The Automatic Reassessment and Relearning System

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Introduction

The Automatic Reassessment and Relearning System

- New feature to the ASSISTment tutoring system
- Periodically retesting students of skills learned
- Helps them relearn forgotten skills
- Requires students to show retention of knowledge over an extended period of time

Cognitive Science Literature and Research

- 2007 Practice Guide by the Institute for Education Sciences
- Supports periodic testing will improve student learning by returning to past topics periodically to test if students have retained knowledge

Mastery Learning

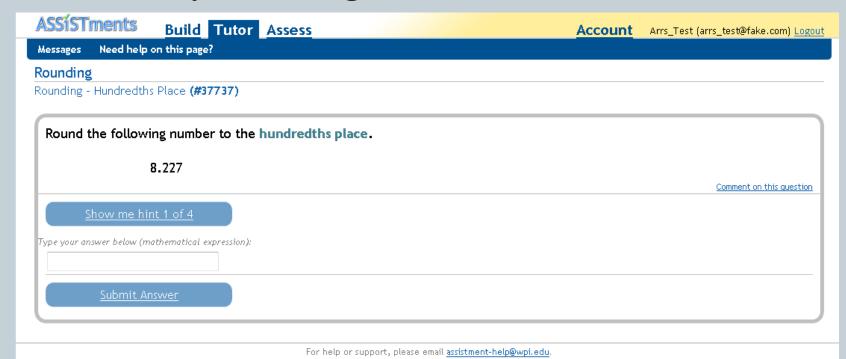
- Many tutor systems use mastery learning
- Students practice until they reach a mastery threshold
 - Instead of set number of problems
 - Threshold is usually high performance on recent problems
- Amount of time it takes students to learn and become mastered varies
- No requirement to remember over time
 - Students can be mastered in a single day
 - Never retested after gaining mastery status

Spaced Learning

- Spacing Effect
 - Students will learn more if practice is spaced out over time instead of a single large practice session
- Improve measurement of mastery to be more robust
 - Change criteria for mastery to require students to pass retention tests
- Why is Spaced Learning is not widely adopted?
 - Requires tedious bookkeeping
- Students gain initial mastery then are reassessed
 - Schedule progressively lengthens time
 - Student that fail test must relearn using ASSISTment tutor

ASSISTment Tutor

- www.assistments.org
- 130 Mastery Learning Skills for Middle School Math



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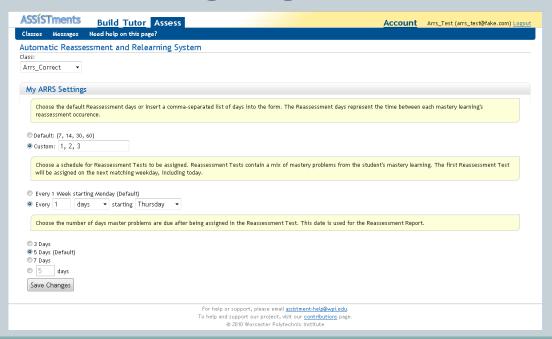
Project Overview

Timeline

- o A Term
 - Studying ASSISTment codebase
 - × Project Design
- o B Term
 - **X** Implementation
 - o 24 new files
 - o 15 modified files
- o D Term
 - × Testing
 - × Deployment

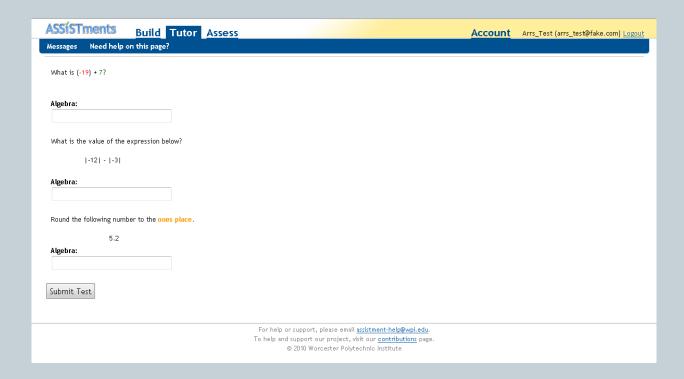
Settings

- Three parameters
 - Reassessment Days
 - Reassessment Schedule
 - o Days until Relearning Assignments are due



