Effective design for technology enhanced learning

Tom Boyle

Learning Technology Research Institute (LTRI)

London Metropolitan University

CUHK, Hong Kong Oct 17 2008

We live in a world characterised by dramatic waves of new technology that potentially offer rich opportunities for enhancing the learning experience of our students.

The technologies themselves, however, will not improve teaching and learning.

The key challenge is how to use these technologies effectively.

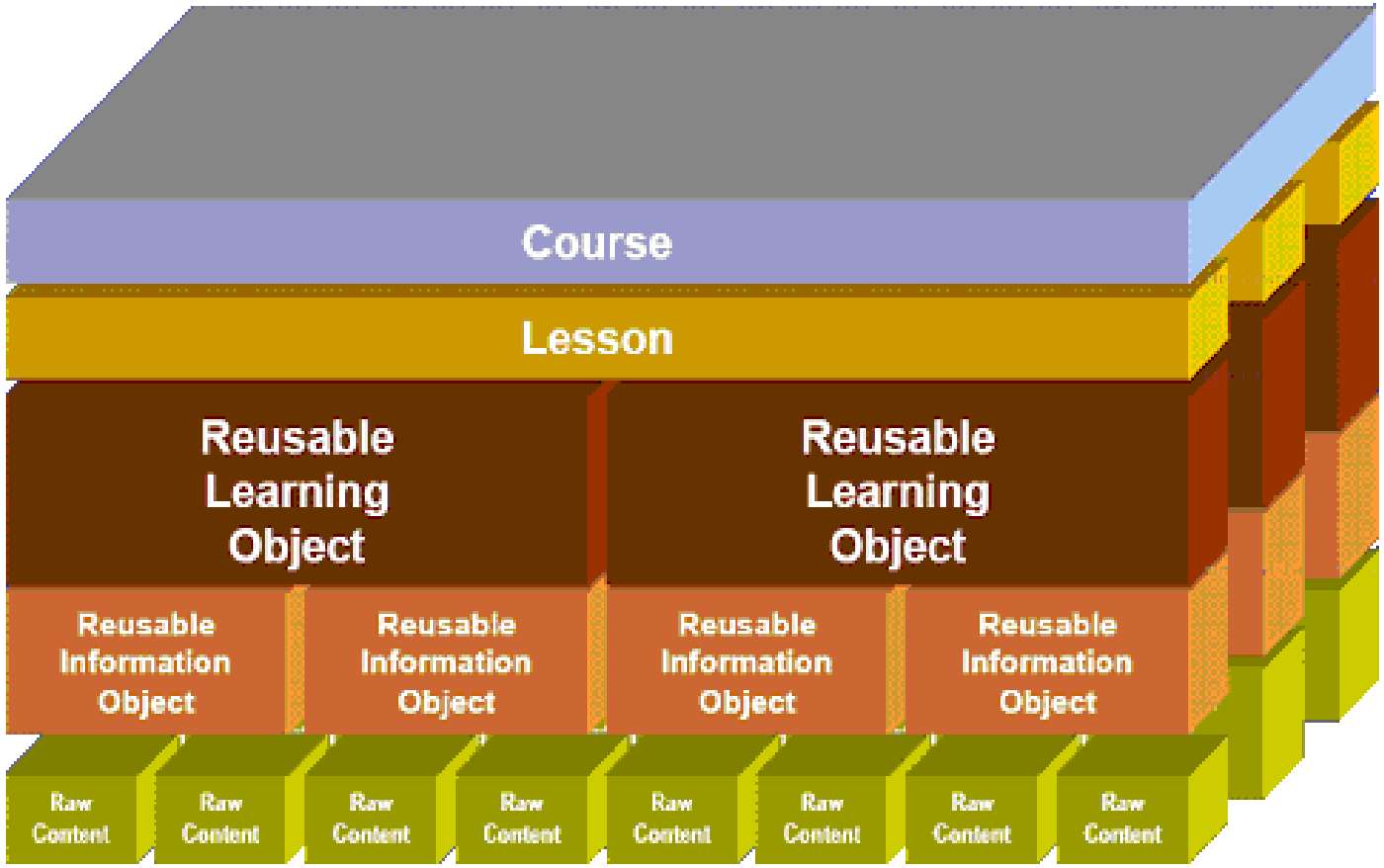
How can we better *design* learning experience using the resources and tools available?

There are different levels at which we can design and implement educational change. These can range from learning objects focused on discreet learning goals, through to changing lesson plans, or transforming whole courses.

The talk will move from the learning object level to how on to change a whole course using a blended learning approach. Throughout the talk, the approach will be to describe and illustrate a range of principles and techniques. The talk will link these principles and illustrations to ‘Agile’ methods for developing rich, technology based learning.

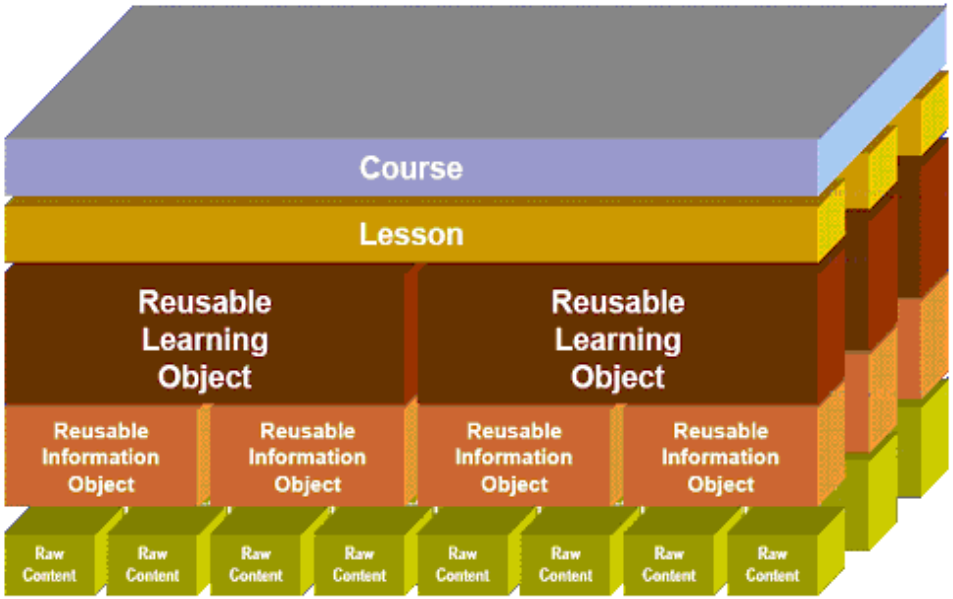
What is your goal?

Choose the size and nature of the intervention to meet the target that you set.



Different levels at which design for learning can be focused (Autodesk Model)

Reusable learning objects



CETL

Reusable Learning Objects

www.rlo-cetl.ac.uk

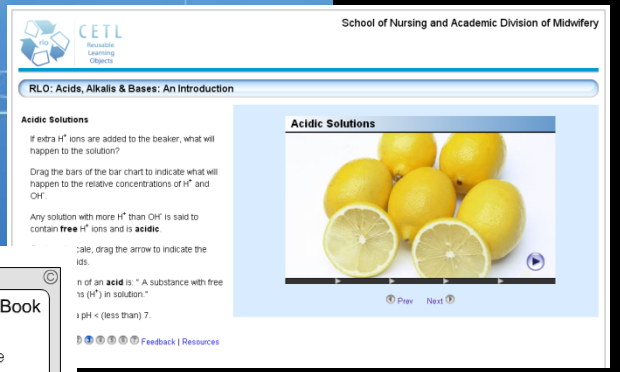
CENTRE FOR EXCELLENCE IN TEACHING & LEARNING

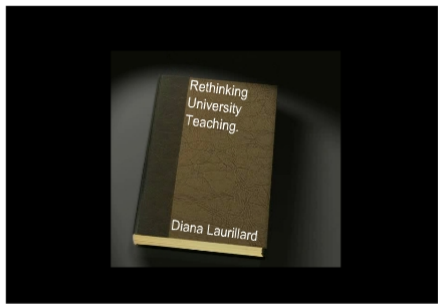
IN REUSABLE LEARNING OBJECTS

LONDON metropolitan university

The University of Nottingham

UNIVERSITY OF CAMBRIDGE





1 The Book is a reference for my essay or report

Quoting from a Book

This is how you take a reference from a BOOK. Press the Show button a number of times to go through the steps

SHOW

CETL for Reusable Learning Objects

- Started in April 2005 with £3.3 million funding from HEFCE for the period 2005-2010
- Partners: London Metropolitan University, University of Cambridge, University of Nottingham
- Develop reusable learning objects (RLOs)
  - *with a strong pedagogical focus*
- Use and evaluate these RLOs with substantial student cohorts
- Extensive staff development and dissemination programme
- ***Advance the conceptual basis for RLOs***

