

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
```



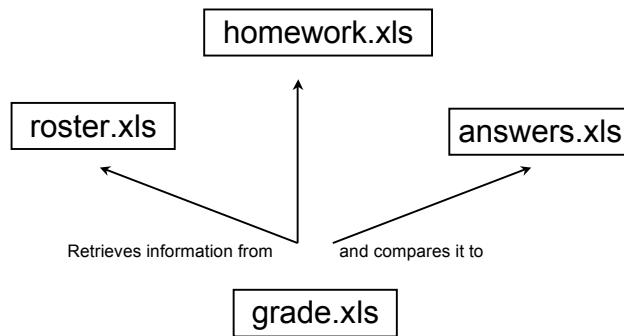
Why not use web-based tools?

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

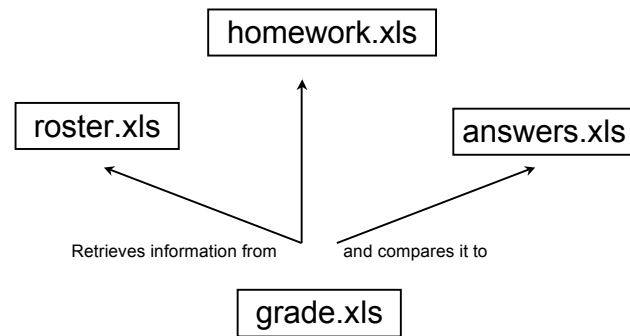
Why not use web-based tools?

- 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



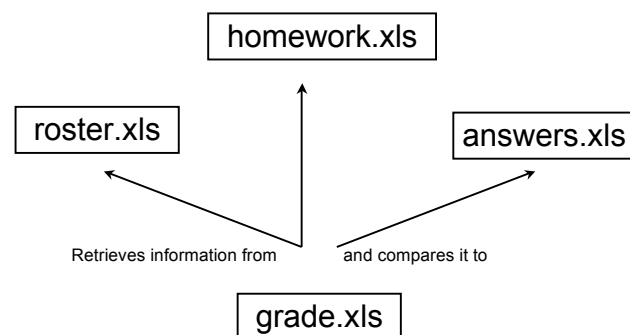
How It Works: The Modules



The Modules: Roster

	A	B	C	D	E
1	bennett	professorbennett@yahoo.com			
2	brown	brown@gmail.com			
3	jones	jones@university.edu			
4	smith	smith@college.edu			
5	turner	turner@simmons.edu			
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					

How It Works: The Modules



The Modules: Homework

homework.xls

Two worksheets

- The questions
- The responses
- Linked by forms

The Modules: Homework

Learning.xls

Last Name

Instructions: Please type your last name in the box in the upper-right corner. Next, for the following five scenarios, use the pull-down menus to identify the NS, UCS, UCR, CS, or CR. Each item is worth 1 point. Half correct gets half credit.

1. A nursing mother puts her baby to the breast as soon as she hears it cry. Her milk then begins to flow when the baby starts nursing. After a few days, her milk begins to flow as soon as the baby cries.

NS	UCS
<input type="text"/>	<input type="text"/>
2. A small boy is watching a thunderstorm. He is frightened by thunder and jumps when he hears it. Then he sees lightning happening shortly before the starting thunderclap. The child now jumps when he sees lightning.

UCS	UCR
<input type="text"/>	<input type="text"/>
3. A patient who receives chemotherapy for cancer now becomes nauseous every time he sees a doctor in a lab coat.

NS	CS
<input type="text"/>	<input type="text"/>
4. A coyote that ate a rotten lamb carcass now walks away from sheep.

UCR	CR
<input type="text"/>	<input type="text"/>
5. A politician who puts the American flag on his campaign signs increases his favorability ratings with voters.

CS	CR
<input type="text"/>	<input type="text"/>

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.

<input type="text"/>	<input type="text"/>
----------------------	----------------------
7. Dad picks up a toddler to stop her screaming.

<input type="text"/>	<input type="text"/>
----------------------	----------------------
8. Susan stops pinching her cousin after getting yelled at for it.

<input type="text"/>	<input type="text"/>
----------------------	----------------------
9. To reduce his inappropriate behavior, David's teacher makes him stay inside during recess after he writes on the wall with a crayon.

