Automatic homework:

- The benefits of using Excel and VB Scripting to make homework that grades itself

(And how it can work for you!)

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Why give homework?

Large body of research from 70s & 80s

- Shows small but consistent finding that time-on-task is positively correlated with achievement

Brophy & Good (1986)

- Redundancy enhances learning

Cotton (1989)

- Summarizes research that shows increased time benefits everyone, but lower-ability students benefit disproportionately more
- Decreases anxiety for highly anxious students

Why give homework?

Kulik & Kulik (1991)

- Meta-analysis of computer-based instruction
- Found drill-and-practice exercises effective at all ages, K-College

Walberg, Paschal, & Weinstein (1985)

- Homework increases learning, graded homework *greatly* increases learning
- Frequent homework better than sporadic or infrequent homework

Dempster (1988)

- Cites over a century's worth of research that demonstrates the unequivocal benefits of spaced practice

Why give homework?

Shields & Gredler (2003)

- Improves problem-solving skill
- Scaffolding of increasingly complex problems

Thompson & Zamboanga (2003)

- Knowledge students bring into classroom predicts achievement in Psych 101

Why give homework?

Other benefits:

- Acknowledges different learning/testing strengths
- Allows students to extend knowledge
- Increases knowledge of student difficulties
  - Individual students
  - Common issues for class
- Low-pain way for students to monitor studying effectiveness
  - Gurung (2005) - monitoring one of the most effective, but least used study technique.

Okay, I'm convinced, but …

Increased demands (i.e., research, administrative tasks, committee work, etc.) have reduced the time I devote to teaching. Who has the time for an extra like homework?

Time to:

- Create meaningful assignments
- Distribute them to large classes
- GRADE THEM - AAAAAHHHGG!

The solution…

Create your own.

The practical criteria

- Low time & effort requirements for creating, distributing, grading, and returning
- Couldn't require large investment in programming knowledge
- Couldn't require special software for students
- Should look familiar to students
- Should be easy to modify/re-use
- Answers should *not* be hackable
- Should be platform independent

The pedagogic criteria

- Short - 10 to 20 items
- Any “objective” item
- Connected to classwork
- Re-takable
- Problem solving *OR* pretesting
- Immediate feedback (or at least pretty darn quick)

Why not use web-based tools?

If you can program in VB, you can sit at the cool table in the Faculty Dining Room.

```
Set objExcel = CreateObject("Excel.Application")
Set objWorkbook = objExcel.Workbooks.Open _
    ("C:\Scripts\New_users.xls")

intRow = 2

Do Until objExcel.Cells(intRow,1).Value = ""
    Set objOU = GetObject("ou=Finance, dc=fabrikam,
dc=com")
    Set objUser = objOU.Create _
        ("User", "cn=" & objExcel.Cells(intRow, 1).Value)
    objUser.sAMAccountName = objExcel.Cells(intRow,
2).Value
    objUser.GivenName = objExcel.Cells(intRow, 3).Value
    objUser.SN = objExcel.Cells(intRow, 4).Value
    objUser.AccountDisabled = FALSE
    objUser.SetInfo
    intRow = intRow + 1
Loop

objExcel.Quit
```

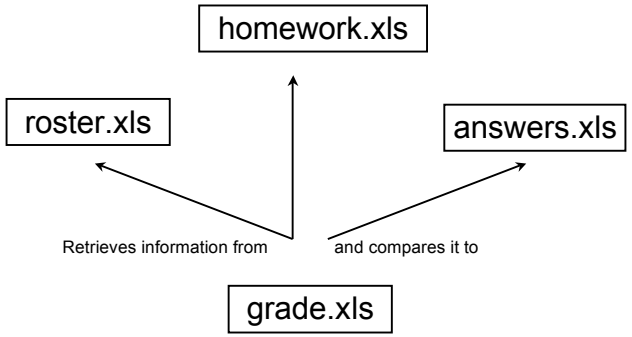
Why not use web-based tools?

