



Social Sciences Invade Algebra! (S147)

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Abstract

- We explore the effectiveness of an anthropological lesson in numbers and number systems given to algebra classes by an anthropology faculty member.
- Examples will be provided and the presenters will discuss other possible interdisciplinary collaborations.



How it started

- Discussions at the 2010 Phi Theta Kappa Honors Institute among literature, math, science, and social science faculty on ways to blend lessons from different disciplines into other courses.
- The core idea was to get students to think outside of the _____ classroom, and see the connections among the various courses.



Implementation

- Our shared interest in each other's fields built the primary concepts.
- We wanted to explore ways to integrate anthropological views/theories onto the mathematics classroom to help math students understand the cultural context surrounding the development of the mathematical language.
- Two levels of algebra were selected as target math courses because algebra students often don't understand the relevance of math and algebra is a foundation for all other math classes.



Action

- We chose to concentrate on the concepts of zero and infinity as they relate to cultural developments.
- Both concepts seem elementary to us today in mathematical and cultural terms, but that has not always been the case.
- By using zero and infinity as the focus, we can draw upon two concepts that the students are familiar with to tie in culture and algebra.



Goals

- To get students to consider the importance, or lack thereof, for counting systems and how they develop(ed).
- To provide students with a cultural basis for the development of zero and infinity in the math language.
- To get students to start thinking about the cultural implications of mathematics.
- To provoke an interest in other cultural ties with mathematics.



Action

- On-site visits to algebra classes
- Presentations opened with some basics on counting, why numbers may or may not matter, and discussions on cultures which rejected or utilized zero.
- Tying the pieces together were short discussions on math in a few cultures and how culture and math reflect and shape each other.
- For example. . .



Who needs zero?

- Early hunter-gatherers?
- Nope.
- 1, 2, many (or much).
- **Baicairi** and **Bororo** (Brazil): 1, 2, 1 and 2, 2 and 2, “all in my hand,” many (or much)
- When goods are plentiful, you don’t need sophisticated numbers.
- For many, numbers and mathematics are akin to magic.



Student Engagement

- After brief discussions about early cultures, a little application.
- Students got to role play with a lesson on **generalized reciprocity**, an economic anthropology concept on sharing and giving.
- In most cultures, you can never have “nothing,” so zero doesn’t count.



Student Recall

- Measured via quizzes with questions drawn from the presentations.
- Class discussions to allow students an opportunity to see that zero and infinity as mathematical constructs are different than zero and infinity as philosophical (cultural) constructs.
- The two views complement each other.



Student responses

- Students were engaged and enjoyed the presentation.
- Students discussed ideas after class and for next few class periods.
- Subsequent class discussions of zero and infinity had more meaning for students.
- Students seemed to make connections between algebra and other disciplines more easily (example: extension from 3 dimensions to eleven dimensions, then infinite dimensions)



Future implications, Part I

- Expanded/enhanced vignettes on the topics for which students' want more information.
- Continued face-to-face presentations.
- Periodic Skype visits.
- Follow-up discussions in online course shell.
- Assignment of research projects based on concepts from this presentation.



Future Implications, Part II

- IVC presentations as follow-ups.
- Mathematical presentations in cultural anthropology classes.
- Actively pursue other course venues for collaboration.
- Other disciplines? Biology, chemistry, philosophy, theology, economics, political science...



“Anthromath” Project

- Challenge students (for extra credit!) to develop a 2 to 4 minute video presentation.
- Math students must focus on a cultural aspect of mathematics. Anthropology students must focus on a mathematics system from a particular culture.
- Research is a must.
- Used the Vi Hart Youtube math videos as examples.



“Anthromath” Project

- Requires students to go beyond the “normal” aspects of math or anthropology classes.
- Meets CCSSE guidelines for student engagement.



Questions?

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