

Responding to Webwork

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Phoenix 2004

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Webwork works best when feedback loops are closed and tight.

calculus@columbia, jan 2002

- Calculus required for many students
- ~12 sections of calculus 1, calculus 2
- Limited teaching resources:
 - ◆ staffing
 - ◆ classrooms

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meager resources for graders

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no space for recitations

jda@columbia, jan 2002

- Calculus required for much of my teaching
- $\sim 1/3$ of calc students in my sections
- Limited teaching resources:
 - ◆ staffing
 - ◆ administrative overhead

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maintaining flow of hundreds of pages per week
tore into class time

Initial configuration

- sysadmin downloaded, installed.
- graduate TA wrote questions
- jda taught

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(That's the social configuration.)

Technical: Dell four processor server, 700 Mhz PIII, 4G RAM, RAID array.)

Successes

- great feedback to students
- students kept working problems
- TA found employment

Challenges

- problems with problems
- talking back to webwork

Feedback (I)

Issue New problems have buggy answers.

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Impact ♦ students waste time, get frustrated.

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- ◆ better debugging.

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Solution

- ◆ better debugging.
- ◆ have students write directly to TA.
closing the feedback loop solved the problem

Feedback (II)

Issue Very limited support for free answers

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Very limited support for free answers

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Closes off potentially useful line of communication:

- ◆ instructor can't ask open-ended questions. *In this application, what does the derivative measure? Explain.*
- ◆ students can't explain themselves. *Is this a syntax error, or am I actually wrong?*
- ◆ students can't comment on the course. *I'm feeling very shaky now..*

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Facilities exist for emailing responses, but this doesn't address all concerns:

- inconvenient for instructor
- hard to process answers efficiently
- not integrated with grades database.
- no snapshot of class.

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Intrinsically, nothing, but:

- same weaknesses as email (inefficient, separate from grades database, no snapshot).
- vitiates administrative benefit of electronic classroom.

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Proposed solution

Add support to WeBWorK for freeform answers.

- students can enter (short) text responses.
- WeBWorK stores, but doesn't grade.
- TA/instructor can easily:
 - ◆ write back to student..
 - ◆ change student score.
- student can easily view all text answers and instructor responses.

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Implementation

WeBWorK (already) stores the text of student answers. So, harness this with **modifications**:

- introduce fields `ProblemResponse` (`prp1`, `prp2`,...) where instructor can respond to students' answers, and utility routines.
- Database: add `putProblemResponse`, etc.
- Interface: add buttons to `login.pl`, `profLogin.pl`, `TALogin.pl`
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and extensions:

- `respond.pl` Lets instructor view all responses to given problem. If desired, instructor can write back to student(s) and update score.
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- more student feedback about course
- more instructor feedback about student performance

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- more instructor feedback about student performance
- invoked unsuspected “feature” in database.

One more request

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- ◆ lots of account turnover at beginning of semester.

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Solution

Perhaps WeBWorK can be changed to use university's (Kerberos?) server?

Postscript: Final Configuration

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- sysadmin administers system
- instructors instruct
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- same technical configuration

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- one TA maintains WeBWorK for calculus 1, and another for calculus 2.
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- ...jda thanks you for your attention