- More control
  - Formatting
  - Delivery
  - Partial Credit
  - Pictures
  - Responses
  - Questions

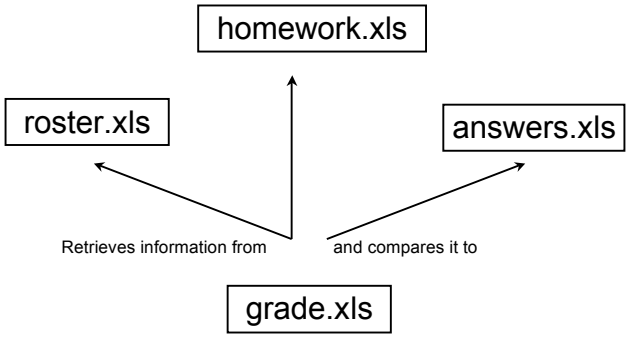
Why not use web-based tools?

- More control
- Ease of use (for instructor - almost everyone is familiar with Excel already)
- Integration with gradebook
- No online access necessary (once retrieved)
- More reliable - no universal system downtime

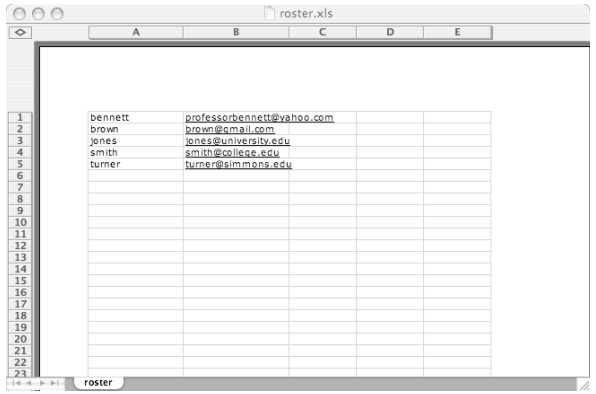
How It Works: The Modules



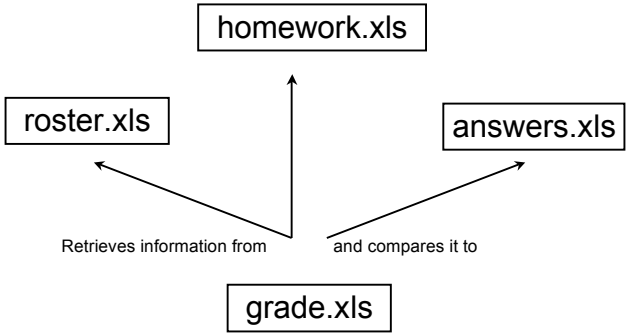
How It Works: The Modules



The Modules: Roster



How It Works: The Modules

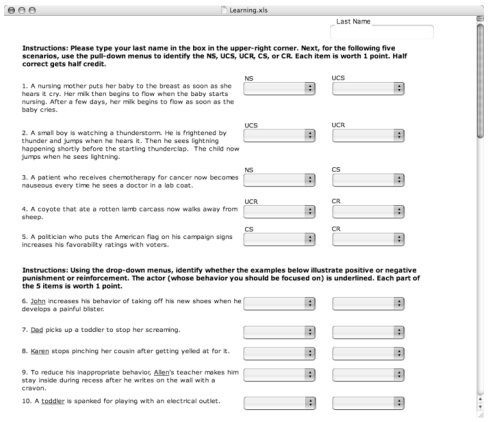


The Modules: Homework

homework.xls

Two worksheets
- The questions
- The responses
- Linked by forms

The Modules: Homework



The Modules: Homework

4. A coyote that ate a rotten lamb carcass now walks away from sheep. UCR CR

5. A politician who puts the American flag on his campaign signs increases his favorability ratings with voters. CS: Politician CR: Voting

Instructions: Using the drop-down menus, identify whether the examples below illustrate positive or negative punishment or reinforcement. The actor (whose behavior you should be focused on) is underlined. Each part of the 5 items is worth 1 point.

