Study on How College Science Courses Influence Elementary School Teachers

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Collaborators

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NASA Opportunities for Visionary Academics (NOVA)

- [http://www.novaprogram.org/Home](http://www.novaprogram.org/Home)
- >100 institutions participated
- Development or modification of “reform” science courses for elementary education majors
  - Courses incorporate an inquiry-based approach and center on student interactions
National Study of Education in Undergraduate Science

- Follow-up to the NOVA project
- Total of 30 institutions around the country over ~3 years
- Site visits
  - Class Observations
  - Interviews of college faculty, pre- and in-service teachers
- RTOP*
- On-line Surveys
- Content Questions

* (Piburn and Sawada, 2000)
# The Course and Schools

<table>
<thead>
<tr>
<th>School</th>
<th>NOVA Course Description</th>
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<tbody>
<tr>
<td>1 (Public)</td>
<td>Content integrated with teaching pedagogy Taught with a 5E* learning cycle Hands-on/Interactive Experiments that are easily adaptable to elementary classroom Create lesson plan for fellow students.</td>
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<tr>
<td>2 (Public)</td>
<td>Fairly traditional lecture/lab style Pedagogy was not integrated Year-long research project</td>
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<tr>
<td>3 (Private)</td>
<td></td>
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</tbody>
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Views of Pre-service Teachers

<table>
<thead>
<tr>
<th>School</th>
<th>Pre-Service Teachers Interview Quotes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>(Public) “This course is a refresher course from HS. I am learning how to teach.”</td>
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<tr>
<td></td>
<td>(Public) “I understand more because it is hands-on.”</td>
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<td>2</td>
<td>(Public) “The lesson plan activity forced you to understand what and why first … and then figure out a way to make the rest of the class understand.”</td>
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<td>3</td>
<td>(Private) “Research project – hands-on ourselves. Not just looking at data.”</td>
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<td></td>
<td>(Private) “Look at the methods lessons – all those I could teach…”</td>
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## Views of In-service NOVA Teachers

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<tr>
<th>School</th>
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<tbody>
<tr>
<td>1 (Public)</td>
<td>“I learned a lot more hands-on. I liked [the NOVA] class.”</td>
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<tr>
<td>2 (Public)</td>
<td>“It was more hands-on experiments. I could see what did/did not work. It built my confidence.” My Biology course was least important because it “was more lecture.”</td>
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<td>3 (Private)</td>
<td>“The methods course … because got to do hands-on inquiry based learning that kids would get to do.” “The methods course changed the way I think about science, about teaching, the way I look at the world.”</td>
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<td>School</td>
<td>In-Service Teachers Interview Quotes</td>
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<tr>
<td>1 (Public)</td>
<td>“Physical science lab and my methods course. They were hands-on and showed ways to adapt and use materials at different levels… The content course was least important.”</td>
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<tr>
<td>2 (Public)</td>
<td>“My ‘geology courses.’ Actually going into classrooms as an undergrad and teaching it.” “My methods course.”</td>
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<tr>
<td>3 (Private)</td>
<td>“The methods course ‘gave lots of hands-on teaching in classroom situations.’ “The methods course focuses on how to teach, … how to effectively be explicit.”</td>
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## Observations of Elementary Classes

<table>
<thead>
<tr>
<th>School</th>
<th>Observation</th>
<th>Comments</th>
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<tbody>
<tr>
<td>1 (Public)</td>
<td>NOVA: Interactive Book - (based) NOVA: Interactive Management issues</td>
<td></td>
</tr>
<tr>
<td>2 (Public)</td>
<td>NOVA: Interactive Montessori Book - (based) NOVA: Interactive Management issues</td>
<td></td>
</tr>
<tr>
<td>3 (Private)</td>
<td>NOVA: Interactive FOSS * (Full Option Science System) <a href="http://www.fossweb.com/">http://www.fossweb.com/</a></td>
<td></td>
</tr>
</tbody>
</table>
Conclusions and Questions

• All observed elementary teachers at least attempted to teach by reform methods.
  • What role does the provided curriculum play in this decision?
• When the college content course also integrates pedagogy, it is better remembered by in-service teachers.
  • Where should the line be drawn between content and methods courses and should more effort be placed into their integration?
• Interactions between reform faculty and pre-service teachers have a positive influence.
  • What can/should be done to facilitate these interactions?