Long-Term Impacts of Project Work

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WPI’s Project Requirements

Interactive Qualifying Project (IQP)
Major Qualifying Project (MQP)

• Degree requirements, 9 CH each
• Not courses; small teams (2-4) work independently under faculty direction
• Most done with external agencies and organizations
• Many completed full-time off campus
Curricular Fit and Examples

**IQP** – gen ed capstone; interdisciplinary research project at interface between society and technology

- *Erosion and flood control in informal settlements*, Namibia Housing Action Group
- *Improving community nutrition*, AIDS Project Worcester

**MQP** – major capstone; integrative application of disciplinary skills and knowledge to professional-level challenge

- *Design and prototyping of a sorting mechanism*, Gillette
- *Biochemical characterization of protein-protein interactions*, Prof. K. Wobbe
Motivations and Overview of the Study

• Increasingly, colleges and universities are implementing project work into the curriculum
• Evidence of impacts can drive reform, justify investment, persuade skeptics, and guide implementation
• Research questions:
  – What are the long-term impacts of project work?
  – Do projects prepare alumni for careers and life?
  – How do different groups experience project work?
• Study group: Graduates of WPI’s project-based curriculum (1974-2011)
Study Details

- Alumni survey
  - Professional and personal impacts of projects
  - 39 areas of long-term impact
  - Random sample of alumni
  - 25% response rate \( (n=2532) \)

- Alumni interviews
  - 25 in-depth interviews to explore “how and why” behind long-term impacts
Survey Instrument

• 39 Likert-scale items on project impacts
  – Professional skills and abilities
  – World views
  – Personal impacts

• Demographics
  – Gender, place of residence
  – Major
  – Projects done on or off campus
Findings

• Formal project work conveys *many* positive impacts
  – A wide range of professional abilities and skills
  – Broader world views and personal growth

• Some alumni groups report especially positive impacts from project work
  – Women
  – Engineering majors
  – Those who completed off-campus projects

• Interviews reveal compelling stories of growth and transformation
<table>
<thead>
<tr>
<th>Professional Impacts</th>
<th>% Positive Responses</th>
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<tbody>
<tr>
<td>Responsibility for own learning</td>
<td>89</td>
</tr>
<tr>
<td>Develop ideas</td>
<td>89</td>
</tr>
<tr>
<td>Solve problems</td>
<td>88</td>
</tr>
<tr>
<td>Effective professional interactions</td>
<td>87</td>
</tr>
<tr>
<td>Function effectively on a team</td>
<td>86</td>
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<tr>
<td>Effectively manage a project</td>
<td>86</td>
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<tr>
<td>Write clearly and effectively</td>
<td>83</td>
</tr>
<tr>
<td>Succeed in business or industry</td>
<td>78</td>
</tr>
<tr>
<td>Be an effective leader</td>
<td>78</td>
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<td>Speak clearly and effectively</td>
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Alumni Voices: Preparation for Work

“For me, when I started to work ... every project I got involved with ... was like an IQP or an MQP ... I just felt ... ‘I’ve done this before.’”

“[Project work] is really a problem-solving and project management education, and that’s something I use constantly at work.”

“It’s close ... to what I do now. ... I can’t think of another school that would have been suitable for me to be doing what I do now ... life is projects.”
Alumni Voices: Professional Skills

“You gain so many skills working with other people and you learn to value other people and what they bring.”

“I think the [projects] just really mimic, at a very early age—a formative age … in your learning process— … how to work, how to be successful.”

“You’ve got to get used to speaking … and answering questions and being confident, and that was invaluable.”

“[Project work] teaches you a great deal about how to present yourself … and present your ideas effectively.”
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<td>Feeling able to make a difference</td>
<td>66</td>
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<tr>
<td>Enriched personal life</td>
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<td>Feeling connected to WPI</td>
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“...taking pride in your work, operating according to a strong work ethic, persevering through adversity, being self-motivated, feeling self-confident, feeling self-aware, and operating according to a well-defined code of personal values”
Alumni Voices: Personal Impacts

“[The projects]... give you the opportunity to become independent, work on your own, find ... solutions.... It just gave me the opportunity to develop my character and drive.”

“To have something that really takes you out of your comfort zone ... where you can’t predict exactly what’s going to happen ... helped me to become a stronger person as I headed out of college.”

“The projects gave me an enhanced confidence level, that I could achieve—and it sounds almost cocky—but I could achieve almost anything.”
Benefits of Off-Campus Projects

• About 40% of respondents had done at least one project away from campus
• Alumni who did off-campus projects reported more positive impact in 33/39 areas
• Consistent with research indicating that “study away” experiences convey similar benefits to study abroad

“I don’t think it really mattered where I went ... my entire experience after the [project] was different than before.... Somehow, something changed. I felt like a different person when I came back. ... I saw the reason why I went to college, because I saw something taken to completion in the real world.”
Benefits to Women

• Female alumni reported more positive impact in **36/39** areas

• Research shows women are more motivated than men by context, application, and collaboration

“For the longest time, [I] didn’t want to be an engineer because ... I thought that ... it was just sitting behind a desk doing calculations.... These projects really allowed me to see the impacts on society that engineering can have, and it made it fun, it made it interesting and relatable, and it really stimulated my interest in staying with engineering.”
Project Impact for Engineers

• Engineering alumni report more positive impacts for **24/24** professional outcomes

• Significant differences in leadership, interpersonal, and communication skills

• Possible explanations:
  — Teamwork emphasis in engineering
  — Project-focused nature of engineering
Additional Findings

• “Real world” aspect highly motivational
• Adversity in projects viewed as an asset
• Unpredictability of projects promoted learning, growth, and confidence
• Projects viewed as a “safe environment” to develop professional skills
“I still tell people about [my project] all the time ... [it’s] a cornerstone of how I work.”

“Both projects definitely had a lasting impact. To this day I talk about those more than ... any other academic thing I did.”

“One of my fondest memories ... in my whole life.”
Conclusions

• Projects are doing what was intended – and more – for most WPI graduates
  – Career success and leadership
  – Character, confidence, efficacy

• Off-campus projects have greater impacts
  – Interpersonal and communication skills
  – Broader world views, personal fulfillment

• Projects are particularly impactful for women
  – Can aid in attracting and retaining women in STEM

• Opportunities for improving the experience
  – More off-campus projects
  – More emphasis on certain outcomes
  – Better training and mentoring of advisors
Questions for Discussion

• Can colleges and universities carve out curricular space for substantial project work?
• What are the barriers?
• What evidence will be most persuasive?
• What implications does project work have for faculty development?