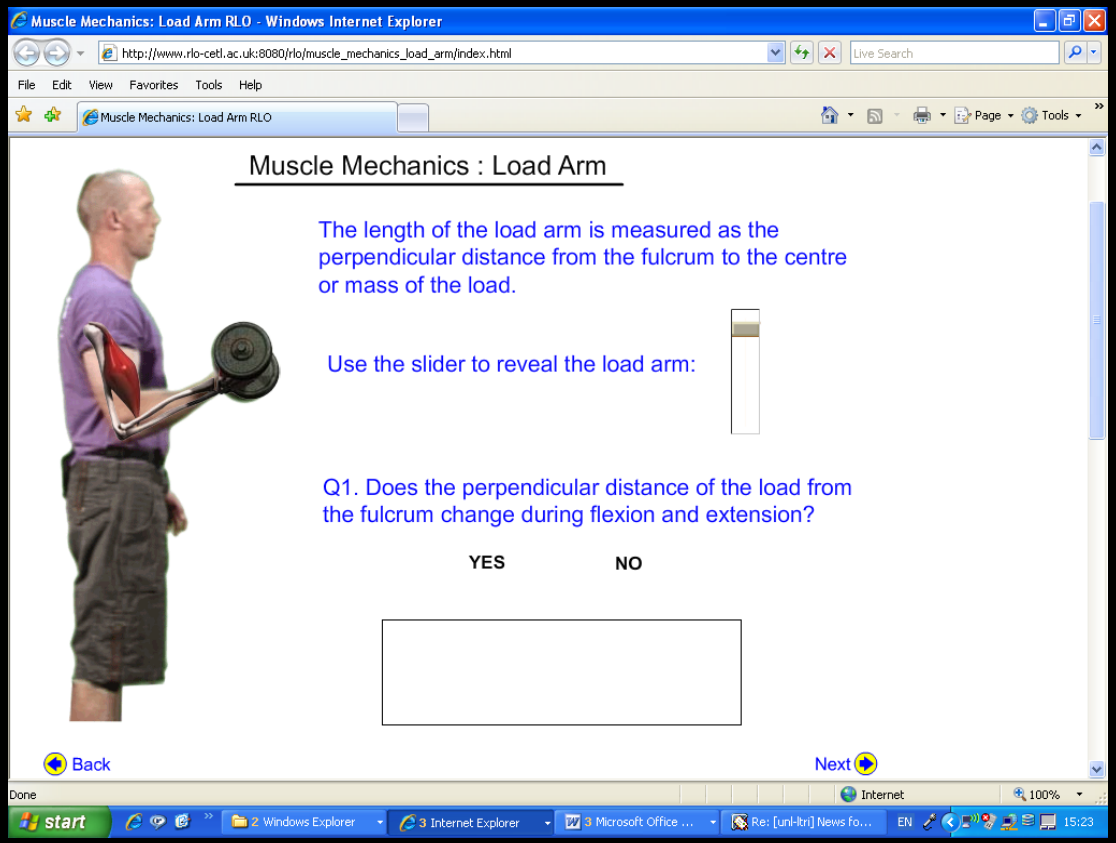
All the examples used can be accessed at the Web site of the Centre for Excellence in Teaching and Learning (CETL) in Reusable Learning Objects

http://www.rlo-cetl.ac.uk

Some design principles

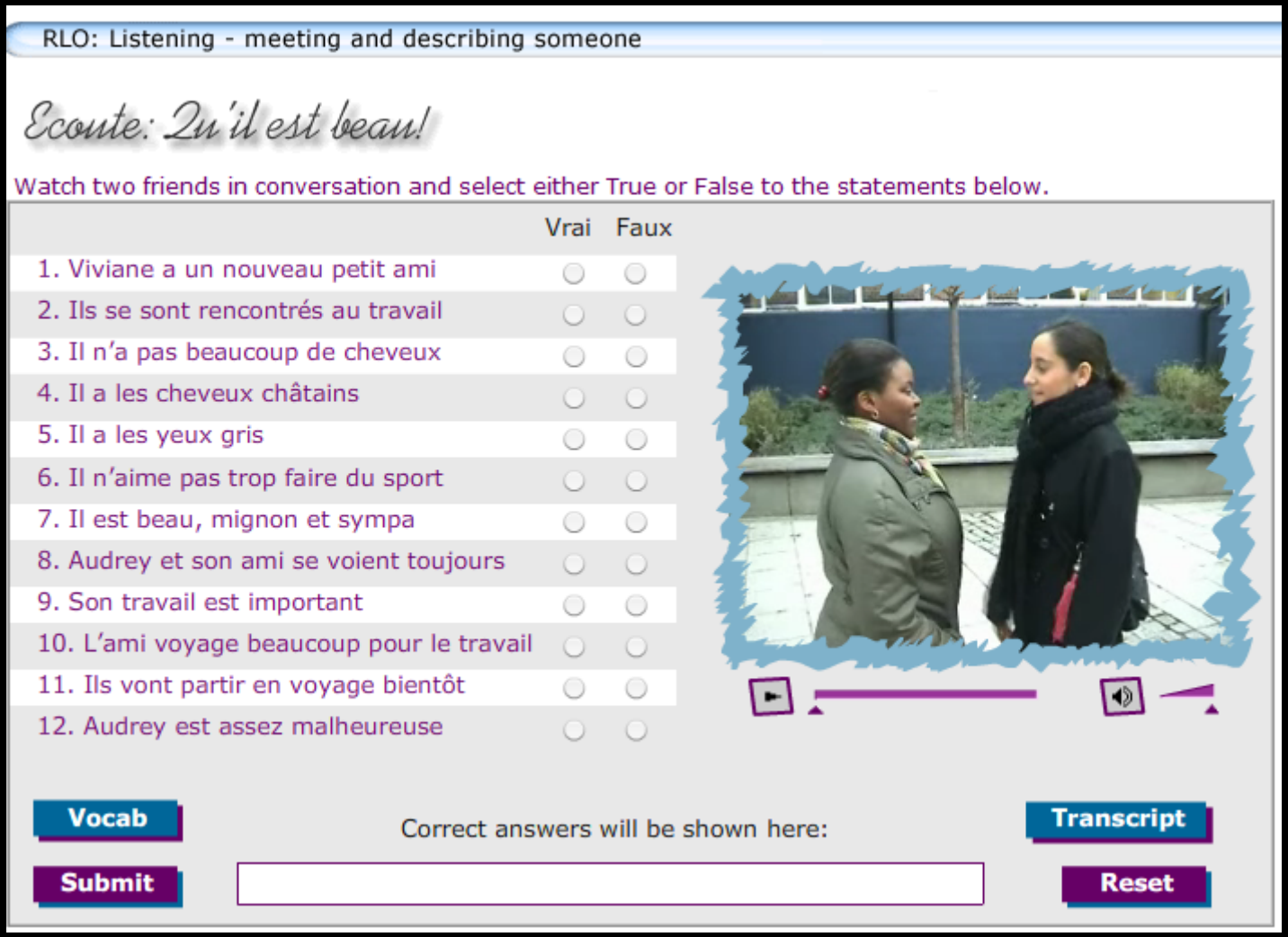
- Appropriate and effective use of media
  - use the natural blend of media to suit the learning task
  - visualization, including dynamic visualization
- Interactivity
  - interaction for learning
- User control

