

OLM

---

I

I

C

A

L

L

---

# Open Learner Models

**Susan Bull**

University of Birmingham, U.K.

OLM

# What We Aim to Avoid

---

I  
I  
C  
A  
L  
L



Can we make  
Detmar happy  
with an open  
learner model?

# OLM

## Overview

---

I

- Adaptive Learning Environments (brief)
- What is an Open Learner Model?

I

- *Why have an Open Learner Model?*
- OLM work – brief overview

C

- Presentation of Open Learner Models
- Interaction with Open Learner Models (control)

A

- Multiple View Open Learner Models
- Learner Constructed Open Learner Models

L

- Multiple User Open Learner Models

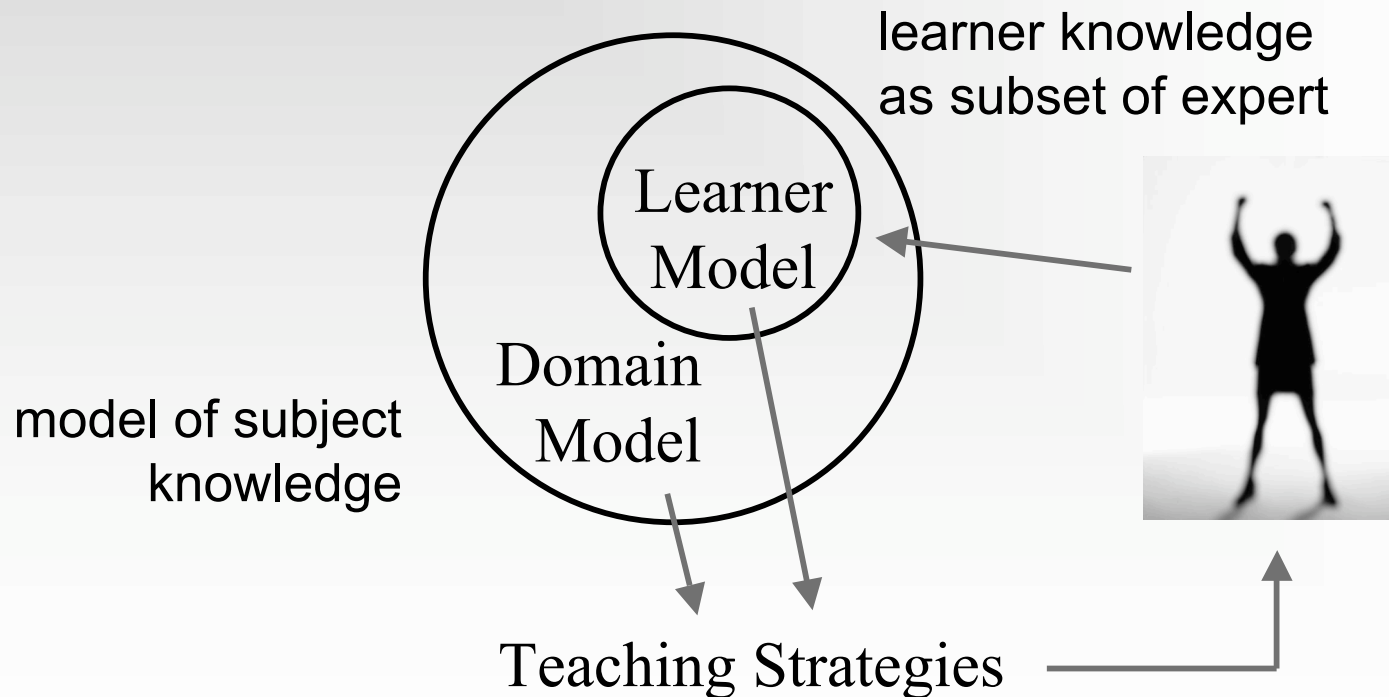
L

- Lab – OLMlets, Flexi-OLM

OLM

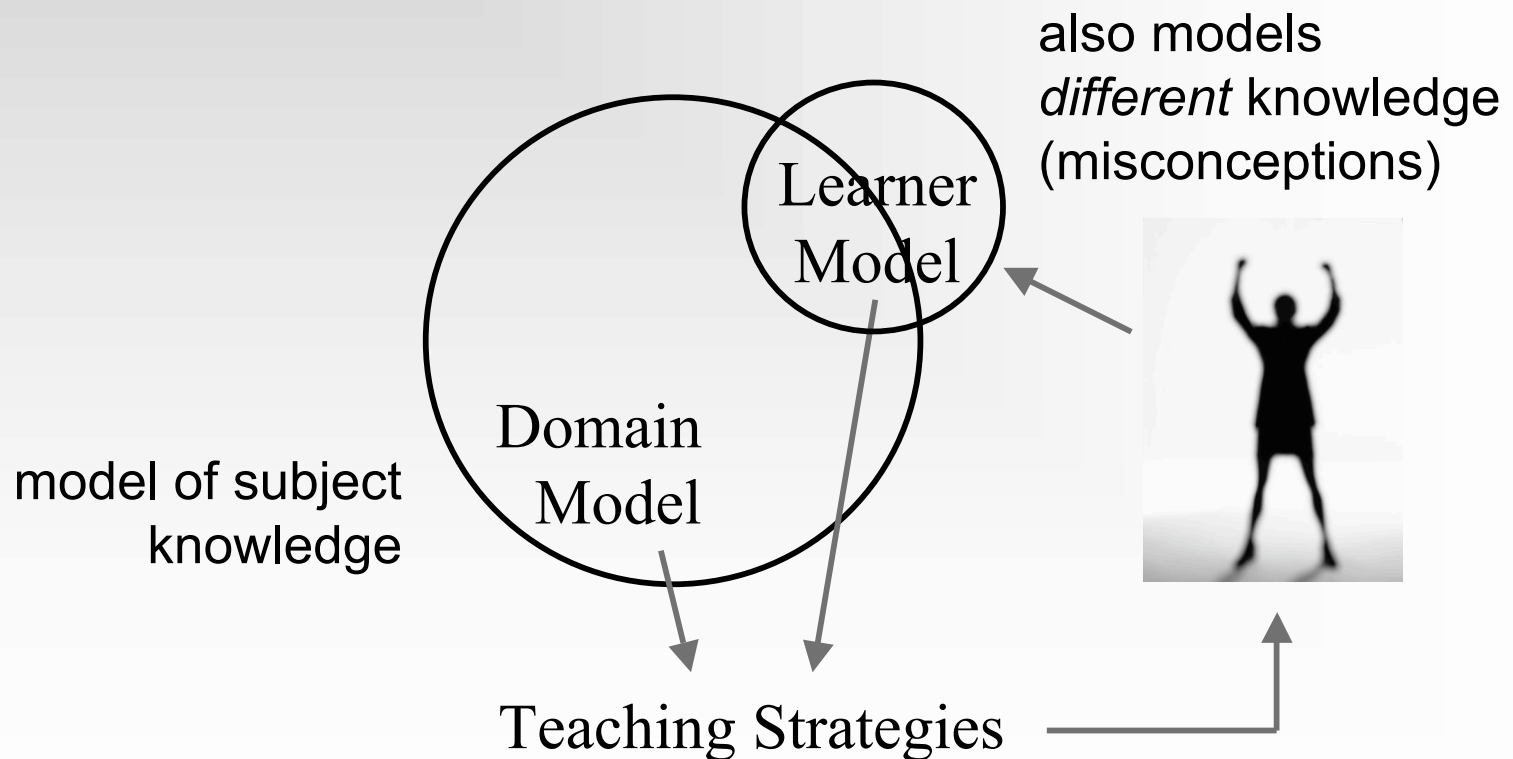
# Adaptive Learning Environments

- adaptive (individualised) interaction



# Adaptive Learning Environments

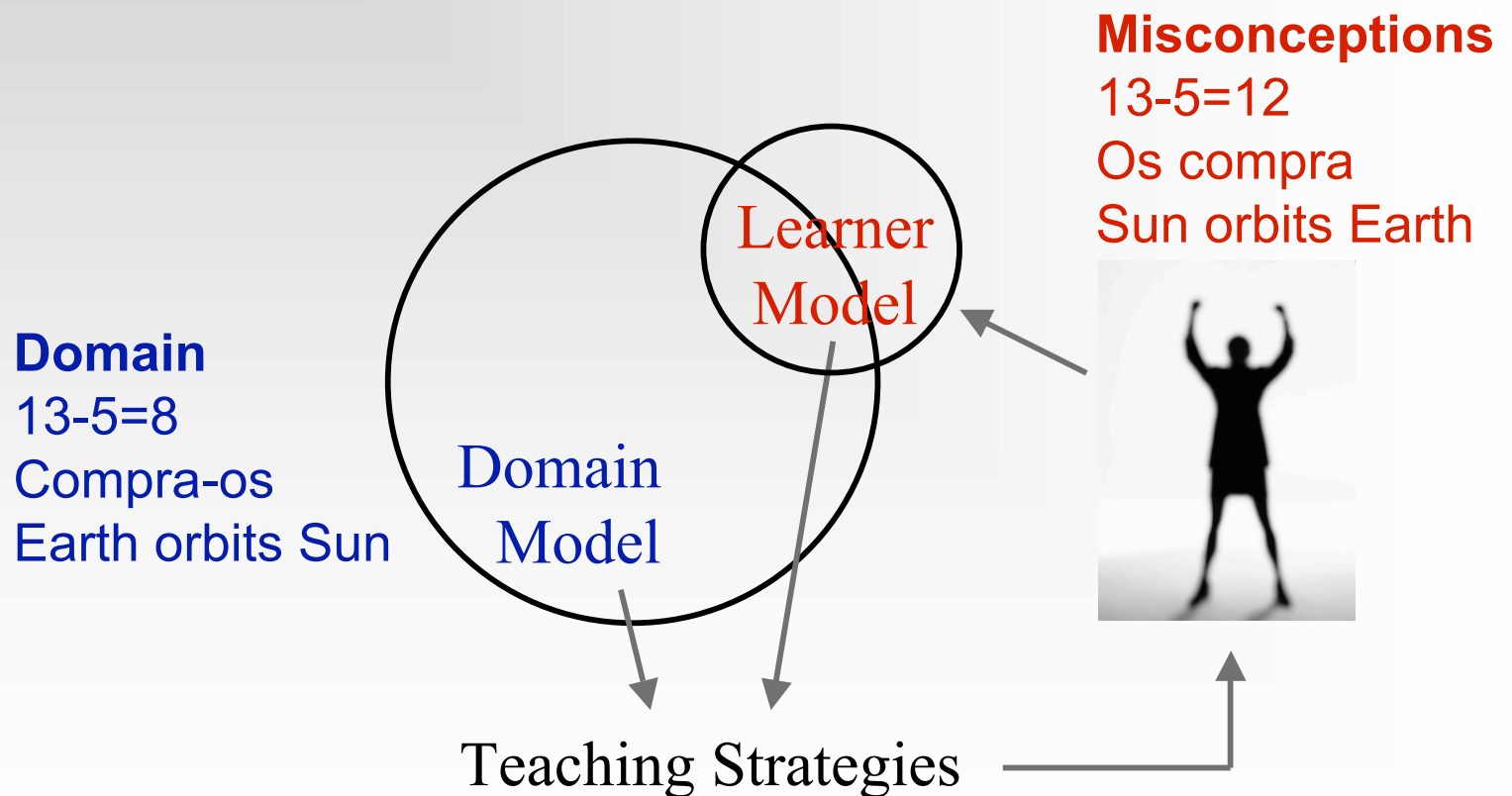
- adaptive (individualised) interaction



OLM

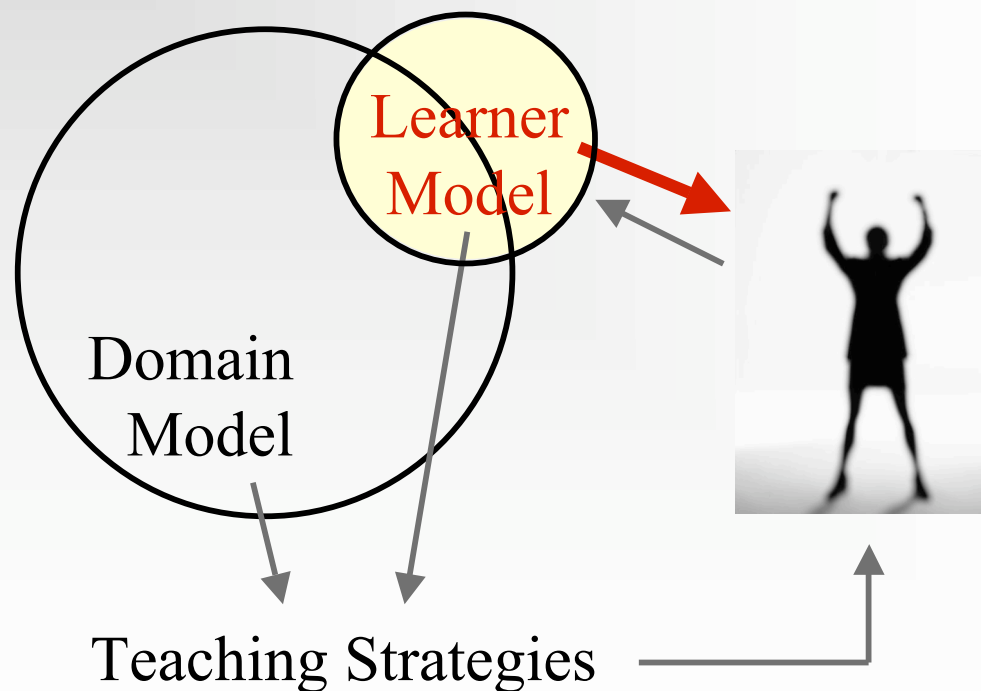
# Adaptive Learning Environments

- adaptive (individualised) interaction



# What is an Open Learner Model?

- Learning resource:  
reflection on knowledge and learning
- model accuracy, navigation...

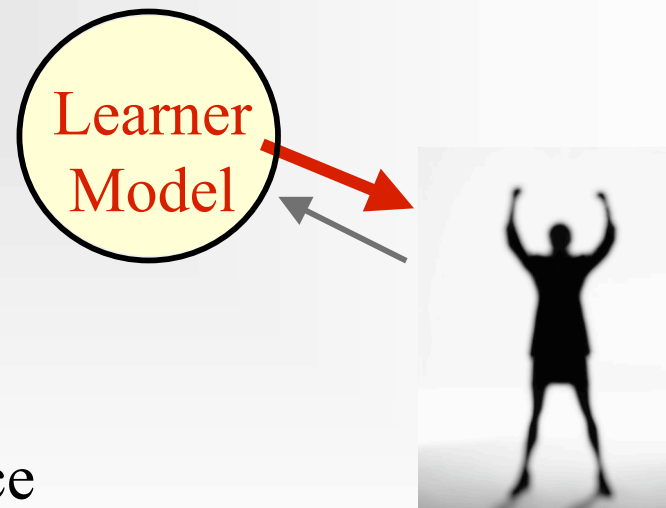


# OLM

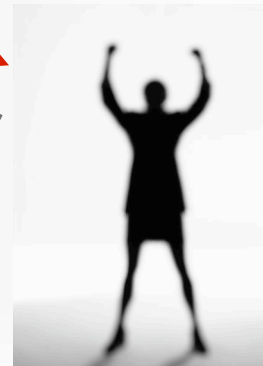
## What is an Open Learner Model?

---

- Learning resource:  
**reflection on knowledge and learning**
- model accuracy, navigation...



encourage learner  
autonomy/independence



I

I

C

A

L

L



# OLM

# What is an Open Learner Model?

Thanks to:

Inderdip Gakhal

Mohammed Ghani

Piyush Kathuria

Lisa Ko

Stella Lee

Luke Lim

Andrew Mabbott

Manveer Mangat

Tom Marianczak

Josie Marsh

Adam Thomas McEvoy

Mark McKay

Theson Nghiem

Harpreet Pabla

The collage displays various components of the OLM system:

- AGGREGATE MODEL:** A hierarchical diagram showing the structure of a course or topic.
- Learner Model:** A visual representation of a student's knowledge state, often using a globe or similar metaphor.
- Sub Topic Ratings:** A table showing knowledge levels and relative sizes for different sub-topics.
 

Sub Topic Name	Knowledge	Relative Size
Introduction to ITS	100%	1.5
Domain Models	175%	0.8
- Sub Topic Ratings (Detailed):** A table showing ratings for specific titles.
 

Title	Rating
Introduction to ITS	100%
Domain Models	75%
Learner Models	50%
Teaching Strategies	0%
- Key Performance Indicators (KPIs):** A dashboard showing various metrics like 'Excellent. You are doing brilliantly...' and 'KEY' indicators.
- Conceptual Models:** Diagrams illustrating student understanding of concepts like 'Possible Misconceptions' and 'Follow the path to better understanding!'.
- Progress Tracking:** Bar charts and graphs showing progress over time for different topics.
- Learning Objectives:** Lists of topics and their associated learning goals.
- Visualizations:** Various charts and graphs used to represent data and progress.
- Feedback and Reflection:** Screens for 'What your tree means' and 'Misunderstanding in Topic 1'.

# OLM

## Brief Overview of the OLM Field

---

Self (1988)

why keep the learner model hidden from the learner?



early 1990s: complex interactive open learner models  
*model accuracy, learner reflection*

Bull – negotiated LMs

Kay – learner add evidence

mid 1990s:  
Dimitrova,  
Morales,  
Zapata-Rivera

mid 1990s: simple inspectable skill meters  
*learner reflection, navigation*

Brusilovsky, Bull, Corbett,  
Mitrovic, Papanikolaou, Weber

2006: simple and complex open learner models

OLM

# Why have an Open Learner Model?

---

I

"I don't really believe that, do I?"

Confront students with their problems

Focus on knowledge, NOT on questions/answers



C

A

L

L

"Well, yes, I suppose I do..."