<input type="text"/>	<input type="text"/>
----------------------	----------------------
10. A toddler is spanked for playing with an electrical outlet.

<input type="text"/>	<input type="text"/>
----------------------	----------------------

The Modules: Homework

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

UCR	CR
<input type="text"/>	<input type="text"/>
5. A politician who puts the American flag on his campaign signs increases his favorability ratings with voters.

CS	CR
Politician	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.

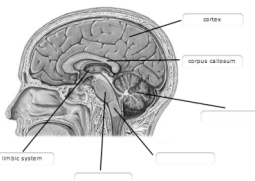
Negative	<input type="text"/>
Punishment	<input type="text"/>
Reinforcement	<input type="text"/>
7. Dad picks up a toddler to stop her screaming.

<input type="text"/>	<input type="text"/>
<input type="text"/>	<input type="text"/>

The Modules: Homework

- Graphics
- Fill-in-the-blank items

brain1.xls



Instructions: Type the terms below in the correct boxes above so that the each term points to its associated structure. Spelling counts here, so be careful.

- A. Medulla
- B. Pons
- C. Cerebellum
- D. Limbic System
- E. Cortex
- F. Corpus Callosum

The Modules: Homework

Conditional branching - questions

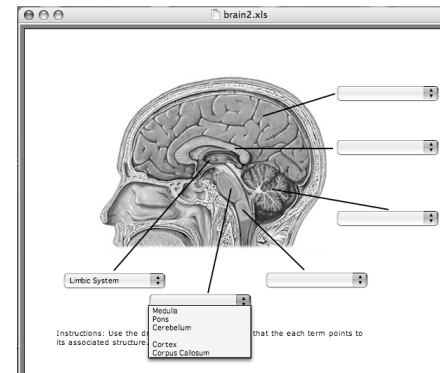
The screenshot shows a spreadsheet titled 'RMHW3.xls' with four numbered scenarios. Each scenario has a text description and two dropdown menus for selecting variables.

- Scenario 1:** Dr. Ivory believes that people take longer to get into their cars, get buckled, and drive away when there is someone waiting for the parking spot than when no one is waiting. He goes to a mall, sits in the food court, looks out the window, and uses a stopwatch to time how long people take to drive away when others are and are not waiting for the parking spot.
 - Experiment: [Dropdown]
 - The independent variable is: [Dropdown: Whether Anyone Waiting Time to Drive Away]
- Scenario 2:** Professor Vermillion believes that her new study technique will improve students' grades. She takes the students in her intro psych class and, by pulling their names out of a hat, assigns them to one of two study groups. One group sees a film every Wednesday afternoon, while the other group writes and takes its own quizzes on the class material. At the end of the term, Professor Smith compares grades for the two groups.
 - Survey: [Dropdown]
 - [Dropdown]
- Scenario 3:** Dr. Brown is interested in children's sharing behavior. To observe how well children share, he puts two children into a room with one toy and watches what happens. He records instances of both sharing and fighting.
 - [Dropdown]
 - [Dropdown]
- Scenario 4:** In order to find out whether parents have an influence on sharing behavior, Dr. Brown conducts a second study. He randomly assigns half of the children in this study to a group where the parents are present when the two children are placed in the room with one toy. The children from the other group are unsupervised. He then measure sharing and fighting in children from both groups.
 - [Dropdown]
 - [Dropdown]

At the bottom, there are buttons for 'Ready', 'Exit', and a keyboard shortcut indicator: 'SCRL | CAPS | NUM'.