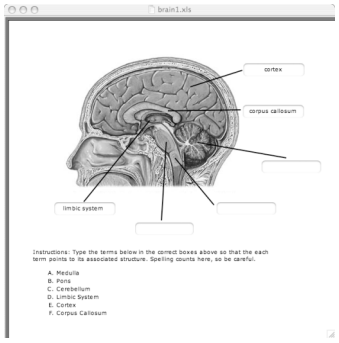
6. John increases his behavior of taking off his new shoes when he develops a painful blister. Negative

Punishment
Reinforcement

7. Dad picks up a toddler to stop her screaming.

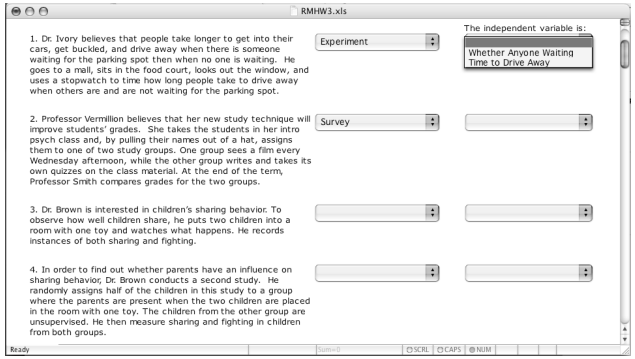
The Modules: Homework

- Graphics
- Fill-in-the-blank items



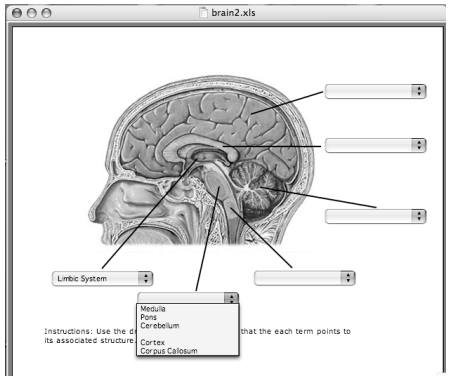
The Modules: Homework

Conditional branching - questions



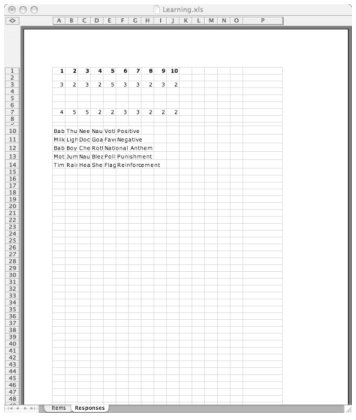
The Modules: Homework

Conditional branching - answers



The Modules: Homework

The Hidden Worksheet



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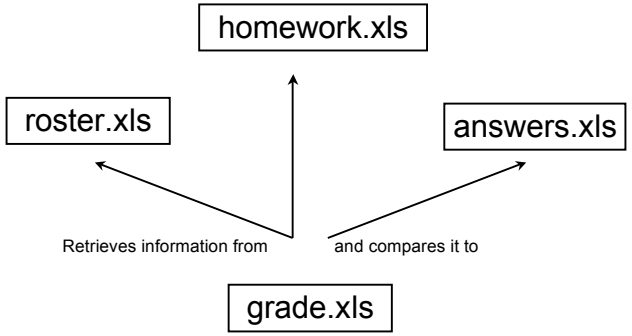
