Consortium for Computing Sciences in Colleges

Making Interdisciplinary Courses and Projects Work

Panelists

Bonnie MacKellar (organizer)
Division of Computer Science, Mathematics and Science
St. John's University

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Dept. of Mathematics and Computer Science
Simmons College

Joan Peckham
Dept. of Computer Science
University of Rhode Island

Jesse M. Heines
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University of Massachusetts Lowell

Discussion Questions

1. Why would you do this?
2. How do you find the right person in the other discipline?
3. How much does each person need to know about the other's field?
4. How much work is it compared to developing a new course?
5. Should you sit in on each other's classes?
6. How do you ensure the integration?
7. What about grading?
8. What about how this counts in your teaching load?
9. What are the pros and cons of doing early vs. late in a student's life?
10. Will you cover more of less material than in standalone courses?

Consortium for Computing Sciences in Colleges

Panel Presentation

Making Interdisciplinary Courses and Projects Work

Jesse M. Heines
University of Massachusetts Lowell
Dept. of Computer Science

College of the Holy Cross
Worcester, MA

April 17, 2015

UMASS University of Massachusetts Lowell

Why would you do this?

"Once you graduate college you will never again work on a project of any significant size completely by yourself."

5

How much does each need to know about the other's field?

How much work is it compared to developing a new course?

7

How do you ensure the integration?

What about grading?

Scores from Jesse

Program:	9
Notes:	4
Reflection:	5

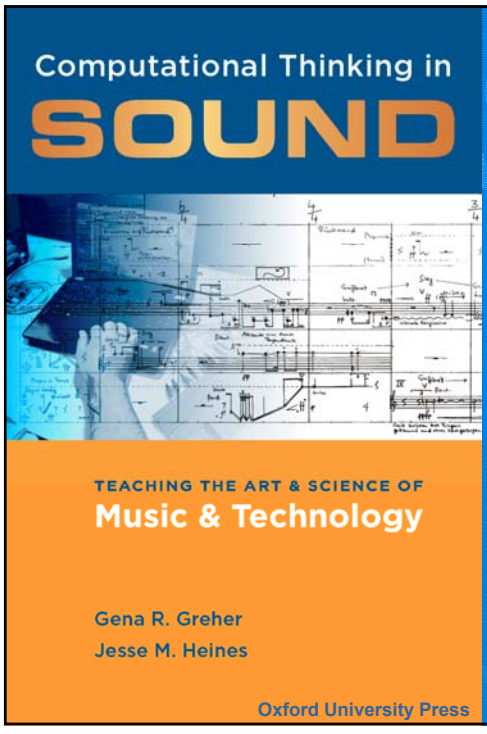
Scores from Dan

Program:	8
Notes:	5
Reflection:	4

Total Grade: 35 out of 40

9

What about how this counts in your teaching load?



thank you

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University of Massachusetts Lowell

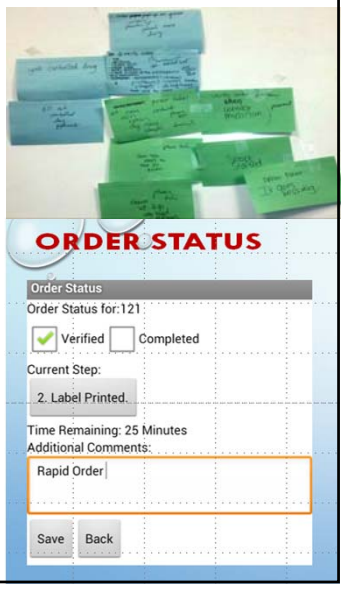
Panel Presentation: Making Interdisciplinary Courses and Projects Work

Doing it informally with an interdisciplinary mobile app project

Bonnie MacKellar
Computer Science
St John's University
Queens, NY

An Interdisciplinary Mobile App Project

- A collaboration between computer science, healthcare IT, and pharmacy students.
- I work with a pharmacy professor to develop scenarios that lend themselves to mobile apps.
- During the semester, the 3 groups of students meet to do a workflow analysis based on the scenario.
- Pharmacy students are 5th year and are not in the course.
- Students taking the course use workflows to design an app, which is then critiqued.
- The apps are built and demo'ed for pharmacy.