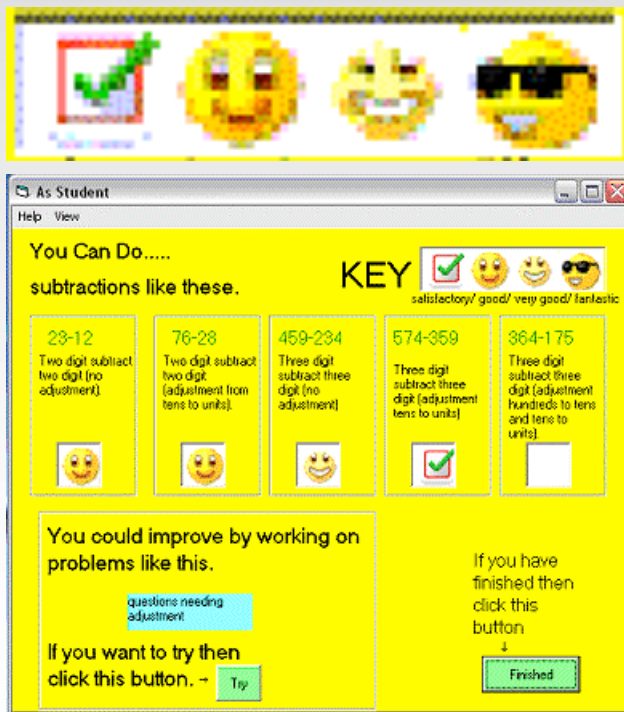
OLM

# Different Presentation Methods

simple representations for children

Bull & McKay (2004)

Subtraction Master  
8-9 year olds



Bull et al (2005)

Wandies Magical World of English  
7-8 year olds



I

I

C

A

L

L

OLM

# Different Presentation Methods

Wandies

simple representations for children

- children aged 7-8 used individually or in pairs
- understood their OLM
- keen to practise to obtain gold wands  
(practised during lunch break to improve for afternoon)
- general improvement - more from paired students
- raised awareness of educational needs
- developed a 'team spirit'
- helped each other *outside* pairings (if saw red wands)
- increased interest in communication with peers,  
supporting each other



OLM

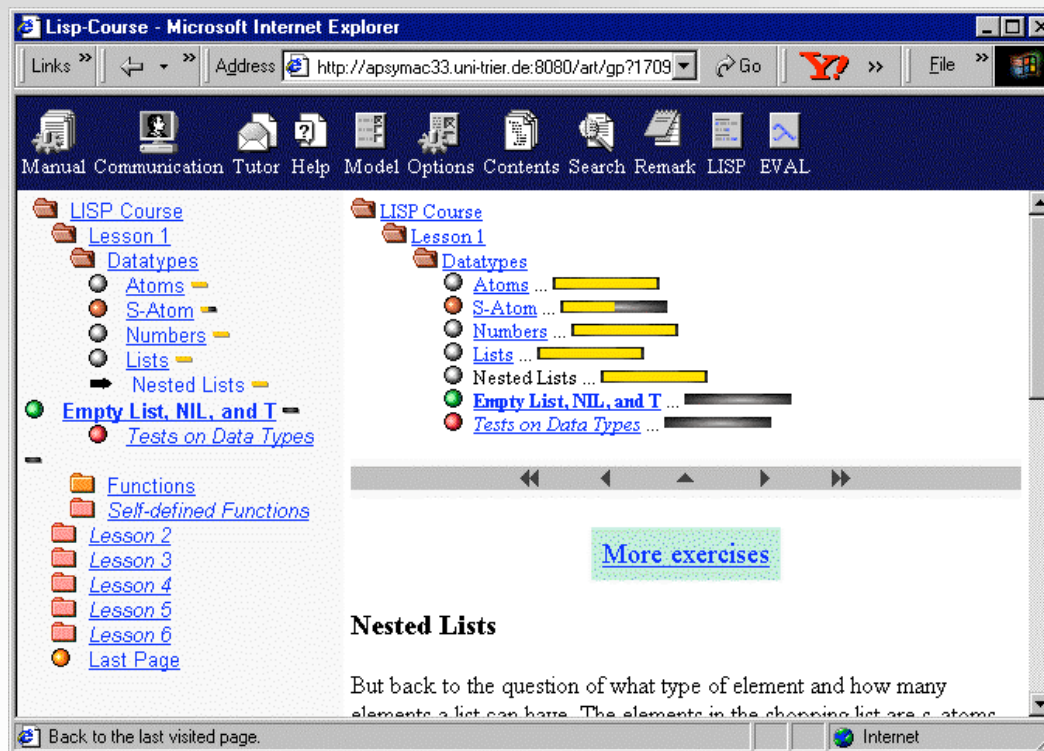
# Different Presentation Methods

simple representations for adults

Weber & Brusilovsky (2001)

most common: skill meters

ELM-ART



I

I

C

A

L

L

OLM

# Different Presentation Methods

simple representations for adults

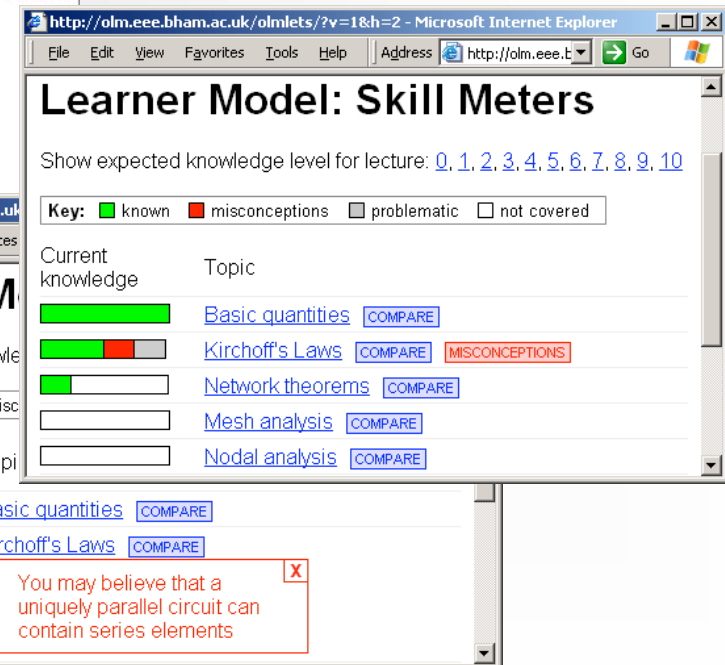
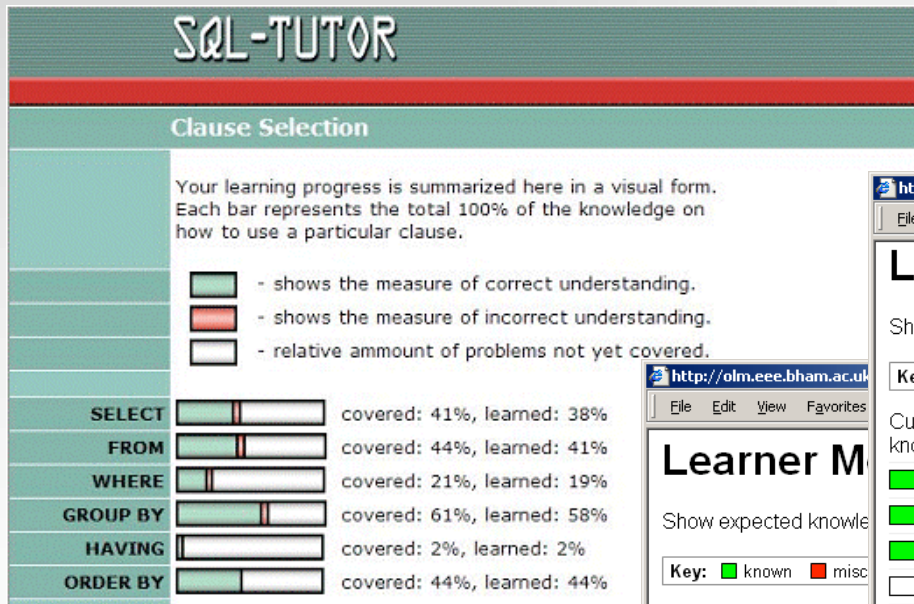
Mitrovic & Martin (2002)

extended skill meters

SQL Tutor

Bull & Mabbott (2006)

OLMlets



I

I

C

A

L

L

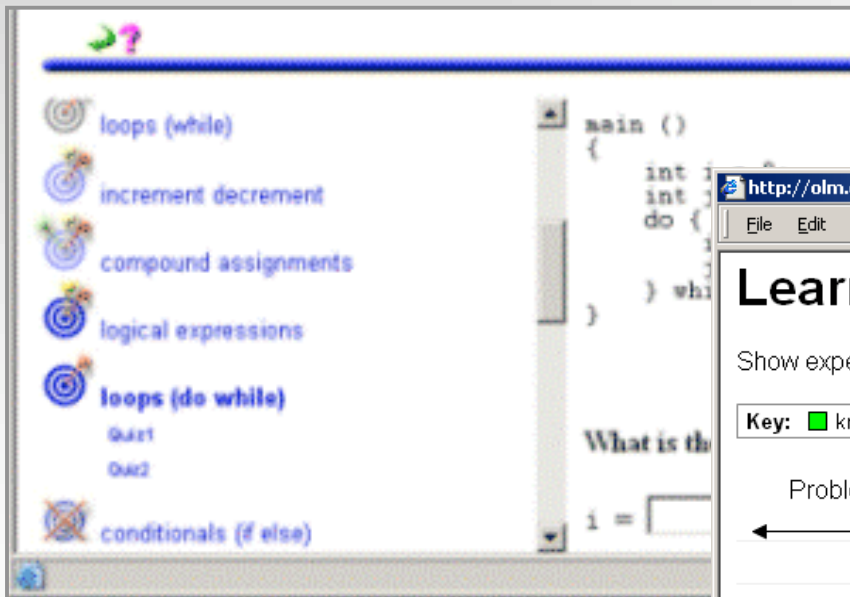
# Different Presentation Methods

simple representations for adults

Brusilovsky & Sosnovsky (2005)

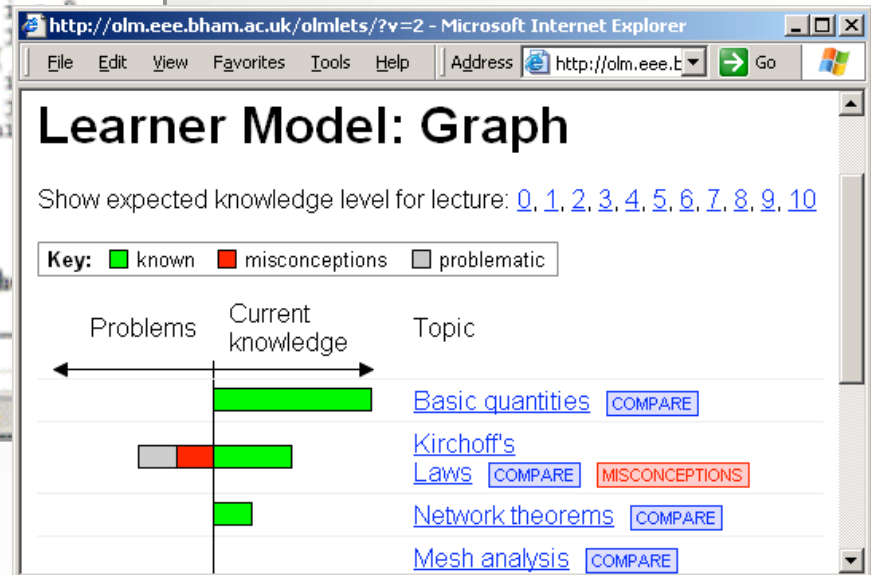
other simple representations

Quiz Guide



Bull & Mabbott (2006)

OLMlets



- arrows: knowledge level
- colour intensity of target: current relevance of topic

negative | positive



# Different Presentation Methods

## OLMlets

## simple representations for adults

• “Using the skill meters gave me a target which was to fill them to the top.”



• “I found that the problematic being indicated by grey was very clever as we do sometimes find ourselves in the grey area, this colour helped me understand that I do in fact have some grey areas in certain topics which do require me to look over certain parts of the topic.”

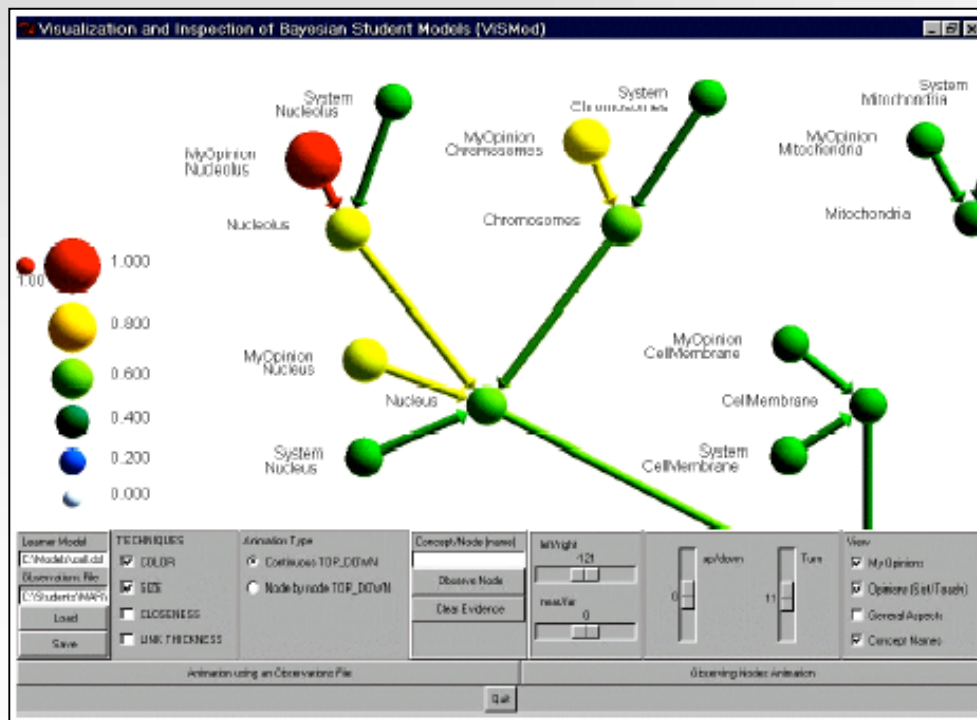
• “Overall OLMlets was very useful. I found it frustrating at times trying to get my knowledge meters to full but after going away and reading, these problems were overcome, which is the aim of OLMlets.”

# Different Presentation Methods

more complex representations

Zapata-Rivera & Greer (2004)

Vis-Mod



presentation of a Bayesian network

- colour of nodes

- size of nodes

OLM

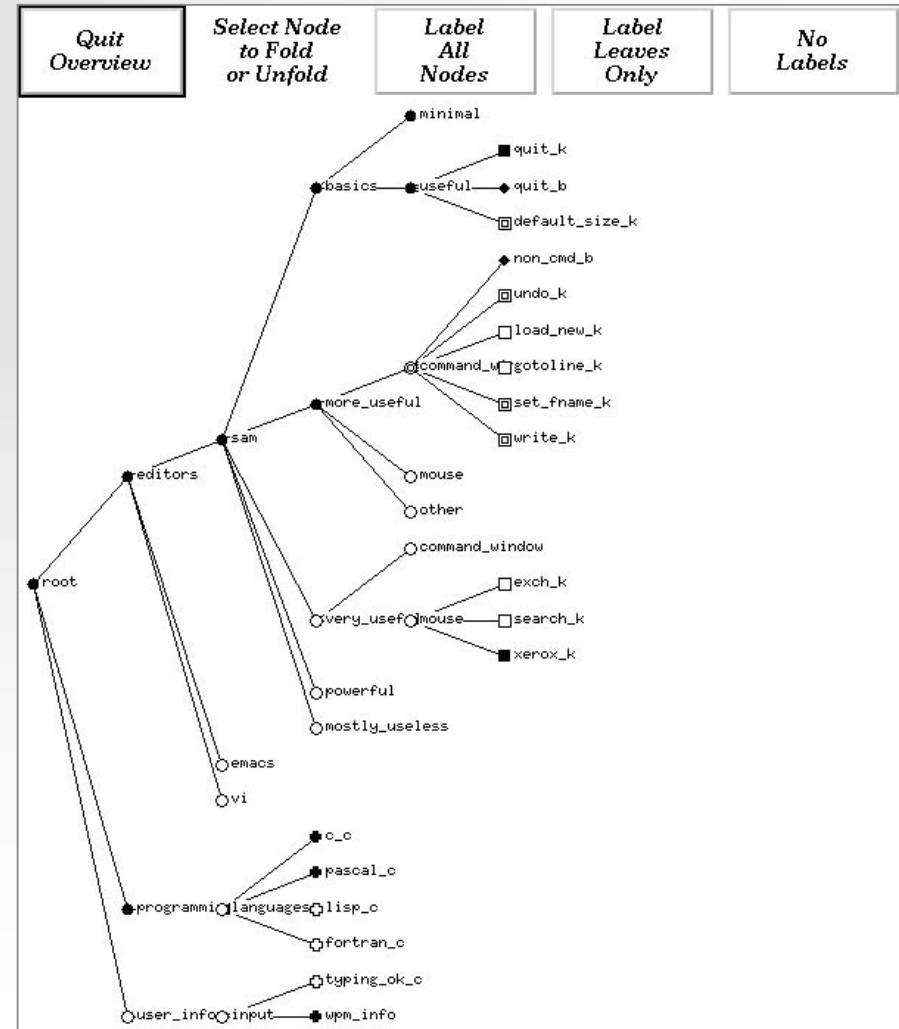
# Different Presentation Methods

more complex representations

Kay (1997)

sam-coach

- tree structure
- expand/collapse node
- knowledge level represented in nodes



OLM

# Different Presentation Methods

more complex representations

Kay & Lum (2005)

SIV

The screenshot shows the SIV interface with a search bar and navigation buttons. The main area displays a concept expansion for 'prototyping' with a score of 0.98. The interface includes a 'Term Expansion' panel on the left and a 'Current concept' panel on the right. The 'Current concept' panel shows the concept 'prototyping (0.98)' and provides evidence from various sources, including audio and tutorials, with links to 'Show/Hide Evidence'.

Views: [My User Model](#) | [Me vs. Average](#) | [Average of Class](#)

Current concept: [Show evidence](#)

**Concept: prototyping (0.98)**

You are performing better than average.

Audio Evidence (raw 0.80, contribution 0.20) [Show/Hide Evidence](#)  
 The lecture slide [PredCognitive/3](#) was attended for a duration of 66 seconds.  
 The lecture slide [ScreenBackground/11](#) was attended for a duration of 207 seconds.

Tutorial Evidence (raw 1.00, contribution 0.75) [Show/Hide Evidence](#)  
 The tutorial [Week/07](#) has a mark of 10 out of 10.  
 The tutorial [Week/10](#) has a mark of 10 out of 10.  
 Note - tutorial evidence is weighted higher than audio evidence in resolving the final score shown above.

