

ROXIE

Real Outreach eXperiences In Engineering

First-Year Engineering Students
Designing for Community Partners

MUDD DESIGN VII

May 28-30, 2009



ENGINEERING EDUCATION

“The best designers are the ones who know when to stop knitting their brows and relax, who know how to let a new drawing use their hands to put itself on paper.”

- Richard Bach, Out of My Mind, Morrow, pg 74



The Instructional Team

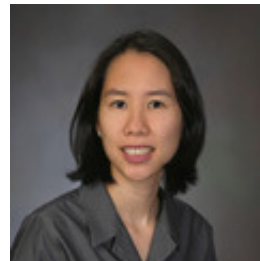
ENGE 1114: Exploration of Engineering Design



Richard Goff



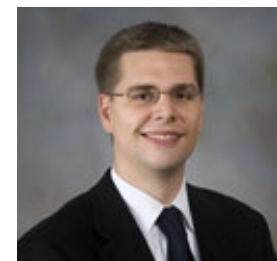
Tamara Knott



Jenny Lo



Janis Terpenney



Christopher Williams

- **Department of Engineering Education**
- **Second course in first-year engineering curriculum**
- **Contains 3 learning modules:**
 - **Graphics Communication**
 - **Engineering Design**
 - **Computer Programming**
- **900 1st-year engineering students**



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The Service Learning Team



Karen Gilbert

Coordinator
VT-ENGAGE

Center for Student Engagement
And Community Partnerships



Andy Morikawa

Executive Director
Community Foundation of
the New River Valley



Michele James Deramo

Director Service-Learning
Center for Student Engagement
And Community Partnerships



ENGINEERING EDUCATION

ROXIE

Real

Outreach

eXperiences

In

Engineering



Putting the fish back in
the water.

You never know what
treasure you will find.



- Students working on real projects for actual clients. Service – Learning : Reciprocity and Reflection.
- Purdue’s EPICS program
- UMass Lowell’s SLICE program
- ROXIE is Unique in that it involves
 - a large number of students,
 - first-year engineering students,
 - a focus on problem definition in design



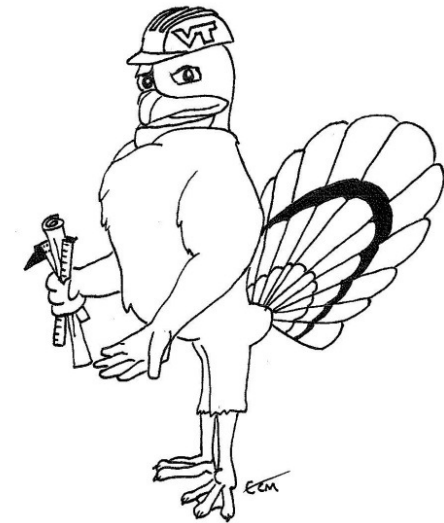
Three Key Sustainability Factors

- 1. Creating solid partnerships and projects with the community
- 2. Creating sustainable hands-on activities for our design module that includes ROXIE
- 3. Creating sustainable infrastructure of
 - Faculty
 - Teaching Assistants
 - VT Engage community partners
 - Exploring alternative projects



What is ROXIE?

- Service-Learning Design Project
- Students serve as “Design Consultants” for a community partner
- Work with the community partner to identify a need
- Work towards a solution using the design methods taught in class



Lending a HOKIE hand
to our community.

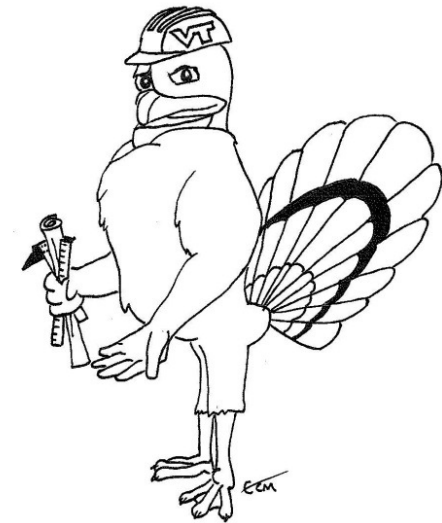


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What is ROXIE?

6 Steps:

1. Partner with community service organization
2. Perform volunteer service activity with the organization
3. Reflect on experience and identify an opportunity for improvement
4. Propose a design problem
5. Follow design method to propose a solution to the problem
6. Report and reflect on experience



Lending a HOKIE hand
to our community.