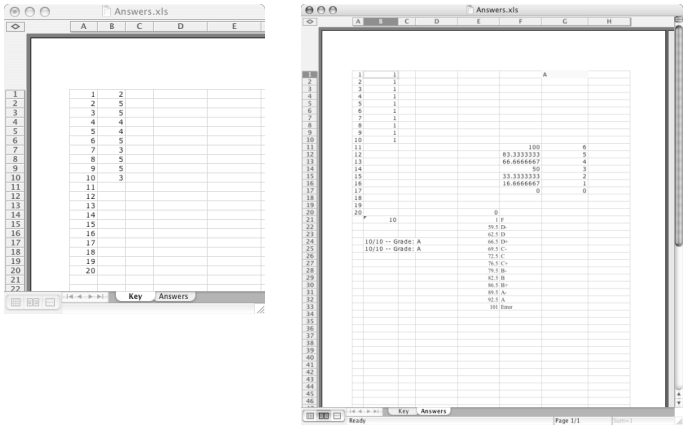
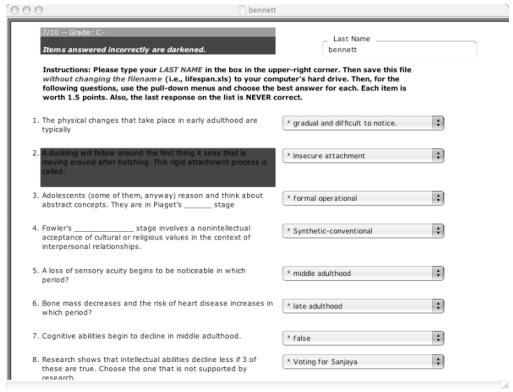


The Modules: Answers

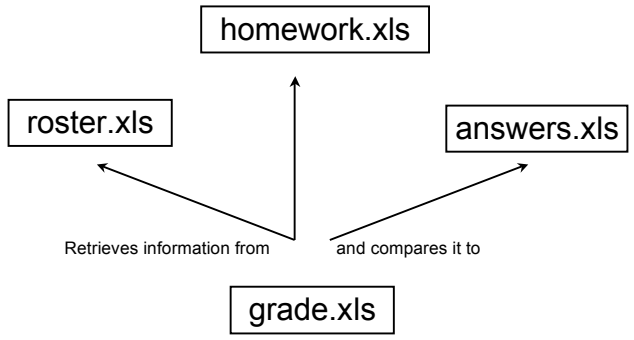


The Modules: Graded Homework

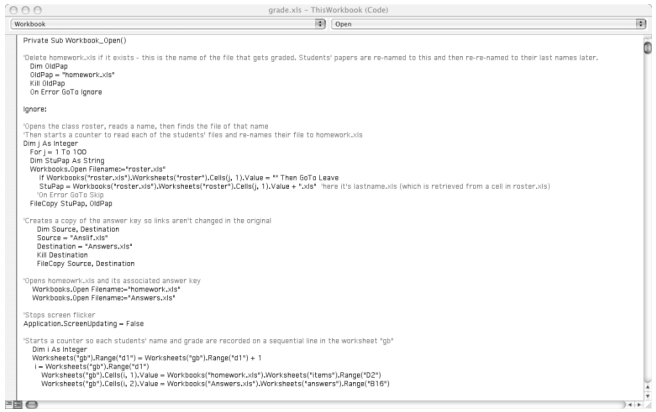


Feedback lets students know *which* items they got wrong, but not what the right answers are - this allows for re-submitting and re-grading

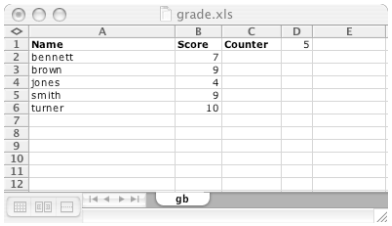
How It Works: The Modules



The Modules: Grade - The Engine



The Modules: Grade - The Gradebook



Evaluation

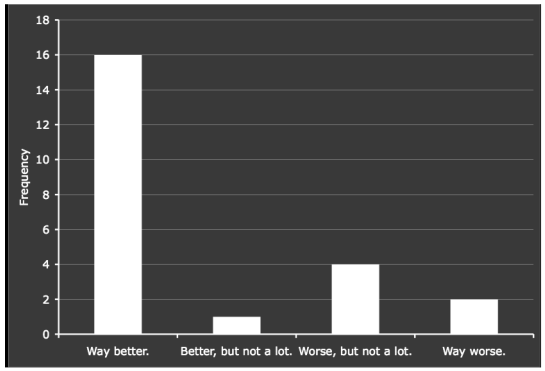
- Didn't evaluate learning
  - presumed - enough research
  - (almost)
- Is it practical?