Effective media mix: visualization



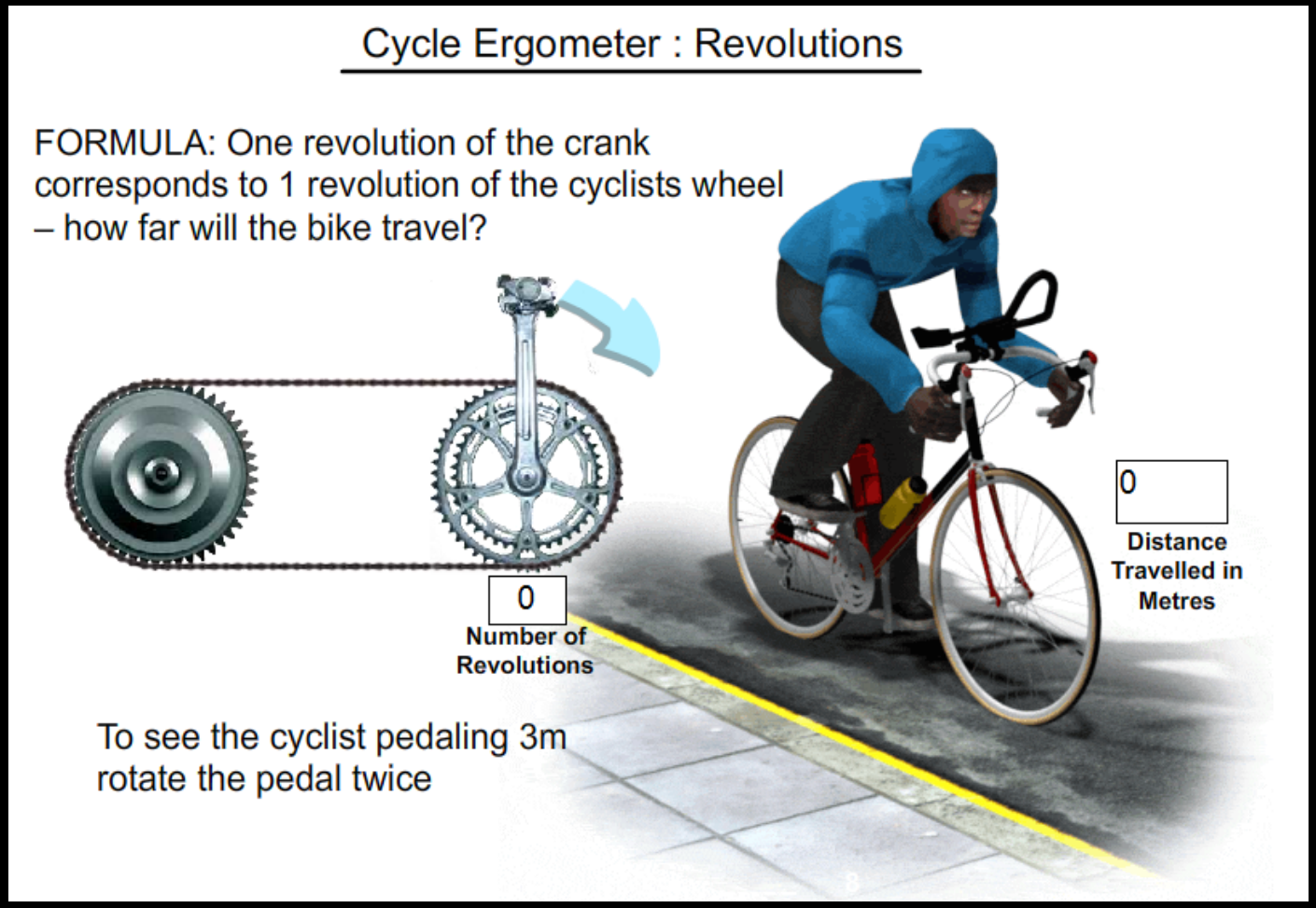
Dynamic visualization of muscle action

Effective media mix: language learning

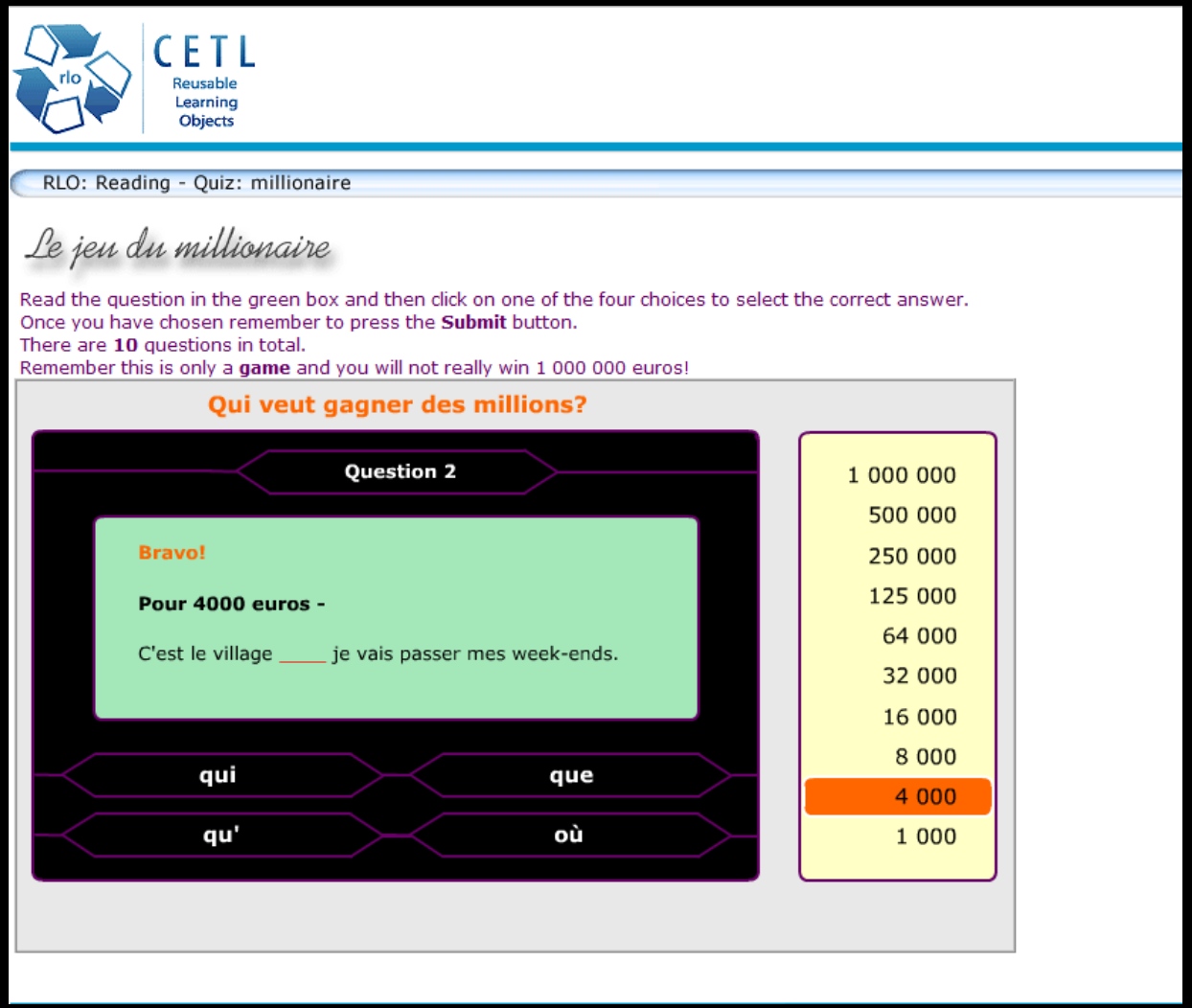


Language games

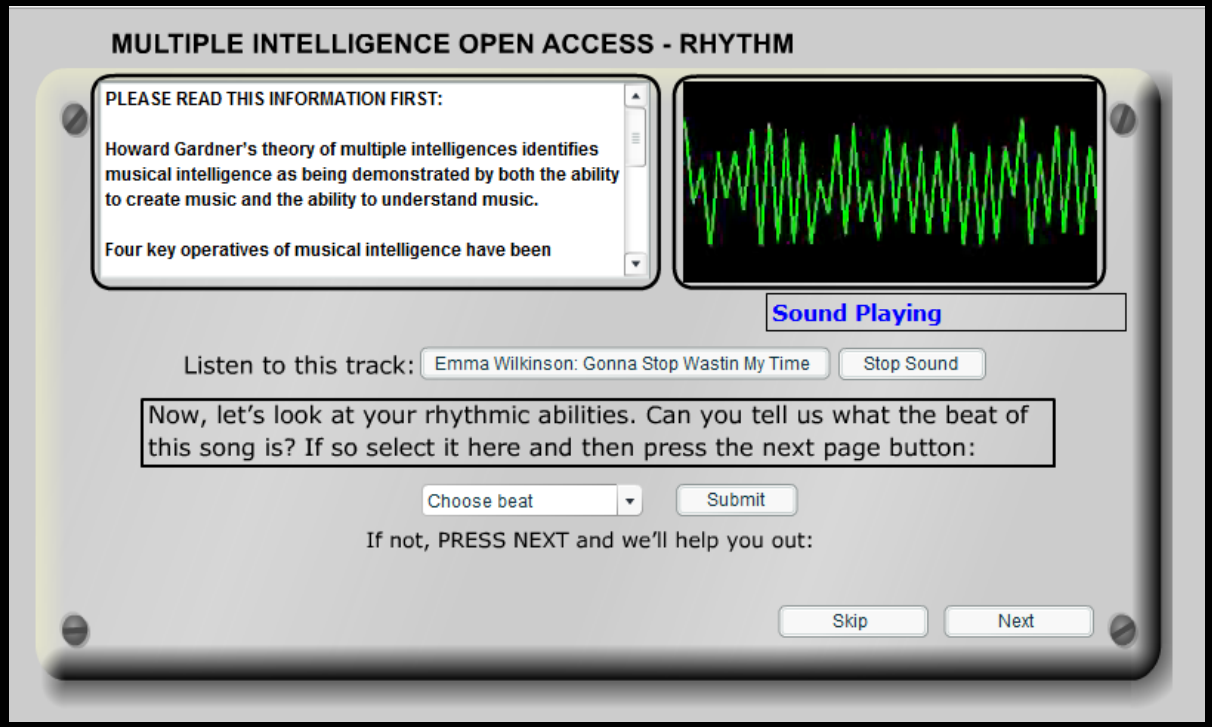
Effective use of media mix



Games to encourage engagement

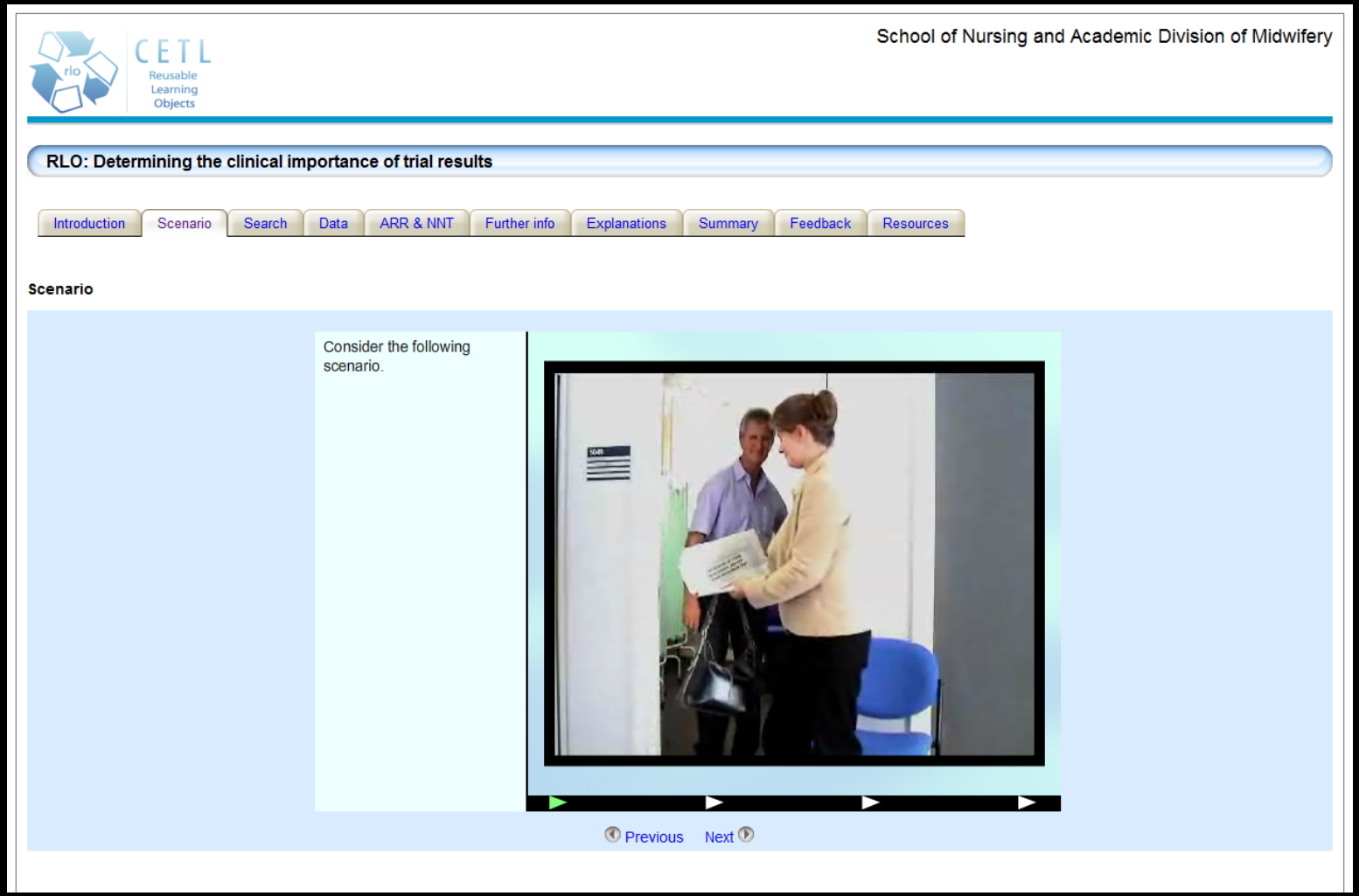


Interactivity



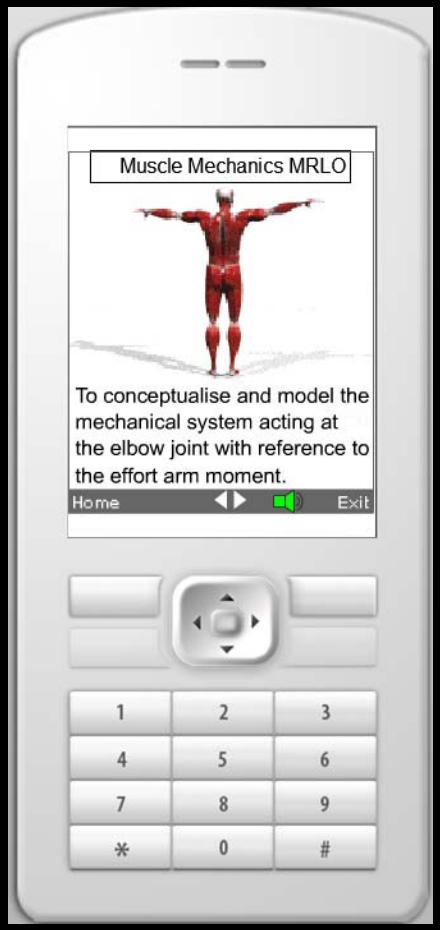
Interacting with music for non musicians

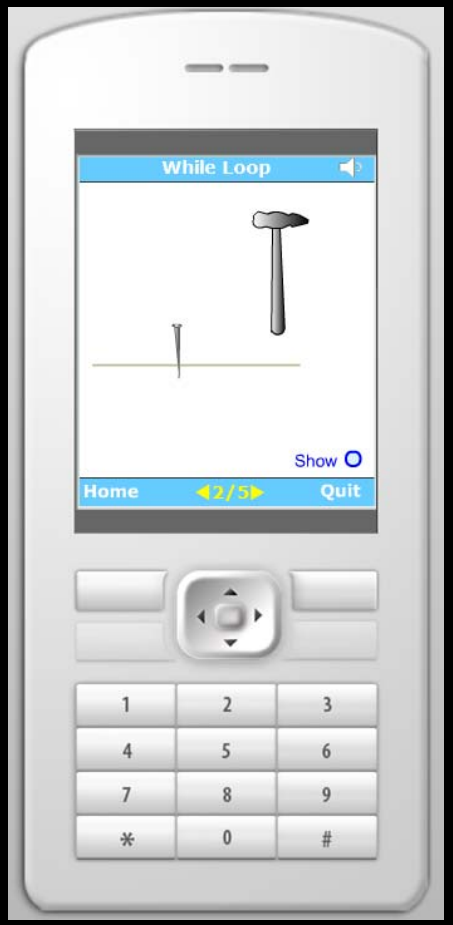
Simulation and engagement



Creating a scenario for the learner

Delivery on mobile phones





CETL
reusable learning objects

search...

Home | Who we are | What we do | Press office | Contact us

RLO-CETL - The CETL for Reusable Learning Objects

Welcome

The RLO-CETL is the Centre for Excellence for the design, development and use of learning objects. The partner institutions are London Metropolitan University, the University of Cambridge and the University of Nottingham.

The CETL develops, shares and evaluates learning objects and leads on innovation in pedagogical design.

This Web site gives access to a rich set of learning objects, tools and information developed by RLO-CETL. Read more

Quick links

- Reusable learning objects (RLOs)
- Generative learning objects (GLOs)
- M-Learning
- Development framework
- Evaluation
- Publications

Featured RLOs

Determining the importance of trial results

This RLO demonstrates how to interpret and use clinical trial data in practice. See RLO

Latest news

- Tom Boyle invited to speak at symposium in Colom
- Book chapter proposal accepted
- Wolfson Reward Programme held July 7-9 2008 in
- GLO Maker Version 1 released for use
- Magazine article on TVU reuse of RLO-CETL learni

Click on the headline for details and for other news ite

File Edit View History Bookmarks Tools Help

http://www.rlo-cetl.ac.uk/joomla/index.php?option=com_content&task=view&id=246&Itemid=297

Google

Getting Started | Latest Headlines | CETL News

- RLOs
  - Completed RLOs
  - RLO development
- GLOs
- M-Learning
- Community
- Development framework
- Workshops
- Evaluation
- Related projects

Completed RLOs

Learning objects in our repository available for use, listed by subject area. All the RLOs are free for use and repurposing for educational, non-commercial purposes. When you view an object, note that the panel on the left generated by the repository can be dragged sideways to view the learning object full screen.

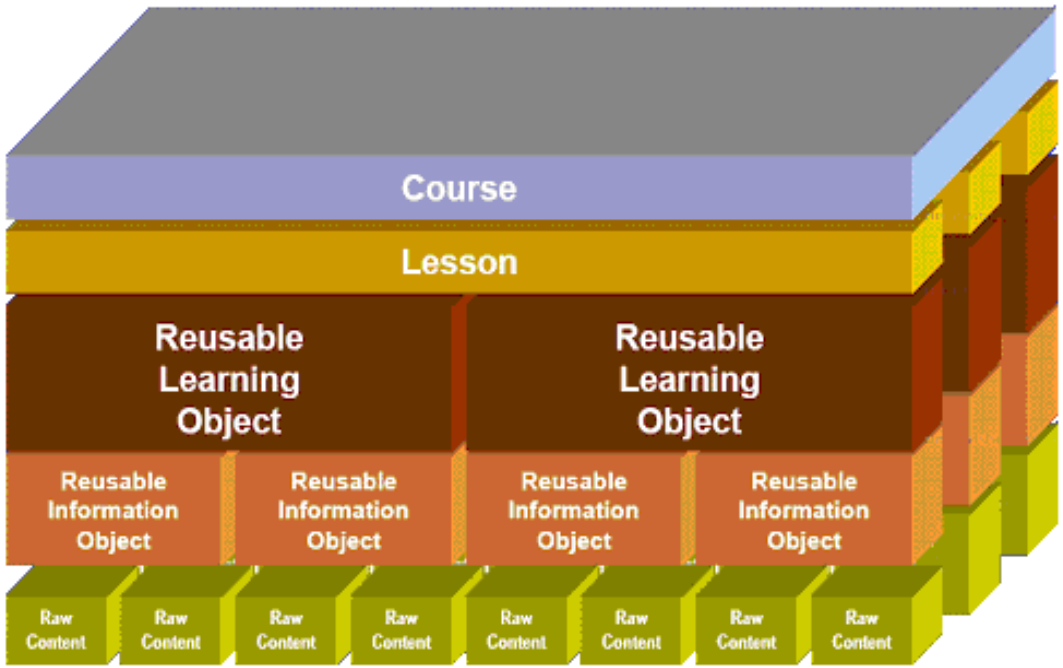
- Business Studies
- Clinical Skills
- Ethics
- Evidence-based Practice for Health Sciences
- Foundation Sciences
- French
- Human Life Sciences
- Inter-professional Learning
- Maths
- Pharmacology
- Sports Science
- Statistics
- Study Skills

Business Studies		
Employability	This RLO asks the student to complete an online questionnaire that asks about their current skill base. The grid is then completed and builds up a profile of an individual's strengths and weaknesses, which can be printed out as a graph. The final section suggests strategies to develop skills, and gives concrete examples that a potential employer may find useful.	London Met
