/sign-out form will be used).
  - Bucket of soil to replace and removed for samples.
  - A minimum of twelve zip lock bags for soil samples.
  - Markers to identify bags.
  - Field note book.
  - Pen or pencil.
  - Shovel.
  - Rake.
  - Cost keeper “utility locator.”
  - String with weights to measure ground water depth.

Field Procedure
- Verify location of underground utilities with the “utility locator.”
- Collect a soil sample from each structure. Beginning at ground surface.
- Measure and record the depth and thickness of each soil stratum.
- Measure and record the depth of the ground water table.
- Locate the boring both horizontally and vertically using only issued field land tools.
- Identify delineate all near-surface sources that “feed” the bioswale.
- Record all information in the field note book.
- Backfill hole when completed.

Office/Laboratory Procedure
- Clean up each soil sample from each test using six different classification methods (i.e., Sedimentation, Bransen, USDA, FRWA, ASTM, and OSHA).
- Draw subsurface soil section.

**PART THREE**
Reporting Procedure for Results
- Present the results of the investigation within ten (10) minutes.
- Develop a team presentation using PowerPoint.
- Describe the field activities.
- Discuss the techniques used to classify each soil sample.
- Develop a subsurface log using examples from GeoVista.
- Show the classification of each soil sample using different classification methods (i.e., Sedimentation, Bransen, USDA, FRWA, ASTM, and OSHA).
- Include the results of a literature search using resources on GeoVista.
- Compare the site evaluation with the Bulloch County Soil Survey.
- Discuss expansive soil potential for each stratum.
- Discuss ground water.
- Discuss underground utilities and use of the “utility locator.”

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• Student Comments on the POGIL Team Learning Experience
  – Learning how to work with others
  – Working as a team to get things done
  – Learning how to coordinate well with others
  – Gaining experience in the difficulties of working as a team
  – Networking with classmates
  – Learning valuable teamwork skills
  – If you don’t understand, you have a team member that probably will
  – Teammates working together for a common goal, leaves no one behind
  – Learned from each other
POGIL Implementation

• Summary for Site Construction
  – All students participated in the laboratory
  – Students demonstrated applied knowledge through in-class presentations
  – Students reported on formative evaluations at the end of the semester that they made positive progress by working in teams
For more information on POGIL

- www.pogil.org
- Attend a workshop, sign up at pogil.org
Questions/Discussion

Questions for panel members?

Start thinking about your own classroom. What is it that you want your students to know? Can you find a model or example that illustrates this? If so, you can POGIL it!