Study on How College Science Courses Influence Elementary School Teachers

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AAPT 2009 Summer Meeting

ESI-055-4594

Collaborators

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NASA Opportunities for Visionary Academics (NOVA)

- (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

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

Views of Pre-service Teachers

School	Pre-Service Teachers Interview Quotes
1 (Public)	"This course is a refresher course from HS – I am learning how to teach." "I understand more because it is hands-on"
2 (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."
3 (Private)	"Research project – hands-on ourselves. Not just looking at data." "Look at the methods lessons – all those I could teach…"

Views of In-service NOVA Teachers

School	In-Service Teachers Interview Quotes
1 (Public)	"I learned a lot more hands-on. I liked [the NOVA] class."
2 (Public)	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."
3 (Private)	"The methods course … because got to do hands-on inquiry based learning that kids would get to do." "The methods course change the way I think about science, about teaching, the way I look at the world."

Views of In-service Non-NOVA Teachers

School	In-Service Teachers Interview Quotes
1 (Public)	"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."
2 (Public)	My "geology courses." "Actually going into classrooms as an undergrad and teaching it." "My methods course."
3 (Private)	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."

Observations of Elementary Classes

School	Observation	Comments
1 (Public)	NOVA: Interactive	Book-based
	Non-NOVA: Interactive	
2 (Public)	NOVA: Interactive	Montessori Book-based
	Non-NOVA: Interactive	Management issues
3 (Private)	NOVA: Interactive	FOSS*/Management issues
	Non-NOVA: Interactive	FOSS

(* Full Option Science System http://www.fossweb.com/)

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?