Imagineering	This RLO was designed to support an introductory lecture on the subject of Imagineering, a core concept within the curriculum for Events Marketing Management; but could be easily used by anyone who has an interest in marketing theory, or art, design or product design. The interesting aspect of this RLO is the introduction of a 'boiled sweet' (use Strawberry & Cream flavour Campino) that students are asked to interact with. The objective of the RLO is to encourage students to view everyday activities in a different way in order to enhance their perception of the value of the activity. In this way, students can gain a greater understanding of how a new economy can be created through an experience.	London Met
Multiple intelligence	Howard Gardner's theory of multiple intelligences identifies musical intelligence as being demonstrated by both the ability to create music and the ability to understand music. Four key operatives of musical intelligence have been identified by Gardner: rhythm, timbre, pitch, and melody/harmony. The learning object is designed to focus individually on each of those functions of musical intelligence and the ability to understand music.	London Met

Web site of the Centre for Excellence in Teaching and Learning (CETL) in Reusable Learning objects

http://www.rlo-cetl.ac.uk

Changes at the lesson level



Repositories of
lesson plans and
supporting materials

‘Executable’
lesson/activity
plan

Phoebe (Oxford University)

- Online planning tool that will
- Offer users both flexible and guided paths through the planning process
- Enable them to access a wide range of models, research findings and examples of innovative learning designs, intended to
- Encourage them to explore new approaches and tools in their pedagogy

http://phoebe-app.conted.ox.ac.uk/

Basic design template

Standard Phoebe template with basic detail.

Created by: David A. Balch (david.balch@conted.ox.ac.uk)

Contextual information

Title and author	
Course information	
Timetabling	

Curriculum aspects

Learning outcomes	
Teaching resources	
Teaching approach	

Assessment

Assessment	

The students

The students	

Learning Activities

Learning Activities	

Contingency Plan

Contingency Plan	

Alternative activities

Reflections on the Learning Session

Personal impressions	
Outcome for	

Technology-Supported Learning Database

Home | Login | Search | Show all activities | Add activity

The Technology-Supported Learning Database is designed to make effective technology-facilitated teaching ideas, reusable and sharable. The database seeks to share good teaching ideas. The learning activities in this database have been supplied by teachers who are keen to see them used freely by others.

Browse and search the database

The activities can be browsed and searched to discover those that might be used or modified. Browsing and searching do not require the user to be logged in.

Add an activity

Teachers can add their own innovative activities to the database. Adding simply requires registering a name and password and logging in. Once registered in this way, users can add activities, maintain their entries, and rate other activities.

