A Look at Quiz Systems in Mathematical Subjects

A MapleTA Demonstration
Sean Scott, MFCF & Paul Kates, LT3
Opportunities
A MapleTA question
Online quiz systems
Math aware computer assessment
Areas of use and general features
Question & assignment types
Student comments

UW & MapleTA
Future
Contacts
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Readings
Question 8: (1 point)

Find the arc length of the hypocycloid \( y^{\frac{2}{3}} + x^{\frac{2}{3}} = 2^{\frac{2}{3}} \) in the first quadrant.
Online Quiz Systems

- More than quizzes:
  - skill assessment, development, mastery
  - pre-qualification
  - pre-class warmup
  - post-class review, post-module assessment
  - independent self-study
  - test, exam practice
- And
  - supervised tests, exams
Math aware means

- Treating equivalent expressions the same
  - ½ and .5, 2(x+4) and 2x+8 and 8+2x

- Finer control of feedback
  - e.g. recheck your answer 3(y^2+2)^2, the derivative 12y(y^2+2) is not the original integrand

- Examining parts of the answer
  - Checking for typical mistakes
    - e.g. the constant of integration is missing
Math awareness cont

- More choice in range and randomization for question parameterization
- Can ask to make math objects with given properties rather than ask just to identify properties e.g. create a quadratic function in x through pts (1,3) and (4,3).
Areas of use/General features

- Math: algebra, calculus, linear algebra, probability, statistics, differential equations
- Science & Engineering courses
- Professional development, self-study
- Distance education

- Rapid feedback
- Expert content
- Available anytime, anywhere
Question & Assignment Types

Question types
- Maple graded – full power of Maple to evaluate and reply, including plots
- Clickable image – e.g. locate stationary point
- MCQ, T/F, matching, multiple selection, short ans

Assignment types
- Mix of features: anonymous/password, recorded grade, solution, hints, set size & time, unlimited
- Works with HTML, javascript, MathML, Flash
Student comments

- Generally positive
- Like availability of online systems in general
  - Wide range of login times and places
- Motivated to keep trying for answer – persistence rewarded
- Liked immediate feedback – building confidence
- Missed showing intermediate steps in answer – a matter of partial credit
Early collaboration: Maplesoft, Brownstone EDU
MapleTA demo at 2005 Maple Conference (WLU)
2005 Maplesoft.com hosted a demo MapleTA account for Mathematics Faculty
2005 Maplesoft.com provided server software
'05-'06 interest from STAT 202, 206, 211, 230, ACTSCI 231, MATH 138
Fall 2006 licenced MapleTA licence for MFCF/Math
Future

- More assignment control features
- Ever-improving math editing
- Expanding availability of shareable question banks
- Integration with course management systems like UW-ACE (roster, authentication, gradebook)
Contacts

- MapleTA accounts & statistic courses: Sean Scott, STAT/ACTSI/MFCF, sm3scott@math.uwaterloo.ca, x37175
- Math, CS, Engineering, Stats courses: Paul Kates, LT3, pkates@uwaterloo.ca, x37047
- Gavin Fitzpatrick, gfitzpatrick@maplesoft.com, 1-800-267-6583x271
- MapleTA demo course – try it mirfak.math.uwaterloo.ca:8080/classes/math138/
MapleTA web sites

- MapleTA home page:
- Getting started MapleTA (75p)
  www.maplesoft.com/documentation_center/
- Suny use of MapleTA with 3500 students for pre-course assessment,
  www.maplesoft.com/company/casestudies/suny_ta.aspx
Readings

  staff.science.uva.nl/~heck/instaptoetsen/ahlvg.pdf, includes study of first year math skills improvement

- *Asking the Right Questions*, Lynn A. Steen
  www.maa.org/saum/cases/steen1105-saum.pdf

- *Assessing mathematics automatically using computer algebra and the internet*, C.J Sangwin,
  Teaching Mathematics and its Applications 2004 23(1):1-14-
  web.mat.bham.ac.uk/C.J.Sangwin/Publications/tma03.pdf