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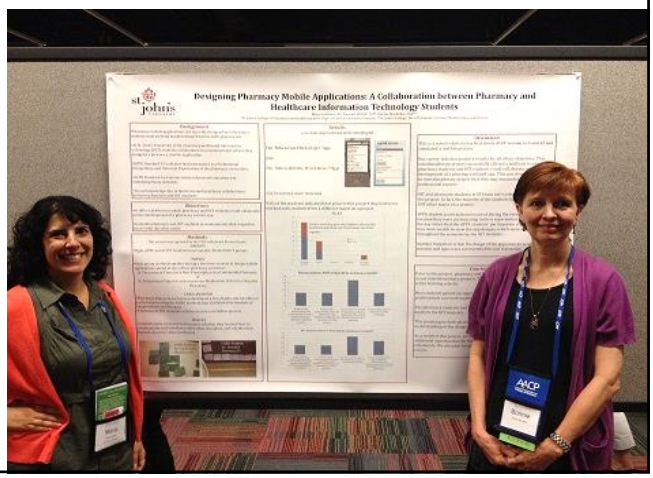
Why would you do this?

Faculty: innovative teaching projects may be useful for the tenure process
May lead to research collaborations



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Why would you do this?

Students: CS students need to learn to work with people in other fields? What about the pharmacy students? Surprisingly, they need to learn to work with IT projects; technology is included in the pharmacy curriculum standards.

5

How do you find the right person to work with?

- Each participant must be gaining something
- Need a way to find each other!
- Our university has a 2-year Teaching Technology program in which faculty from all departments meet on a monthly basis while working on a project – this is a goldmine
- Sometimes smaller, more informal projects are easier to fit into schedules

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How much does each person need to know about the other's field?

- Unfortunately, a fair amount
- Since a major goal of this project was for students to learn how to communicate with people from other fields, the students educated each other, and us.
- "I had no idea how much we pharmacists do!"

Making Interdisciplinary Courses & Projects Work

Joan Peckham
Professor & Chair
Computer Science & Statistics
University of Rhode Island

THINK BIG WE DO

No-Boundary (N-B) Thinking in Bioinformatics Research

Huang, et. al
BioData Mining 2013, **6**:19

- Moving beyond disciplinary boundaries
- Problem formulation (all-hands)
- N-B method
- N-B teaching and learning

URI Adventures in N-B Research & Education

- Graduate Bioinformatics Class
  - Team Teaching & Mentoring
  - Project-Based
- N-B Research Project
  - Multiple Disciplines & Institutions
  - Cognitive Modeling at the Core

Workload? What To Do?

- Find a great project
- It takes a village
- Find a great book (or papers)
- Structure deliverables carefully
  - For both class and research project
- Student responsibility
- Management plan!

Workload & Responsibilities

- Workload credit for teaching/research?
- Do you sit in on every class or research meeting?
- How much do your colleagues help?
- How much homework/grading (publication/student meetings?)

Integration?

Research Proposal & Syllabus
Students in the Process

Rise above the boundaries!
N-B problem definition!

Making Interdisciplinary Courses and Projects Work

Margaret Menzin
Computer Science
Simmons College

CCSNE April 2015

Example: A freshman course in bio-informatics

- Faculty: One biochemist and one computer scientist
- Pre-requisite: AP Biology in high school
- Syllabus:
  - *CS*: CS 1 in python, with an emphasis on pattern matching and a survey of data structures, databases, regular expressions, and big-O (3.5 hours/week)
  - *Biochemistry*: Articles on you and your micro-biome; annotating genes (2 hours/week)
  - *Integration*: Articles and discussion on philosophy of science, women in science, etc. & skyping with scientists (1.5 hours/week)

How do you find the right person to work with?

- What comes first – the topic or the person?
- Should your teaching styles be the similar or contrasting?
- Will both of you be equally engaged in the course?

How much does each person need to know about the other's field?

- Remember why you are teaching an interdisciplinary course! Possibly …
  - Because the material needs both halves
  - To teach more material more efficiently
  - Because that is how science is done
  - For fun
  - No matter what, you are not supposed to be equally expert in each other's disciplines, but the answers to "Why are you doing this" will determine how much you need to know.
- What is the least you need to know?
- Does it help if you know a lot?

How much extra work is this?

- A ton! - But it's worth it!
- The work:
  - Learning *something* about the other's field
  - The integration
  - A standard text may or may not work for you
- The rewards:
  - You learn new things
  - You get to partner with people who think differently from you
  - You get students excited
  - You get to be on a panel at CCSNE

What are the advantages of doing it early or late in the students' career?

- Early:
  - Turn students on to one or both disciplines
  - Best practices in retention
  - You tend to attract ambitious students
- Late:
  - Capstone experience
  - They are more prepared to work with others
  - They bring more knowledge to the projects

Will you cover more or less material than in a stand alone course?

- Surprisingly – much more!
  - You don't need to make up applications.
  - The other discipline may lead to interesting problems.
  - The other discipline may lead to insights in how to approach a problem.