



Serving Maths

Experiences from a JISC Distributed e-Learning Project

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Serving Maths: a collaborative project

☀ Partners:

- University of York
- University of Sheffield
- University of Birmingham
- Imperial College London
- University of Edinburgh

☀ Existing tools:

- Moodle
- AiM
- CABLE
- METRIC
- WaLLiS

Goal:

Interoperability between different tools for e-assessment in Mathematics

Why me?

My guesses about why I was asked to make a presentation today:

- ★ The Serving Maths project has tried to build a community around its tools
- ★ The Serving Maths project has explored ways to allow tool interoperability
- ★ I am part of the academic as well as the open-source community



I. Similarity of Communities: Academic - Open-Source

Particle Physics Community

The strength of the community can be more important than the project itself

- ☀ **Aim of particle physics community:**
The understanding of high-energy phenomena that are only relevant during the first fraction of a second after the big bang and in multi-billion dollar particle accelerators.
- ☀ **Practical value:**
None
- ☀ **Outcome:**
The World Wide Web (among other innovations)

Academic - Open-Source

- ✱ Publish results openly
- ✱ World-wide, non-geographic
- ✱ Self-motivated, money secondary
- ✱ Strive for perfection (think they can do it better)
- ✱ Follow fashions, like ideological debates
- ✱ Innovative

Negatives

☀ Academic

- High entry barrier
- Little connection to users

☀ Open source

- Not enough open-source jobs



II. Interoperability of e-assessment tools

Many different assessment tools

- ★ Stand-alone:

- ★ TOIA, Questionmark, ...

- ★ Integrated into VLE:

- ★ Moodle, WebCT, BlackBoard, ...

- ★ Specialised:

- ★ AiM, STACK, WeBWorK, ASAP,

Needs of different subjects

☀ Mathematics

- ☀ Computer algebra systems to randomise, render and score maths questions

☀ Computer Science

- ☀ Automatic evaluation of software code

☀ Discursive subjects

- ☀ Essay marking

☀

Interoperability

- ★ Users want to use their favourite front-end but want to be able to use assessment items written for different systems. Two ways to achieve this:
 - ★ Use a common format for specifying assessment items (QTI)
 - ★ Use web services to render and score assessment items

Use of a standard format (QTI)

- ✱ Very complex due to large variety of possible assessment items
- ✱ Systems can usually only interpret a subset of the standard (loss of interoperability)
- ✱ Subjects need their own extensions of the standard
- ✱ Serving Maths project tried to develop MathQTI, very limited success

Assessment web services

☀ Idea:

- when an assessment system needs to deal with an unknown assessment item it connects to a web service that does the rendering and response processing.

☀ Advantages:

- It is easy to add the web services clients and servers in existing systems
- Leads to universal interoperability: every system can take advantage of the full capabilities of all assessment item types.
- One web services protocol (RQP) can work for all subjects.



III. Project community

4th of July 2005

OSS Watch Conference
Edinburgh

Serving Maths Community

- ✦ Developers from the original projects:
AiM, STACK, METRIC, WaLLiS, Moodle
- ✦ Developers from other projects:
APIS, ASAP, ASSIS, TIP, TOIA, WebAlt
- ✦ Lecturers and teachers from around the world

They communicate via the Project Web Site at
http://mantis.york.ac.uk/serving_maths/

The project web site

Course: Information about the Serving Maths project - Mozilla Firefox

File Edit View Go Bookmarks Tools Help

http://mantis.york.ac.uk/serving_maths/course/view.php?id=2

Course: Information about the Servin... OSS Watch - Building Open Source Communi...

Information about the Serving Maths project

You are logged in as [Gustav Delius](#) (Logout)

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Topic outline

1 **Overview**

The Serving Mathematics project is developing tools for on-line assessment in mathematics education.

This project has received funding from JISC for its [project plan](#). However we want this to be a community project. Our software is open-source and, with your help, will become both useful and user-friendly. We invite you to participate by [trying the demo software](#) on this site, [downloading](#) the software, posting feedback on the [discussion forums](#) and perhaps even taking part in the [development](#).

There are already several mathematical assessment systems in existence. Some are listed in the corresponding [section of the web-link glossary](#) and in the list of [participating projects](#). Each has its own strengths and weaknesses. In this project we are therefore working towards the goal of making these systems interoperable so that the user can take advantage of the strength of each. There are two ways in which we are approaching the interoperability issue:

- The Remote Question Protocol (RQP):** By using web services we are making it possible for users (teachers and students) to access all the different assessment systems through a single interface. This could for example be the VLE that the user is already using.

Online Users

(last 5 minutes)

[Gustav Delius](#)

Messages

No messages waiting

[Messages...](#)

Recent Activity

Activity since Saturday, 2 July 2005, 08:07 AM

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28 Feb, 19:12
Chris Sangwin
Future Development of Mathematical e-Learning [more...](#)

Diversity of community

☀ End-users

- ☀ Administrators
- ☀ Content creators
- ☀ Teachers
- ☀ Students

☀ Developers

- ☀ Professional
- ☀ Amateur

Important to break down barriers

Important factors for community building

★ Open discussion forums

- ★ Users can subscribe to whole forum only, not to individual threads
- ★ Posts show user image
- ★ Combine end-user and developer discussions in the same forum

★ Modular software

- ★ Plug-ins, modules, blocks
- ★ Language packs
- ★ Collaborative documentation building

★ Tap in to existing communities

Summary

- ★ Academic – Open Source
- ★ Project community
- ★ Lessons for Interoperability
 - ★ Standard Format (MathQTI)
 - ★ Web Services Protocol (RQP)