Inferred Evidence (contribution 0.03) [Show/Hide Evidence](#)  
 This extra contribution has been inferred from the terms visible at depth 2.

size, colour and position of words; explanations of the evidence shown

I

I

C

A

L

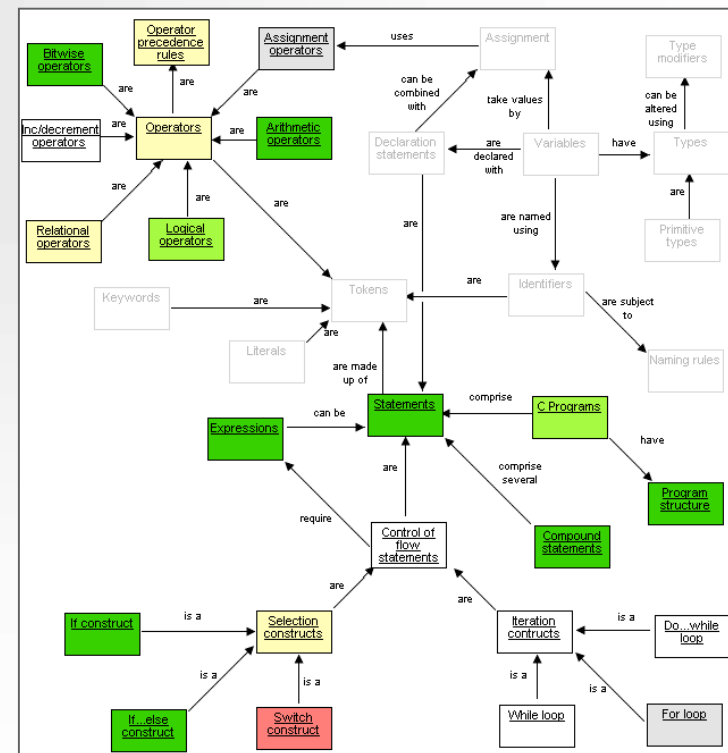
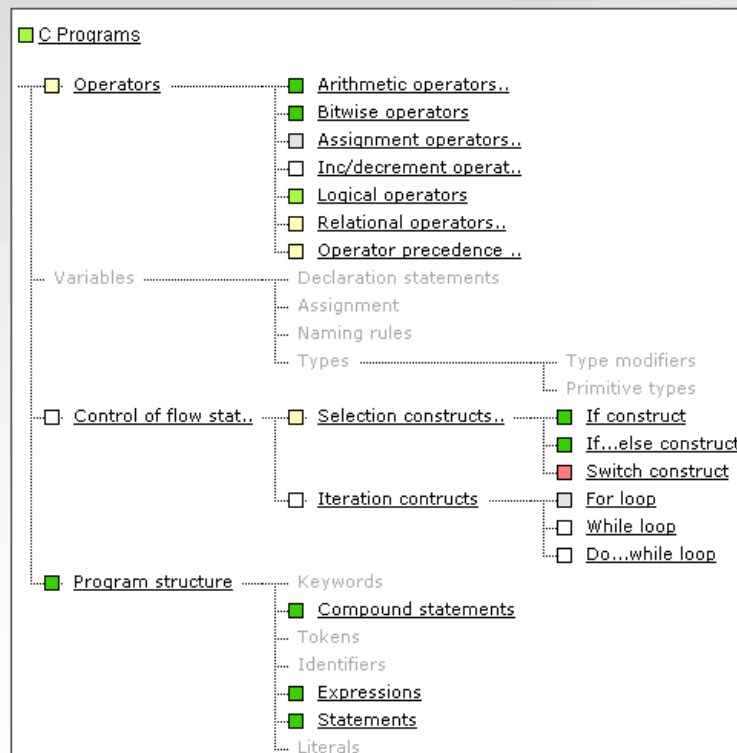
L

# Different Presentation Methods

more complex representations

Mabbott & Bull (2006)

## Flexi-OLM



colour of nodes and structure of domain

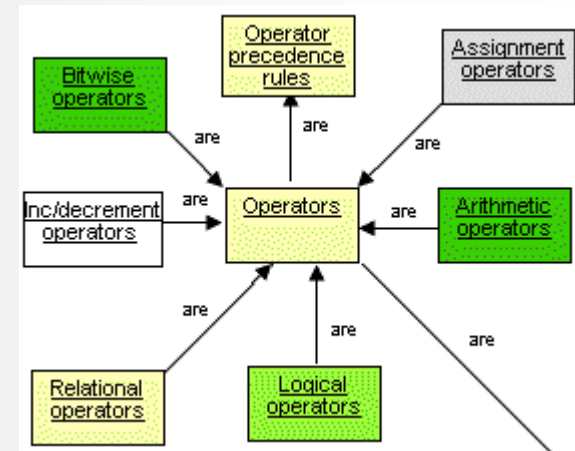
# OLM

## Different Presentation Methods

### Flexi-OLM

more complex representations

- “I found it good to see the links between different topics, which greatly influenced which topics to look at next”



- “The concept map ... shows the relationship between all subject areas and where my weaknesses lie”

*Greater detail, relationships in domain information*

# Different Presentation Methods

---

I

- Underlying representations simple or complex

I

Presentation:

simple

simple

complex

C

- Range of learner modelling techniques

- Bayesian networks (Zapata-Rivera & Greer, 2004)

- Knowledge tracing (Corbett & Bhatnagar, 1997)

- Constraint-based modelling (Mitrovic & Martin, 2002)

L

⋮

L

OLM

# Why have an Open Learner Model?

---

I

Question:

I

C

- How could an open learner model help *you*?

A

L

L



# OLM

## Why have an Open Learner Model?

---

(Kay, 1997)

Students have  
the right to  
access their  
own data  
(Self, 1988)

- Awareness of knowledge
  - identify learning goals
  - learner responsibility
- What do I know?
- How well do I know X?
- What do I want to know? / Do I want to know X?
- How can I best learn X?
- How much knowledge is required to pass the exam?
- How much does the average student know?
- How much do the best students know?
- How much do experts know?
- How much does the instructor recommend knowing?

Privacy: who  
has access?

OLM

# Open Learner Models - Control

---

I

- Inspectable

I

- System Encourage
- Co-operative

C

- Persuasion

A

- Negotiated (collaborative)
- Student Add Evidence

L

- Editable

L

*control*



system



student

OLM

# Open Learner Models: *inspectable*

Bull & Mabbott (2006)

system's model of learner's knowledge

## OLMlets

Overview: knowledge level, difficulties, misconceptions

Misconception statements

The screenshot shows a web browser window with the URL <http://olm.eee.bham.ac.uk/olmlets/?v=1&h=2>. The page title is "Learner Model: Skill Meters". It displays a table of topics with progress bars and buttons to compare knowledge levels. A red box highlights a misconception statement for Kirchoff's Laws.

Current knowledge	Topic
	Basic quantities <a href="#">COMPARE</a>
	Kirchoff's Laws <a href="#">COMPARE</a> <b>MISCONCEPTIONS</b>
	Network theorems <a href="#">COMPARE</a>
	Mesh analysis <a href="#">COMPARE</a>
	Nodal analysis <a href="#">COMPARE</a>

**Misconception Statement:**

- You may believe that a uniquely parallel circuit can contain series elements

This is a zoomed-in view of the "Learner Model: Skill Meters" page. It shows the "Current knowledge" and "Topic" columns. The "Kirchoff's Laws" row is highlighted with a red box around the "MISCONCEPTIONS" label. A red box also highlights the misconception statement: "You may believe that a uniquely parallel circuit can contain series elements".

I

I

C

A

L

L




OLM

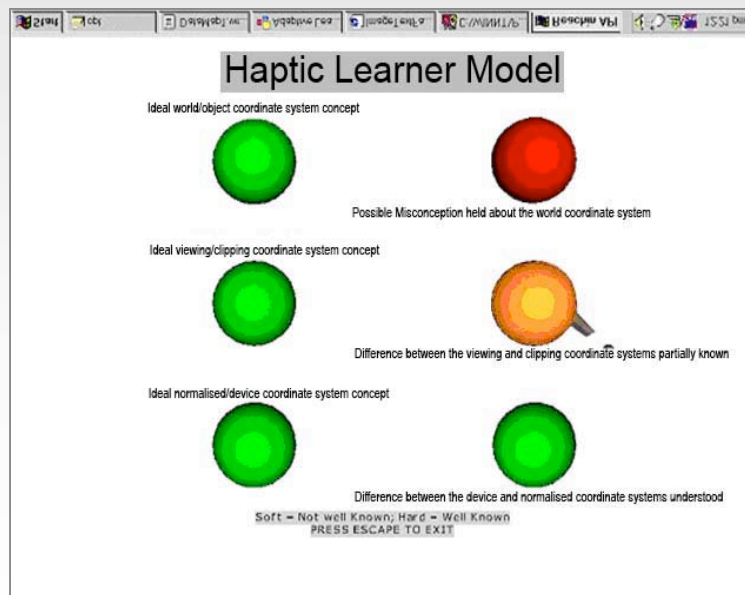
# Open Learner Models: **inspectable**

Lloyd & Bull (2006)

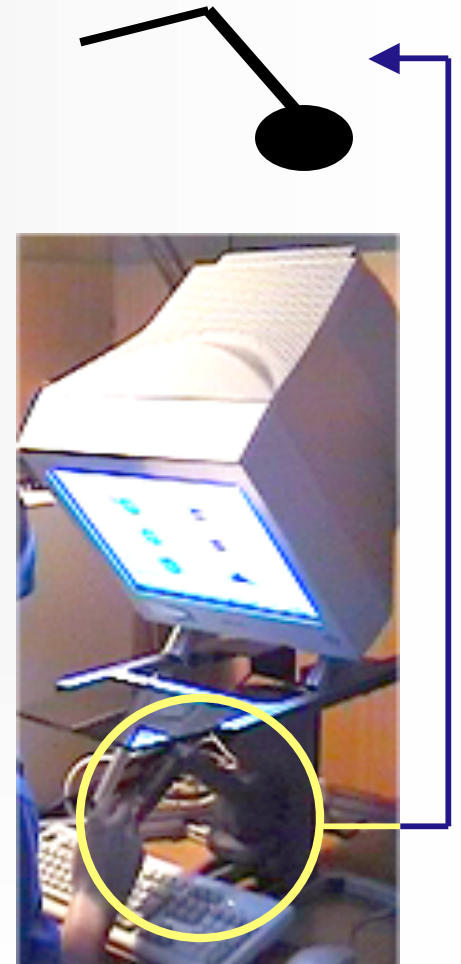
system's model of learner's knowledge

## Haptic Learner Model

-  known well - hard
-  partly known - soft
-  misconception - soft & sticky



- 3D tactile objects
- Phantom
- Reaching Display Unit



I  
I  
C  
A  
L  
L

# OLM

## Open Learner Models: encourage

Grigoriadou et al (2003)

HTC

Historical Text  
Comprehension

- student led towards identifying difficulties

- once problems recognised, learner can change model

system encourages learner to change model

I INSIST in my position that the LIVING CONDITIONS ARE THE MOST IMPORTANT REASON.

Let us consider that the living conditions as a reason for the French revolution didn't exist. Do you believe that the French revolution would have happened?

I believe that the French revolution would have NOT HAPPENED.

But the French revolution has happened. What is your logical conclusion?

The LIVING CONDITIONS ARE NOT THE MOST IMPORTANT REASON.

OLM

# Open Learner Models: **co-operative**

Beck et al (1997)

jointly constructed model of learner's knowledge

MFD

(Mixed Numbers,  
Fractions, Decimals)

- Information that cannot be inferred by the system
- Information that is more easily obtained from the student
- Information to initialise the learner model

How well do you think you understand: dividing whole numbers

Perfectly

Pretty well

Ok

Not so well

Need more work on this

OK

OLM

# Open Learner Models: persuasion

Bull et al (2007)

student can prompt, system has control

UMPTTEEN

http://localhost:800/umpteent/model.php - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Address http://localhost:800/umpteent/model.php Go Links

## Learner Model for Michael Lloyd

[Show help for this page](#)

Number of stars used to represent a topic  Update (Must be between 3 and 20)

### Current Model

★★★★☆ Overall understanding of the subject

**Topics rated as good**

★★★★★ Pre-increment and post-increment

**Topics rated as fair**

★★★★★ Array index

**Topics with misconceptions**

★★★★★ Do-while and while loops

- you may believe that while loop and do-while loop are equivalent

**Untested topics**

The break keyword used inside switch statements

Bitwise and logical operators

If you disagree with the system's model of your understanding, use the checkboxes to select topics you wish to attempt more questions on.

Retest selected

### Model History

**Do-while and while loops**

29th November 2005 at 12:16 ★★★★★

- you may believe that while loop and do-while loop are equivalent

**The break keyword used inside switch statements**

No questions have been answered on this topic

*request test  
to update  
learner  
model*

I

I

C

A

L

L

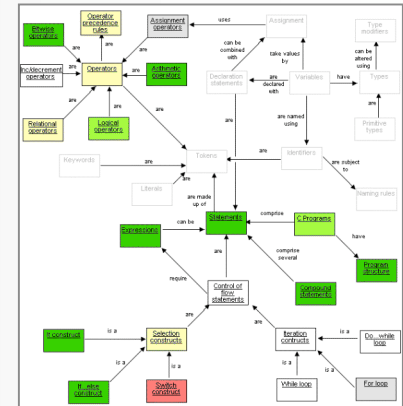
OLM

# Open Learner Models: persuasion

Mabbott & Bull (2006)

student can prompt, system has control

## Flexi-OLM



http://localhost:800/flexi-olm\_old/persuade.php?t=40 - Microsoft Internet Explorer

File Edit View Favorites Tools Help Links >>

Address http://localhost:800/flexi-olm\_old/persuade.php?t=40 Go

Hierarchy Lectures Concept Map Prerequisites Index Ranked Summary

### Persuade

#### Arrays

Here are some of your incorrect responses that suggest you may hold misconceptions.

Question	Your response
Study the array initialisation below.	
<code>float y[]={1.3,4.5,6.1,7.5,10.0,11.1};</code>	1.3
What is the value of <code>y[1]</code> ?	

If you still wish to persuade the system, click proceed below, and the system will ask you a series of questions. If your answers convince the system that your assessment is correct, your model will be updated.

Proceed Cancel

*evidence*

*request test to update learner model*

I

I

C

A

L

L



# Open Learner Models: **negotiation**

Bull & Pain (1995)

Mr Collins

joint control

viewing the learner model

- So far this session you have attempted 13 NEGATIVE sentences.
- Your total number of correct sentences with this structure is: 9.
- **From your most recent performance the system believes you to have a perfect command of the rule used in NEGATIVE CLAUSES.**
- So far this session you have attempted 7 sentences with a DECLARATIVE VERB-PRONOUN structure.
- Your total number of correct sentences with this structure is: 2.
- **From your most recent performance the system believes you to have a shaky knowledge of the rule for AFFIRMATIVE MAIN CLAUSE STATEMENTS.**

**The pronoun is:**

- Pre-verbal in negatives  
e.g. Não os compra

- Post-verbal in positive main clauses  
e.g. Compra-os

**Your  
confidence**

**System  
confidence**

unsure

very sure

almost sure

unsure

# Open Learner Models: **negotiation**

Bull & Pain (1995)

Mr Collins

student has control

changing the student's beliefs

Currently your own confidence in your use of the rule applicable in positive main clause statements is: 'almost sure'. (system's confidence = 'unsure')

What is your new confidence level?:

very sure

unsure

very unsure

You have changed your confidence measure from 'sure' to 'very sure'. This new confidence value is a lot higher than that of the system. The two confidence measures are incompatible. Your last five attempts to place the pronoun in positive main clause statements were the following:

\*O Manuel a mostrou no mapa.

\*O Manuel mostrou a no mapa.

O Manuel mostrou-a no mapa.

\*O homem o comeu rapidamente.

O homem comeu-o rapidamente.

These recent attempts demonstrate that you are having difficulties. Confidence measure 'very sure' is too high for your proficiency. What do you wish to do?

view student model

system justify itself

keep new belief

change my belief

# Open Learner Models: **negotiation**

Bull & Pain (1995)

Mr Collins

system has control  
challenging the system's beliefs

The system's confidence in *your use* of the rule for positive main clauses is currently: 'unsure'. What do you believe the system's confidence should be?

very sure

almost sure

very unsure

Your choice of 'very sure' is very different from the system's assessment.

What do you wish to do?

accept system's decision

view student model

accept compromise

system justify itself

justify myself

You are trying to change the system's confidence measure from 'unsure' to 'very sure'. This new confidence value is too high. Your last five attempts to place the pronoun in positive main clause statements were the following:

\*O Manuel a mostrou no mapa.

\*O Manuel mostrou a no mapa.

O Manuel mostrou-a no mapa.

\*O homem o comeu rapidamente.

O homem comeu-o rapidamente.

These recent attempts demonstrate that you are having difficulties.

You have probable transfer from Spanish for pronoun placement twice.

You have omitted the hyphen once.

You have only two correct sentences in your last five attempts.

OLM

# Open Learner Models: negotiation

Dimitrova (2003)

joint control

STYLE  
OLM

Conceptual  
graphs

Dialogue  
games

The screenshot shows the STyLE-OLM demo version 2.1 interface. At the top, there is a menu bar with 'File' and 'Help'. Below the menu bar is a toolbar with various icons for navigation and editing, including a mouse cursor, a green square, a green circle, a play button, a scissors icon for 'Cut', an 'Undo' button, and left/right arrow buttons. A 'DISCUSS' button with a smiley face icon is also present.

The main area displays a conceptual graph with nodes and arrows. The nodes include 'capital\_market', 'operate\_with', 'treasury\_bill', and 'short\_term\_investment'. The 'operate\_with' node is highlighted in green, and the 'treasury\_bill' node is highlighted in pink. A blue box with the text 'Justify: BECAUSE' is overlaid on the graph.

On the right side, there is a vertical stack of buttons: '< inform', '< inquire', 'challenge', 'disagree', 'justify', 'agree', 'suggest', 'skip', and 'SUBMIT'. The 'SUBMIT' button is highlighted in green.

At the bottom, there is a dialogue log with the following text:

```

4 : SYSTEM: [challenge]. WHY DO YOU THINK capital_market operates with short_term_investment.
0 : SYSTEM: [inquire]. DO YOU THINK Money market operates with short term investments.
1 : LEARNER: [agree]. I AGREE money_market operates with short_term_investment.
2 : SYSTEM: [inquire]. WHAT IS Capital market raises capital and operates with what?
3 : LEARNER: [inform]. I THINK capital_market operates with short_term_investment.
4 : SYSTEM: [challenge]. WHY DO YOU THINK capital_market operates with short_term_investment.

```

Buttons:

challenge

disagree

justify

agree

suggest

I

I

C

A

L

L

OLM

# Open Learner Models: negotiation

Van Labeke et al (2006)

joint control

xOLM

Inspection based on learner queries: e.g. ability to solve problems on [topic] competency, affect, motivation, metacognition, misconceptions

The screenshot shows the xOLM interface. On the left is a scrollable list of topics under the heading "Differential Calculus", including "Average Rate of Change", "Average Slope", "Basic Function Rules", "Chain Rule", "Change", "Constant Rule", "Curve", "Derivative", "Derivative at a Point", "Difference Quotient", "Differentiation", "Differentiation Rules", "First-order Derivative", "Function", "High-order Derivative", "Instantaneous Rate of Change", and "Instantaneous Slope". Above this list are checkboxes for "CAPEs", "Descriptor", "Affect", "Metacognition", "Domain", "Competency", and "Motivation". To the right is a grid of model components: "Metacognition", "Motivation", "Affect", "CAPEs", "solve", and "diff\_quotient". Below the grid is a "Tell me more" button. At the bottom is a chat window with a "Show me" button and several status buttons: "I'm Lost", "I am Baffled", "I Agree", "I Disagree", and "Move On". The chat window contains a message from "OLM" and a response from "toto".