The Modules: Homework

Conditional branching - answers



The Modules: Homework

The Hidden Worksheet

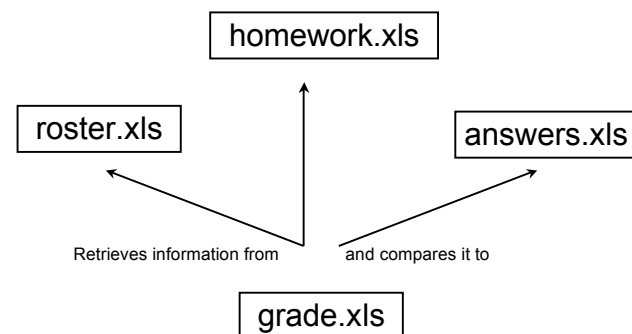
The screenshot shows a spreadsheet titled 'Learning.xls' with a hidden worksheet. The grid contains numbers and text. The first few rows are:

	1	2	3	4	5	6	7	8	9	10
1	1	2	3	4	5	6	7	8	9	10
2	3	2	3	2	5	3	3	2	3	2
3	4	5	3	2	3	3	2	2	2	2

Below the grid, there is a list of names and their corresponding responses:

Name	Response
Bob	1
John	2
Mike	3
Tom	4
Tim	5
Tom	6
Tom	7
Tom	8
Tom	9
Tom	10
Tom	11
Tom	12
Tom	13
Tom	14
Tom	15
Tom	16
Tom	17
Tom	18
Tom	19
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Tom	31
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Tom	34
Tom	35
Tom	36
Tom	37
Tom	38
Tom	39
Tom	40
Tom	41
Tom	42
Tom	43
Tom	44
Tom	45
Tom	46
Tom	47
Tom	48
Tom	49
Tom	50

How It Works: The Modules



The Modules: Answers

The Modules: Graded Homework

7/20 -- Grade: C

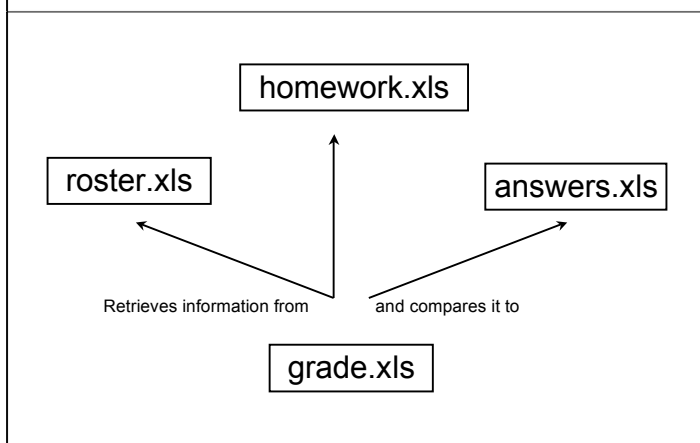
Last Name: bennett

Instructions: Please type your LAST NAME in the box in the upper-right corner. Then save this file without changing the filename (i.e., lifespan.xls) to your computer's hard drive. Then, for the following questions, use the pull-down menus and choose the best answer for each. Each item is worth 1.5 points. Also, the last response on the list is NEVER correct.

- The physical changes that take place in early adulthood are typically
- A clustering will follow around the first thing it sees that is being around after hatching. The right attachment process is called
- Adolescents (some of them, anyway) reason and think about abstract concepts. They are in Piaget's _____ stage
- Fowler's _____ stage involves a nonintellectual acceptance of cultural or religious values in the context of interpersonal relationships.
- A loss of sensory acuity begins to be noticeable in which period?
- Bone mass decreases and the risk of heart disease increases in which period?
- Cognitive abilities begin to decline in middle adulthood.
- Research shows that intellectual abilities decline less if 3 of these are true. Choose the one that is NOT supported by research.

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

```

Private Sub Workbook_Open()
    'Delete homework.xls if it exists - this is the name of the file that gets graded. Students' papers are re-named to this and then re-named to their last names later.
