Thursday Morning Breakout
Group 1

1. What teaching materials/learning resources are you currently using with your students?

Web CT, books, journals, texts. Customized texts – collect chapters from a variety of books/journals if no single text appropriate. Commercial software for design and simulation. Engineers able to use technology with text. PowerPoint presentations. Socioeconomic differences a factor. Technology not the be-all and end-all. Honors DiffEQ – students worked in groups, no textbook; notes and manual. Textbook of the future – same as now, but won't get used. Publisher reps in the future: adopt our learning environment, and we'll throw in a free textbook. Learning environments: physics suite, textbook one element, but not the center of the course, activities are the focus, read the text after the activities. Students want a textbook. Mathematica/spreadsheet calculations.

2. What do you know about your students' use of these learning resources and materials?

3. What is the current interplay between modern pedagogy and existing learning resources/teaching materials?

Good examples of effective marriage between modern learning theory and technology – mobile computing, clickers. Challenge is scaling, social and political barriers. Fundamental barriers in terms of our understanding of effective pedagogy, need to proceed cautiously. Physics – students come in with misconceptions, purge that misinformation, side effect is that they don't trust their intuition. Develop learning environments that blend these (refinement and reconciliation). How do you get intuition to match the physics that students are learning? Integrate new technologies slowly in order to study implications. Clickers not used for assessment, used for feedback. Need individualized materials. Takes time to bring active learning into the classroom, new faculty members largely not guided in terms of curriculum development/pedagogy. Need to change evaluation criteria for faculty (research and teaching). Promotion and tenure process looking more favorably on education research. Learning curve for older professors regarding technology; new faculty under huge pressures for funding, publishing. Newly tenured faculty may be a good target. Difficulty at R1s. Innovation regarding pedagogy not valued.

4. What roles do textbooks play in student learning?

5. How are publishers and educators using what we know about student learning to design effective resources/teaching materials?

Research Question: Are there differences in learning and usage when using a printed text versus an electronic text?

What Teaching Materials/learning resources are you currently using with your students?

- Animations - watching and building
- Physical models: Cake and Brownies
- Textbook/internet as reference
- Problem-based models
- Case study teaching
- Real-time data
- Engagement from things around you
- Demonstrations / student-built experiments
- Construction toolkit (LEGOs, Clay, etc)

Have kids develop teaching materials

What do you know about your student's use of these materials?

- Different kids using them differently
- Wide range of approaches for kids
- If optional and expensive - they will not use it
- Engagement increases with wide range

Prefer to use the tools they already know

What roles do textbooks play in student learning?

- Standardization of vocabulary, images, concepts
- Disposable textbooks - ask them to annotate / draw in textbook
- Backup information / resource
- Read ahead - come prepared - test with pretest

Does textbook design lend itself better to a teacher-centered classroom?

General comments

- Need some lecture
  - Set stage / case studies / how to argue
- Future
  - iPod

—Cell phone

- Take time in class to “learn a foreign language”

- Usability studies

Have them speak aloud / make presentations on material

- So excited that it becomes a hobby

- Want students to come into class with some content knowledge (from reading, experiment, watch a movie, etc)

Need faculty innovation and freedom

Group 3
Morning Questions

1. **What teaching materials/learning resources are you currently using with your student?**

Variety: animations, case study downloads, overhead as a blackboard
Learning objects combined with textbook, designing and building

Is what's being learned new knowledge or old knowledge?
Challenge is making new knowledge accessible

Howstuffworks.com

Textbooks turn over for new information

Having students ask their own questions. Getting them to do real science. Process drives content. Using mostly secondary sets of data. (AP Biology and Genetics)

Labs, card sorts, handheld molecules, worksheets

2. **What do you know about your students' use of these resources and materials?**

Strong convergence between teacher and student perception means improved performance

If student perceives what it is that they are learning matches what the teacher is doing, student performs well

Strong link between teacher and textbook, big gap between students and the textbook

Students use the resources to get an "A" – students are extremely good at matching patterns, not the same thing as understanding

The textbooks don't help you determine what is important, can't tell big ideas from details

3. **What is the current interplay between modern pedagogy and existing learning resources/teaching materials?**

Is there an agreed upon role of the textbook and the teacher? Are they on separate footings or equal footings? (College: mostly teacher, K-12: mostly textbook in some states, in others it is the textbook)

Textbook doesn't provide a plan for how to teach the materials

Curriculum development is hard.