Buttons:

agree

disagree

show me

I'm lost

I'm baffled

I

I

C

A

L

L

OLM

# Open Learner Models: negotiation

Van Labeke et al (2006)

xOLM

joint control

The screenshot displays the xOLM interface. At the top left, there is a zoom control. The main area contains a knowledge graph with nodes: '[diff\_quotient, , solve, , , ]', 'toto', 'Claim : Level I', 'Data', 'Evidence 3', 'Evidence 4', 'Evidence 0', 'Evidence 1', and 'Evidence 2'. Relationships include 'about', 'given', and 'since'. On the right, a progress bar shows levels I, II, III, and IV. The chat window at the bottom shows a dialogue between OLM and toto.

**Chat Log:**

- OLM: Welcome my dear toto.
- OLM: We didn't finish our discussion on [diff\_quotient, , solve, , , ] last time. Why don't we have a look again?
- toto: Yes, why not.
- toto: Show me what you think I know about [diff\_quotient, , solve, , , ].
- OLM: I think your are Level I about [diff\_quotient, , solve, , , ].
- toto: I don't understand why you think I'm Level I.
- OLM: Here is the evidence for me to think you are Level I
- toto: I don't understand how you obtained this profile.
- OLM: Here are all the individual pieces of evidence for me to think you are Level I

evidence supporting inferred level: I-IV

I  
I  
C  
A  
L  
L  
L

OLM

# Open Learner Models: negotiation

Kerly & Bull (2006)

joint control

CALM

Chatbot:

natural language

Untitled Page - Mozilla Firefox

This page shows your own beliefs about your understanding of this subject

The beliefs shown are calculated from those you have told the system either in the initial self-rating page, or when you have rated your confidence after attempting questions.

To view CALMsystem's beliefs about your understanding, use the System Beliefs link in the navigation menu, or the Compare Beliefs link to see how your beliefs differ from those of CALMsystem.

If you need an explanation for any of the beliefs you can talk to the chatbot. You can also tell the chatbot if you would like to update any of your beliefs. The chatbot may have a conversation with you about this, but your beliefs are personal to you, and you are free to disagree with the system if you can't accept its reasoning.

TopicName	Belief
Educational issues and what the module is about	slightly low confidence
Intelligent tutoring systems	slightly low confidence
Open learner models	very confident
Individual differences	slightly low confidence
Evaluation	slightly low confidence

To view your own beliefs about your understanding, use the My Beliefs link in the navigation menu.

If you need an explanation for any of the system's beliefs you can talk to the chatbot. You can also tell the chatbot if you feel any of CALMsystem's are wrong and need updating in some way. The chatbot may have a conversation with you about this, and you may be able to explain why CALMsystem's belief should be changed.

TopicName	Belief
Educational issues and what the module is about	excellent knowledge
Intelligent tutoring systems	low knowledge
Open learner models	excellent knowledge

Chatbot will go here

I

I

C

A

L

L

# Open Learner Models: add evidence

Czarkowski et al (2005)

SASY-unix

evidence

editing adds further evidence – interpreted by consumer program

(does not delete/alter existing evidence)

**Personalisation**

2 items removed  
5 items added

because your profile has:

- You want to get more than a pass grade [why?](#)
- You know the UNIX File System but haven't passed the quiz [why?](#)
- You want Henrik's hints [why?](#)
- You want UNIX jokes [why?](#)
- You want lots of practice quizzes [why?](#)

student adds evidence for consideration

Home Contents Your Profile Make Notes Change Topic Help

**UNIX File System overview**

**Personalisation**  
2 items removed  
5 items added

because your profile has:

- You want to get more than a pass grade [why?](#)
- You know the UNIX File System but haven't passed the quiz [why?](#)
- You want Henrik's hints [why?](#)
- You want UNIX jokes [why?](#)
- You want lots of practice quizzes [why?](#)

**UNIX Joke:**  
Costello calls Abbott with some questions about UNIX:  
Costello: What is the command that will tell me the revision code of a program?  
Abbott: Yes, that's correct.  
Costello: No, what is it?  
Abbott: Yes.  
Costello: So, which is the one?  
Abbott: No, 'which' is used to find the program.  
Costello: Stop this. Who are you?  
Abbott: Use 'who am i' not 'who r yoo'. You can also 'finger yoo' to get information about 'yoo'.  
Costello: All I want to know is what finds the revision code?  
Abbott: Use 'what'.

The File System is responsible for the management of data and files within your computer. It is responsible for storing your files on a permanent storage device (e.g. a hard-disk), allowing you to retrieve, view, modify and return them to storage.

In UNIX, all your data is stored in files and directories, in a hierarchical structure. A directory is a logical container of files and more directories. This is the same as the concept of folders in a Windows operating system. A UNIX file stores data, for example, text or an image.

**Did U know ?**

In actual fact, in UNIX directories are just special files that contain the names of the files they contain. However, the system knows to interpret these files differently to regular files. In UNIX, all data in the file system is stored as files and inodes. Inodes store system information about files that tell the file system where the data physically is stored on disk (i.e. the disk address of the data chunks).

A UNIX File System holds system files/directories user's private files/directories. Typically, the system administrator will restrict access to the system area and provide users with their own private areas.

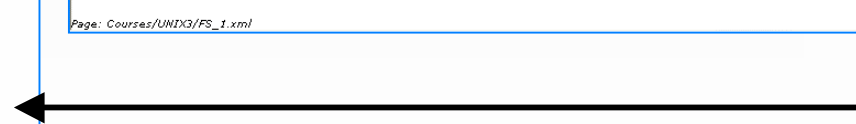
**Henrik's Hint :** This topic is here because you need to know these things:

- How to navigate around the file system
- How to use relative and absolute paths
- How to view the security permissions on a file or directory

According to your profile, you know about the UNIX File System but haven't passed the quiz:

You can either [review these topics](#) or [attempt the UNIX File System Quiz](#)

Page: Courses/UNIX3/FS\_1.xml





OLM

# Open Learner Models: **editable**

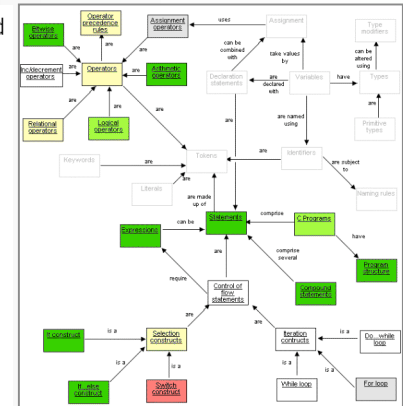
Mabbott & Bull (2006)

## Flexi-OLM

student has control

Here are some of your incorrect responses that suggest you may hold misconceptions.

Question	Your response
What would go in the declaration, for the array exactly by the supplied values? <code>char a[] = {'a', 'z', 'b', 'y', 'c', 'x'};</code>	5
What would go in the declaration below if you had six elements?	5



http://localhost:800/fo1e2/edit.php?t=40 - Microsoft Internet Explorer

File Edit View Favorites Tools Help Address http://localhost:800/fo1e2/edit.php?t=40

Hierarchy Lectures Concept Map Prerequisite

### Edit Learner Model

**Selected topic: Arrays**

Use the menus to set your new knowledge level for this topic.

define/initialise one-dimensional arrays

accessing one-dimensional arrays

define/initialise 2-dimensional arrays

accessing 2-dimensional arrays

**Misconceptions**

declaration specifies the highest index (rather than size)

Submit Cancel

*evidence*

*edit knowledge of concepts*

I

I

C

A

L

L

OLM

# Open Learner Models: **editable**

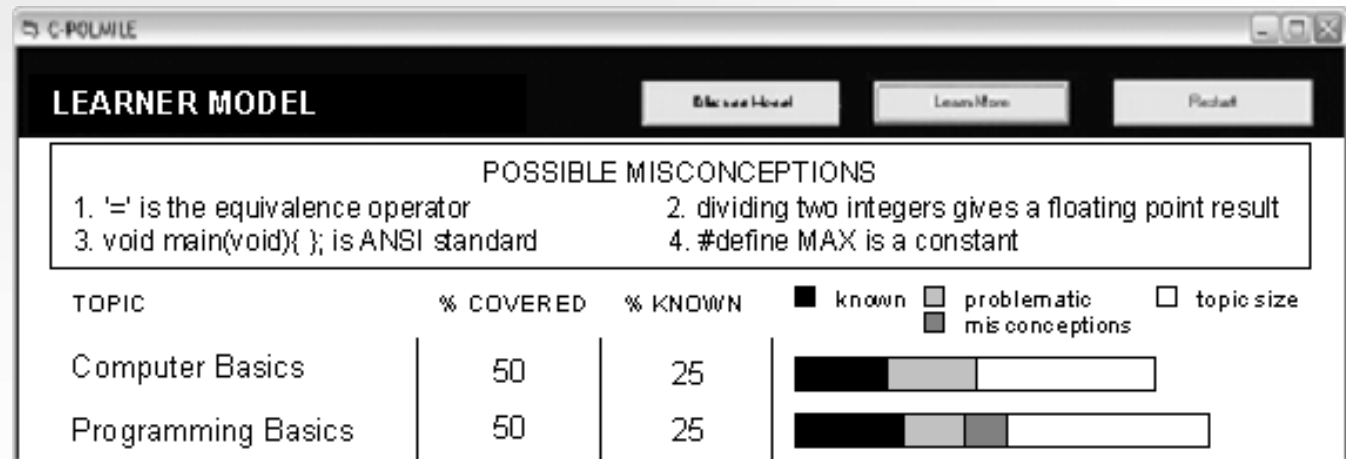
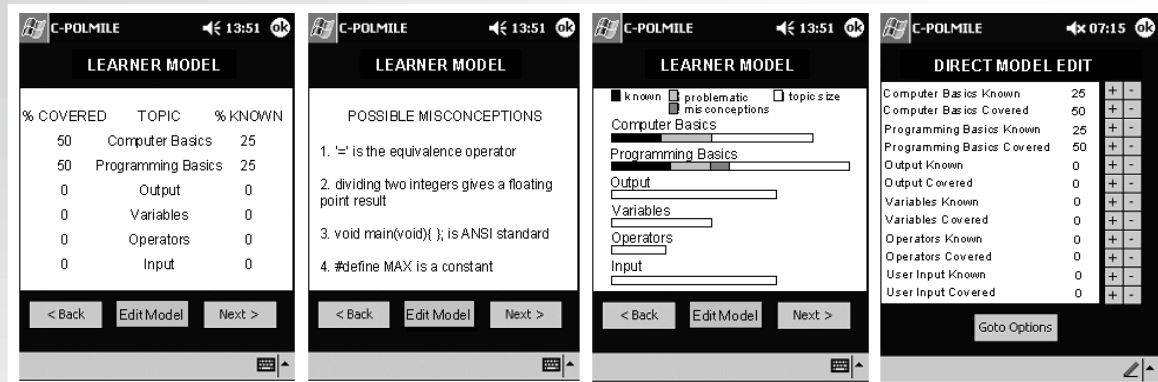
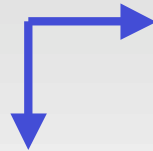
Bull & McEvoy (2003)

student has control  
**Handheld Computer**

## C-POLMILE

use  
across  
devices

edit to  
update



**Desktop PC**

I

I

C

A

L

L

OLM

# Open Learner Models: **editable**

Bull & McEvoy (2003)

student has control

## C-POLMILE

use  
across  
devices

edit to  
update

Topic	Known	Covered	+	-
Computer Basics	25	50	+	-
Programming Basics	25	50	+	-
Output	0	0	+	-
Variables	0	0	+	-
Operators	0	0	+	-
User Input	0	0	+	-

Goto Options

POSSIBLE MISCONCEPTIONS

- '=' is the equivalence operator
- dividing two integers gives a floating point result
- void main(void){ }; is ANSI standard
- #define MAX is a constant

< Back Edit Model Next >

% COVERED	TOPIC	% KNOWN
50	Computer Basics	25
50	Programming Basics	25
0	Output	0
0	Variables	0
0	Operators	0
0	Input	0

< Back Edit Model Next >

LEARNER MODEL

■ known □ problematic mis conceptions □ topic size

Computer Basics: [Progress bar]

Programming Basics: [Progress bar]

Output: [Progress bar]

Variables: [Progress bar]

Operators: [Progress bar]

Input: [Progress bar]

< Back Edit Model Next >

LEARNER MODEL

POSSIBLE MISCONCEPTIONS

- '=' is the equivalence operator
- dividing two integers gives a floating point result
- void main(void){ }; is ANSI standard
- #define MAX is a constant

TOPIC	% COVERED	% KNOWN	Legend
Computer Basics	50	25	[Progress bar]
Programming Basics	50	25	[Progress bar]

Legend: ■ known □ problematic mis conceptions □ topic size

I

I

C

A

L

L

# OLM

## Open Learner Models - Control

---

I

Inspectable models: frustrating if cannot change?

I

System encourage change: will students bother?

C

Co-operative models: will student want to give info?

A

Negotiated: will students bother?

L

Add evidence: frustrating if small/unnoticed change in model?

L

Editable models: can student accurately change info?

*Plenty of work still to do!*

OLM

# Open Learner Models - Control

I

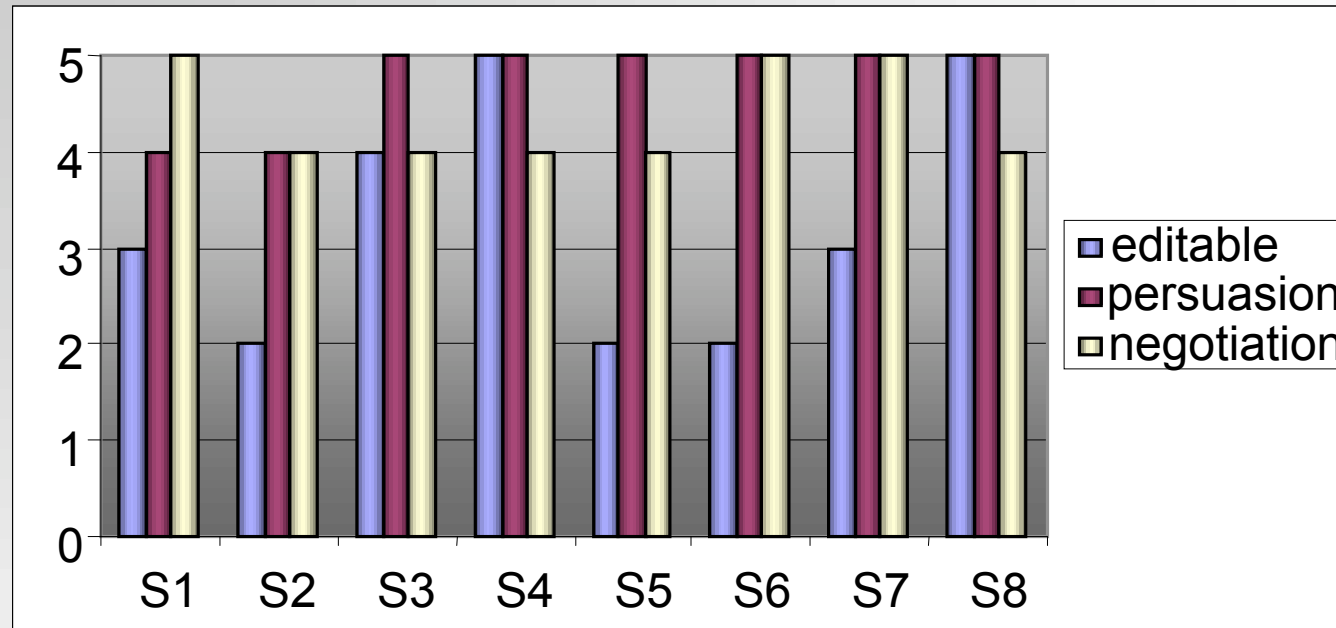
I

C

A

L

L

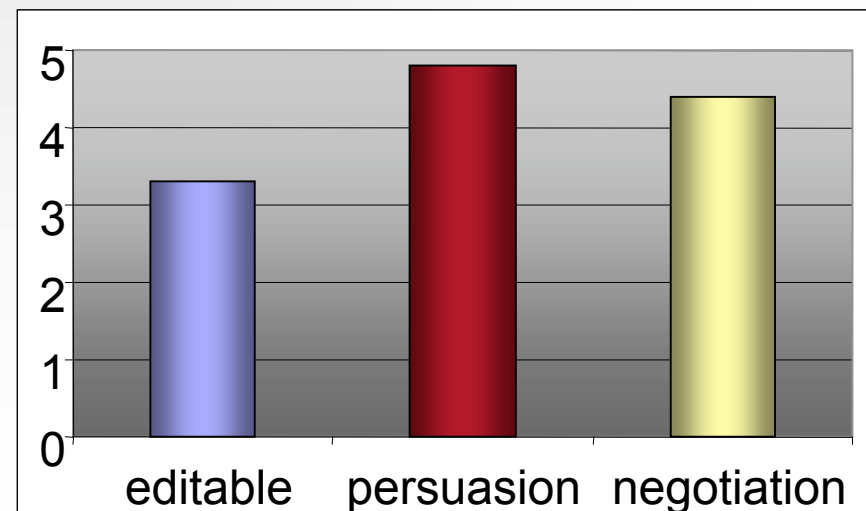


Mabbott & Bull (2006)

Flexi-OLM & Wizard of Oz study

How do students react to different OLM interaction methods?

Perceived utility of methods



## OLM

# Open Learner Models - Control

---

I

I

C

A

L

L

- “Editing allowed a way of cheating to improve your model.”
- “The edit function in my opinion could be abused... Though when used sensibly saved me the bother of covering topics I know I can do.”
- “I found the persuade function useful and liked the fact it would test me before changing my knowledge level.”
- “Persuading was extremely useful in forcing me to answer further questions and realise that I do lack knowledge in that topic.”
- “The persuasion function definitely improved my learning as it allowed me to keep persuading until I understood the topic.”
- “I saw negotiation as an opportunity to put it right if it was wrong and correct myself if it proved I was wrong.”
- “[In negotiation the system was] right most of the time, and never unreasonable.”

Flexi-OLM: Mabbott & Bull (2006)  
CALM/Wizard of Oz: Kerly & Bull (2006)

OLM

# Open Learner Models: multiple views

Lloyd & Bull (2006)

## Haptic Learner Model

The screenshot shows the Adaptive Learning Environment (ALE) interface. On the left is a navigation tree with categories like Syllabus, Learning Material, Lectures, Reading List, Code Examples, Forum, Course Notes, Learning Style, Tests, and Learner Models. The 'Learner Models' section is expanded, showing 'Tactile' models: 'TLM (Graphics Pipeline)', 'TLM (Illumination)', 'Standard', 'SLM (Graphics Pipeline)', and 'SLM (Illumination)'. The main window displays the 'Textual Learner Model' for the 'Graphics Pipeline'.

