

Disaster Modeling – Beyond the Numbers

Ben Galluzzo

Department of Mathematics
Shippensburg University

Joint Mathematics Meetings
January 6, 2011

Shippensburg University

- Pennsylvania state system
- Approximately 7500 students (6500 undergraduates)
- Nearly 150 math majors

Mathematical Modeling at Ship

The class explores how mathematics is used to interpret and solve real-world problems.

- Prerequisite: Calculus III or Elementary Linear Algebra
- Excel is used as the primary modeling tool.
- 24 students
- Two 75 minute classes/week are a combination of short (individual) one-day activities and longer (group) projects.
- A focus on communication of mathematical ideas.

“Experiential Learning Break” doesn't roll off the tongue

Alternative Fall Break

Motivated by the Deepwater Horizon oil spill, the goal of the 2010 Alternative Fall Break (AFB) is to provide Shippensburg University students, faculty, and staff opportunities to serve gulf coast communities while learning first-hand how the region has struggled in the wake of recent hurricanes and the the oil spill.

Alternative Fall Break

- Early October 2010
- Mississippi Gulf Coast near (and in) Biloxi
- 50 students

Math Modeling and AFB

To bring the trip into the classroom, the Deepwater Horizon oil spill was used as the theme for our first group project. Teams examined:

- The effect on tourism
- Oil and dispersant movements
- The effect on the seafood industry
- The impact on gulf flora and fauna
- Gulf water quality/characteristics (salinity, temperature, pH)

Real world modeling is hard

The Deepwater Horizon oil spill was a very effective project theme, students had to

- Define their problem
- State assumptions
- Develop a modeling plan

What oil? It's (almost) all about Katrina

Two students from the mathematical modeling class went on the AFB trip. While in Mississippi the AFB group toured the area and volunteered in the Biloxi community. Some activities included helping

- Environmental reconstruction efforts
- Home rebuilding
- local soup kitchen
- Children's fair

Home construction



Home construction



Trail reconstruction



Trail reconstruction



Beachfront beautification



Beachfront beautification



Qualitative data counts too

Following a presentation by our AFB “delegates”, changes were made and questions were raised.

- New hotels (casinos)?!
- Salinity and oysters
- Katrina? Really?!

What worked

- Increased student world view.
- Amplified the reach of the service project.
- Promoted group (and class) cohesiveness.
- Great example of complexity involved in “real world” modeling.
- Further established class credibility.

Looking forward

- Involve non-traveling students in pre-trip planning activities.
- Invite non-math students to share their experiences with the class.
- Starting point for interdisciplinary undergraduate research projects.

The End

THANK YOU!

Please feel free to ask questions now or to contact me later at:

bjgalluzzo@ship.edu