Counting Cars: An Economics Experiential Learning Project

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EXPERIENTIAL LEARNING

What It Is:

- Learning as the process whereby knowledge is created through the transformation of experience
- A concrete experience forms reflective observations that play a central role in the learning process
- Evaluate the impact of an outside-the-classroom research experience on student learning outcomes, attitudes and sustainability

How It Works:

- Integrate a beyond-the-classroom experience with the theories learned in the classroom in an Economics of Sustainable Development course.
- Hands-on economic research experience involving collecting, analyzing and presenting data
- Outside-the-classroom experience through counting cars
- Findings:
  higher student evaluations of teaching
  increased student awareness about environmental issues

THE PROJECT

Main Topics:

- Economic Education & Teaching
- Experiential Learning
- Sustainable Development
- Pollution, Energy and Transportation

Procedure:

- *Class Discussions and Readings* on:
  - U.S. Energy Use
  - Oil Dependency
  - Contribution of the transportation sector to carbon dioxide
- In-class inquiries of students' perceptions on local traffic
- Students *summarize articles* about energy & externalities:
  - Covert, Greenstone & Knittel (2016), Parry, Walls & Harrington (2007), Ramey & Vine (2011), Delucchi (1998)
- Students work in pairs and *count traffic* twice during the semester
- Students conduct a *mid-project reflection* assignment
- Students make four *Facebook video posts* while counting traffic then upload traffic count sheets on Dropbox
- Students *propose a solution* to reduce traffic congestion
- Students *quantify the economic and environmental costs and benefits* of their proposed solution
  - *Environmental benefits* (reductions in external costs): pollution costs, oil dependency costs, greenhouse warming costs, congestion costs & the costs of accidents (Parry, Walls & Harrington (2007) & Delucchi (1998))
- Students create a 10 minute *video project*
- Students conduct *peer reviews*

METHODS

Goal: Explore Lifestyle Changes in the Transportation Sector

- Brainstorm & Integrate Theories
- Research & Observation
- Calculation & Analysis
- Collect Data & Interactive Learning
- Evaluate Learning Outcomes

Traditional vs. Experiential Learning Technique

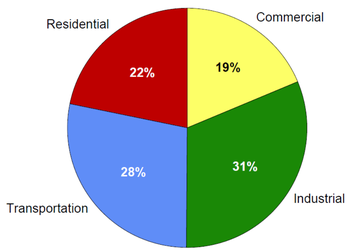
Overall Instructor Evaluation Score	+6% Student Rating
Consensus in Overall Instructor Ratings	-32% Standard Deviation
Passion about Environmental Issues	Statistically Significant Increase
Impact of Lifestyles of Consumers in Developed Countries on Global Environment	Statistically Significant Increase
Instructor Performance	+9% Student Rating
Learning & Skill Development	+9% Student Rating
Instructor Recommendation	+19% More Likely to Recommend

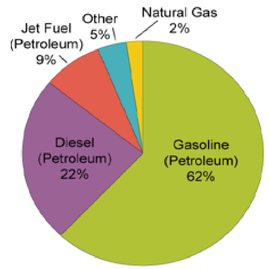
RESULTS

Ratings from Student Evaluations of Teaching

	Fall 2016		Spring 2017		% Change	% Change
	Mean Ratings	Standard Deviation	Mean Ratings	Standard Deviation	Mean Ratings	Standard Deviation
Instructor Performance						
Clarity on Grade Determination	4.67	0.50	4.35	0.94	7.36	-46.81
Attendance Policy	4.56	0.53	4.33	0.9	5.31	-41.11
Timeliness of Feedback	4.44	0.73	4.42	0.87	0.45	-16.09
Regular class meetings	4.78	0.44	4.5	0.83	6.22	-46.99
Reasonable office hours	4.56	0.53	4.27	0.95	6.79	-44.21
Instructor Availability	3.78	0.44	3.32	0.78	13.86	-43.59
Usefulness of additional resources	4.33	0.7	4.2	0.92	3.10	-23.91
Instructor well-prepared	4.67	0.5	4.22	0.95	10.66	-47.37
Instructor knowledgeable	4.78	0.44	4.41	0.88	8.39	-50.00
Effective teaching Style	4.78	0.44	4.12	1.06	16.02	-58.49
Recommend this instructor	4.89	0.33	4.1	1.03	19.27	-67.96
Willingness to help	4.78	0.44	4.28	0.9	11.68	-51.11
Helpful feedback from instructor	4.44	0.73	4.01	1.11	10.72	-34.23
Learning & Skill Development						
Learned a great deal	4.67	0.50	4.02	0.97	16.17	-48.45
Analytical thinking	4.67	0.50	4.19	0.87	11.46	-42.53
Useful Later in career	4.11	0.78	4.21	0.9	-2.38	-13.33
Development of written and oral communication	4.22	0.67	3.77	1.1	11.94	-39.09
Course Material, Examinations and Assignments						
Usefulness of textbook	3.5	1.31	3.8	1.14	-7.90	14.91
Consistent exams and assignments	4.67	0.50	4.04	1	15.59	-50.00
Challenging exams and assignments	4.67	0.50	4.2	0.8	11.19	-37.50

Percentage change is calculated subtracting the spring 2017 ratings from the fall 2016 ratings.





Source: U.S. Department of Energy, Transportation Energy Data Book Edition 28

The Transportation Sector accounts for 28% Petroleum Usage

Petroleum accounts for 84% Total Energy Usage in the US

BENEFITS

Instructor Benefits:

- Engage in Applied Instructional Techniques
- Evolve with New Teaching Methods
- Flexible Applications in all Levels of Economics Courses
- Cost-Benefit Analysis
- Interdisciplinary Teaching Methods
- Connect Students with Real-life Experiences
- Better Student Evaluation Results & Learning Outcomes
- Outside-the-Classroom Engagement with Students
- Perceived as an Approachable Instructor
- A Fulfilling Teaching Experience

Student Benefits:

- Research Experience and Data Collection Exposure
- Flexibility with Research Techniques
- Engagement with Real-Life Situations
- Builds Commitment, Responsibility and Creativity
- Fosters Cooperation and Leadership
- Application of Social Problems & Environmental Challenges
- Exposure to the Transportation Sector & Externalities
- Fosters Critical Thinking Skills
- Builds Fundamental Skills for Future Career
- Problem Solving Ability while Tackling Complex Issues
- Increases exposure to Interdisciplinary Studies
- Making a Connection between Personal Choices & Environmental Issues
- Rethinking Lifestyle Choices for the Greater Good
- Increases Student Motivation, Retention, and Depth of Understanding

Societal Benefits:

- Increases Awareness of Societal Issues
- Teaching Innovation Method
- Better Learning Outcomes
- Builds a Stronger Student-Instructor and Student-to-Student Bond
- Promotes Better Understanding of the Public Sector
- Creates New Knowledge & Ideas
- Stimulates Innovation & Critical Thinking Skills
- Encourages *Greener* Lifestyles
- Inspires Careers & Future Research in Related Fields
- Applied Research Skills Create more Capable Employees for the Labor Force

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