Graphic Pipeline Concepts		Overall
Confusion between object and world coordinates systems	<input type="text"/>	0%
Confusion between clipping and veiwing coordinates systems	<input type="text"/>	0%
Confusion between normalised device and device coordinates systems	<input type="text"/>	0%

Graphic Pipeline Misconceptions		Strength
Misconception about the world coordinate system	<input type="text"/>	4 out of 4
Misconception about the clipping coordinate system	<input type="text"/>	6 out of 6
Misconception about the device coordinate system	<input type="text"/>	4 out of 4

**Results of the last test**

Graphics Pipeline	<input type="text"/>	0 out of 18 attempted
Overall	<input type="text"/>	0 out of 18
Questions Remaining	<input type="text"/>	All Question Attempted

The screenshot shows the 'Haptic Learner Model' interface. It displays three coordinate system concepts, each with a haptic feedback icon (a sphere) and a description of the learner's understanding level:

- Ideal world/object coordinate system concept:** A green sphere (left) and a red sphere (right). Description: "Possible Misconception held about the world coordinate system".
- Ideal viewing/clipping coordinate system concept:** A green sphere (left) and a yellow/orange sphere (right). Description: "Difference between the viewing and clipping coordinate systems partially known".
- Ideal normalised/device coordinate system concept:** A green sphere (left) and a green sphere (right). Description: "Difference between the device and normalised coordinate systems understood".

Legend: Soft = Not well Known; Hard = Well Known  
PRESS ESCAPE TO EXIT

I

I

C

A

L

L

OLM

# Open Learner Models: *multiple views*

Bull et al (2005)

## The Fractionator

I  
I  
C  
A  
L  
L

The Fractionator software interface displays four different views of learner models:

- Top Right View:** A 2x2 grid with colored cells (yellow, blue, green, cyan) and a butterfly illustration. Text includes "The better you get, the more you will see." and a legend: VERY GOOD (yellow), GOOD (green), OK (cyan), KEEP TRYING (blue).
- Middle View:** A 3x3 grid of colored cells with text labels such as "Same denominator, no simplifying" (red), "Same denominator, simplifying needed" (red), "Unlike denominators, no simplifying to mixed numbers" (green), "Fantastical" (red), "Good" (green), "Mixed numbers, with same denominator" (green), "Mixed numbers, with unlike denominators" (red), and "Unlikely denominators, simplifying to mixed numbers needed" (green). A legend at the bottom shows: VERY GOOD (yellow), GOOD (green), OK (cyan), KEEP TRYING (blue).
- Bottom Left View:** A circular progress indicator labeled "Very good" with a yellow circle. Below it is a 3x3 grid of colored cells with text labels: "Same denominator, simplifying needed." (red), "Unlike denominator, no simplifying." (green), "Unlike denominator, simplifying needed." (yellow), "Mixed numbers, with same denominator." (red), "Mixed numbers, with unlike denominator." (cyan). A legend at the bottom shows: FANTASTICAL (red), VERY GOOD (yellow), GOOD (green), OK (cyan), KEEP TRYING (blue).
- Bottom Right View:** A flowchart titled "Follow the paths to better understanding!" showing relationships between colored boxes: "Same denominator, no simplifying" (red) branches to "Same denominator, simplifying needed" (red) and "Unlike denominators, no mixed numbers" (green). "Same denominator, simplifying needed" (red) branches to "Mixed numbers, with same denominator" (red) and "Unlike denominators, mixed numbers" (yellow). "Unlike denominators, no mixed numbers" (green) branches to "Mixed numbers, with unlike denominators" (yellow). "Unlike denominators, mixed numbers" (yellow) branches to "Mixed numbers, with same denominator" (red) and "Mixed numbers, with unlike denominators" (yellow). A legend at the bottom shows: FANTASTICAL (red), VERY GOOD (yellow), GOOD (green), OK (cyan), KEEP TRYING (blue).



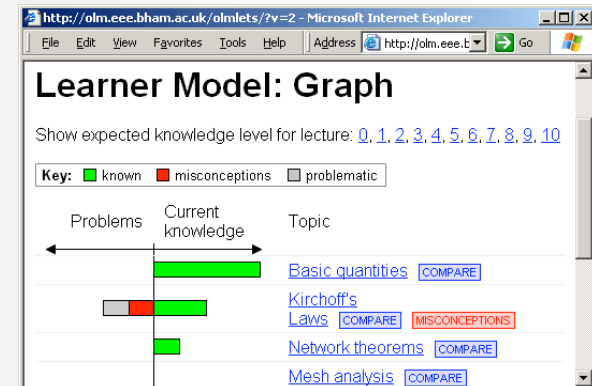
OLM

# Open Learner Models: **multiple views**

Bull & Mabbott (2006)

OLMlets

Simple individual views for deployment in a range of courses



**Learner Model: Text**

Show expected knowledge level for lecture: [0](#), [1](#), [2](#), [3](#), [4](#), [5](#), [6](#), [7](#), [8](#), [9](#), [10](#)

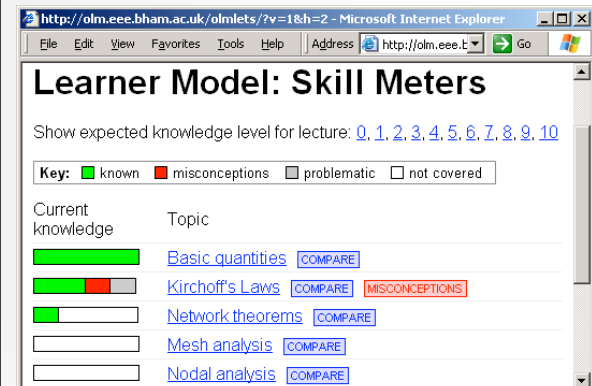
Your understanding of *Basic quantities* is very high. [COMPARE](#)

You may hold misconceptions about *Kirchoff's Laws*. [COMPARE](#) [MISCONCEPTIONS](#)

Your understanding of *Network theorems* is very low. [COMPARE](#)

Your understanding of *Mesh analysis* is very low. [COMPARE](#)

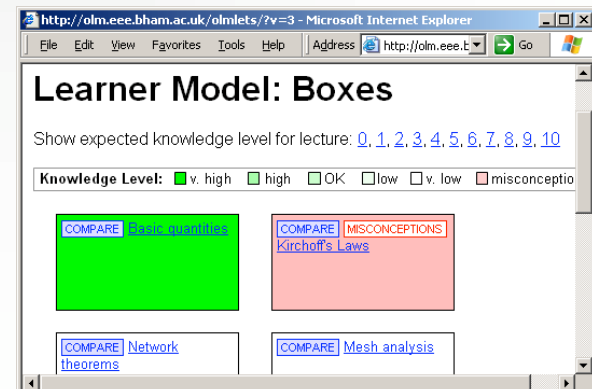
Your understanding of *Nodal analysis* is very low. [COMPARE](#)



**Learner Model: Table**

Show expected knowledge level for lecture: [0](#), [1](#), [2](#), [3](#), [4](#), [5](#), [6](#), [7](#), [8](#), [9](#), [10](#)

Level of knowledge	Topics currently at this level
very high	<a href="#">Basic quantities</a> <a href="#">COMPARE</a>
high	
OK	
low	<a href="#">Network theorems</a> <a href="#">COMPARE</a> <a href="#">Mesh analysis</a> <a href="#">COMPARE</a> <a href="#">Nodal analysis</a> <a href="#">COMPARE</a>



I

I

C

A

L

L

# Open Learner Models: multiple views

Mabbott & Bull (2006)

## Flexi-OLM

Simple and structured views

- Arithmetic operators
- Assignment operators
- Bitwise operators
- C Programs
- Compound statements
- Control of flow statements
- Do...while loop
- Expressions
- For loop
- If construct
- If...else construct
- Inc/decrement operators
- Iteration constructs
- Logical operators
- Operator precedence rules
- Operators
- Program structure
- Relational operators
- Selection constructs
- Statements
- Switch construct
- While loop

- If...else construct
- Compound statements
- Program structure
- Expressions
- Statements
- If construct
- Arithmetic operators
- Bitwise operators
- Logical operators
- C Programs
- Relational operators
- Operators
- Operator precedence rules
- Selection constructs
- Inc/decrement operators
- While loop
- Control of flow statements
- Iteration constructs
- Do...while loop
- Switch construct

There is insufficient data to assess your understanding of the following

- Assignment operators
- For loop

Overall, your understanding of basic C programming is moderate

You have misconceptions about the following topics: Switch construct

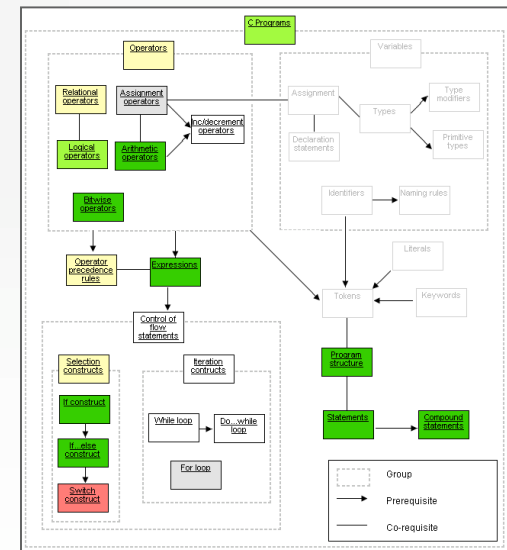
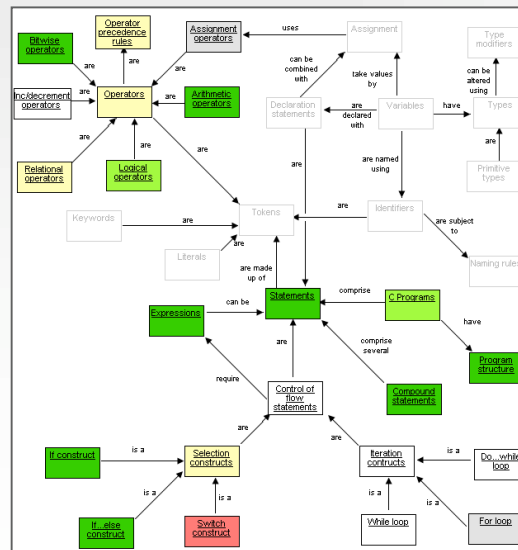
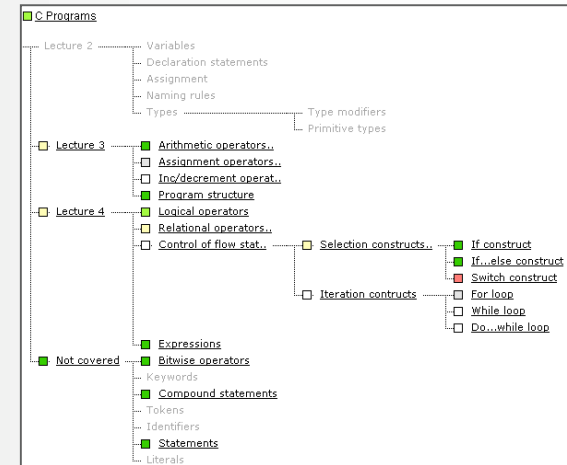
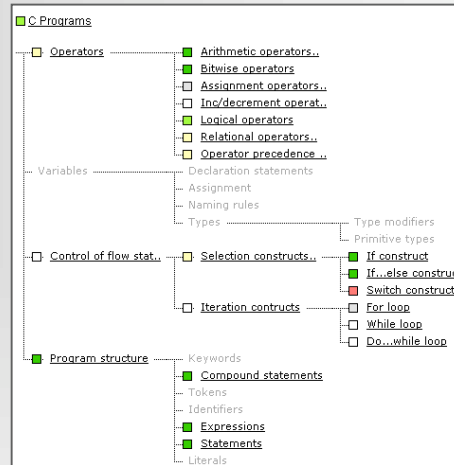
You have excellent understanding of the following topics: If...else construct, Compound statements, Program structure, Expressions, Statements, If construct, Arithmetic operators, Bitwise operators.

Your understanding of the following topics is moderate: Logical operators, C Programs.

Your understanding of the following topics is quite limited: Relational operators, Operators, Operator precedence rules, Selection constructs.

You do not understand following topics: Inc/decrement operators, While loop, Control of flow statements, Iteration constructs, Do...while loop.

The system has insufficient data to assess your understanding of the following topics: Assignment operators, For loop.



I  
I  
C  
A  
L  
L

# OLM

## Open Learner Models: **multiple views**

---

Is it worth having multiple views?

The Fractionator (children)

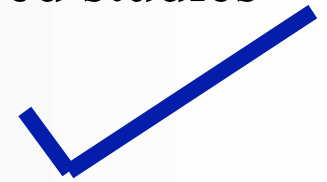
Haptic Learner Model (adults)

Flexi-OLM (adults)

OLMlets (adults)

} lab-based studies

} full deployments



*People have different preferences*

**OLMlets - user comments:**

- The graph view was less useful. The reason was because by having the grey and red areas separate it was difficult to see how much of the topic I had good knowledge of. In the skill meter I could tell more easily.
- The graph view is very much similar to the skill meter. They only differ as the graph has an axis. I found this view easier to interpret as there are results on both sides of the y axis.

OLM

# Open Learner Models: **multiple views**

---

Is it worth having multiple views?

The Fractionator (children)

Haptic Learner Model (adults)

Flexi-OLM (adults)

OLMlets (adults)

}

lab-based studies

}

full deployments



*People have different preferences*

## **Flexi-OLM - user comments:**

- The concept map was the most useful as it shows the relationship between all subject areas and where my weaknesses lie.
- Concept map is a bit complex compared to the others, making it a bit difficult to understand.

OLM

# Open Learner Models: **multiple views**

Is it worth having multiple views?

The Fractionator (children)

Haptic Learner Model (adults)

Flexi-OLM (adults)

OLMlets (adults)

} lab-based studies

} full deployments



*People have different preferences*

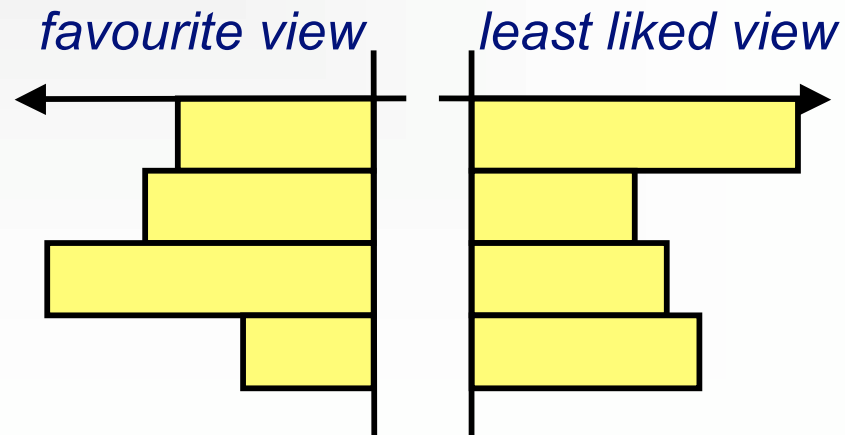
**Flexi-OLM - preferences:**

Related concepts

Lectures

Concept map

Pre-requisites



I

I

C

A

L

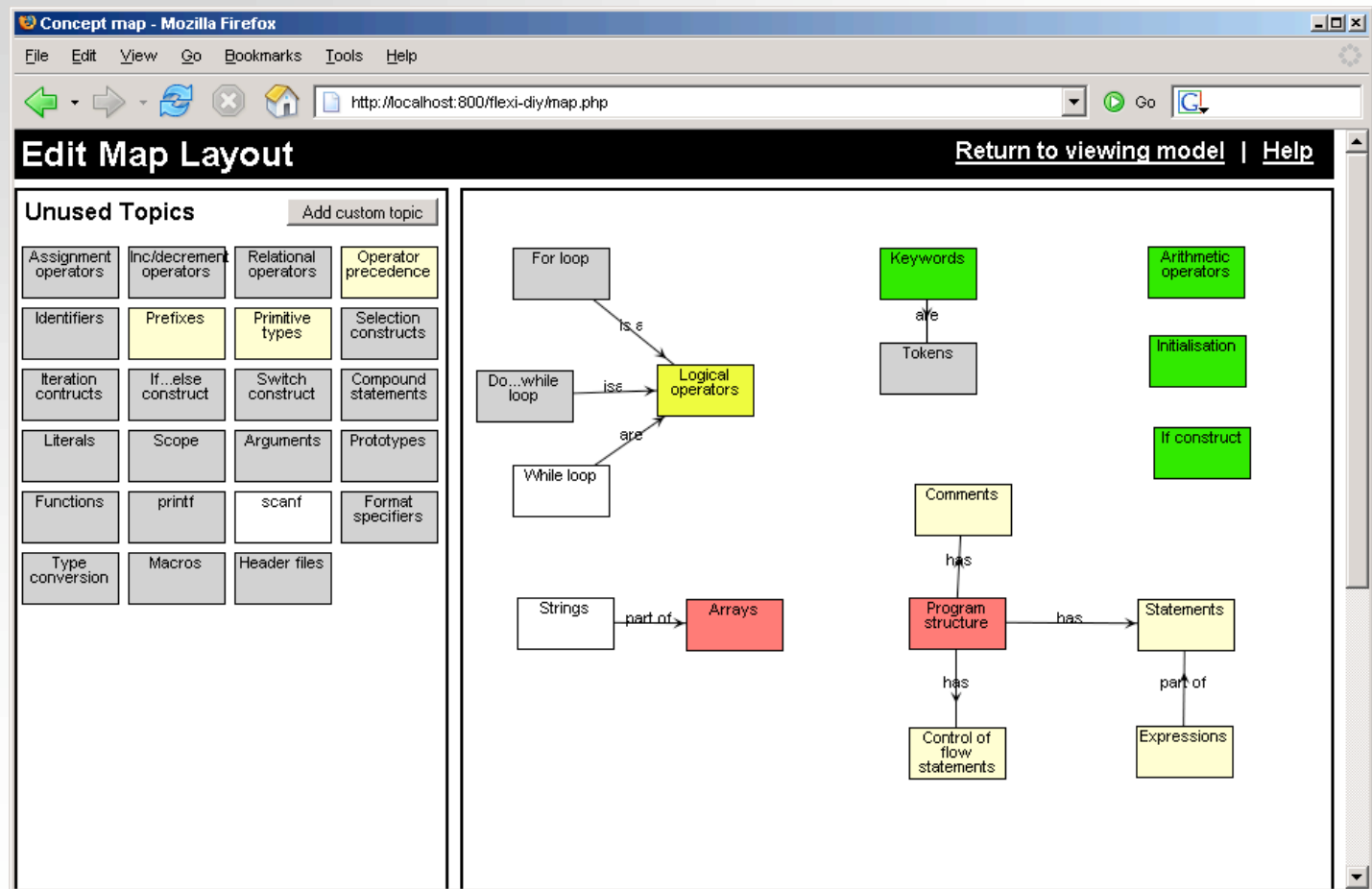
L

OLM

# Open Learner Models: **user constructed**

Mabbott (ongoing work)

Flexi-OLM: user-constructed views – drag and drop



I

I

C

A

L

L

OLM

# Open Learner Models: user constructed

Mabbott (ongoing work)

Flexi-OLM:  
user-constructed  
views (list)

