THE MODEL ANSWER

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Introduction and Project context.

Project had a number of catalysts

• **Large student numbers** enrolled on a Construction Systems 1 in SEM 2.

• Desire to see how BIM (Building Information Modelling) could be embedded not just in teaching but exploited **to supplement assignment** types such as Moodle quizzes.

• Can BIM digital models help to provide **reliable and useful feedback** to students who have undertaken Moodle online quizzes?
Rationale and aims of the project

• to analyse whether methods using non graphical text in digital models can **deliver effective feedback** to large student numbers after quiz assessment.

• to see if this approach could be used to **alleviate onerous assessment** workloads for tutors of courses with **large student numbers**

• by embedding the answers within the elements of the model to encourage construction students to **engage with digital BIM models** and become more comfortable in their use.

*The term “Model answer” is often used across education taking many forms but here the intention is that the Model really will be the answer.*
Methodologies employed – Setting up the Assignments.

Main Moodle page showing specific topic area assignment brief, some resources and link to assessment quiz.
Methodologies employed – Setting up the Assignments.

Assignment brief and additional resources required, e.g., design sheets.
POE 3 - Sub Floor Framing Basic

Students should complete their Wall Framing Design worksheets before attempting this quiz as all the answers should have been resolved in those sheets. It will then just be a matter of choosing the response in the quiz which matches your design sheet answer.

You will also need to refer to the assignment exercise sheet given out in class which describes the building to fill in some of the data asked for in this quiz.

DO NOT ATTEMPT THIS QUIZ WITHOUT FIRST HAVING COMPLETED THE DESIGN WORKSHEETS.

Attempts allowed: 1

This quiz closed on Wednesday, 19 August 2015, 1:00 PM

Attempts: 54
Methodologies employed – Attempting the Moodle quizzes

**Question 1**
What is the approximate joist span?
Not yet answered
Marked out of 1.00
Select one:
- a. 3000
- b. 400
- c. 2400
- d. 2000

**Question 2**
Floor joists for house subfloors are sized for 1.5 kPa
Not yet answered
Marked out of 1.00
Select one:
- True
- False

**Question 3**
What size are the floor joists? (set at 400 crs. using SG8 strength timber)
Not yet answered
Marked out of 1.00
Select one:
- a. 50x45
- b. 190x45
- c. 140x90
- d. 140x45

**Question 4**
If a bearer has a minimum size of 140 x 70 from Table 6.4, what would be a suitable substitute size for this bearer when specified in industry? (using built up members)
Not yet answered
Marked out of 1.00
Select one:
- a. 2/140x35
- b. 2/140x45
- c. 2/190x45
- d. 140x90
Methodologies employed – Assessing the Moodle quizzes

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<th>Email address</th>
<th>State</th>
<th>Started on</th>
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<th>Grade/10.00</th>
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<th>Q. 2 /0.63</th>
<th>Q. 3 /0.63</th>
<th>Q. 4 /0.63</th>
<th>Q. 5 /0.63</th>
<th>Q. 6 /0.63</th>
<th>Q. 7 /0.63</th>
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<td>✓ 0.63</td>
<td>× 0.00</td>
<td>× 0.00</td>
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</table>

Initial feedback to students gives them their score and tells them which questions are right or wrong. Tutor can modify feedback options in the quiz settings.
Methodologies employed – Provision of resources to students.

**POE Model Answers**

- **Solibri Model viewer download link**
  This link should take students to the Solibri website where the Free BIM model viewer can be downloaded.
  After this software has been downloaded and installed, students will be able to open and view the digital model answers provided to check where they may have made mistakes in their Moodle quiz submissions.

- **Solibri Quickstart guide**
  A word document to help students navigate and use the Solibri Model viewer to open up and get information from the POE model answer files provided. Document has screenshots to aid understanding of the software’s use and help recover windows that may have been closed by mistake.

- **Introduction to using Solibri Model viewer**

- **Contours POE 2 Model**
  A digital model of the site topography produced when the spot levels from the POE exercise are inputted into a CAD programme.
  This model can be viewed using the FREE BIM viewer, Solibri Model viewer.

- **Basic Sub floor model answer . POE3**
  A digital model of a solution to the basic sub floor exercise set in POE3.
  This model can be viewed in Solibri Model viewer and the answers to the questions in the Moodle quiz can all be obtained in this model to see where students may have made any errors.
Methodologies employed – Provision of resources to students.

Solibri Model viewer- Free BIM viewer which can be downloaded from internet and works on PC or Mac
**Methodologies employed – Provision of Feedback to students.**

**Question 9**

What is the stud size (from 3604) for external non-loadbearing walls for this house if the studs are spaced at 600 crs?

Select one:

- a. 90 x 70mm
- b. 90 x 90mm
- c. 90 x 35mm
- d. 90 x 45mm

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**Solibri model providing the answer to the wall stud size.**

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<th>Value</th>
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<td>Timber studs</td>
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<td>Type</td>
<td>Timber - Wall 45 x 90</td>
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<td>Full height timber studs 45 x 90 @ 600mm centres</td>
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<td>Layer</td>
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<td>BATID</td>
<td>Note stud sizes for 600mm centres to help size trimmi...</td>
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</table>
Methodologies employed – Provision of Feedback to students.

A combination of a 90 x 45mm top plate with a 140 x 35mm strengthening plate on top will work on our POE 5 building?

Select one:
- True
- False

Solibri model providing answer regarding use of a strengthening top plate combination.
Methodologies employed – Provision of Feedback to students.

Other BIM model viewers can be used also but sometimes data can get lost in conversion to required IFC file type. BIMVision interface sample shown.
## General scope of questions

Q1-Q3 - Not shown as just general queries about levels of previous BIM use

Q4, Q5 - How useful was BIM viewer demo and improvement suggestions

Q6 to Q8 - Ease of access to Software download, Usefulness of support resources. Suggestions

Q9 to Q11 - Ease of opening up Models, finding embedded answers to check where they had gone wrong

Q12 - Did students enjoy engaging with the BIM models to find answers

Q13, Q14 - Effectiveness as feedback method to individual students and large numbers
### General scope of questions

**Q1 to Q3**  - Queries on ease of software access, issues and usefulness of resources.

**Q4 to Q7**  - Use of models, element identification, accessing embedded info to find answers

**Q8**  - Use of models, did students interacting to find answers?

**Q9 to Q11**  - Student opinion on feedback effectiveness whether individual or to large groups

**Q12**  - Student perception of overall quiz and model answer approach

**Q13, Q14**  - Effectiveness as feedback to individual students and large numbers. Comments.
Data analysis - Teaching Colleagues

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<tr>
<th>Positive</th>
<th>Negative</th>
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General scope of questions

Q1 to Q3 - Previous Solibri experience, ease of use and whether resources provided helpful
Q4 to Q5 - Ease of finding answers in models and comments on issues if any
Q6 to Q7 - Value as means of feedback to individuals and large numbers
Q8 to Q9 - any comments on particular likes or dislikes of the approach
Q10 to Q11 - Overall opinion on the quiz and model answer approach, comments, suggestions
Future developments and applications

Access to the model answers made available on mobile devices
Conclusions and further development of project.

- Investigation of developments into using various BIM model viewers on Mobile devices such as Ipads and Tablets, not just computers.

Any Questions?
Possible developments and applications

Naval architecture and Marine Technology

Computing architecture and engineering?

Chemical models
Possible developments and applications - medical

- Osteopathy
- Physiotherapy
- Optometry
- Dentistry