



# E-Assessment & Open Educational Resources: The Virtuous Circle

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## The FETLAR Project

**FETLAR is the MSOR community's project in the  
Open Educational Resources Subject Centre Strand  
funded by JISC and HEA**

**May 2009 – April 2010**

**Project website <http://fetlar.bham.ac.uk/>**



## **MathQurate – The QTI question authoring tool**

<http://aqurate.kingston.ac.uk/mathqurate/>

## **Spectatus – The QTI assessment authoring tool**

<http://aqurate.kingston.ac.uk/spectatus/>

## **MathAssess Engine – The QTI content renderer**

<http://www2.ph.ed.ac.uk/MathAssessEngine/>



## The FETLAR Virtual Appliance

- Moodle with QTI Playr plug-in
- Minibix
- STACK
- MathAssess Engine

Installs into VMWare Player or VirtualBox. Download from

<http://aqurate.kingston.ac.uk/files/fetlar-vm.zip>



<b>Variable definitions</b>	Input – responseVariables Judging – outcomeVariables Randomisation – templateVariables
<b>templateProcessing</b>	Optional Randomisation
<b>itemBody</b>	All the stuff that shows up on the screen <ul style="list-style-type: none"><li>- question</li><li>- input box</li><li>- buttons for Hint/Solution</li><li>- feedback</li></ul>
<b>responseProcessing</b>	Working out what feedback and score should be



The screenshot shows a Mozilla Firefox browser window with the following details:

- Address bar: `http://bls.moodle.gla.ac.uk/mod/quiz/attempt.php?q=40`
- Page title: **KNPU: Numeracy Survey**
- Header: University of Glasgow, School of Life Sciences, Part of the College of Medical, Veterinary and Life Sciences. Includes links for LOG-OUT, IT HELPDESK, and a search bar.
- Breadcrumbs: Life Sciences > Level-1 > KNPU > Quizzes > Numeracy Survey > Attempt 1
- Buttons: Info, Results, Preview, Edit, Update this Quiz
- Section: **Preview Numeracy Survey**
- Button: Start again
- Note: This quiz is not currently available to your students
- Question 1: **1** If  $J = KL$  then  $K = J/L$ . Marks: 1. Answer:  True,  False.
- Question 2: **2**  $a(b+c) = ab + ac$ . Marks: 1. Answer:  True,  False.
- Taskbar: Shows Start button, icons for Firefox, Outlook, eAssessment2010, Microsoft PowerPoint, KNPU: Numeracy S..., and Document1 - Micros... The system clock shows 15:23.



## Editing a choice

The screenshot displays the 'Simple Choice Wizard' interface. The main dialog box contains the following fields:

- Question Title: eAS
- Question Text: If  $J = KL$  then
- Answer text: Answer here
- Correct? (checkbox): Wrong
- Response for correct answer: Well done! That is correct!
- Response for "almost correct" answer: Almost right, but not quite!
- Response for wrong answer: Sorry, that's the wrong answer.
- Hint text: (empty)
- Solution text: (empty)
- Score for correct answer: 10
- Score for "almost" correct: 5
- Hint score divider: 2

An inset 'Maths' dialog box is open, showing the process of editing a choice. It includes a text area with the LaTeX code  $\sqrt{K - \frac{1}{L}}$  and a preview area displaying the rendered equation  $K - \frac{1}{L}$ . The 'Maths' dialog also contains instructions: 'Insert latex math in top pane. View results in bottom pane. Remember to use math mode and delimit with a "\$", e.g.  $\{x+y\}$ '.



# MathAssessEngine<sup>beta</sup>

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## eAssessment Scotland Demo: basic MCQ with MathML

If  $J = KL$ , then

$K = \frac{L}{J}$

$K = JL$

$K = J - L$

$K = \frac{J}{L}$

None of these

Divide both sides by L.

$$K = \frac{J}{L}$$

RESET

SUBMIT ANSWER



All feedback can be seen simultaneously, if required

The screenshot shows a software window titled "Question Body : eAssessment Scotland Demo: MCQ with targeted feedback : gu-102". The interface includes a menu bar (Edit, Insert, Reload, Action) and a toolbar with various icons. The main area is divided into two panes: "Design" and "XML".

**Design Pane:**

- Text: "Edit the text and add features here"
- Content: "if  $\frac{K}{L}$  then choiceInteraction" (where  $\frac{K}{L}$  is a math button)
- Buttons: A grid of "feedbackInline" and "feedbackBlock" buttons.
- Text: "Use the buttons to edit features here"
- Buttons: A "choiceInteraction" button and a vertical stack of "feedbackInline" and "feedbackBlock" buttons.

**Question preview Pane:**

- Text: "Question preview"
- Options: Four radio buttons with labels:  $K = \frac{L}{J}$ ,  $K = \frac{L}{J}$ ,  $K = JL$ , and  $K = J - L$ . The first option is selected.
- Text: "None of these" (radio button)
- Feedback text: "Well done! That is correct! - (variable SCORE was not found) marks. Sorry, that's the wrong answer. Almost right, but not quite! - (variable SCORE was not found) marks. Your fraction is the wrong way up. Make sure that you do the same thing to both sides of the equation. You have multiplied instead of dividing. Make sure that you do the same thing to both sides of the equation. You have subtracted instead of dividing. Make sure that you do the same thing to both sides of the equation. Divide both sides by L."
- Equation: 
$$K = \frac{L}{J}$$
- Text: "Since you have viewed the solution, your score for this"

Buttons at the bottom: Apply, OK, Cancel



# MathAssessEngine<sup>beta</sup>

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## eAssessment Scotland Demo: MCQ with targeted feedback

If  $J = KL$ , then

$K = J - L$

$K = JL$

$K = \frac{J}{L}$

$K = \frac{L}{J}$

None of these

You have multiplied instead of dividing. Make sure that you do the same thing to both sides of the equation.