Teacher and peer convergence is also needed. We won't move forward until we are willing to revise and improve.

Motivation of the students: What role does this play?

Motivation research: Giving students choice in each piece of the learning cycle.

4. What roles do textbooks play in student learning?

We need to ask what we ought to be teaching.

Everybody used to feel okay about learning the basics, then looking at applications
But it used to be a giant sorting system

Like them as a reference. They just need to be written better from the perspective of the student as a learner.

It is appealing that you can write a textbook for a mixed crowd. Use technology to create links that are of interest to student.

Student choice is important. Some like to read.

Effective illustrations in textbooks.

Ultimately need to know the learner

Role of tests as instructional material

Group 3
RESEARCHABLE QUESTIONS

To what extent does convergence of student-teacher perception of the role of the textbook improve educational outcomes?

What resources are enhancing learning outcomes?

In the decentralization of the teacher and the textbook as the ultimate authority, what are the implications for teaching?

THURSDAY Morning – BREAKOUT GROUP 4

Dave – NSF, NC Central U., cognitive psy.,
Mordeki – American Museum of Natural History, earth and space, adj. Columbia U., PD of teachers, museum educators,
Diane Witt – NSF – behavioral neural science, Bingham U.,
Jill – NSF, program director for diversity and education, marine geologist, UW, UH researcher
Lee – Hampshire College, computer science prof., AI, cognitive science dean, evolutionary computing

What teaching materials/learning resources are you currently using with your students?

- Everything and all things
- Depends

What do you know about your students' use of these learning resources and materials?

- Everything needs to be local, relevant to individual student
- Use follows engagement
- Different audiences require different materials
- Informal exhibits and shows useful for provoking discussion
- Students need incentives – cash prizes from publishers to students for using Web site
- Incentive should be intellectual engagement

What is the current interplay between modern pedagogy and existing learning resources/teaching materials?

- How to integrate accountability/assessment with critical thinking

What roles to textbooks play in student learning?

- One-stop sequenced bundle for teachers

How are publishers and educators using what we know about student learning to design effective resources/teaching materials?

- Metadata
- Ability to search
- Semantic web
- Need for publishers to transfer into different technical environment – traditional publishers evolving or new publishers coming to the fore

- Will educators become “publishers”? One-stop bundle. Can you have it both ways? Textbooks need to be reconfigurable. “Take the songs rather than the album.”
- What is the demand side? Limited by local demands.
- Everything needs to be local

TESTABLE HYPOTHESES/RESEARCHABLE QUESTIONS

- Assessment of critical thinking
- Cost effective way to measure

Thursday morning breakout group – the current state of learning resources.

1. **What teaching materials & learning resources are you currently using?**
The students' needs have to be taken into account. E.g. premed biology students need to learn a lot of factual content. The textbook would be important to this mission.

2. **What do you know about your students' use of these learning resources and materials?**
- Concern about standards and effective uses was expressed by Noah.
-We agreed that Tom Banchoff's students do use the technology effectively – looking at each other's homework. Tom uses technology to get into students' lives. It creates social networks.
- We decided that his homework system had pieces of Critical Peer Review and Just in time teaching.

3. **What is the current interplay between modern pedagogy and existing learning resources and teaching materials?**
Can we elicit principles for how to use modern technology effectively?
How we use various technologies is very important. There is no teacher proof technology or curriculum.
Different learning styles also mean that there may not be one best answer. Two additional points here: most students can learn from multiple representations, and as students mature their preferred learning style may change.

Are technologies designed ergonomically both physically and intellectually.
Labs are important in many disciplines and lab manuals are still the standard for getting students started.

4**. What roles do textbooks play?**
We agreed that the textbook is still a key learning resource. It is a good source of historical understanding of the growth of the discipline. [And print media is still often the preferred version of reading matter.]
Steve Rasmussen thinks the published textbook is the "900 lb. Gorilla" in most classrooms and that we should think about its powerful influence.
Now blackboard is the 900 lb. Gorilla.
Steve: interesting example of a company "Textcentric" that was essentially modular and could be disassembled and reassembled, with the addition of markups for users. Sounds like open source software.
Noah: This allows you to adapt rather create. Allowing post-secondary faculty to adapt is a key driver. Asking them to create de-novo is unrealistic.

5. **How are publishers and educators using what we know about student learning to design effective resources and teaching materials?**

Blackboard is an example of investment in electronic resources – it is a shell in which individual faculty are expected to put their resources. Now most faculty are seeing the electronic world through the eyes of blackboard.