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Implementation: Project Unveiling for Students

This semester you will:

Get out of the
classroom

Learn through
doing

Connect with the
community

Actively apply
principles of design

Improve the
community

Be given the freedom to
define your own project

Get hands-on
experience off-campus

Apply your knowledge to
open-ended problem

LEAVE A LEGACY



Implementation: VT-ENGAGE



By participating in ROXIE, you are helping to reaffirm
to the community Virginia Tech's motto:

Ut Prosim "That I May Serve."



Outcome: Example Projects



- **VT Rescue Squad** Workbench Design
- Movable Walls Project for the **Habitat for Humanity** Restore
- Design of **March of Dimes** Educational Curriculum
- Blacksburg Baptist **Church** Parking Lot Runoff Control
- **Camp Powhatan** Welcome Center Renovation
- Design of Indoor Bouldering Facility for **Parks and Recreation**
- Designing a Doggy Domicile for **MoCo Shelter**
- Bridge Handrail Design for **Boy Scout Camp**

Outcome: By The Numbers

- **900 + students**
- **185 teams of five students**
- **87 Community Organizations**
- **Estimated 15,000 hours contributed towards completion of project (17hrs/student)**
- **90% of ROXIE community partners surveyed want to participate again in the future**
 - **Increase in interest of community partners working with engineering students**



Outcome: Community Response

“Just a quick note to say Thank You for developing the ROXIE project. We always enjoy **exposing students**, particularly Freshmen, to community service and **helping them understand how their expertise and time can make a difference in the community.**”

It was enjoyable, and impressive, listening to their presentations.”

E. Gail Billingsley
Executive Director,
YMCA at Virginia Tech



Outcome: Community Response



“Thanks to the hard work of our ROXIE team, 28 young people working on their GED’s already have a computer to help them with their studies, which will help ensure their success with passing this test.”

*Nelda Pearson, Executive Director
Beans and Rice*



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Working in the community was rewarding

“The project has allowed us to be exposed to other peoples’ lives while helping the community.”

“I found it rather fulfilling. I have learned that doing what we did for the ROXIE project is something that I think I would enjoy doing for a living. ... It really allows us to see what it is actually like to work as an engineer in the real world, and that experience is priceless.”

“Working with the community was a great experience”

“I really enjoyed being able to work with a community partner...I believe that the overall process was a positive experience. “

Learned How to Do Engineering Design

“The ROXIE project was a unique experience that helped me to improve on my design abilities and also showed me what the future as an engineer would be like.”

“Before entering the ENG program at VT, I was a submarine mechanic for the US Navy ... Looking back at this period in my life I wish that I had some of the problem definition skills that I was taught during these beginning engineering courses.”

“I think that the design methods we learned in class will be useful for other engineering projects in the future”

Questioning ROXIE's benefit to the community

“The only thing that I think is wrong with this project is the fact that we are not able to deliver our design to our community partners. It feels like we are taunting them with a solution to a major problem of theirs without delivering the solution to them.”

“Since we will not actually implement our project, all the design processes and work we went through are basically useless.”

“Engineers working on a House of Quality is definitely not serving the community or helping them in any way.”



Outcome: Faculty Team Response

How Student Efforts Made a Difference



- By developing alternative solutions to a problem, organizations are now able to focus in on the one idea that works best—in some cases leading to dramatic savings in consultant and professional fees
- With complete, detailed reports in hand, organizations are now able to discuss these projects with their executive boards and apply for grant funding to implement **YOUR** solution
- Many clients of the participating organizations are already enjoying the benefits of the ROXIE project



Community Partners

- Include community partners in kickoff meeting
- Reduce the overall number of community partners involved
- Keep partners involved through all design reviews

Students and Service Learning Design Projects

- Increase number of teams working on a single project
- Emphasize importance of intellectual service to students
- Emphasize importance of design solution and not design product



Three Key Sustainability Factors

- 1. Creating solid partnerships and projects with the community (seems assured)
- 2. Creating sustainable hands-on activities for the design module (Chris Williams @ 2pm).
- 3. Creating sustainable infrastructure of
 - Faculty (six ENGE 1114 faculty)
 - Teaching Assistants (10 teaching assistants)
 - VT Engage community partners (more committed)
 - Exploring other options e.g. HELP without clients



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Real Outreach eXperiences In Engineering

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Thank you.



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