Show Solution

RESET

SUBMIT ANSWER



## Changes needed to variable types and in responseProcessing

The screenshot shows the 'eAssessment Scotland Demo: MathEntryInteraction with targeted feedback : gu-103' window. The interface includes a toolbar with icons for help, undo, redo, bold, italic, and text formatting. The main area is divided into 'Design' and 'XML' tabs. The 'Design' tab shows a 'Question preview' section with the text: 'If  $J = KL$ , express  $K$  in terms of  $J$  and  $L$ '. Below this, there are several 'feedbackInline' and 'feedbackBlock' buttons. A 'Math Entry interaction : RESPONSE' dialog box is open, showing the following fields: 'Response identifier' (RESPONSE), 'Expected length' (20), 'Print identifier' (pMath), and 'Syntax' (text/x-maxima). The dialog box has 'Apply', 'OK', and 'Cancel' buttons. The background shows a question preview with the text: 'If  $J = KL$ , express  $K$  in terms of  $J$  and  $L$ '. Below this, there is a hint: 'What if you divide both sides of the equation by  $L$ ? (variable SCORE was not the wrong answer. The variables  $J$  and  $L$  are represented by upper case characters in your answer. Use upper case characters in your answer. Do not use the wrong way up. Make sure that you do not divide both sides of the equation. You have not divided. Make sure that you do the same on both sides of the equation. You have not divided. Make sure that you do the same on both sides of the equation.' Below the hint, there is a mathematical equation: 
$$K = \frac{J}{L}$$
 and a note: 'If you have the solution, your score for this question is 100%. If you need the hint, your score for this question is 50%.' The dialog box also has 'Apply', 'OK', and 'Cancel' buttons at the bottom.



# MathAssessEngine<sup>beta</sup>

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## eAssessment Scotland Demo: MathEntryInteraction with targeted feedback

If  $J = KL$ , express K in terms of J and L

Input Maths:

Preview:

$$\frac{J}{L}$$

Well done! That is correct! - 10.0 marks.

Show Solution

RESET

SUBMIT ANSWER



## Can use and display randomised variable names

Name	Value	Required
baseType	string	<input checked="" type="checkbox"/>
"value"	s1: make_random_state(true)\$ set_random_stat...	<input type="checkbox"/>

```
choose(list) := list[1+random(length(list))];
varNames: [a,b,c,d,h,k,m,n,p,q,r,s,t,u,v,w,x,y,z];
sDq: choose(varNames);
varNames: delete(sDq,varNames);
sEq: choose(varNames);
varNames: delete(sEq,varNames);
sFq: choose(varNames);
mQues: sEq*sFq;
mAns: sDq/sEq;
mRecip: sFq/sDq;
mMult: sDq*sFq;
```

Severity	Description	Source	Path
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## eAssessment Scotland Demo: randomised MathEntryInteraction with targeted feedback

If  $y = xb$ , express  $x$  in terms of  $y$  and  $b$

Input Maths:

Preview:

$$y - b$$

You have subtracted instead of dividing. Make sure that you do the same thing to both sides of the equation.

Show Solution

RESET

SUBMIT ANSWER



The screenshot shows the Spectatus application window with the following components:

- Menu Bar:** File, Edit, Test, Sections, Questions, Settings
- Test Configuration Panel (Left):**
  - Test Title:
  - Time limit (min):
  - Time limit (max):
  - Post-processing?  Enable individual submission?
  - Icons: Add (+), Move Up, Move Down, Print, Refresh, Play
- Section Configuration Panel (Left):**
  - Section Name:
  - Section Description:
  - Rubric:
  - Number of questions to select:
  - Shuffle Questions:
  - Use same question more than once:
  - Section total score override:
  - Icons: Remove (X), Decrease Score, Increase Score
- Question Bank (Right):**
  - Four question cards are visible:
    - eAssessment Scotland Demo: basic MCQ with MathML
    - eAssessment Scotland Demo: MCQ with targeted feedback
    - eAssessment Scotland Demo: MathEntryInteraction with targeted feedback
    - eAssessment Scotland Demo: randomised MathEntryInteraction with targeted feedback
- Bottom Navigation Bar:** Refresh, Add (+), Move Down, Edit (Pencil), Previous (Left Arrow), Next (Right Arrow), Remove (X)



## QTI Adding a new qtiplayr to topic 7 ?

### General

**Assessment name\***

**Embargo date**       Disable

**Expiry date**       Disable

**Maximum number of attempts**   unlimited

**Allow candidates to view test report**

### Content Package (one required)

**Uploaded QTI Content package containing assessment**

### Common module settings

**Group mode ?**

**Visible**

**ID number ?**

**Grade category**

There are required fields in this form marked\*.



Applied Built Environment Mathematics

Jump to...

FETLAR ► Mathematics ► qtiplayr ► EAS Assessment

Update this qtiplayr

**eAssessment Scotland Demo: MathEntryInteraction with targeted feedback**

**EAS Demo Test**

**Section 1**

Rubric

This section has 4 questions

Question

If  $J = KL$ , express  $K$  in terms of  $J$  and  $L$

Input Maths:

Preview:

Show Hint

Show Solution

Controls

Clear

Submit answer

Next

Forward



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## FETLAR User Group

**The FETLAR User Group will be launched on Tuesday 7 September at the MSOR conference in Birmingham**

**For more details contact Leslie Fletcher**