Service-Learning Integrated throughout the College of Engineering: SLICE

Presenter

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What do you think Service-Learning is?

- Who has had Service-Learning experience?

- Any Examples?

Service-Learning defined

Service-Learning (Bringle & Hatcher, 1995)

A **credit-bearing**, educational experience in which students participate in an **organized service** activity that meets **identified community needs** and **reflect** on the service activity in such a way as to gain further understanding of **course content**, a broader appreciation of the **discipline**, and an enhanced sense of **civic responsibility**.

Scenario # 1

Solo paper cup company needs help redesigning machinery/process – cups getting stuck

Professor teaching "Design of Machine Elements" course has a team of students work on this for their course project
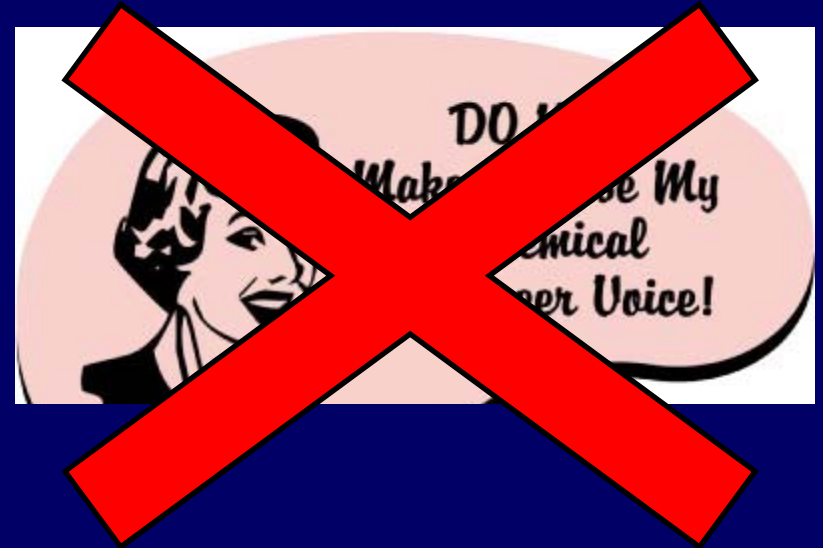
Scenario # 2

A professor in a Chemical Engineering Materials class says that she will drop the lowest homework grade of any student who volunteers to be a judge for the Regional Middle School Science Fair

Scenario # 3

National Grid (for-profit power company) has an issue with squirrels nesting next to their transformers. Unfortunately, the squirrels are little dare devils and sometimes cause the transformer to blow up leaving a whole block without power. A Plastics Engineering Capstone team designs a Squirrel Guard that can be snapped in place

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Overall aim at UMass Lowell:

Combine community-based projects in regular courses to meet learning objectives and meet real community needs (S-L)

Strategic objectives:

Achieve one course every semester for every student

Be more efficient: teaching/learning/research

Attract underrepresented groups

Meet ABET criteria

President's Higher Education Community Service Honor Roll – with Distinction

Goal:

Better Engineers, Better Citizens

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Service-Learning examples

All Majors

Course: 25.107 Introduction to Engineering I

Project: Design, build & deliver Big Cat Enrichment Playthings

Community Partner: Franklin Park Zoo

Students visiting zoo and cats

Students in lab building devices, from hands-on to paws-on.

Service-Learning examples

Chemical Engineering

Course: 10.304 Heat Transfer

Project: Heat loss analysis with recommendations for improvements

Community Partner: Merrimack Valley Food Bank

Where's the Heat going?

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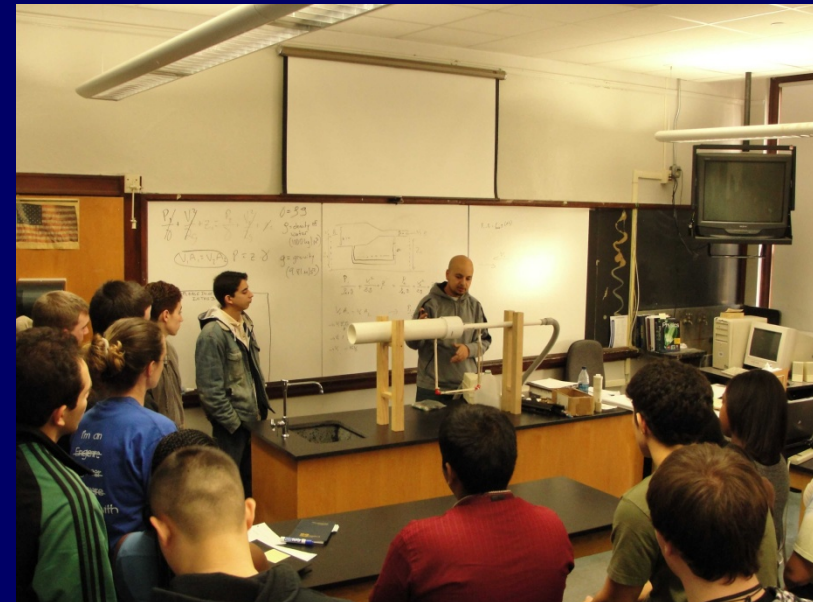
Service-Learning examples