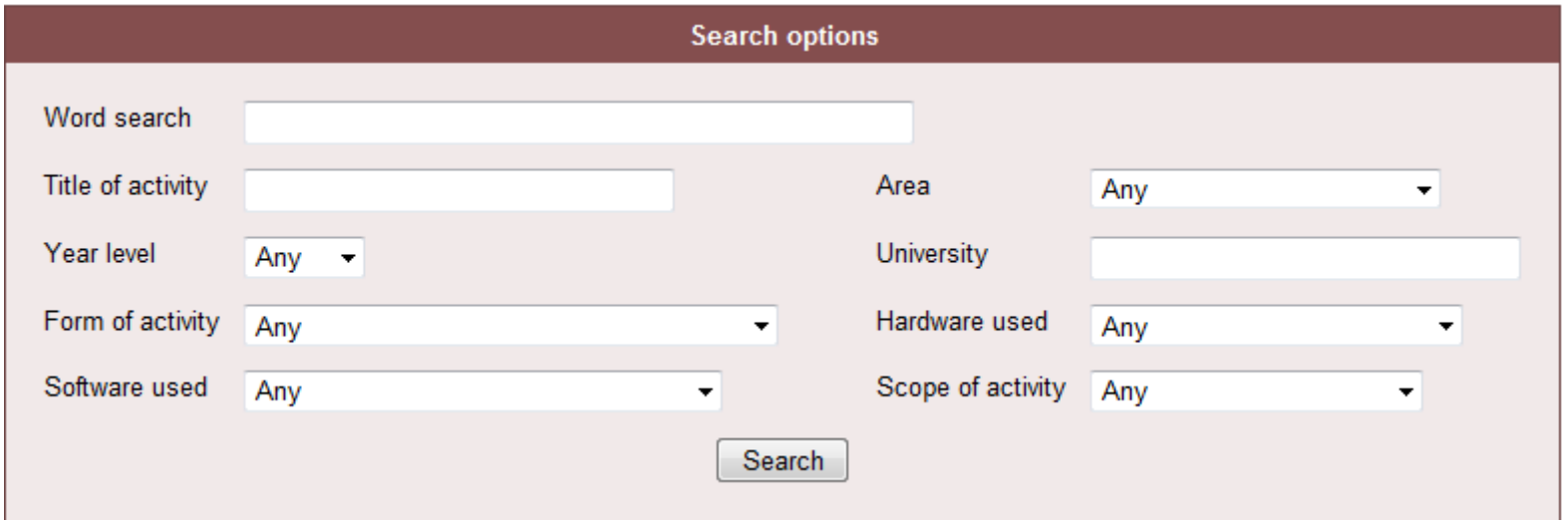
When adding activities, it is important to complete all the fields as descriptively as possible to allow others to understand the activity. When an activity is first submitted, a Moderator will activate the entry, which may take up to 24 hours. Once activated, the activity can then be viewed by others and edited at any time by the activity owner.

Rate an activity

The rating facility allows teachers to rate activities that they feel have strong prospects for sharing reuse. The rating is intended to help identify strong activities in the database. Rating requires teachers to login.

Feedback Welcome

We are very happy to receive your comments and feedback on strategies that might improve the functionality and effectiveness of this resource. Click here to offer advice, comments and to make some suggestions.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Title of activity
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Year level
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Form of activity
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Hardware used
Any
Software used
Any
Scope of activity
Any
Search

Description of activity

Game-informed learning practice in the Edinburgh medical curriculum involves a Web-based Computer-Assisted Learning (CAL) application. Since students can access this application at their convenience, this scenario is self-directed rather than instructor-led. One scenario involves George Prentice, a virtual patient, who has visited the local health clinic complaining of chest pains. Acting as George's doctor, each undergraduate medical student proceeding through the five-year degree program develops a long-term relationship with George as his condition grows increasingly complex.

Currently, George exists as a character within a series of CAL sequences. At the beginning of the scenario, George's condition matches the curricular content of the first year in the medical curriculum (in particular, respiratory medicine) and also integrates students' studies in basic biomedical science and medical sociology.

Student role

Each student assumes the role of George's family doctor. Through textual, video, and animated sequences, students study model examination procedures, request tests, analyse results, and interact with the system by answering a variety of question types relevant to the case. As they consider George's case, students submit test requests and sample analysis forms, which are then processed in real time; likewise, students encounter George's 'appointments' in real time.

Teacher role

Instructors need to assign clear roles or identities to the participating students and specify a starting point for the collaborative simulation.

Instructors also need to set an immersive contextual framework to engage the students performing the central role within the activity.

Advantages derived from technology

Students can access this application at their convenience.

The scenarios are self-directed.

The technology provides an immersive, conceptual environment where students can engage, reflect and learn in a safe environment.

Learning resources

Taken from the first year medical curriculum.

Learning outcomes

Scenarios outline topics encountered directly in public health medicine and addresses multiple learning outcomes by requiring students to consider public health contexts, increase their awareness of tensions in a multi-agency healthcare domain, understand the primacy of effective decision making for short- and long-term solutions, and operate within budgets.

Other outcomes specific to certain scenarios instructs students in practicing effective detection, containment, confinement, and eradication of threats to public safety, relevant concerns in health management and patient admissions.

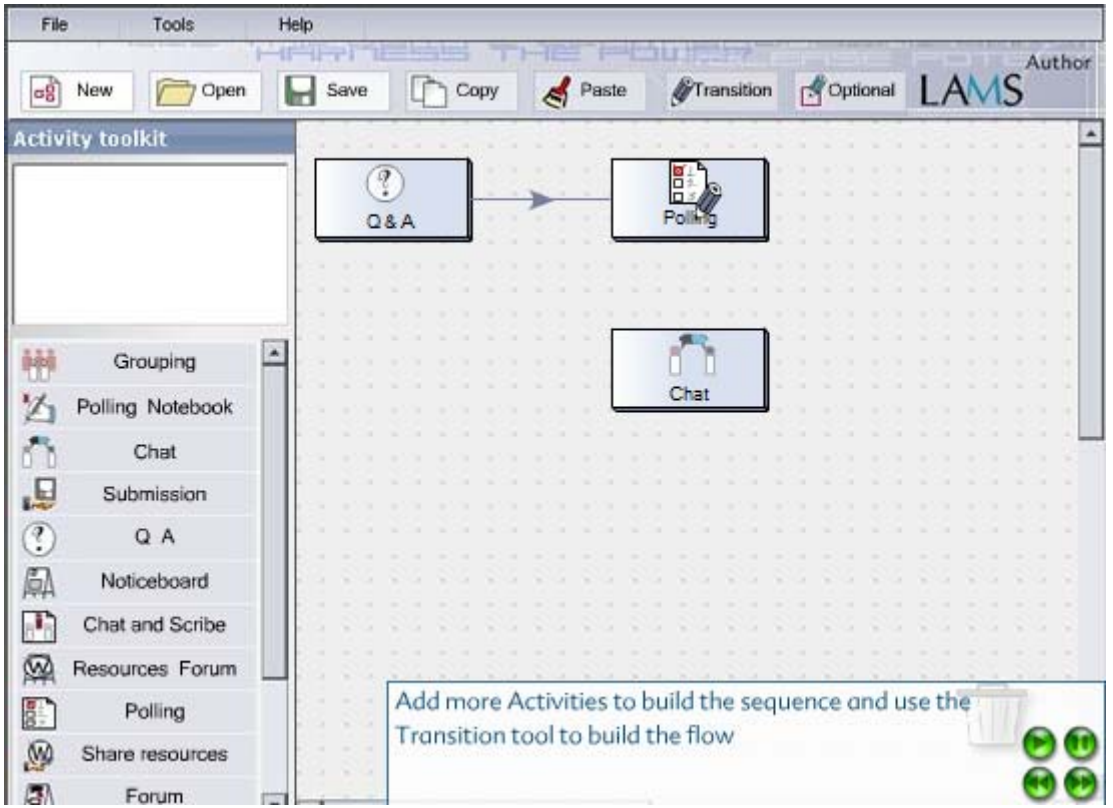
Developed from constructivist and PBL approaches, these scenarios value an engaged, reflective learner who is clearly situated in an immersive, social environment where actions lead to consequences that lead to other actions.

