

Black Table

Q1) How do students learn?

By observation we know that they have multiple styles –visual, haptic etc.

Quality better if engaged – Engagement can be even if listening to lecture

Most of us were taught this way, but we were not turned on this way

Collaborative learning in small classes.

They get up to the board and argue their case. Two factors 1) Always get called upon 2) Liked to do this.

Students work together in groups of 4 – spend 10 minutes working and then come to the board.

Students' learning methods are often counter-productive. Been successful with it in the past e.g. recall facts. They frame this situation accordingly. So takes negotiation to alter learning styles. Help students do other things – develop a different set of learning resources.

They do this naturally – focusing on certain things, and then collapse into a state of learning

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Q2)

All have changed due to technology.

Make professors more accessible – more individualized

Cognitive tutors – individualization.

Allows students to ask stupid questions and remain anonymous

Resist posting lectures on the web b/c otherwise they don't come. But give some materials online.

Scan in notes on tablet PC or elmo

Collapse feedback loop – real-time assessment.

Can project student work – share on elmo

Use of clickers – don't tell answer. Send message as to what is possible.

Remote lectures/labs

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Q3)

Technology helps emphasize that process is more important than product

Frees up cognitive resources that can be used to solve complex problems.

**White Table****Norris: facilitator****How do students learn?**

Lee: when they are engaged.

Harry – is there difference between engaged and active?

Lee: not the same – active is a good way to get them engaged.

Lee: framing their own questions, inquiry, narrative evaluations, own curricula

Can't see them – mentally engaged, not necessarily physically engaged.

Café scientifique – current issues talk about science.. high school 13-18. holding focus groups. Dialogue around the table.

Are they not learning if they aren't engaged?

Kathleen – shy, sitting back; but still engaged;

Cathie: oriental students sit quietly - -then say something very interesting. Mentally engaged;

Michelle: Native American didn't say much; but listened.

Harry: active – passive continuum. Good questions – have students generate questions.

If don't have a question, must not be listening.

Harry: process oriented guided inquiry. Minimize lecturing. Previously prepared materials; small groups;

Cathie: they are giving you the scaffolds to engage the students. Difficult to generate the materials.

Lee: get the students to generate the questions –

Harry: organic chemistry- hard to expect kids to come up with questions.

Cathie: some subjects lend themselves to kids coming up questions.

Lee: not sure if that is true

Michelle: read journals; learned a lot. From reading.

Cathie: technology share event – new york; microwave children.

Kathleen: everything done in a minute.

Harry: cell phone plus ipod

Cathie: getting them to read a static book.

Lee: have the kids read the journal articles – don't know the vocabulary; get the students to care about it. Learn how to read it. Get freshman to do that.

Lee: luxury – don't grade. Microwave – instant gratification.

Harry - giving the kids a puzzle;

**HOW has your teaching in response to changing technology.**

Bob: define technology; digital technology;

Harry: advanced. High tech instrumentation – decades ago were expensive; but can bring it the classroom now. Students can get high quality data;

Bob: low cost accessible.

Cathie: have you seen changes in Maine;

Bob: remarkably little. Trying to come up with more authentic assessment items.

Kids are not using technology; teachers not using tech not taking advantage of it. Hands-on. Just buying the computers isn't enough.

Kathleen: teachers teaching out of field. Ill-prepared.

Michelle: ill-prepared for technology

Bob: what is the software; not statewide. But purchasing the computers is statewide.

Harry: teaching the teachers is more expensive; doing the human stuff is a long hard...

Bob: less to do with technology then with changes in practice.

Michelle: story: \$5m.. bought computers; office; half-a-day training.

Cathie: Penuel report... 1:1 laptop – word, homework assignments, browser; email program.

Michelle: put together podcasts; webcasts; out of 18 students only 1 know what a podcast knows. No clue about webcasts. But all had cell phones.

Cathie – free lunch programs, but have cell phones

Lee: changed teaching over the last 10 years; live simulations (too slow 10 years go); live use of the web.

### **Have the goals....**

Harry: not much – my goals – critical thinking.

Michelle: new skills to get that critical thinking

Learn the appropriate technology to do the jobs.