Another example is the PPT based lectures – which we know are generally not very effective except as organizing devices.

Noah: What are the driving factors that spread effective technology.
Terry: Opportunities to create your own stuff and try it out with your students is a good way to learn. In other words, faculty development is a key driver.
Kurt: Collaborative learning is a way of making this safer.

Steve: I work a lot with math and statistics technologies. … Ultimately we think it is really empowering when students can use and build on faculty software.

Breakout 1 Group 6
Ebert-May facilitator
Hall – recorder

1. What teaching materials / learning resources are you currently using with your students?
Goal – resources will educate and motivate students to take responsibility for their learning.

Testable hypothesis – It does not matter what the materials are, if you have a learner centered course.
Materials must focus on the learner and student learning.
What the materials should be comes secondary to ensuring that they are learner centered.
Can we design materials that help the teacher learn to be learner centered?

Discussion of teaching organic chemistry.
Can learning materials walk students through their prior knowledge to set the stage for new learning?

Testable hypothesis – Materials can help a teacher develop a learner-centered classroom.
Testable hypothesis - Knowledge probing exercise can tell the student and teacher where have the learners been and what their starting point is for new learning.

Role of learning styles? What are the ways you learn best? What are things that impede your learning? How effective is student reporting of their learning styles?

Seeing one person's model supports others in creating their own model. Learning resources should allow students to create their own model.

Learning resources must provide mechanisms for identifying student understanding/deep learning and misconceptions.

Resources should show that there are lots of things we do not know and should also reveal how we do know the things we know.

References of interest
King, P.M. and Kitchener K., 1994– Developing reflective judgment.
Elaine Seymour – Talking about leaving. Relationship of professor to student is number one criteria for staying or leaving.

What do you know about your students' use of these learning resources and materials?
Peer teaching and seeing other examples of how peers understand or know information, often allows students to better form their own representation of knowledge.

Textbooks can slow learning down.

Students are starting to construct or assemble their own resources. Providing guidance on how to do this more effectively is a role for instructors. Students can become sources of good information back to the class and instructor.

Students need places that are peer reviewed and safe for gathering information. Or they need to learn to be discerning consumers.

What is the current interplay between modern pedagogy and existing learning resources / teaching materials?

New materials are coming out that integrate modern pedagogy with some success. Technology can seduce instructors to begin learning about the pedagogy and conducting research on student learning, to really make use of the technology more effective.

What roles do textbooks play in student learning?
Homework source.
Reference material.
To fill in the blanks in knowledge.
Caveat, to be effective, the students must have purpose in their reading efforts beyond just completing the book. Again, they must take responsibility for their learning.
Concern, in hot topics books are out of date or limited in extent.

How are publishers and educators using what we know about student learning to design effective resources/teaching materials?

Testable hypothesis - Faculty drive the textbook market, thus innovative faculty could drive a new textbook phenomenon.

Publishers use pedagogy as a marketing tool.

1. Teaching-Learning Materials
   - Course website
   - Simulations
   - Visualization environments
   - Clickers
   - Texbooks
   - On-line homework
   - Email, chatrooms, discussion groups
   - Course-management: Blackboard, WebCT, Moodle
   - Podcasts
   - Ilabs: remote experimentation

2. What do you know about student use?
   - Some people have complete database: e.g., capture time when students submit homework
   - Challenge to capture information on diverse student use
   - Time on task?

3. Current interplay between pedagogy and existing resources?
   - JITT
   - Peer instructions
   - Cooperative learning
   - Guided inquiry: e.g. POGIL

4. Textbook roles in student learning

- Narrative, structure: helps students organize knowledge structure
- Read before class
- Resource to solve homework problems
- Will textbooks evolve to guidebooks + on-line resources?
- As studying resource to prepare for exam

5. How are publishers and educators using what we know about student learning to design resources?

- Some publishers are doing interesting things: e.g., CD-roms, proprietary websites.

Bancroft: rapid change – 2003 – 2004: students' work public – privacy. Students creating own visualization.

Testable Hypotheses, Researchable Questions

Textbook as ***scalable*** guidebook:
Analogies:

- travel guide analogy: start with outline
- Museum, horticultural guide, zoo

Can a guidebook outperform a traditional textbook?
Methodologies:

- Final exam
- Marketplace: will it propagate?

What are the factors driving successful dissemination?:

- Economics
- Measurable success
- Overcoming pedagogical inertia – finding acceptable pathways to change
- student reaction