Civil and Environmental Engineering

Course: 14.301 Fluid Mechanics

Project: Design, build and demo hardware illustrating Fluids principles

Community Partners: HS Science teachers of students' choice

Students demo the new hardware for High School classrooms

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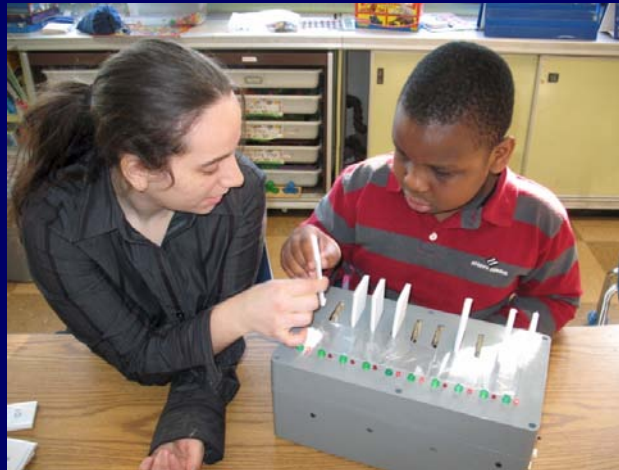SLICE: Service-Learning Integrated throughout a College of Engineering

Service-Learning examples

Electrical and Computer Engineering

Course: 16.499 Capstone

Project: Design, build & deliver custom Assistive Technology device to improve the life of a person with disabilities

Community Partners: many agencies & individuals

Final testing with the client – it works!

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Service-Learning examples

Mechanical Engineering

Course: 22.342 Convective Processes

Project: Design a drip irrigation system for farms in the high Andes

Community Partner: Village Empowerment Peru Project

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Service-Learning examples

Plastics Engineering

Course: 26.218 Introduction to Plastic Design

Project: Computer model and prototype of big button switches

Community Partner: Assistive Technology clients

Service-Learning Research: Student Impacts

Mean responses to Likert scale of 1 (disagree) to 5 (neutral) to 9 (agree)	General mean	Different from Neutral (*)	Male	Female	Different across gender (significant*, 5%)
2. Service and academic coursework should be integrated	6.30	*	6.24	6.77	*
3. Engineers should use their skills to solve social problems.	6.75	*	6.71	7.19	
4. I learn more when courses contain hands-on activities.	7.92	*	7.91	7.95	
5. Service in general should be an expected part of the engineering profession.	6.57	*	6.51	7.05	*
6. People who receive social services largely have only themselves to blame for needing services.	4.17	*	4.25	3.36	*
7. Social problems are not my concern.	3.63	*	3.67	3.14	
8. I can have an impact on solving problems that face my local community.	6.70	*	6.65	7.14	*
9. I can have an impact on solving problems that face underserved communities internationally	6.18	*	6.10	6.90	*
10. Working in teams is a waste of time.	2.04	*	2.09	1.60	*
11. It is important to me personally to influence the political structure.	4.76	*	4.75	4.86	
12. It is important to me personally to have a career that involves helping people.	6.56	*	6.46	7.45	*
13. I am uncomfortable working with people who are different from me in such things as race, wealth, and life experiences.	2.61	*	2.65	2.37	
14. I have a close working relationship with at least one faculty member at this institution.	3.15	*	3.18	2.88	
15. Within service-learning courses, the service-learning projects should be required and not optional (with a choice of both service and non-service projects).	4.98		4.94	5.40	

Service-Learning Research: Student Impacts

Importance of Career Values

	Male	Female
Challenge: Learning new skills or information, doing things in a new way	2	2
Helping: Doing things for others, building a better world.	3	1
Income: Making a high salary.	5	5
Security: Having Stable employment and income, not worrying about lay-offs.	1	3
Variety: Doing many different activities, not doing the same things all the time.	4	4

Service-Learning Research: Student Impacts

Qualitative Research

"When you know that your work will **impact someone's life**, you know you need to get it right, and it makes you driven to succeed. I think that all too often, students are more focused on just getting the work done, rather than on the **impact their work may have in the future**."

Other student quotes, "the obstacles were learning experiences. I learned much more from **solving community problems** than from pushing paper,"

and, "This [S-L capstone project] is the best thing I have ever done."

Service-Learning: Want more?

Custom Technical Electives:

- Sequence of 1 credit courses

    25.200, 25.300, 25.400

- Community-based Engineering Project

    25.401

Established Courses:

16.100 Introduction to Electrical

and Computer Engineering

16.541 Introduction to Biosensors

Other Courses:

What would you like to see?

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For more information on SLICE visit our website:

www.uml.edu/engineering/slice

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