Kathleen: get critical information. Getting students to access critical information. Before sun workstation; now laptop. Rapidity of change. How to accommodate the every increasing change.

Cathie: goal is the same; teach the students new skills

Lee: student asks a question; unplanned for events. Email – goals for what happens in class has changed; boundaries have broken down.

1. Understanding the aggregate population  
do a few individuals drive this understanding?  
They learn a variety of things in a variety of ways  
Timing of learning, evening or morning  
Long problems, short problems  
Prior knowledge is important

2. no data

3. Goals are the same, but achieved differently  
whatever you can do well or want to do well, technology can help you do it better  
computer facilitates sharing and documentation  
social structure change/time and space shifting  
technology is the means not the end  
bringing visuals into the classroom  
access and manipulation of data  
information access  
competitiveness allowed by technology

## Question 1.

## Question 2.

Technology is more than the computer; it's only one tool.  
Brought more exciting, non computer based work into the class.

**Technology is empowering to the student; students can do only what experts did before; what was done in graduate school can now be done in grade school.**

Do we need the text in this era of high tech? Do we know how much the students are learning thru this if we put complex content in early grade levels?

Live simulations are new

## Question 3.

Technology can help you do what you do well better or things that you care about but were time consuming/difficult you can now do.

Goals may be "higher" than previously because of technological advances.

Are textbooks and new technologies actually age appropriate? This can go both ways – up and down.

Textbook is static, linearly organized

Technology allows many more trajectories allowing more student choice in direction; technology is so much richer than books.

Technology allows one to be much more learner-centered.

Finding information is now easier allowing quality of content to go up; easier finding than library.

Problem: how do you differentiate the garbage from the good on the web; upper division students may do better than intro students

**How do we train students to use the web well and discriminate good from bad as well as figure out how to data mine to do science on the web; example = find most distant galaxy known today, first answer they take. This is critical thinking skill....but reflects dynamism of science..this is a major contrast to the textbook. Segway to "about science". What does this tell us about how the textbook works or doesn't.**

Text book and lectures is the traditional way students are introduced to materials  
New ways, primary literature, models

**Do we understand the relationship between the old ways and new ways? There are issues of timing and relevancy – what gets in textbooks is not cutting edge, changing science but the established “facts”**

Linear vs non linear textbook; **technology could make the text more flexible** but some still use the books

Can we study failures to learn what works. Do we want to do away with lecture/textbook, has built in reflection and thought.

Technology allows new forms of engagement and expression.

Students take and post notes to website allowing a variety and diversity of views/ it's shared.

Accessibility and universal design – how does the textbook shape up?

How do we balance the costs of technology with other costs.

How does the library fit into modern student experience? Students don't go...if literature isn't electronic people don't see it....

Kurt – people who spend time on line

Text book is an historical artifact, cooperate ownership

Google is good at getting quick answers but maybe not in depth...accessible, then you need to go deeper, the library or the text to know more in more traditional ways.

Adjacency in library or textbook is important...for finding material

Are students ready to read long text and absorb? Is this a cultural difference?

**Does it have to be a book or Google or can one GET information from either other...USEFUL DISCUSSION**

The sorting aspect of a text, condensed to what's important! NOT GOOGLE

## Dinner Questions – Yellow Table

1. What do you know about how your students learn?

Use of clickers. Exploring who I am as a learner – i.e. knowing that students need to do something physical/active every ten minutes. Use engineering design as a way of learning (Can I drink the water in the creek versus what do I have to do to be able to drink the water in the creek?) Well-chosen questions require students to learn a lot of science. Observe how students go through learning cycles – easy to see lots of things, not so easy to figure out what to do about it.

2. Has your teaching changed in response to changing technology? If so, how?

Laptops, PDAs in classroom. Students take tests with iPods in their ears. Takes more time for faculty to learn new technologies than for students.

3. Have the goals you set for yourself as a teacher and your students as learners changed in response to technological advances? If so, how?

Use as many animations, graphical representations, and interactivity as possible. Tools provide a glimpse into a world that can't be seen in chemistry. Teach things to audiences that you couldn't reach before (teach physics concepts without mathematical underpinnings). How to help students evaluate good content from bad on the web? Help students determine appropriate tools for problem solving.