What did the students say?

- Two brief surveys
  - 23 students from Chicago with a semester's experience with the format
    - In-class quizzes vs. electronic homework
  - 32 students from Boston with one experience (and no graded feedback)
    - Paper homework vs. electronic homework

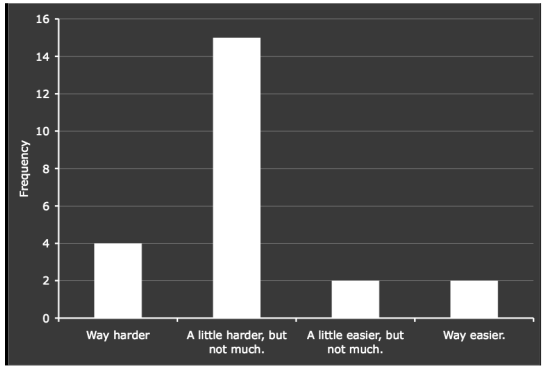
What did the students say?

Compared to the in-class quizzes, I like the format of the homeworks…



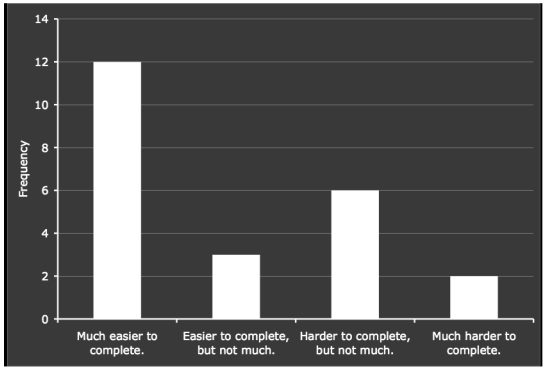
What did the students say?

Compared to the in-class quizzes, the *questions* (i.e., the content, separate from the format) on the homework was…



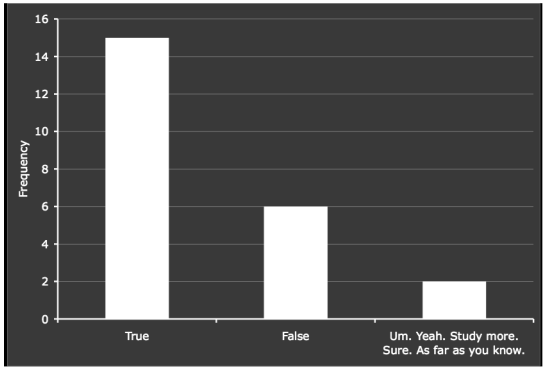
What did the students say?

Compared to the in-class quizzes, the homework *format* (separate from the content) was…



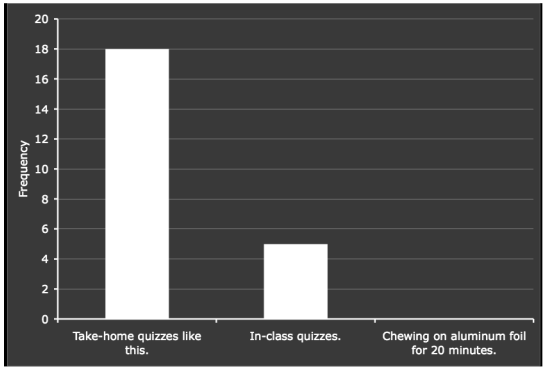
What did the students say?