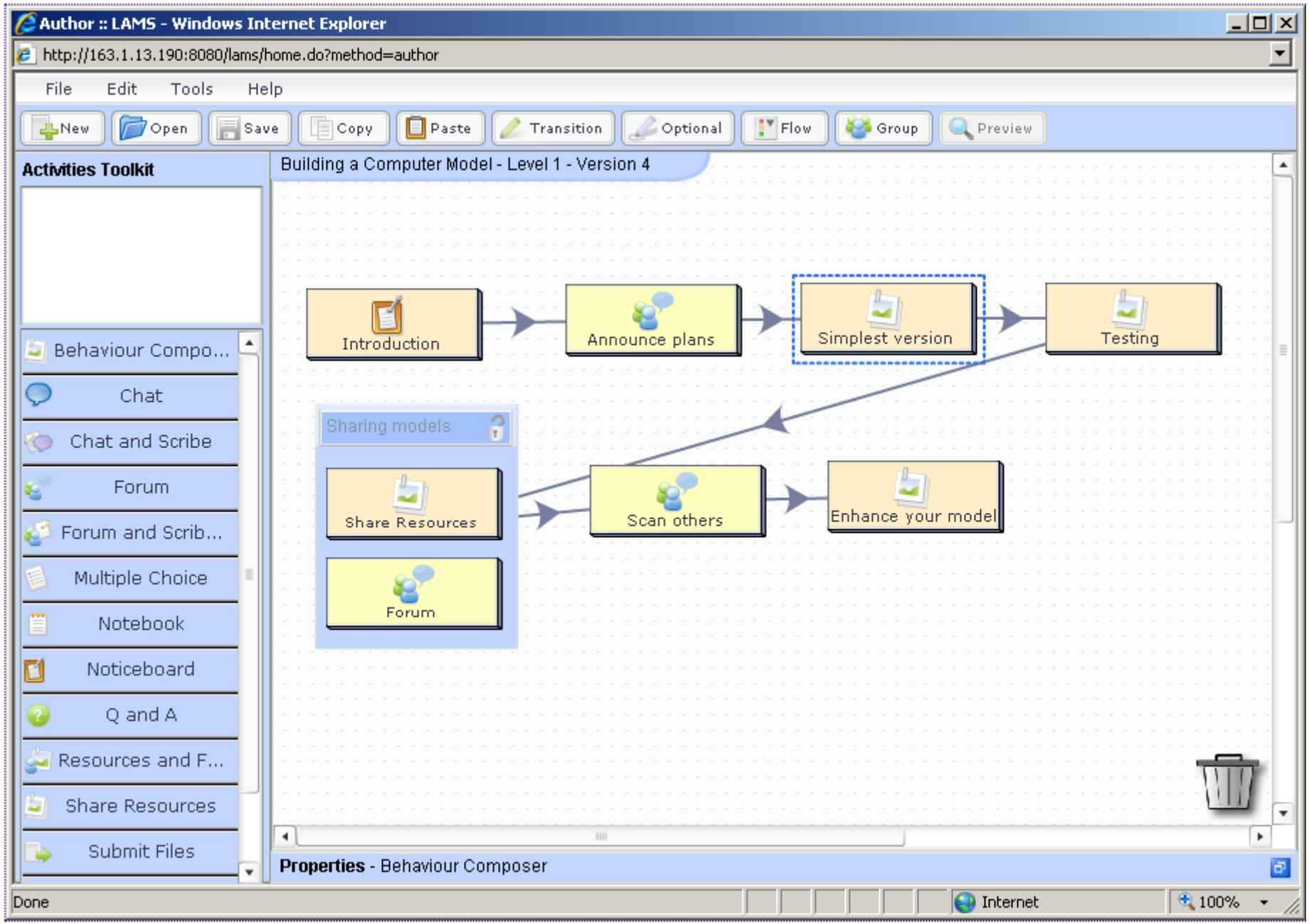
Assessment strategy

End of year exams. Although not marked as a separate entity, an improvement has been noted with the results of students using the program.

LAMS: Learning Activity Management System

- LAMS creates "digital lesson plans" that –
  - can be run online with students,
  - stored online and shared among teachers
- Most famous for the ‘drag and drop’ authoring interface
- Allow digital lessons to be run online

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Behaviour Compo...
Chat
Chat and Scribe
Forum
Forum and Scrib...
Multiple Choice
Notebook
Noticeboard
Q and A
Resources and F...
Share Resources
Submit Files
Building a Computer Model - Level 1 - Version 4
Introduction
Announce plans
Simplest version
Testing
Sharing models
Share Resources
Forum
Scan others
Enhance your model
Properties - Behaviour Composer
Done
Internet
100%

Using LAMs: *lesson level tool*

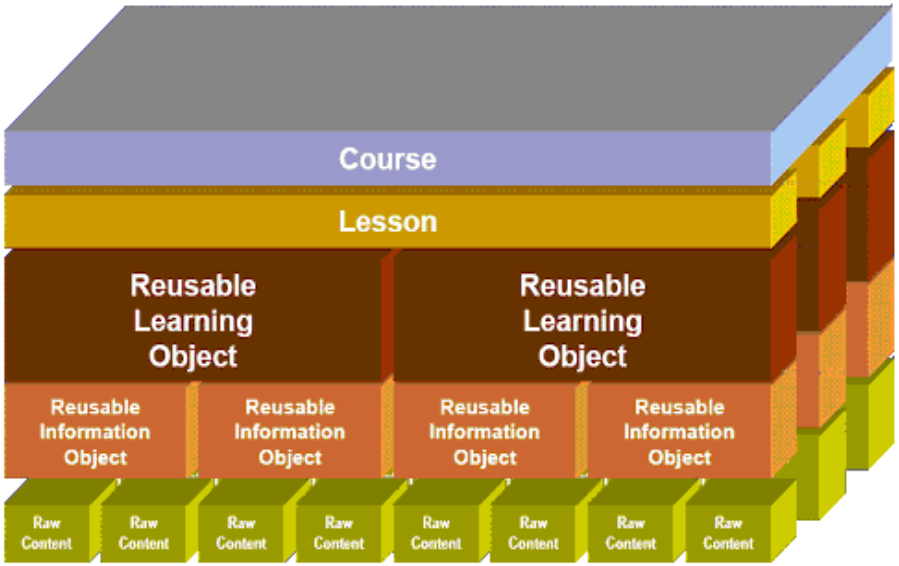
- Create lesson plan using built in tool palette
- Run the lesson online
- Monitor activity and progress of students as they work through the activity sequence

- Powerful open source tool, that is well supported and has its own international community of practice

- Requires the commitments to set up and run the online lessons

- Free with extensive online support
  - http://www.lamscommunity.org/

Transforming a course



‘Blended learning’

- Blended learning: an appropriate combination of traditional face-to-face and online teaching
- It provides a way of introducing novel approaches within a familiar framework.
- Small or large changes to the ‘blend’
  - I can be applied flexibly and gradually to introduce small changes or to transform a complete course
- The nature and scale of the blend is determined by the issues/problems you wish to tackle.

Case study: Improving pass rates in Introductory programming

- This approach started with the users' needs - this is what motivated the particular blend.
- An appropriate blend of online and offline resources which included:
  - significant changes to the content of the curriculum;
  - changes to the organization of the modules
  - development and use of a major eLearning component.
    - the eLearning aspect involved the use of a standard VLE (WebCT) enhanced with multimedia learning objects

IB110 Introduction to Programming (Java) Sem A 02/03 - WebCT 3.8.1 - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Back Search Favorites Media

Address http://webct.uni.ac.uk/SCRIPT/IB110/scripts/serve_home

Go Links Norton AntiVirus

WebCT

MYWEBCT | RESUME COURSE | COURSE MAP | LOGOUT | HELP

Hide Navigation

Control Panel
Visible to Teaching Assi
Manage Students

Course Menu
Homepage
e-Learning Hub
Course Content
Syllabus
Calendar
Glossary
Search
Communication
Mail
Discussions
Chat
Study Tools
Homepages
Presentations
My Progress
Evaluation Tools
Assignments
Self Test
My Grades

IB110 Introduction to Programming (Java) Sem A 02/03

Home › Course Content and Related Materials › Week 3

Basic repetition in Java

Computers are often
again. For example,
terminating only whe
indefinite loop and is
the while statement c

Example code

This is the code need
choice, repeated until

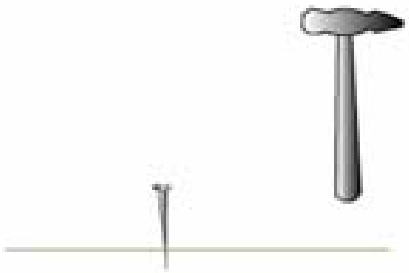
```
while ( choice
        offerMenu
        choice =
) // end while
```

Explanation

In Java a while state

Part 1

While loops - Microsoft Internet Explorer



We use repeated actions to solve problems in everyday life
i.e.
We want to hammer a nail into a piece of wood.So we follow the routine:

while (the nail is not flush) hit the nail

Show

Back WHILE LOOPS 1 of 7 Next

start IB110 Introduction to... While loops - Microsof... PhotoImpression 21:42

Module results

Pass rates increased for all modules

Pass rates

Course	Percentage point increase 2002-3	2003-4
LondonMet HND	+19	+27
LondonMet BSc	+15	+21
Bolton BSc	+23	+12
LondonMet MSc	+12	+19

Note: based on number of students completing modules compared with 2001-2

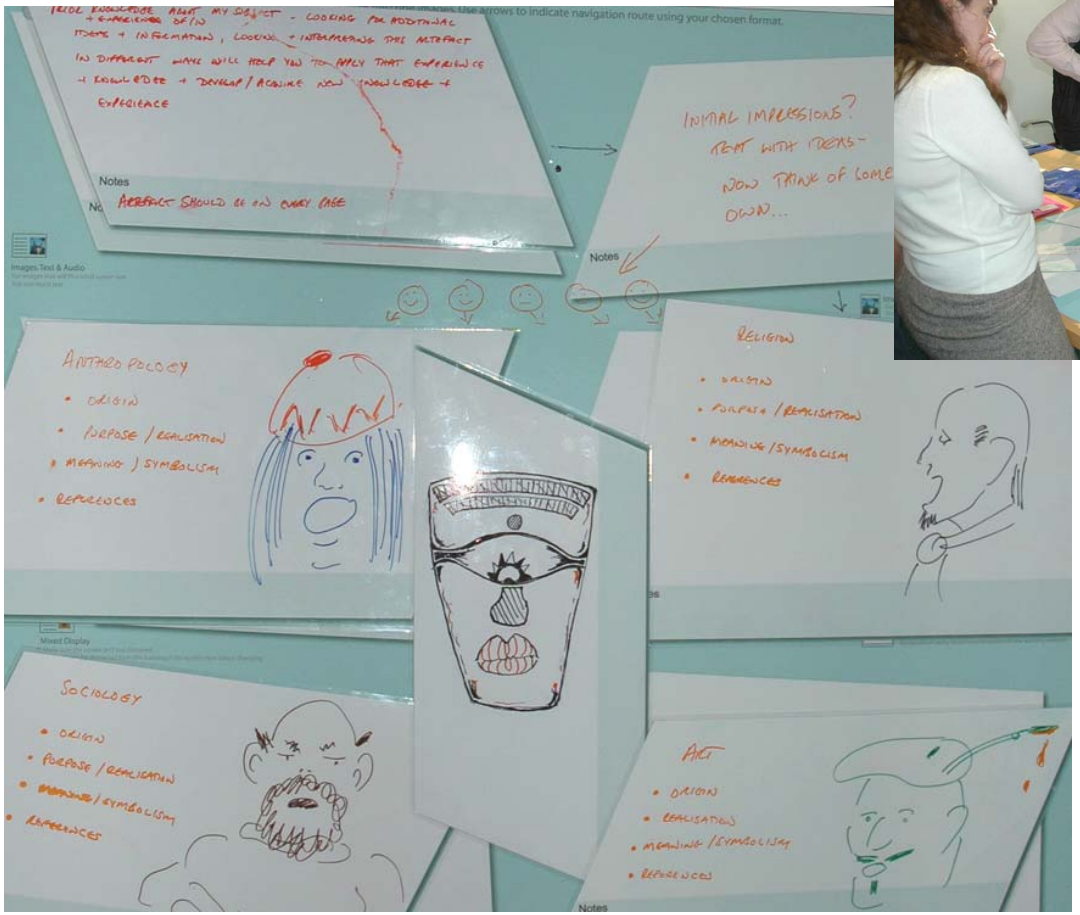
These increases exceeded our expectations

Agile Development of Learning Resources

Developing multimedia learning objects

- ‘Agile’ development
- Small groups
- Tutor (learners) and developer
- Driven by learner needs
- Workshops
- Iterative prototyping
- Evaluation

Boyle T. et al.(2006) An Agile method for developing learning objects. Proceedings of the 23rd Annual ASCILITE conference



Please click on the artefact to progress to the first tutorial task.

