

The Benefits of Using Excel-Based Homework That Grades Itself

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NITOP – January, 2009

Background

A large body of research from the 70s & 80s shows the benefits of homework

- Time-on-task is positively correlated with achievement.
- Increased time benefits everyone, but lower-ability students and highly anxious students benefit disproportionately.
- Homework increases learning, graded homework *greatly* increases learning.
- Frequent homework better than sporadic or infrequent homework (increases spaced practice).
- Homework improves problem-solving skills and allows scaffolding of increasingly complex problems.
- Homework acknowledges different learning/testing strengths.
- Homework can serve as a method of pretesting.
- Homework provides more information about student difficulties – both for individual students and the class as a whole.
- Homework is a low-pain way for students to monitor studying effectiveness.

The Problem

The time to create, distribute, grade, and return homework is burdensome.

Can homework assignments be created that meet the following requirements?

Practical Criteria

- Low time & effort for creating, distributing, grading, and returning
- Low investment in programming knowledge
- No special software for students
- Familiar look to students
- Easy to modify/re-use
- Non-hackable
- Platform independent

Pedagogic Criteria

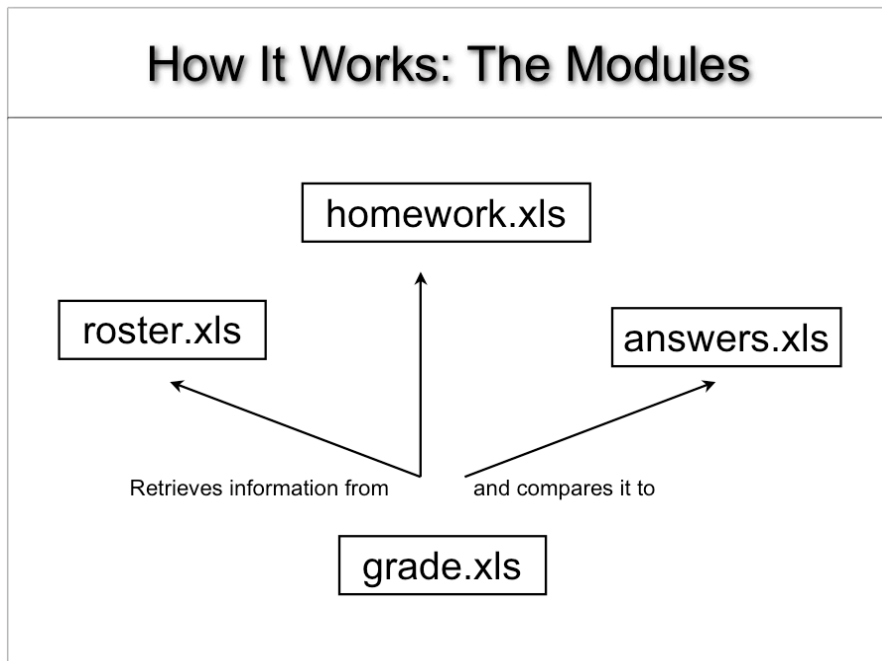
- Short – 10 to 20 items
- Any “objective” item
- Connectable to classwork
- Re-takable
- Problem solving *OR* pretesting
- Immediate feedback (or at least pretty darn quick)

Why not use Web-based tools?

- Lack of control (formatting, delivering, etc.)
- Difficulty of use (for instructor and students – almost everyone is familiar with Excel already)
- Lack of seamless integration with gradebook
- Requires online access
- Unreliable – system downtime renders it non-functional

The Solution

Forms that use drop-down menus are easy to create in Microsoft Excel and distribute as email attachments. Their format is very familiar to students, and they are easy to complete and return via email. They are graded, marked, recorded, and returned to students automatically using a Visual Basic script stored in a file called grade.xls. Once one form is created and a script written, an assignment is easily modified for use in later assignments. Many different kinds of forms can be generated, including those where the questions vary depending on previous responses.



4. A coyote that ate a rotten lamb carcass now walks away from sheep.	UCR <input type="text"/>	CR <input type="text"/>
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. <u>John</u> increases his behavior of taking off his new shoes when he develops a painful blister.	Negative	<div>Punishment Reinforcement</div>
7. <u>Dad</u> picks up a toddler to stop her screaming.	<input type="text"/>	<input type="text"/>

The Results

Four Courses over Three Semesters

1. Twenty-three students from Chicago with a semester's experience with the format: In-class quizzes vs. electronic homework. Homework was preferable to students despite the fact that the content was perceived as more difficult.
2. Thirty-two students from Boston with one experience (and no graded feedback): Paper homework vs. electronic homework. Electronic homework viewed as easier to complete and preferred over paper homework.
3. Thirty-nine students from Boston with a semester's experience with the format: Electronic homework only. Ninety-eight % "Strongly Agreed" or "Agreed" that the electronic homework helped their understanding
4. Forty-eight students from Boston: Active-learning assignment vs. electronic homework. Students felt that the homework, because of its breadth, helped their learning more.

The Conclusion

Excel homework that is easy to create and administer was preferred over other, similar evaluation methods by students and had a greater impact on self-reported learning in every one of the four circumstances. It is no more difficult to create assignments in this medium (once the first assignment is created), but it is MUCH easier to grade. Examples of assignments that can be used and adapted are available at <http://web.simmons.edu/~turnerg/NITOP2009/>

References

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