True or false: the homeworks led me to study more?



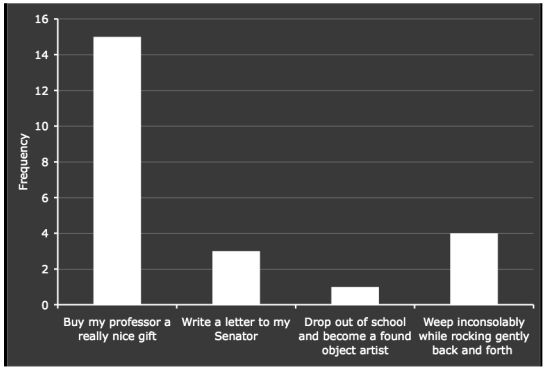
What did the students say?

If I got to pick, all of our quizzes would be …



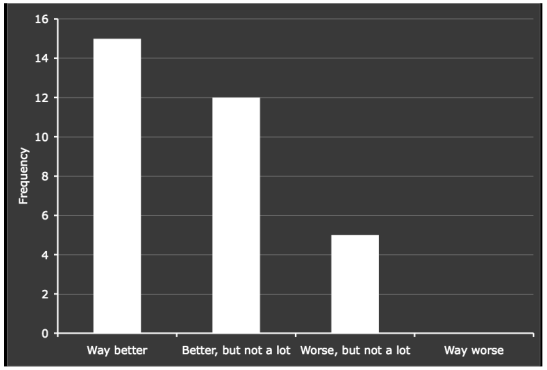
What did the students say?

If this class had only this type of quiz I would:



What did the other students say?

Compared to the paper homework, I like this format …



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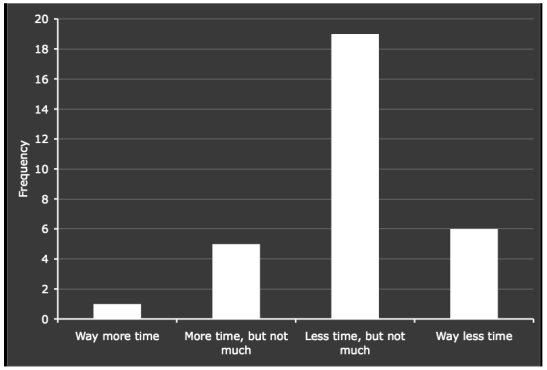
Compared to the paper homework, this format took…



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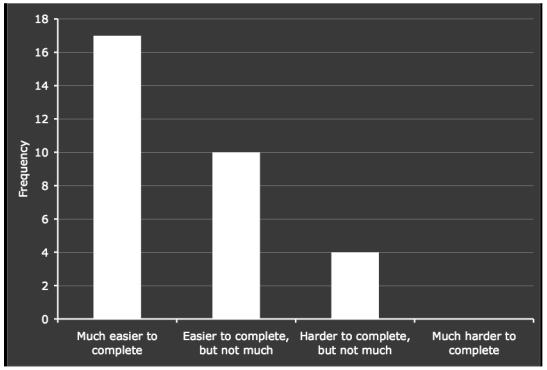
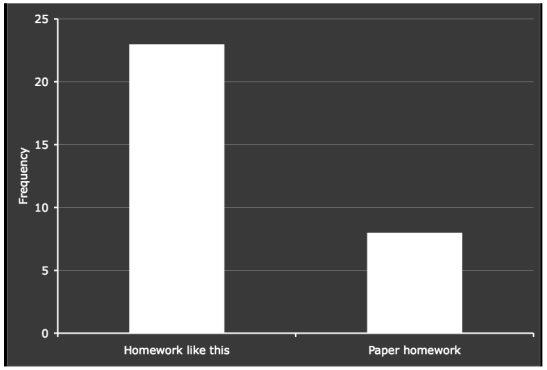


What did the other students say?