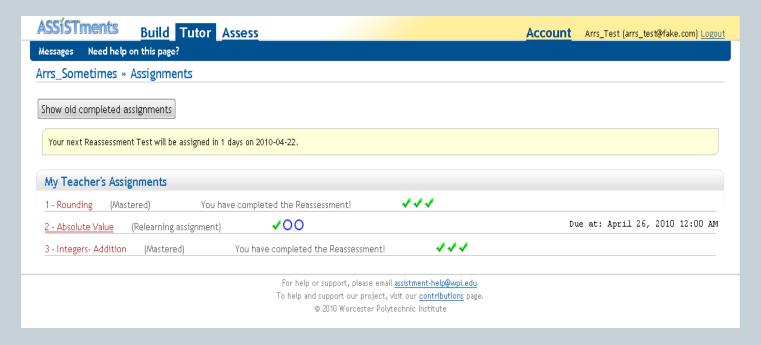
Reassessment

- Mixed Review without tutor help
- One problem from each skill

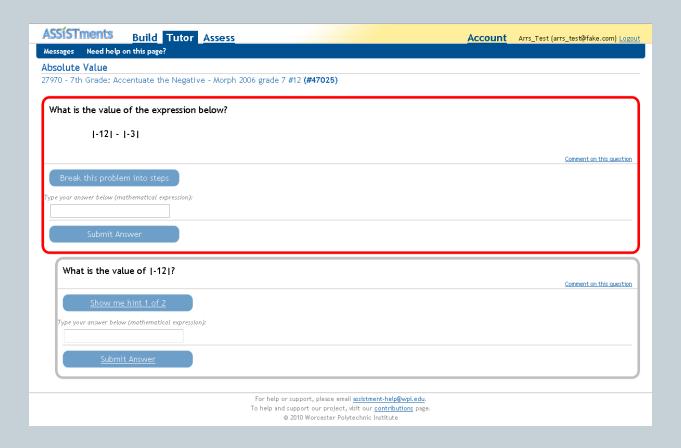


Assignments Page

- Shows student's progress
- Date of next test
- Relearning Assignments



Relearning Assignment



ARRS Report



ASSiSTments

Build Tutor Assess

Account

Arrs_Test (arrs_test@fake.com) Logout

Classes

Messages

Need help on this page?

Automatic Reassessment and Relearning Report

Problem based Report

Reassessment Test:

2010-04-21 🔻

Relearning due: 2010-04-26 (in 4 days)

Student	Status	# of problems	% Correct	Progress of Relearning
Adam B Goldstein	Completed on time	3	66 %	Completed
<u>DWagid</u>	Completed on time	1	100 %	Completed
Arrs_Test	Completed on time	3	66 %	0 / 1 Relearning Assignments Completed

Legend:

Item was completed on time.

Item is late.

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Student Report



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Classes Messages

Student ARRS Report

Reassessment Test:

2010-04-21 -

Legend:

Item was completed on time

Item is late.

Relearning due date: 2010-04-26 (in 4 days)

Student: Arrs_Test

Problem Set	Result	Student Answer	Correct Answers	Reassassment Level	Current Relearning Assignment Status	Next Date to Retest
1 - Rounding	Correct	5	5	Completed Reassassment	Correct on Reassassment Test	Never
3 - Integers- Addition	Correct	-12	-12	Completed Reassassment	Correct on Reassassment Test	Never
2 - Absolute Value	Wrong	wrong answer here	9	2 days	In progress	Must finish Relearning Assignment

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Problem Based Reports



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Problem Based ARRS Report

Cumulative Problem Report

Reassessment Test:

2010-04-21 🔻

The following table shows each student results for problems in the selected Reassessment Test

	2 - Absolute Value	1 - Rounding	3 - Integers- Addition
Adam B Goldstein	Correct	Correct	Wrong
<u>DWagid</u>	Correct	Not tested	Not tested
Arrs_Test	Wrong	Correct	Correct
Totals	2 / 3 = 66 %	2 / 2 = 100 %	1 / 2 = 50 %

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Future Work

Extend ARRS

- Customize schedules to individuals
- Use student's performance on relearning assignments

Research Experiments

- O How much of an affect does ARRS improve retention?
- What is the most effective time intervals of spacing?
- Is some knowledge easier to forget?

Conclusions

- ARRS hopes to improve student learning by helping teachers implement the simple idea of spaced learning from cognitive science.
- ARRS can be the foundation for experimental research
- The project will hopefully affect how and more importantly *when* students learn.