I

I

C

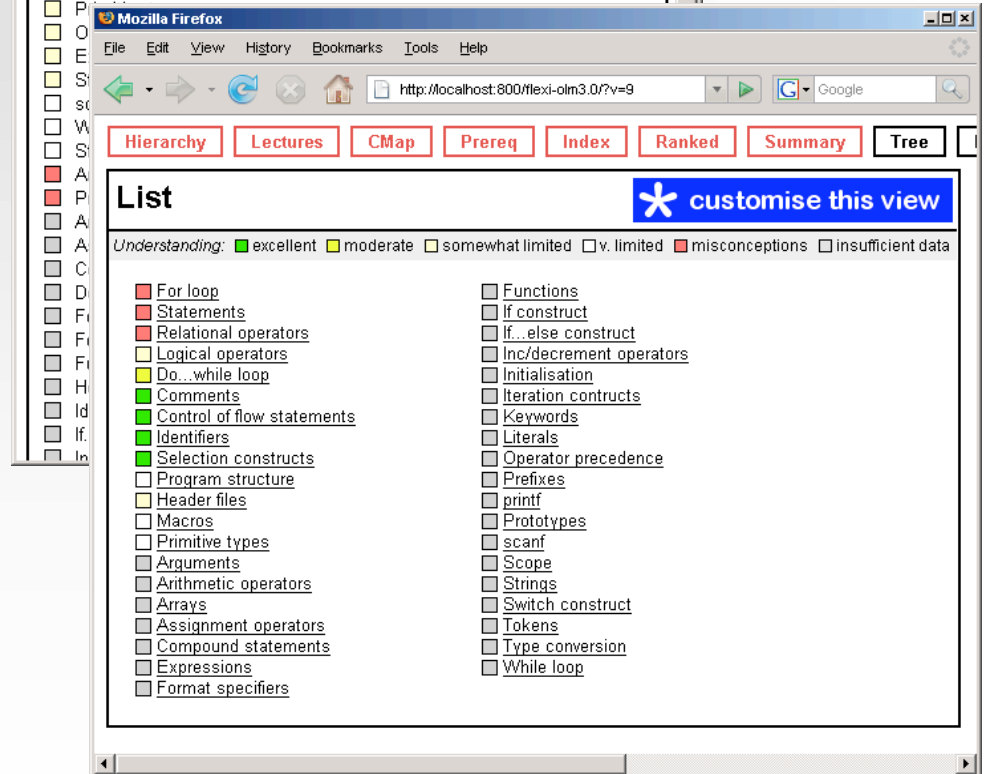
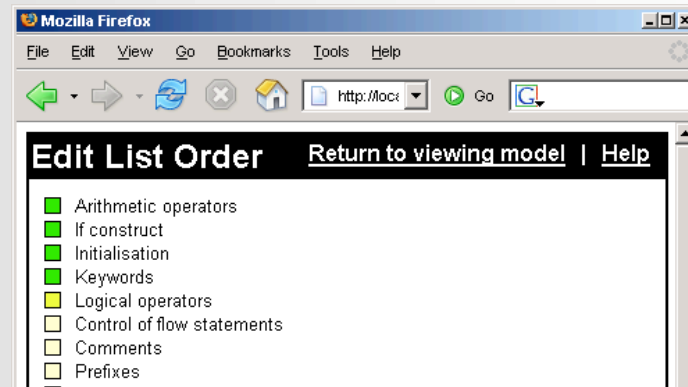
A

L

L

- Arithmetic operators
- Assignment operators
- Bitwise operators
- C Programs
- Compound statements
- Control of flow statements
- Do...while loop
- Expressions
- For loop
- If construct
- If...else construct
- Inc/decrement operators
- Iteration constructs
- Logical operators
- Operator precedence rules
- Operators
- Program structure
- Relational operators
- Selection constructs
- Statements
- Switch construct
- While loop

- If...else construct
  - Compound statements
  - Program structure
  - Expressions
  - Statements
  - If construct
  - Arithmetic operators
  - Bitwise operators
  - Logical operators
  - C Programs
  - Relational operators
  - Operators
  - Operator precedence rules
  - Selection constructs
  - Inc/decrement operators
  - While loop
  - Control of flow statements
  - Iteration constructs
  - Do...while loop
  - Switch construct
- There is insufficient data to assess your understanding of the following**
- Assignment operators
  - For loop



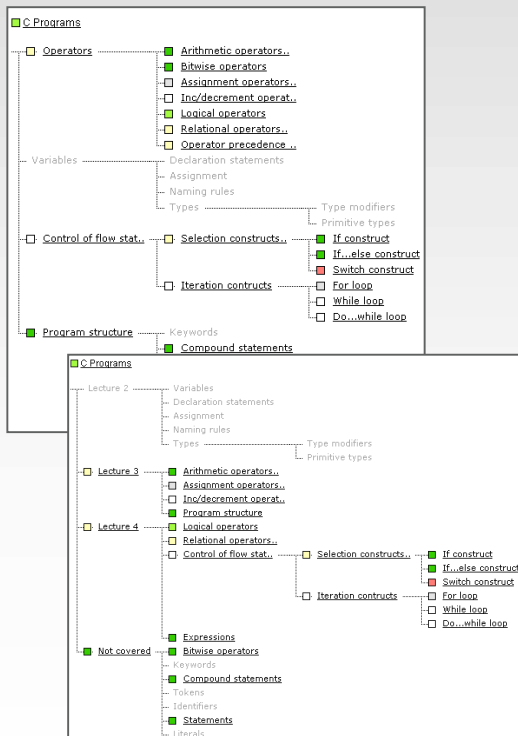
OLM

# Open Learner Models: user constructed

Mabbott (ongoing work)

## Flexi-OLM: user-constructed views (tree)

I  
I  
C  
A  
L  
L  
L



The top screenshot shows a browser window titled 'Flexi-OLM - Mozilla Firefox' with the URL 'http://localhost:8000/flexi-universal/Pv=7'. The interface includes a navigation bar with buttons for 'Tree', 'Map', 'List', 'Test Questions', 'Help', and 'Log Out'. The main content area displays a tree view of C programming topics, including 'Logical operators', 'Arithmetic operators', 'Operator precedence', 'Selection constructs', 'Identifiers', 'Switch construct', 'For loop', 'Keywords', and 'Literals'. The tree is interactive, with checkboxes and expandable/collapsible nodes.

The bottom screenshot shows a browser window titled 'Mozilla Firefox' with the URL 'http://localhost:8000/flexi-olm3.0/Pv=7'. The interface includes a navigation bar with buttons for 'Hierarchy', 'Lectures', 'CMap', 'Prereq', 'Index', 'Ranked', 'Summary', and 'Tree'. The main content area displays a 'Tree' view with a 'customise this view' button. Below the tree is a legend for 'Understanding' levels: excellent (green), moderate (yellow), somewhat limited (orange), v. limited (red), misconceptions (dark red), and insufficient data (grey).



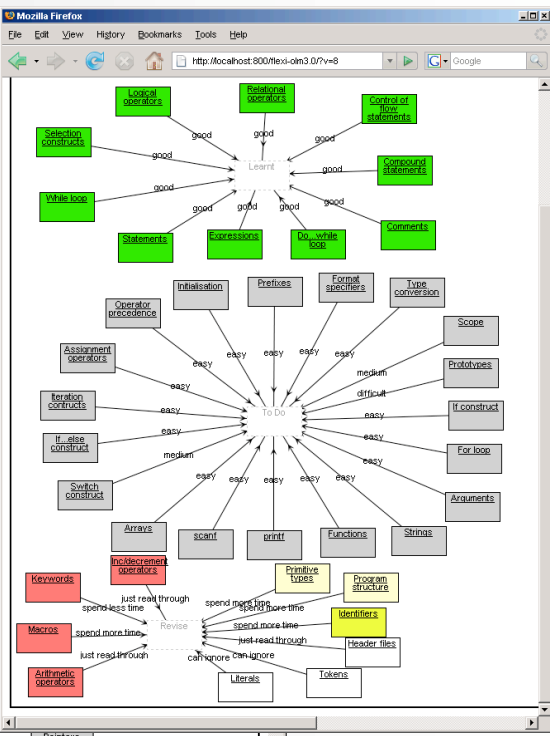
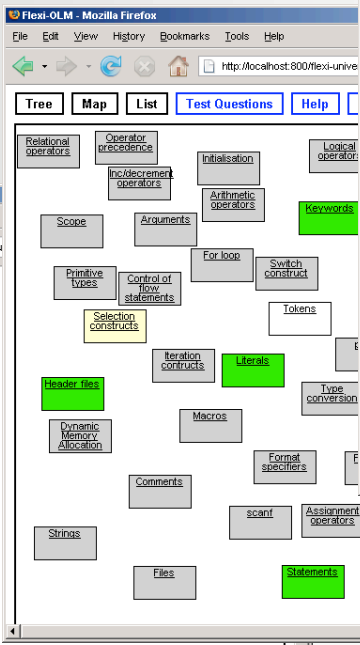
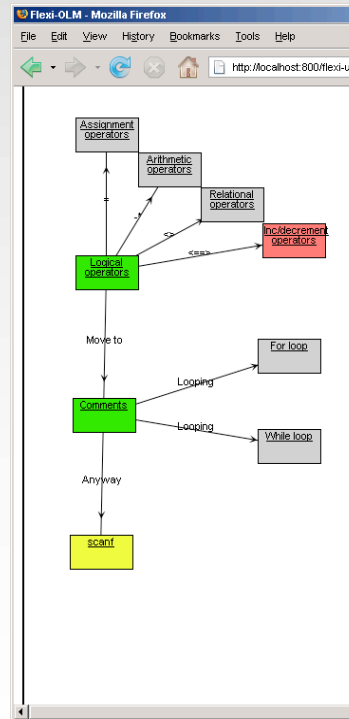
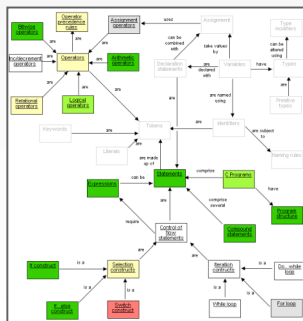
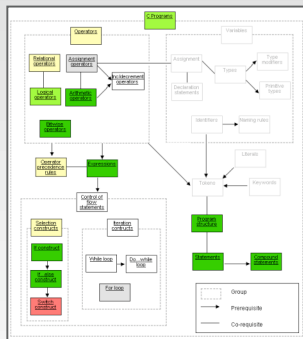
OLM

# Open Learner Models: user constructed

Mabbott (ongoing work)

## Flexi-OLM: user-constructed views (map)

I  
I  
C  
A  
L  
L  
L



OLM

# Open Learner Models: **user constructed**

I

Will students  
create and  
maintain their  
own views?

I

C

Ongoing study

A

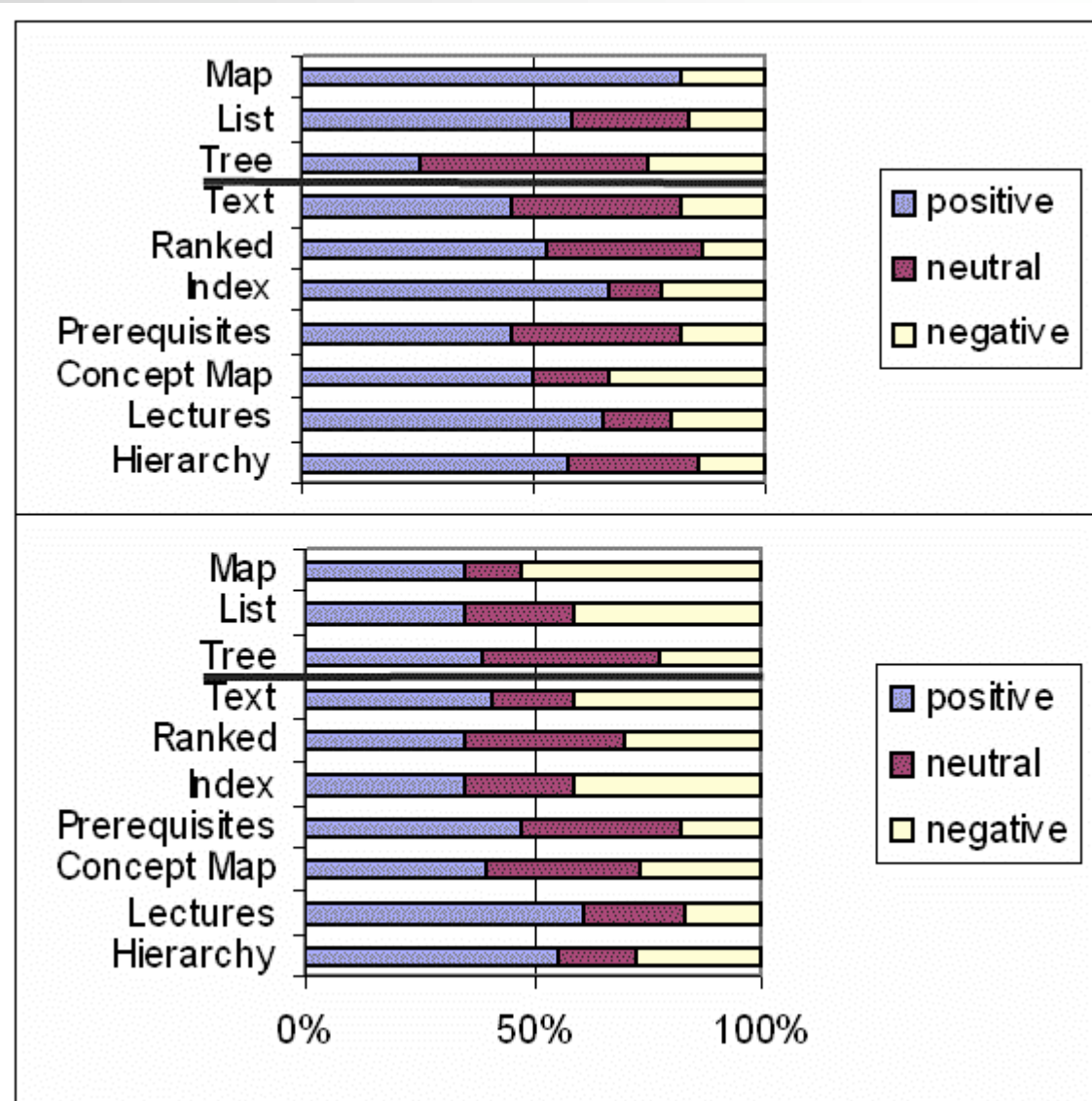
Preference for  
view type:

L

*upper - existing  
first*

L

*lower - own first*



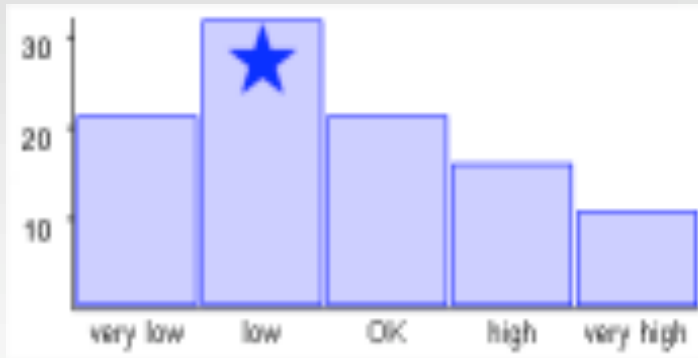
OLM

# Open Learner Models: comparison

Bull & Mabbott (2006)

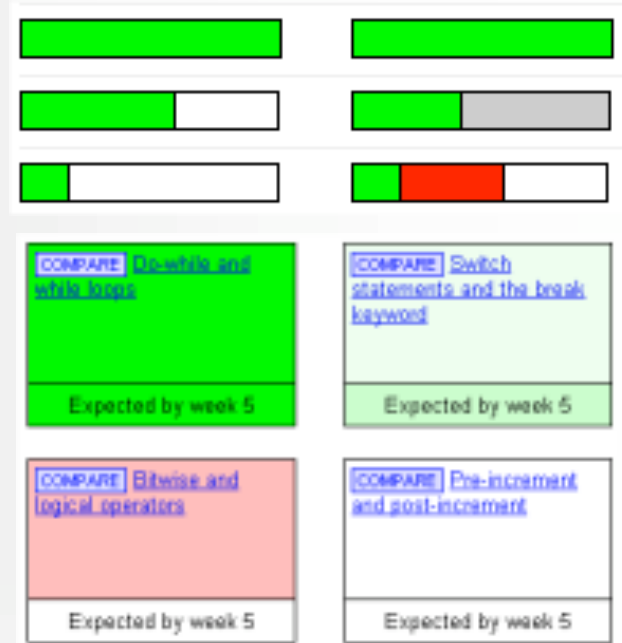
OLMlets

Comparison views



comparison to peers

peers, expectations



Your understanding of *Educational issues and what the m*  
A low level of understanding is expected by week 3.

You may hold misconceptions about *Intelligent tutoring sy.*  
A very high level of understanding is expected by week 3.

Your understanding of *Open learner models* is low. [COMPA](#)  
A high level of understanding is expected by week 3.

comparison to instructor expectations

I

I

C

A

L

L

# OLM

## Open Learner Models: comparison

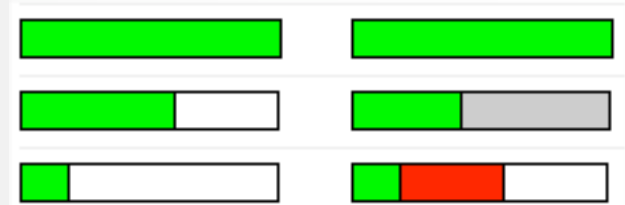
OLMlets

peers, expectations

• “I found the expected knowledge comparison useful, prompting me to read more of the course notes, and to try to meet or exceed the expectations each week.”

• “The comparison against the lecturer's expectations helped me identify if I was on target within the module.”

• “To compare my model to the other students was a useful incentive for me, I do not like being in the bottom half of the class and so the ability to see myself compared to my peers was motivating.”



OLM

# Open Learner Models: multiple users

Bull & McKay (2004)

peers

## Subtraction Master

**As Student**  
Help View

You Can Do.....  
subtractions like these.

**KEY**   
satisfactory/ good/ very good/ fantastic

<b>23-12</b> Two digit subtract two digit (no adjustment). 	<b>76-28</b> Two digit subtract two digit (adjustment from tens to units). 	<b>459-234</b> Three digit subtract three digit (no adjustment). 	<b>574-359</b> Three digit subtract three digit (adjustment tens to units). 	<b>364-175</b> Three digit subtract three digit (adjustment hundreds to tens and tens to units). 
---	---	---	--	---

**As Peer**  
Help View

Excellent. You are doing brilliantly. Compared to other children of your age you are doing very well.