Screen 2

[Title]
Reflective Activity 1

[Instructions: Free Text Box]
Look at the artefact on the right and open the notepad to record your answers to the following questions:

1. What is it?
   If you do not already know what it is, simply record what you see (for example, a statue of a family group, a text about a battle).
2. What do you know about it already?
   If you know what it is, do you know what it was for or where it is now?
   If you do not know what it is, review your answer to 1 to discover what you know already.
3. What do you want to find out?
   Remember to make a note of the view(s) and phase(s) where you find information to answer your questions.

[Artefact as link to next page - clickable]

Comment: Yes we do, it only occured to me when I was writing the instructions that no-one will want to do this in one go and, using evidence from medicine students in computer clusters using Blackboard tests, may well want to break off doing it alone and work together, but go back to them later.

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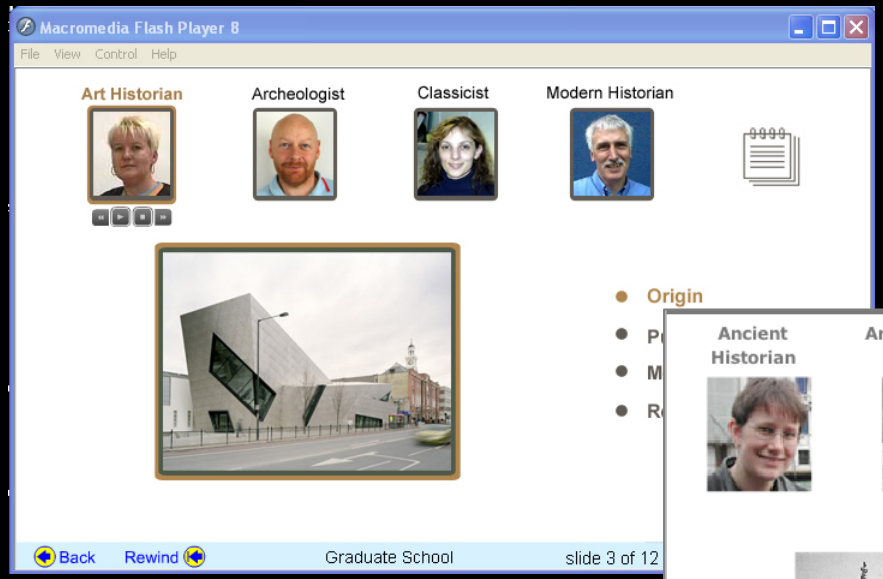
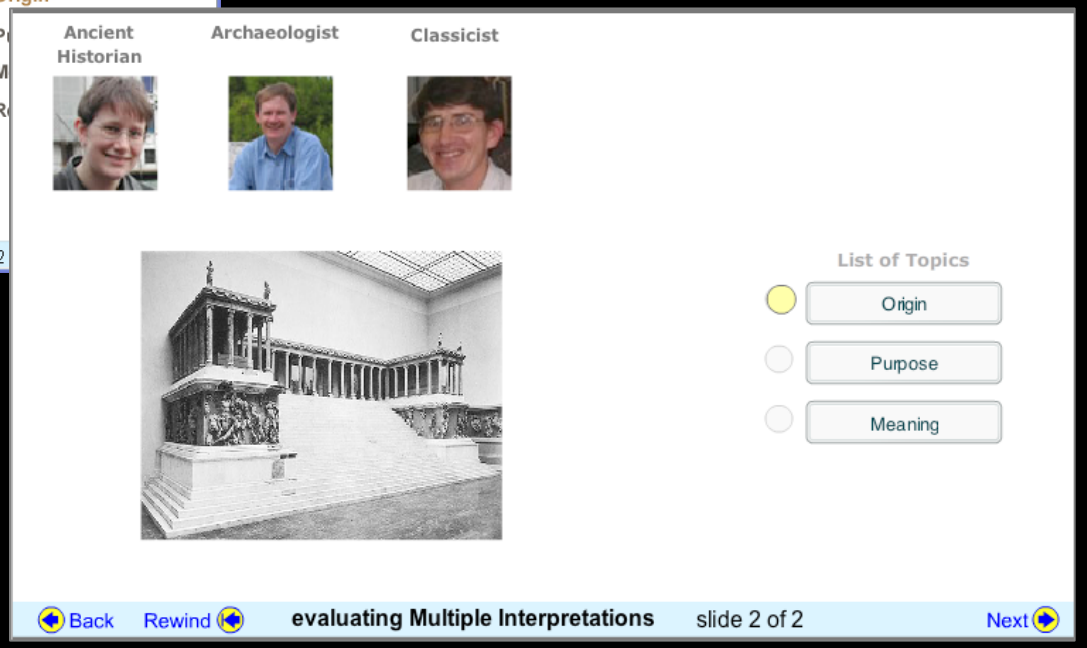
Artefact GLO tool

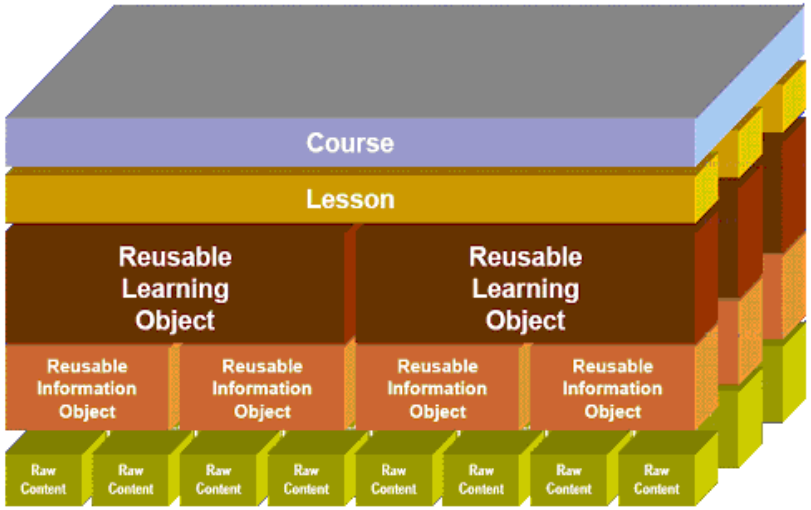


Prototype

Instance



Adaptable learning resources



Generative learning objects (GLOs)

- The basis for reuse is the pedagogical pattern rather than ‘content’ of the learning object
- A richer basis for reuse and *repurposing*
- This gives a tremendous increase in productivity
- Allows local tutors to repurpose learning objects to meet their local needs and preferences
  - including international adaptation

Making GLOs available to users

- Pedagogical designs are represented as ‘plug-in’ patterns to the an Authoring tool.
- The tool can be used to create specific learning objects based on the chosen pattern.
- Each of these learning objects can be adapted by local tutors (or learners), using the same tool, to meet their local needs and preferences.
- All these learning objects run as Web based learning objects.

The following slides show screen shots from the demonstration of the GLO Authoring tool

The authoring tool may be downloaded free from the web site:

http://www.glomaker.org

GLO Authoring Tool

GLO Maker

Generative Learning Object Maker

Generative Learning Object Maker

Version 1.0 of GLO Maker released July 17th 2008.

Welcome to the support site for GLO-Maker. This tool is used to create and adapt generative learning objects (GLOs).