    Dim OldPap As String
    OldPap = "homework.xls"
    Kill OldPap
    On Error GoTo Ignore

    Ignore:
    'Opens the class roster, reads a name, then finds the file of that name
    'Then starts a counter to read each of the students' files and re-names their file to homework.xls
    Dim i As Integer
    For j = 1 To 100
        Dim StuPap As String
        Worksheets.Open FileName="roster.xls"
        If Worksheets("roster.xls").Worksheets("roster").Cells(i, 1).Value = "" Then GoTo Leave
        StuPap = Worksheets("roster.xls").Worksheets("roster").Cells(i, 1).Value & ".xls"
        On Error GoTo Ignore
        FileCopy StuPap, OldPap

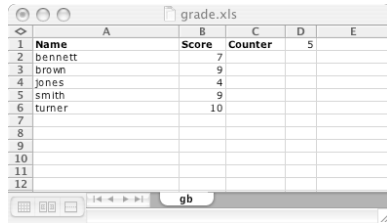
        'Creates a copy of the answer key so links aren't changed in the original
        Dim Source, Destination
        Source = "Answers.xls"
        Destination = "Answers.xls"
        Kill Destination
        FileCopy Source, Destination

        'Opens homework.xls and its associated answer key
        Worksheets.Open FileName="homework.xls"
        Worksheets.Open FileName="Answers.xls"

        'Stops screen flicker
        Application.ScreenUpdating = False

        'Starts a counter so each student's name and grade are recorded on a sequential line in the worksheet "gp"
        Dim i As Integer
        Worksheets("gp").Range("G1") = Worksheets("gp").Range("G1") + 1
        i = Worksheets("gp").Range("G1")
        Worksheets("gp").Cells(i, 1).Value = Worksheets("homework.xls").Worksheets("items").Range("G2")
        Worksheets("gp").Cells(i, 2).Value = Worksheets("Answers.xls").Worksheets("answers").Range("G1")
    Next j
End Sub
  
```

The Modules: Grade-The Gradebook



	A	B	C	D	E
1	Name	Score	Counter	5	
2	bennett	7			
3	brown	9			
4	jones	4			
5	smith	9			
6	turner	10			
7					
8					
9					
10					
11					
12					

Evaluation

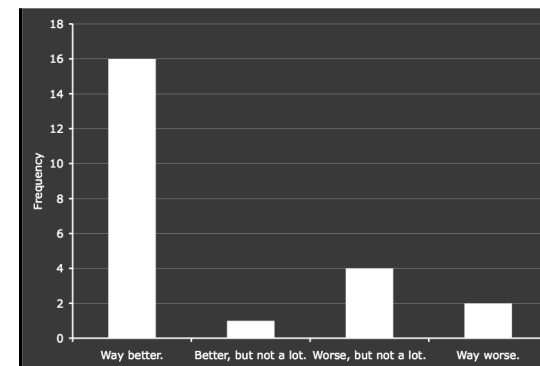
- Didn't evaluate learning
 - presumed - enough research
 - (almost)
- Is it practical?

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

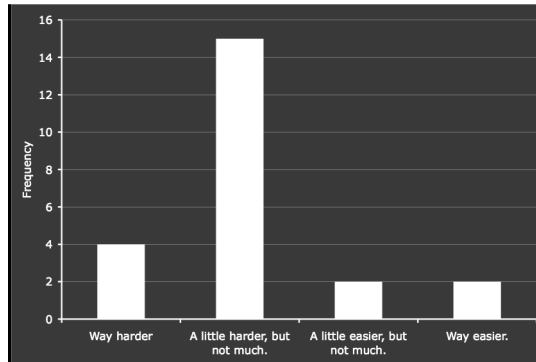
What did the students say?

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



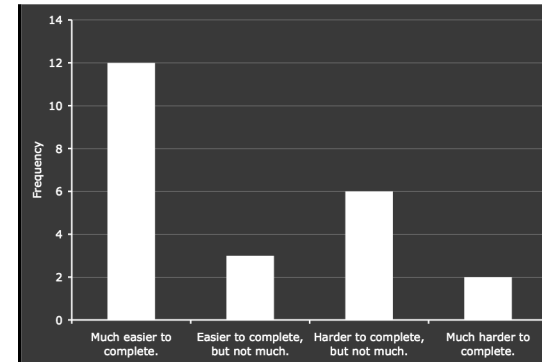
What did the students say?

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



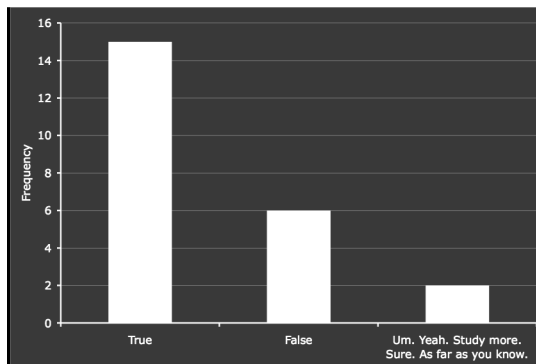
What did the students say?

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



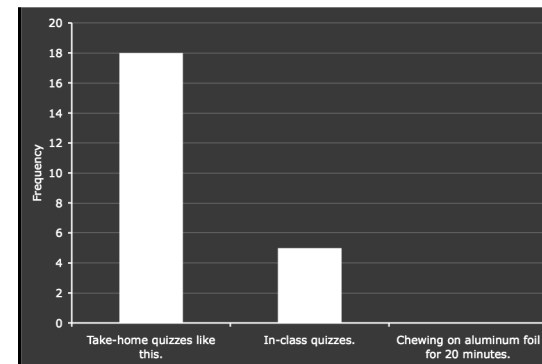
What did the students say?