**KEY**   
satisfactory/ good/ very good/ fantastic

<b>23-12</b> Two digit subtract two digit (no adjustment). 	<b>76-28</b> Two digit subtract two digit (adjustment from tens to units). 	<b>459-234</b> Three digit subtract three digit (no adjustment). 	<b>574-359</b> Three digit subtract three digit (adjustment tens to units). 	<b>364-175</b> Three digit subtract three digit (adjustment hundreds to tens and tens to units). 
---	---	---	--	---

**Return**

C

A

L

L

OLM

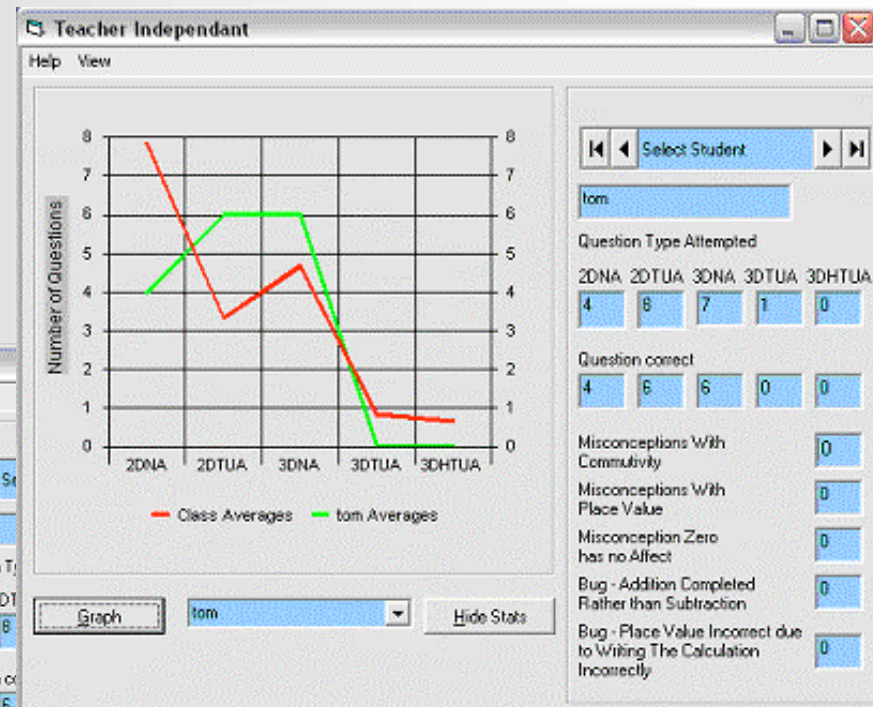
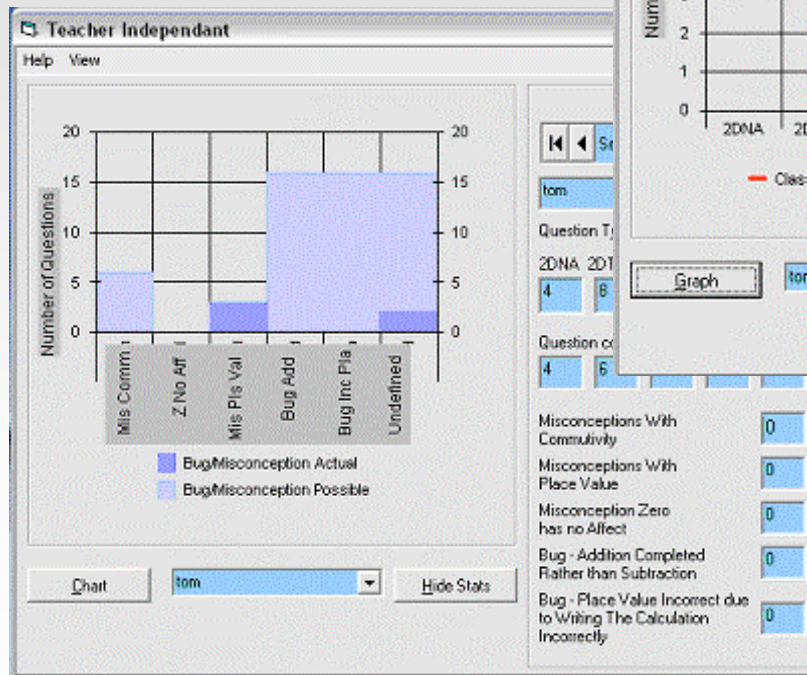
# Open Learner Models: multiple users

Bull & McKay (2004)

teachers

## Subtraction Master

SCORING—MISCONCEPTIONS



PERFORMANCE

- with child
- at own PC

I

I

C

A

L

L

OLM

# Open Learner Models: multiple users

Lee & Bull (submitted)

children, parents

## Fraction Helper

Fraction conquer with parents open learning model

FRACTION STUDENT OPEN LEARNER MODEL PARENTS OPEN LEARNER MODEL HELP-'How to read Tree'

UPDATE Parents Open Learner Panel

The table shows your child's overall understanding of fractions  
The ticks show your child's level of knowledge.  
Press UPDATE Parents Open Learner Panel to update your child's progress.

DETAILS	EXCELLENT	VERY GOOD	MODERATE	SLOW	UNSATISFACTORY
MIN...	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
RED ...	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

(NO MISCONCEPTION)  
GOOD UNDERSTANDING of:  
**Common denominator conversion in Fraction**  
**Relation between Fractions and Mixed Number**

(MOST MISCONCEPTION OCCURED)  
MISCONCEPTION in:  
**In denominator conversion in Fractions**

COMMON DENOMINATOR CONVERSION FRACTION & MIXED NUMBER

Child Misconception QUESTIONS

Fraction conquer with parents open learning model

FRACTION STUDENT OPEN LEARNER MODEL PARENTS OPEN LEARNER MODEL HELP-'How to read Tree'

WHAT YOUR TREE MEANS

TREE LEVEL 1 TREE LEVEL 2 TREE LEVEL 3 TREE LEVEL 4 TREE LEVEL 5 SAD LEVEL 1 SAD LEVEL 2 SAD LEVEL 3 SAD LEVEL 4 SAD LEVEL 5

TOPIC 1: COMMON DENOMINATOR CONVERSION

MISUNDERSTANDING in TOPIC 1  
You have misunderstanding about common denominator means same value of denominator.

TOPIC 2: FRACTION & MIXED NUMBER

MISUNDERSTANDING in TOPIC 2  
You have misunderstanding about common denominator means same value of denominator.

SOLVE MORE QUESTIONS UPDATE YOUR PROGRESS

I

I

C

A

L

L

OLM

# Open Learner Models: multiple users

Lee & Bull (submitted)

children, parents

I

## Fraction Helper

I

Sweetheart, look at this fraction, 8 over 12. If you want to get the simplest form of it, what do you have?

It is 2 over 3 isn't it? *(correct)*

C

No, the first thing you need to do is to subtract the equal number. The smallest number you can divide 8 by is 2, so what you need is 8 minus 2 over 12 minus 2 is 6 over 10. Then you need to keep subtracting until you can't subtract any more, so. 6 minus 2 over 10 minus 2 is 4 minus 8, and then 4 minus 2 over 8 minus 2 is 2 over 6.

A

L

Oh, so the answer is 0 over 4?

L

Hold on, I made a mistake. Well it must have gone wrong half way, *I'll teach you later*. Just stick with what you have done for now.



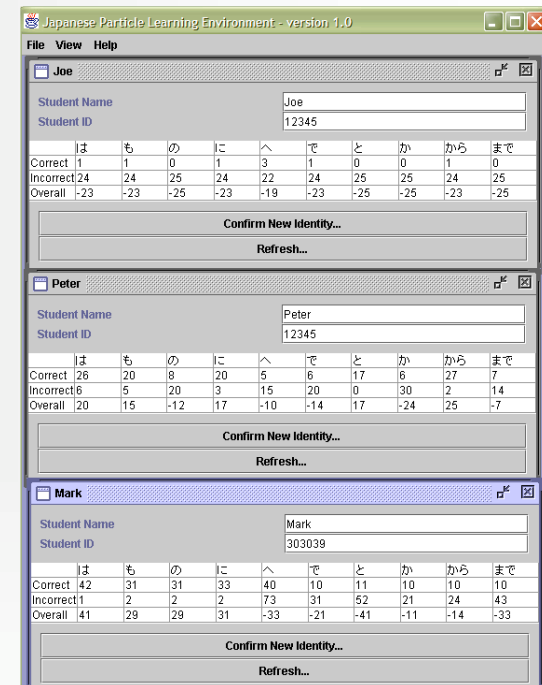
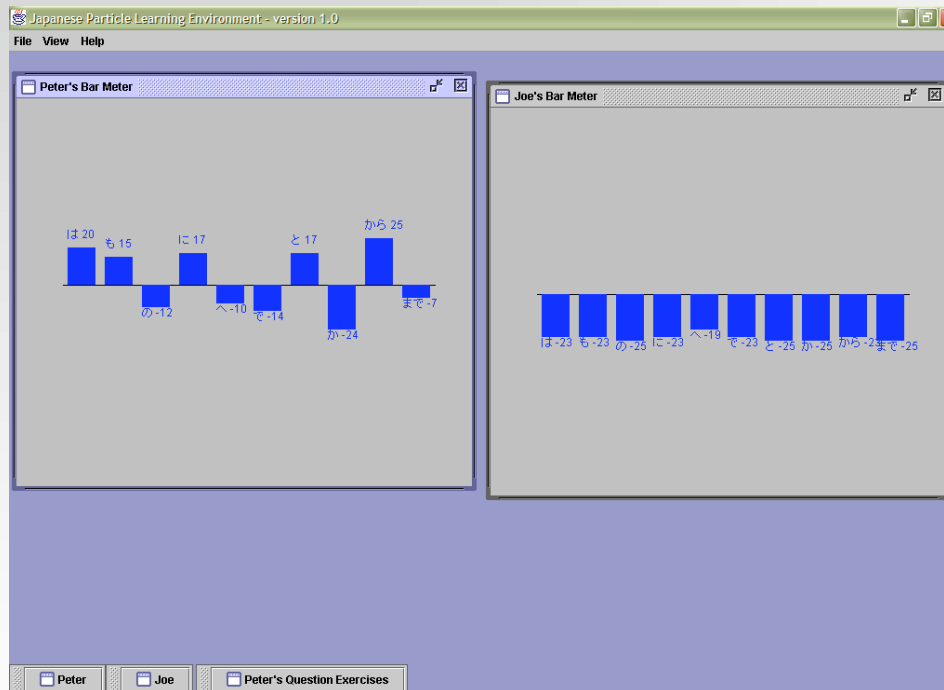
OLM

# Open Learner Models: multiple users

Bull & Nghiem (2002)

peers, instructors

JPLE



Comparing individual models

I

I

C

A

L

L


OLM

# Open Learner Models: multiple users

Bull et al (2007)

peers, instructors

UMPTTEEN

Address  http://localhost/stage2/update\_general\_control.php

instructors :

<input type="checkbox"/> Susan Bull	<input checked="" type="radio"/> Open Anonymously	<input type="radio"/> Open with personal details
<input type="checkbox"/> David Pycock	<input checked="" type="radio"/> Open Anonymously	<input type="radio"/> Open with personal details
<input checked="" type="checkbox"/> Peter Jancovic	<input type="radio"/> Open Anonymously	<input checked="" type="radio"/> Open with personal details
<input type="checkbox"/> Steven Quigley	<input checked="" type="radio"/> Open Anonymously	<input type="radio"/> Open with personal details
<input checked="" type="checkbox"/> Peter Hall	<input type="radio"/> Open Anonymously	<input checked="" type="radio"/> Open with personal details
<input checked="" type="checkbox"/> Sandra Woolley	<input checked="" type="radio"/> Open Anonymously	<input type="radio"/> Open with personal details
<input type="checkbox"/> Andrew Mabbott (TA)	<input checked="" type="radio"/> Open Anonymously	<input type="radio"/> Open with personal details

Who can view an individual's learner model?

1. Array size and index  
★★★★★

The system thinks that you have *weak knowledge* in the following concepts

1. do-while loop and while loop  
★★★★★

I dont agree on the result of selected concepts. Test me again

I

I

C

A

L

L

OLM

# Open Learner Models: multiple users

extended from Bull & Mabbott (2006)

peers, instructors

## OLMlets

**OLMlets learner model - Microsoft Internet Explorer**

**User 25's Model**

Current knowledge Topic

- Do-while and while loops
- Switch statements and the break keyword
- Bitwise and logical operators **MISCONCEPTIONS**
- Pre-increment and post-increment

**student name's Model**

Current knowledge Topic

- Do-while and while loops **MISCONCEPTIONS**
- Bitwise and logical operators
- Array index

**User 28's Model**

Current knowledge Topic

- Do-while and while loops **MISCONCEPTIONS**
- Switch statements and the break keyword

**Set Model Access - Microsoft Internet Explorer**

Home Skill Meters Graph Boxes Table Text Group Access Peers Options Help

OLMlets Example (C Programming) [Log Out]

### Set Model Access

		Peers	Instructors	Group 1 [x]	Group 2 [x]
<b>Extent of access</b>	full	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
	selected	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
	none	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
Do-while and while loops		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Switch statements and the break keyword		<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Bitwise and logical operators		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Pre-increment and post-increment		<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Array index		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Identifiable</b>	anonymous	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
	named	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
<b>Members</b>		Andrew Mabbott	Alice Kerly Sridhar Pammu Susan Bull		

student names hidden

Who can view an individual's learner model?

I

I

C

A

L

L

OLM

# Open Learner Models: **multiple users**

---

I

Will students want to view peer models and share their own model with others?

I

UMPTEEN



*Small group (12) - most opened to all*

*Large group (50) - different patterns*

*Use in courses*

} lab studies

C

A

**UMPTEEN - user comment:**

- "Viewing the group model let me know not only one out of three students have problems on concept of array size and index, it let me to realize that I am performing better than I thought, low mark on this concept is not all my fault, it is actually quite difficult for students, what I need to do is do not lose courage and confidence, study hard."

L

L

OLM

# Open Learner Models: **multiple users**

---

I

Will students want to view peer models and share their own model with others?

I

UMPTEEN



*Small group (12) - most opened to all*

*Large group (50) - different patterns*



lab studies

*Use in courses*

C

A

**UMPTEEN - user comment:**

L

• "I opened my learner model to all the peers anonymously. Maybe this will make someone who did as bad as me feel better. At least, he or she was accompanied."

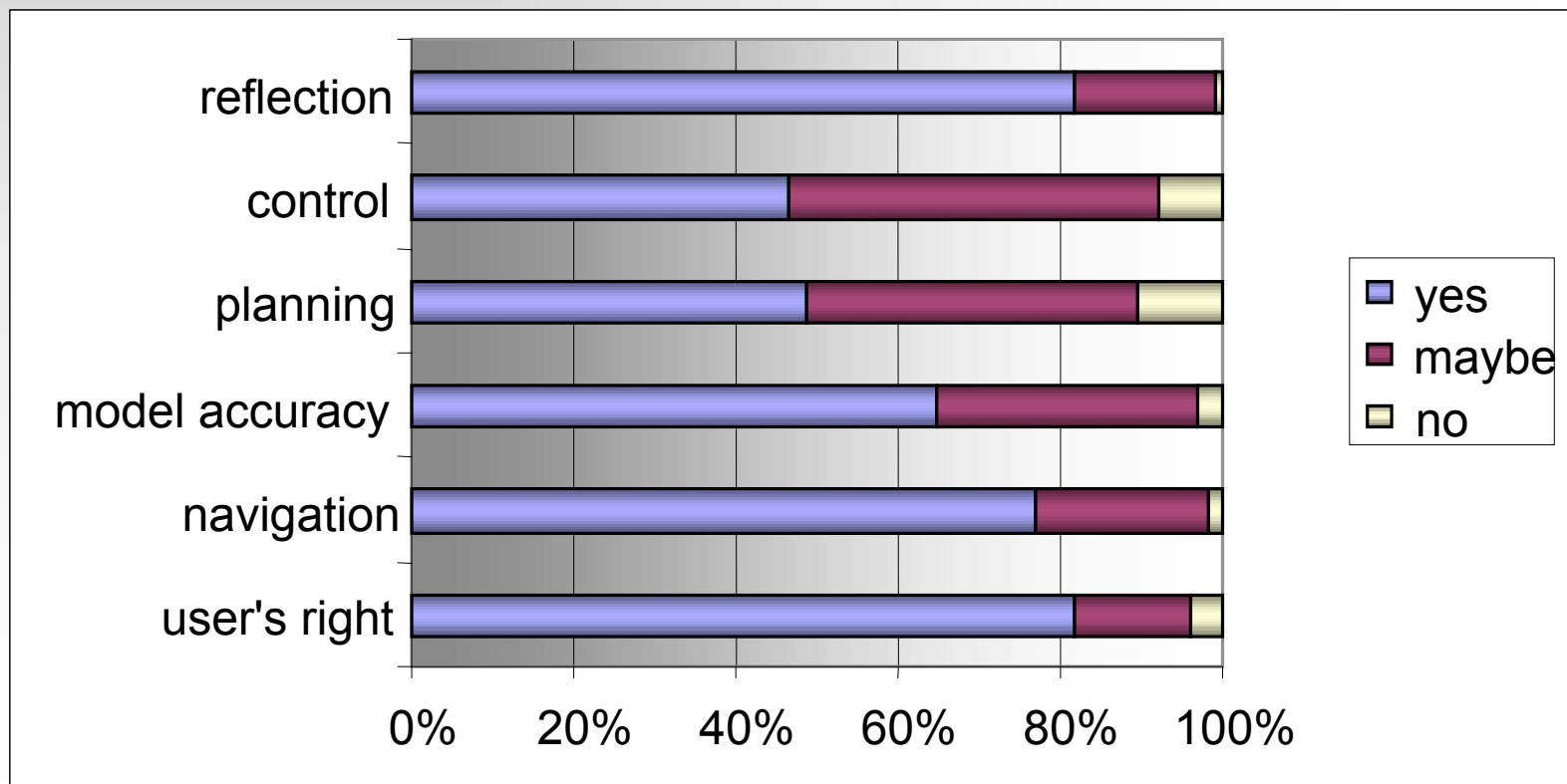
L

• "I get information from others' learner model, so I think it's my responsibility to open my learner model to others. That's fair."

