

Using the Tools of the Trade

Connecting Education Students with the Profession

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About the Profession

- There is a shortage of qualified teachers for the urban schools of America. In particular, there has been and continues to be a high demand for Mathematics teachers
- There is lack of diversity in the teacher workforce
- Teacher turnover: close to 50% of newcomers flee the profession during their first five years of teaching

What we can do now

- Provide instruction and training that translates mathematical knowledge into value and ability
- Acknowledge diversity in knowledge making process
- Help our diverse student body improve their employability – in particular, improve breadth and quality of their informal employment networks
- Help students recognize the complexity of the profession (expectations and scope of job)

Social Justice Model

Today's world is written and read through the language of mathematics

- Encourages the learning of mathematics as a social justice action that strengthens the student as a citizen who can bring about change to his/her life and the world around him/her
- Teaches mathematics through the study of social problems, proposing solutions that are sensible and equitable

Social Justice Model

- Recognizes, integrates and develops three components of knowledge: community, critical, classical
- Work is directed at posing problems not just solving them: teacher and students propose problems or issues that need to be addressed intellectually -with mathematics- and with action

A Pedagogy, A Strategy

Service learning is an educational method by which participants learn and develop through active participation in a service experience designed to meet the needs of a community and the learning objectives of a course.

Project-based Service Learning

Taking Theory into Practice

- ☑ Present mathematical problems in *realistic, meaningful* and (whenever possible) familiar contexts to facilitate the transfer of knowledge
- ☑ Promote Discipline fluency in both fields:
Mathematics & Education
which includes helping students familiarize themselves with the use of technology

MA 303/Number Systems

Target

- Future elementary teachers

Service Learning task

- Embedded in course's traditional Statistical Analysis Project
- Mandatory
- Students work in groups organizing and analyzing data from a public health database maintained by CIH-TB prevention program

Community Partner

- NYU's Center for Immigrant Health (CIH)

MA 303 (Number systems for future elementary teachers)

Service Learning \leftrightarrow Course objectives

- To instruct students in areas of mathematics that are related to the elementary school curriculum.
- To clear up common misunderstandings of mathematical concepts and results.
- To use current computer technologies with the concepts developed in the course as tools for problem solving.

MA 303 (Number systems for future elementary teachers)

Service Learning ↔ Gen Ed objectives

- Communication Skills
- Analytical Reasoning/Ability to make Informed Decisions
- Quantitative and Mathematical Reasoning
- Information Management/Technology skills (academic research and lifelong learning)
- Work collaboratively in diverse groups

Implementation Details

- Students worked in small groups; their work was supported via Blackboard's Group Pages
- Students cleaned-up and analyzed data; then wrote reports with their findings
- Students presented their work and findings. Excel extensively used.
- Their grade was based on the quality of their work

Student Reflections

“It taught me more about using programs like Excel – and that I can do it, no matter how hard it is.”



Student Reflections

- “The ability of learning information about something else”
- “Numbers are important to just about *everything* we do in life. Numbers can be valuable to people’s lives and people’s careers”
- “Helping each other with the work was a valuable lesson. It improved our communication and [teamworking] skills”

Student Reflections

“This will be very useful when we become teachers because we now know how to manipulate and examine vast amounts of data. In addition to expanding upon our mathematics skills, we also felt a great deal of accomplishment and pride in providing helpful information that will benefit our community”

MA 481/Probability and Statistics

Target

- Future Secondary Mathematics teachers

Service Learning task

- Statistical Analysis project –trade-off with a traditional exam
- Mandatory
- Students worked in groups organizing and analyzing data, assisting the math department in its assessment of MA-120

Community Partner

- Our own Mathematics Department

Implementation Details

- Students researched the web and brought back research papers connected to assessment and/or statistics
- Students read selected research papers: identified research questions, sampling and analysis methods; discussed and criticized the results
- Students were introduced to the assessment tool and data collected by the math department

Implementation Details

- Students identified the department's 'research question' as ***Are MA-120 students learning, understanding and recalling the curriculum?***
- Students draw connections between the questions in the assessment tool and
 - ✓ the course's learning objectives
 - ✓ the college's Gen Ed objectives
 - ✓ higher order thinking skills (Quellmalz Taxonomy)

Implementation Details

- Working in groups, students then cleaned-up data, entered data into Excel files, analyzed, produced graphs and charts, prepared a PPT of their findings
- A group leader served as the liaison between instructor and groups –transfer responsibility and accountability to students, created opportunities for leadership.
- Group work supported on Blackboard

The results

Linking Research and Practice

A service learning project for pre-service teachers

Samantha Aiello, Man Seng Lei, Yezi Li & Prestine Zainuddin

Annual Honors Conference
Queensborough Community College
April 18, 2008

Conclusion

- ▣ Students succeeded the most when the problem did not include analysis level of thinking and when the problem allowed them to check their answers quickly.
- ▣ Problems 2 and 3 required the use of technology (calculators) but it apparently did not have an effect
- ▣ The number of hours spent on each topic may have an effect
- ▣ The times in the semester when the topics were introduced and tested seem to matter.
- ▣ Does language matter?

Reflections

- ▣ It is important to conduct assessments
 - You want to make sure that the students are understanding the curriculum and to look for ways to improve teaching

- ▣ Conducting this assessment made us realize that there is more to the teaching profession
 - There is more than just a lecture
 - Research is needed and it should inform practice

Reflections

- ▣ We learned how to use excel to organize our data
 - Creating graphs and a 5-number summary
- ▣ Descriptive statistics was a totally new topic for us.
 - We are still in the process of fully understanding it especially how to use it to conduct research or analysis