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



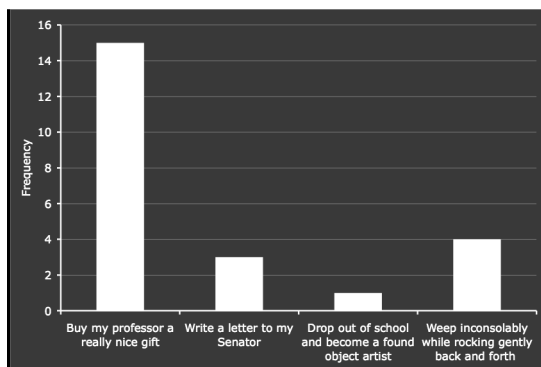
What did the students say?

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



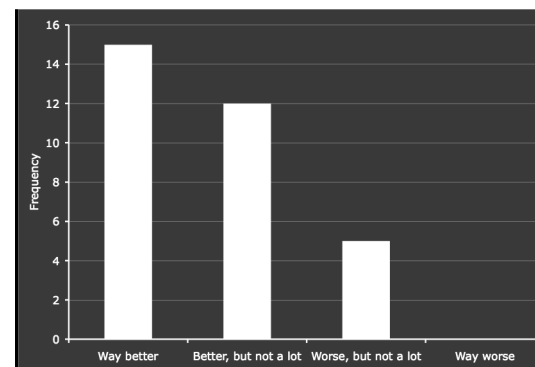
What did the students say?

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



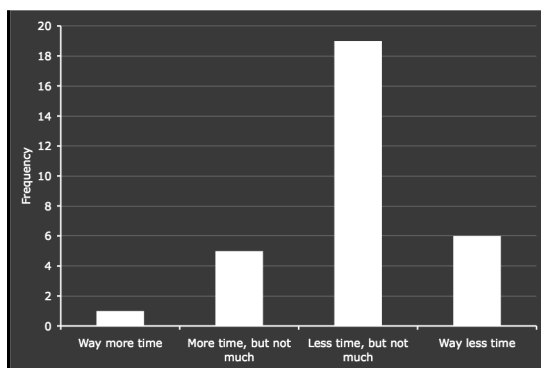
What did the other students say?

Compared to the paper homework, I like this format ...



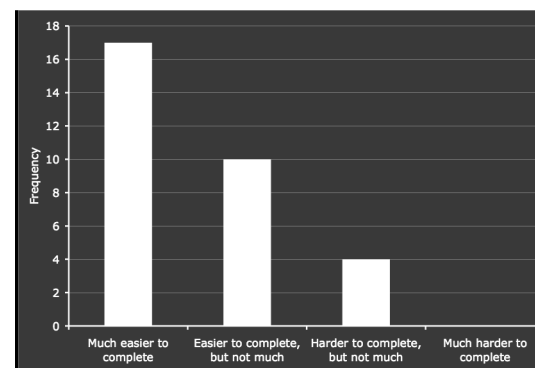
What did the other students say?

Compared to the paper homework, this format took...



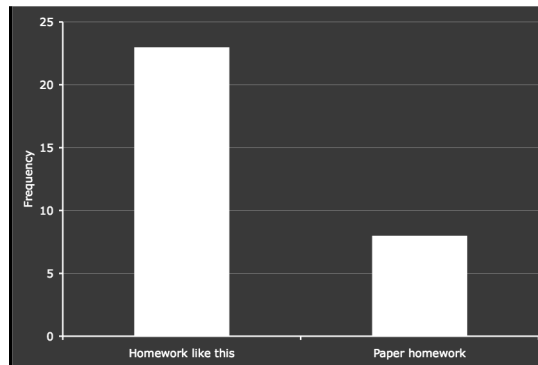
What did the other students say?

Compared to the paper homework, this format was...



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 was good and did help on material we were learning in class.

☐: also thought the excel homework assignments were beneficial, they really made me learn the material & I think 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

The course assignments contributed to my understanding of the subject.

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Not Applicable
n =	0,0	0,0	2,6	47,4	50,0	0,0
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