# Why have an Open Learner Model?

**Results:** Do students want an open learner model?

Reasons for an Open Learner Model (105 users)

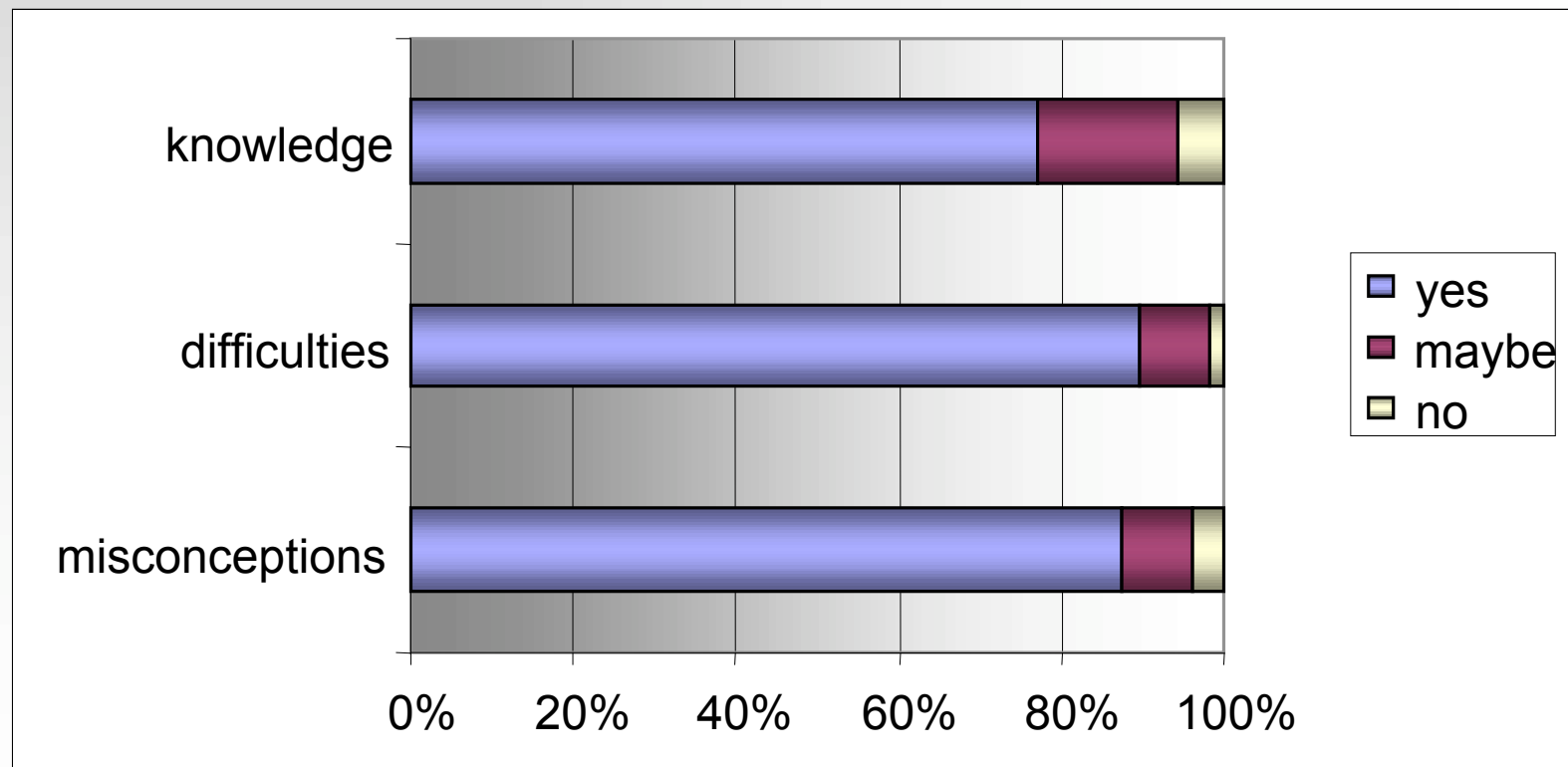


*Extended from Bull (2004)*

# Why have an Open Learner Model?

**Results:** Do students want an open learner model?

Open Learner Model Contents (105 users)

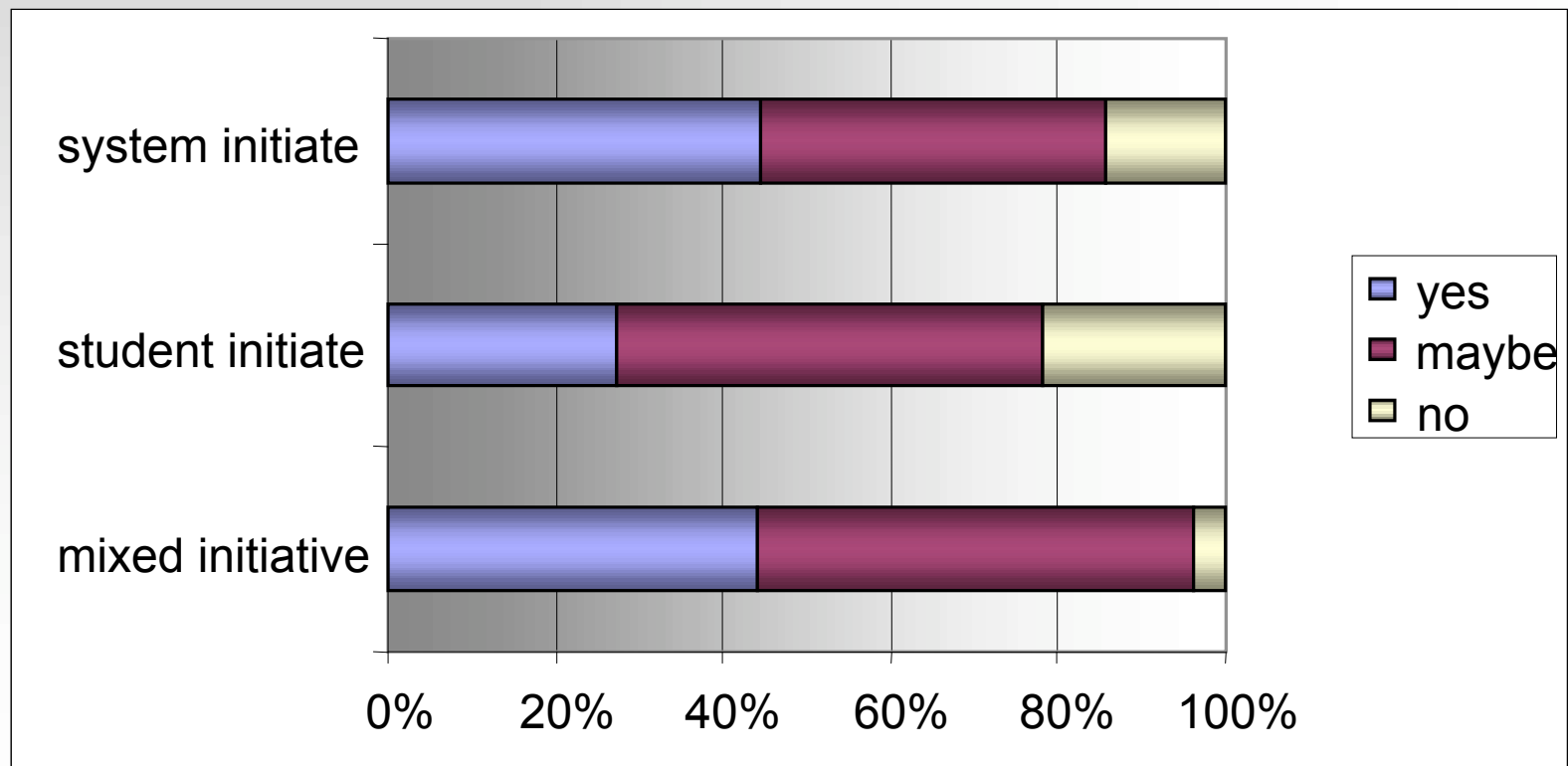


*Extended from Bull (2004)*

# Why have an Open Learner Model?

**Results:** Do students want an open learner model?

Open Learner Model Access Initiative (105 users)



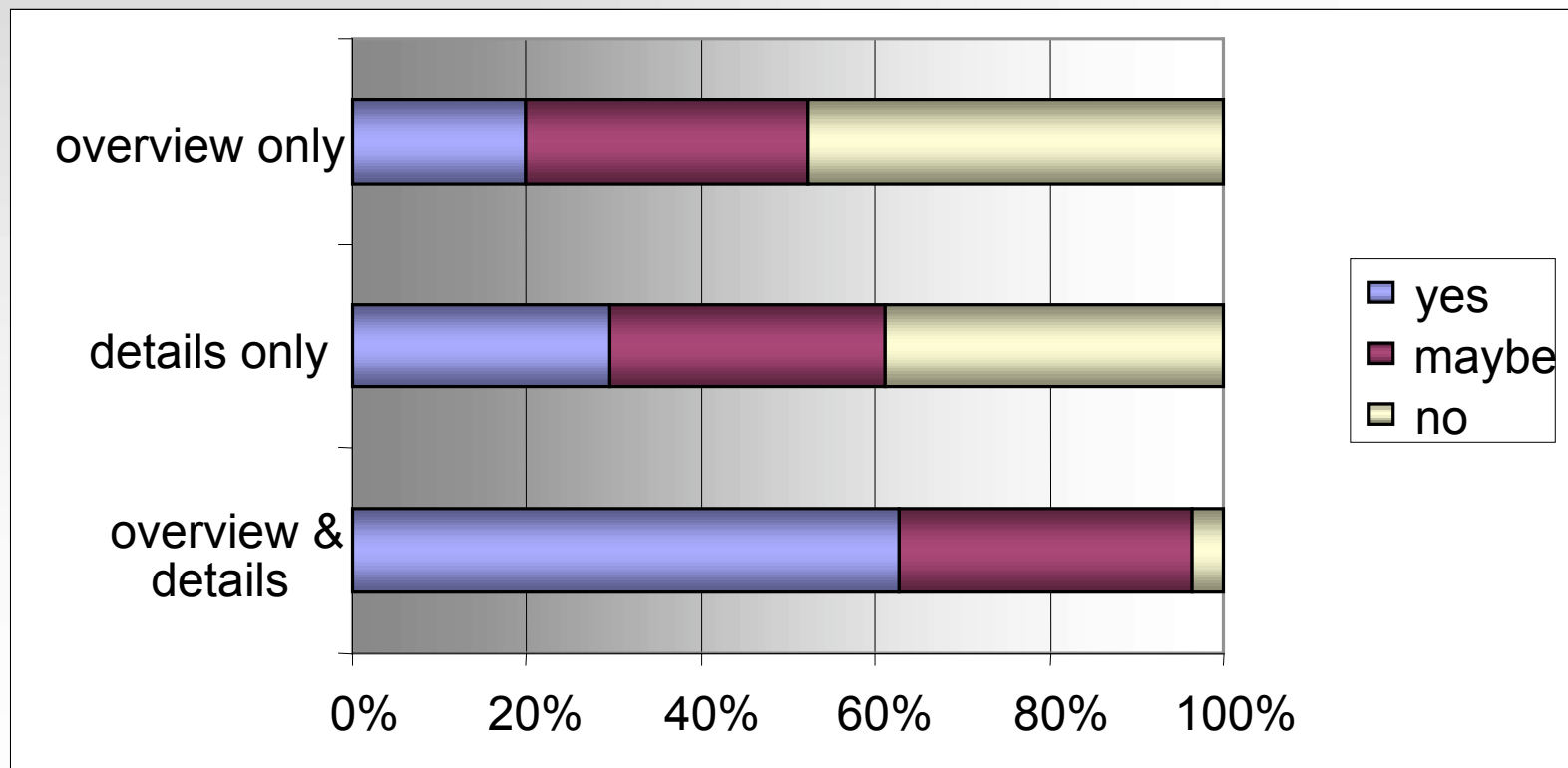
*Extended from Bull (2004)*



# Why have an Open Learner Model?

**Results:** Do students want an open learner model?

Open Learner Model Level of Detail (105 users)



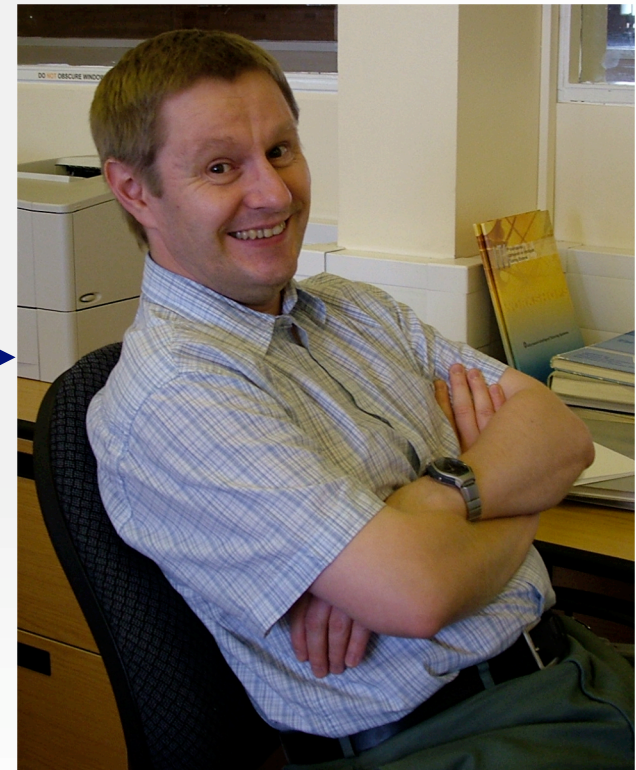
*Extended from Bull (2004)*

OLM

# Why have an Open Learner Model?

I  
I  
C  
A  
L  
L

"I don't really believe that, do I?"



"Well, yes, I suppose I do."

"But now I know better."

OLM

# Why have an Open Learner Model?

---

I

Happy, autonomous, responsible learners



I

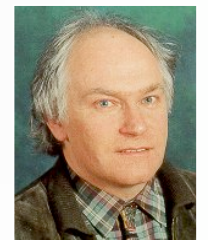
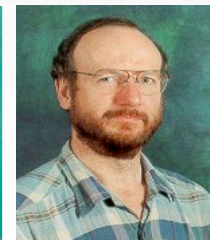
C

A

L

Happy instructors:

L



# OLM

## Summary

---

I

- Adaptive Learning Environments (brief)
- What is an Open Learner Model?

I

- *Why have an Open Learner Model?*
- OLM work – brief overview

C

- Presentation of Open Learner Models
- Interaction with Open Learner Models (control)

A

- Multiple View Open Learner Models
- Learner Constructed Open Learner Models

L

- Multiple User Open Learner Models

L

- Lab – OLMlets, Flexi-OLM



# Learn one set of words

---

I

*Portuguese*

*Chinese (Mandarin)*

I

1. cow - vaca

1. cow - mǔniú

C

2. cat - gato

2. cat - māo

3. dog - cão

3. dog - gǒu

A

4. rabbit - coelho

4. rabbit - tùzi

5. bird - passaro

5. bird - niǎo

L

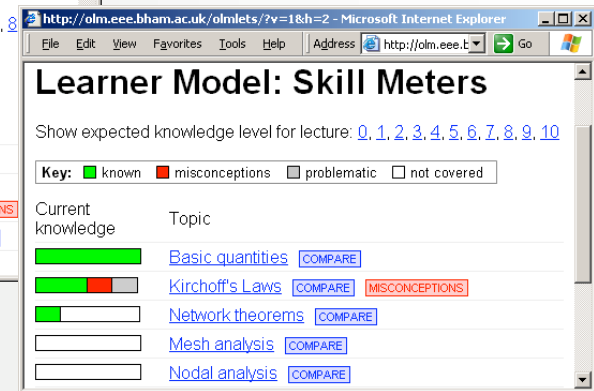
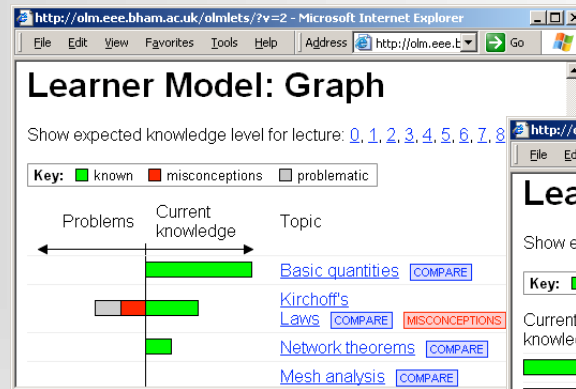
L

OLM

# Practical Session

- OLMlets

<http://olm.eee.bham.ac.uk/olmlets/>



**User 25's Model**

Current knowledge:  Do-while and while loops  
 Switch statements and the break keyword  
█ ██ █ Bitwise and logical operators  
 Pre-increment and post-increment

student name:  s Model

Current knowledge: ██ █ █ Do-while and while loops  
 Bitwise and logical operators  
 Array index

**User 28's Model**

Current knowledge: ██ █ █ Do-while and while loops  
██ █ Switch statements and the break keyword

OLMlets Example (C Programming) [Log Out]

	Peers	Instructors	Group 1 [x]	Group 2 [x]
<b>Extent of access</b>	full <input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	selected <input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	none <input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Do-while and while loops	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Switch statements and the break keyword	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Bitwise and logical operators	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Pre-increment and post-increment	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Array index	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Identifiable</b>	anonymous <input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	named <input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>Members</b>	Alice Kerly Andrew Mabbott Sridhar Pammu Susan Bull			

I

I

C

A

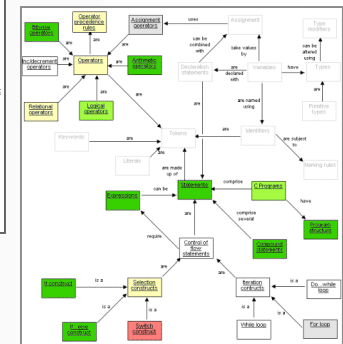
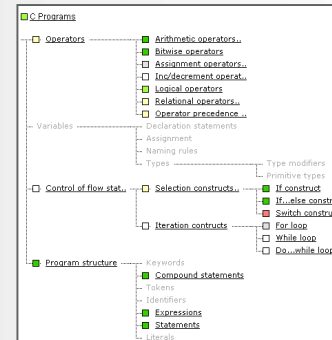
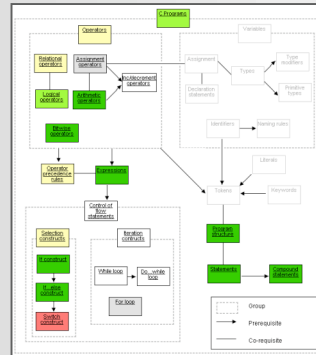
L

L

# Practical Session

- Flexi-OLM

<http://olm.eee.bham.ac.uk/flexi-olm/>



http://localhost:800/fole2/persuade.php?t=40 - Microsoft Internet Explorer

File Edit View Favorites Tools Help Address http://localhost:800/fole2/

Hierarchy Lectures Concept Map Prerequisites

## Persuade System

**Selected topic: Arrays**

Here are some of your incorrect responses that suggest you may hold misconceptions.

Question	Your response
What number should go in the declaration, for the array to be filled exactly by the supplied values? <code>char t[] = {'a', 'z', 'b', 'y', 'c', 'x'};</code>	5
What number should go in the declaration below if array t is to have six elements? <code>int t[];</code>	5

If you still wish to persuade the system, click proceed below, and the system will ask you a series of questions. If your answers convince the system that your assessment is correct, your model will be updated.

Proceed Cancel

http://localhost:800/fole2/edit.php?t=40 - Microsoft Internet Explorer

File Edit View Favorites Tools Help Address http://localhost:800/fole2/

Hierarchy Lectures Concept Map Prerequisites

## Edit Learner Model

**Selected topic: Arrays**

Use the menus to set your new knowledge level for this topic.

define/initialise one-dimensional arrays very limited

accessing one-dimensional arrays excellent

define/initialise 2-dimensional arrays somewhat limited

accessing 2-dimensional arrays moderate

### Misconceptions

declaration specifies the highest index (rather than size) held

Submit Cancel

OLM

# Acknowledgements

---

I

Thanks to all those who gave permission to use their open learner model screens

I

C

A

And thanks to Detmar for his face

L

L