If I got to pick, all of our homework assignments would be…



What's the bottom line?

- They like the format
  - Even though the items were harder
  - Even though they have to study more to do well

What did you like about the way the course was taught?

I enjoyed that it was interactive. I liked the clickers & the homework. they were both a helpful way to increase my understanding of the material

What's the bottom line?

- They like the format
  - Even though the items were harder
  - Even though they have to study more to do well

How do you think the teaching in the course could be improved?

More homework assignments

-Homework on excel were good and did help on material we were learning in class.

I also thought the excell homework assignments were beneficial, the really made me learn the material & I thought there should be more of them.

What's the bottom line?

- They like the format
  - Even though the items were harder
  - Even though they have to study more to do well

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Not Applicable
The course assignments contributed to my understanding of the subject.	0.0	0.0	2.6	47.4	50.0	0.0
n = 38	Mean: 4.47/5	SD: 0.56	Mode: 5/6	Rank: 7/15		

The Reality

- How long does it take?

The Reality

- How long does it take?
  - Creation 30 minutes*
  - Collecting 14 minutes**
  - Grading 3 minutes
  - Distributing 10 minutes**

  Total 57 minutes**

Practically speaking, work time is independent of the number of students in class.

The Reality

- How long does it take?
- Some problems arose

The Problems

- Following directions
- Technical knowledge
  - Occasionally, no attachment
  - 1-2 Blank .xls files per assignment
  - 1-2 .html files as attachment
  - 1-2 undecodable files as attachment
- Each problem decreased over time

The Problems

An opportunity for learning

Last Name

Instructions: Please type your *LAST NAME* in the green box in the upper-right corner (your name will appear in white letters). If you can't see the green box, then use the right arrow key on your keyboard or widen the window by dragging the lower-right corner to the right.

You forgot to type your name in the green box!

Almost finished. Double check that all of your responses are within the boxes' outlines. Please save this file again (DO NOT change the filename - continue to use your last name - e.g., smith.xls), then send it as an email attachment to me at turnerg@simmons.edu by midnight tonight. You should CC yourself so that you know the attachment was sent, then open the attached file to make sure it was saved and sent successfully.

Potential Problems

- Cheating by collaborating
- The digital divide
- System failures & due dates

Other Potential Benefits

- Self-correcting exams
  - Joann Montepare - (2005) APS Observer
  - DesRosiers & Johnson (2008) - "Requizzing can be tedious."
- Partial Credit
  - Epstein et al. (2005)

Other Potential Benefits

For each multiple choice item below, choose the best answer from among the four choices by typing a "1" in the box next to your choice. Each correct answer will receive 2 points. If you like, you may write a "2" in the box next to the answer you think is second best. If your first choice is correct, you will receive 1.8 points. If your second choice was actually the correct answer, you will receive 1 point. The other two (or three) boxes should be left blank. If a box turns red, that means you've either typed more than one "1" or more than one "2," or you've typed something other than a "1" or a "2." You should fix your mistake (you can always delete what you've typed).

1. The superimposition technique is used to study:

- working memory.
- episodic memory.
- immediate memory.
- sensory memory.

In Sum: Automated homework can be used as a

- way to practice problem solving - e.g., conditioning (Shields & Gredler, 2003)
- way to encourage pre-reading (Thompson & Zamboanga, 2003)
- diagnostic method for us
- diagnostic method for them
- way to extend classroom knowledge
- way to help students over-prepare & reduce anxiety
- way to show that we practice what we preach about spaced practice
- and many other ways I'm not smart enough to have considered

What's Next

- "Create" Module
- Evaluating its impact on learning

Where can I get my copy?

- At special conference pricing, the software can be yours for *ONLY 3 EZ payments $19.95* (+ $12.50 shipping and handling).

  Order before midnight tonight!

Or

- go to http://web.simmons.edu/~turnerg/NITOP2009/ and download the files for free at your leisure

Thanks