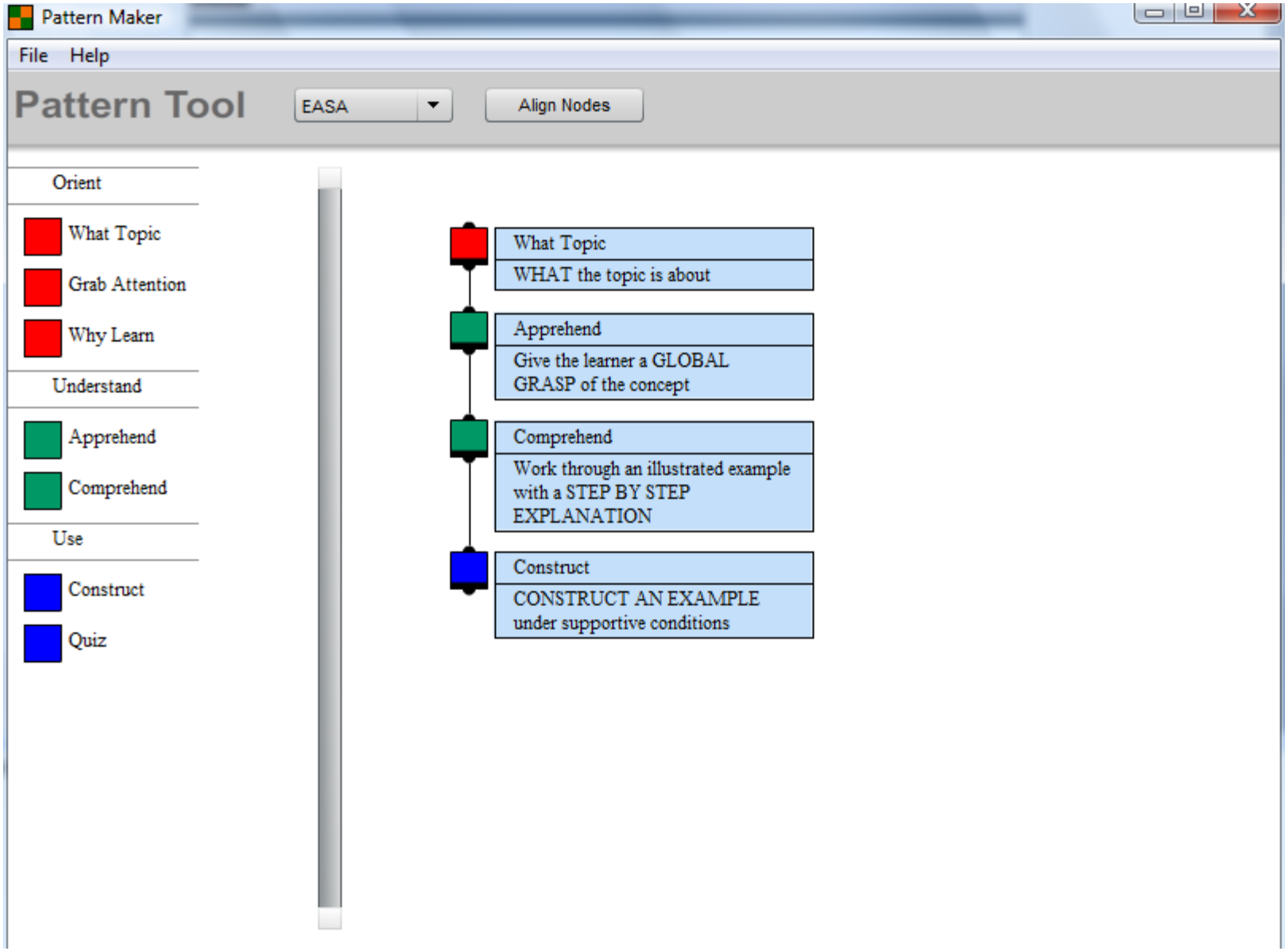
The first phase of learning objects, whilst engaging, interactive and educationally effective, is limited in some respects. The basic unit of reuse is the object as a whole and this leads to marked limitation in productivity. GLOs provide a more flexible format for developing learning objects which supports both increased productivity in initial development and flexible repurposing by local tutors.

GLO-Maker aims to provide a powerful and user friendly tool to create new generative learning objects, or adapt and repurpose existing generative learning objects. From this site you can download the latest, free version of the tool. You can also download the User Guide and resources for interactive tutorials provided.

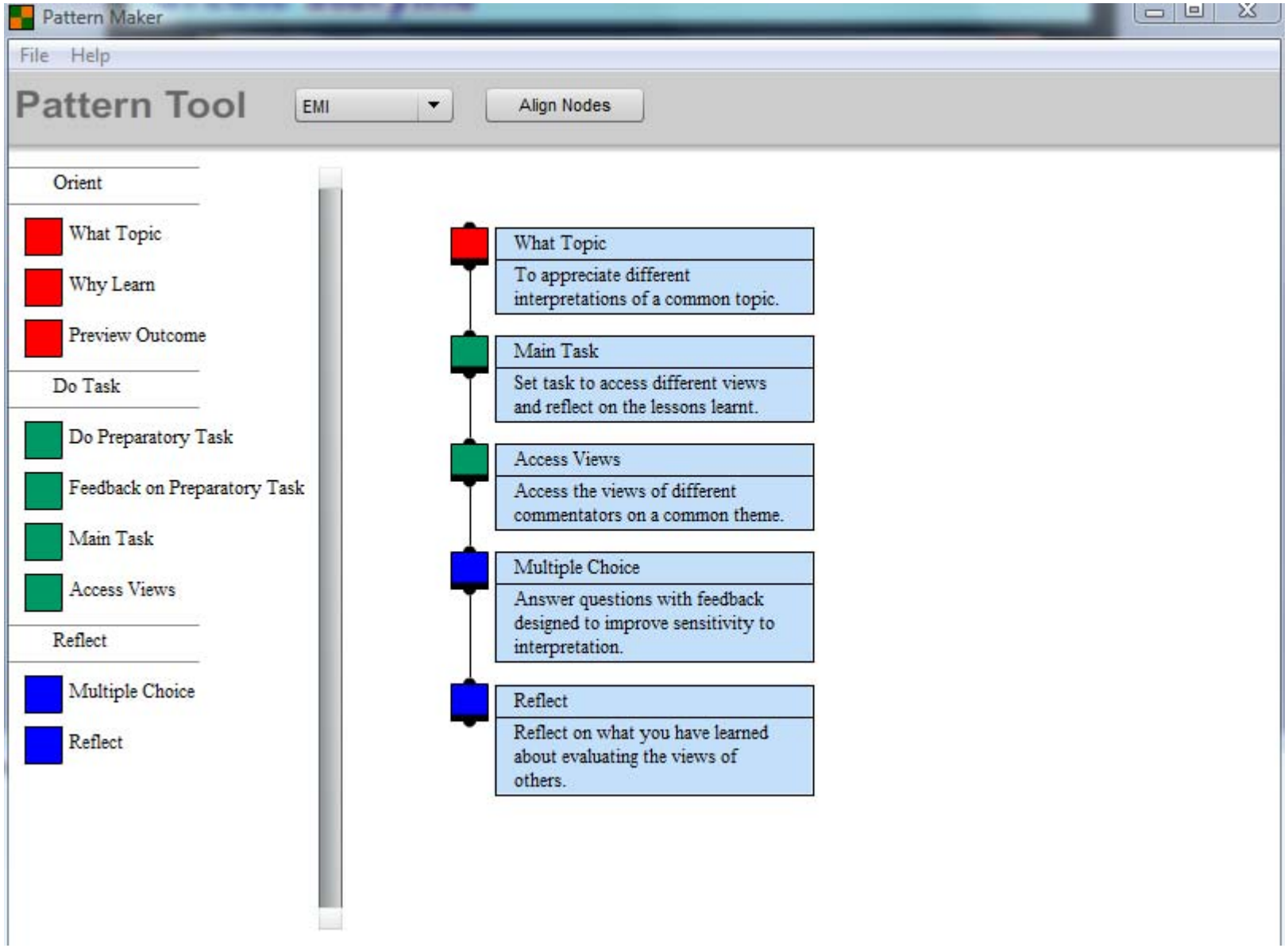
Contact Us

For further information about the GLO Maker please email:
Dr. Dejan Ljubojevic
d.ljubojevic@londonmet.ac.uk

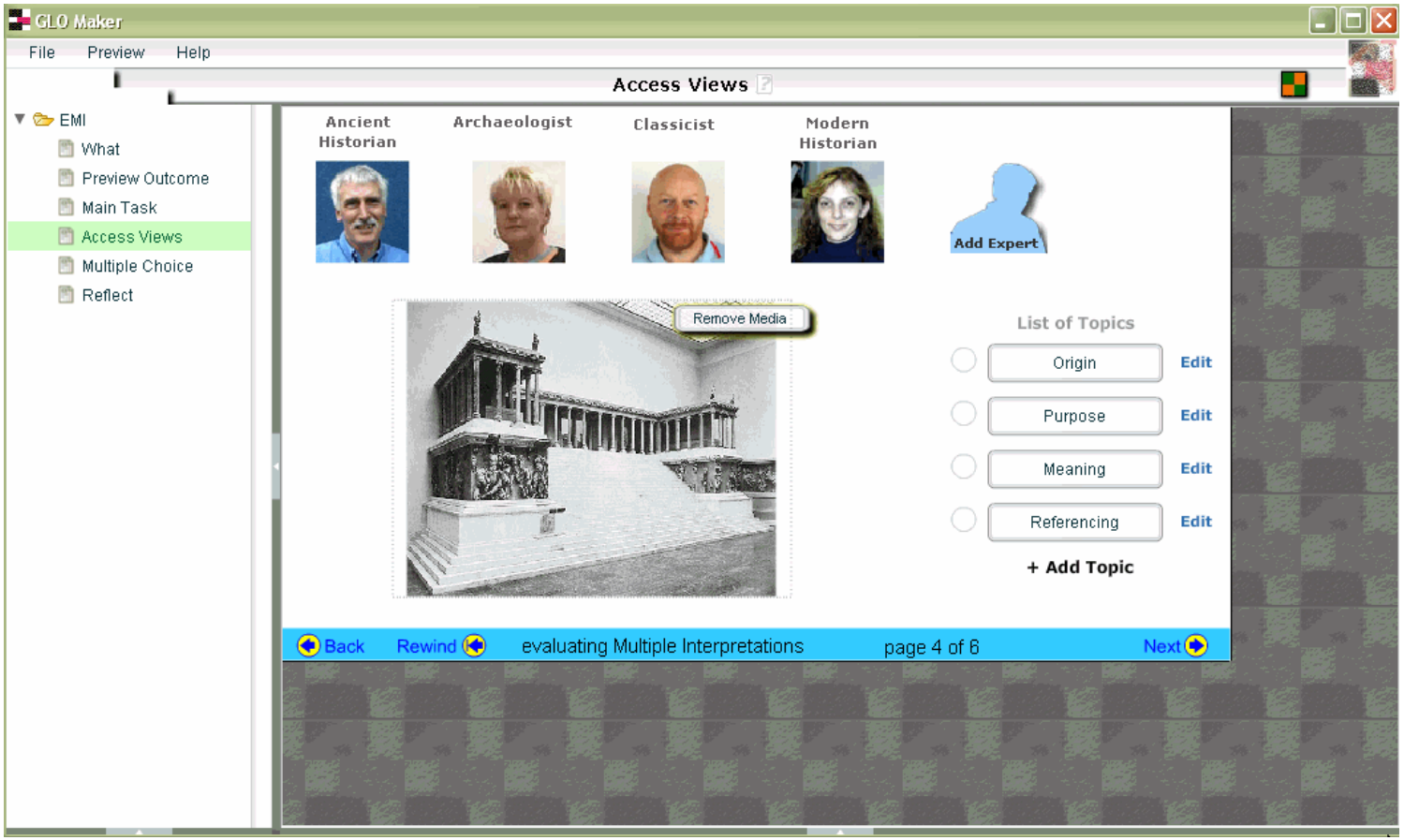
‘Create storyline’



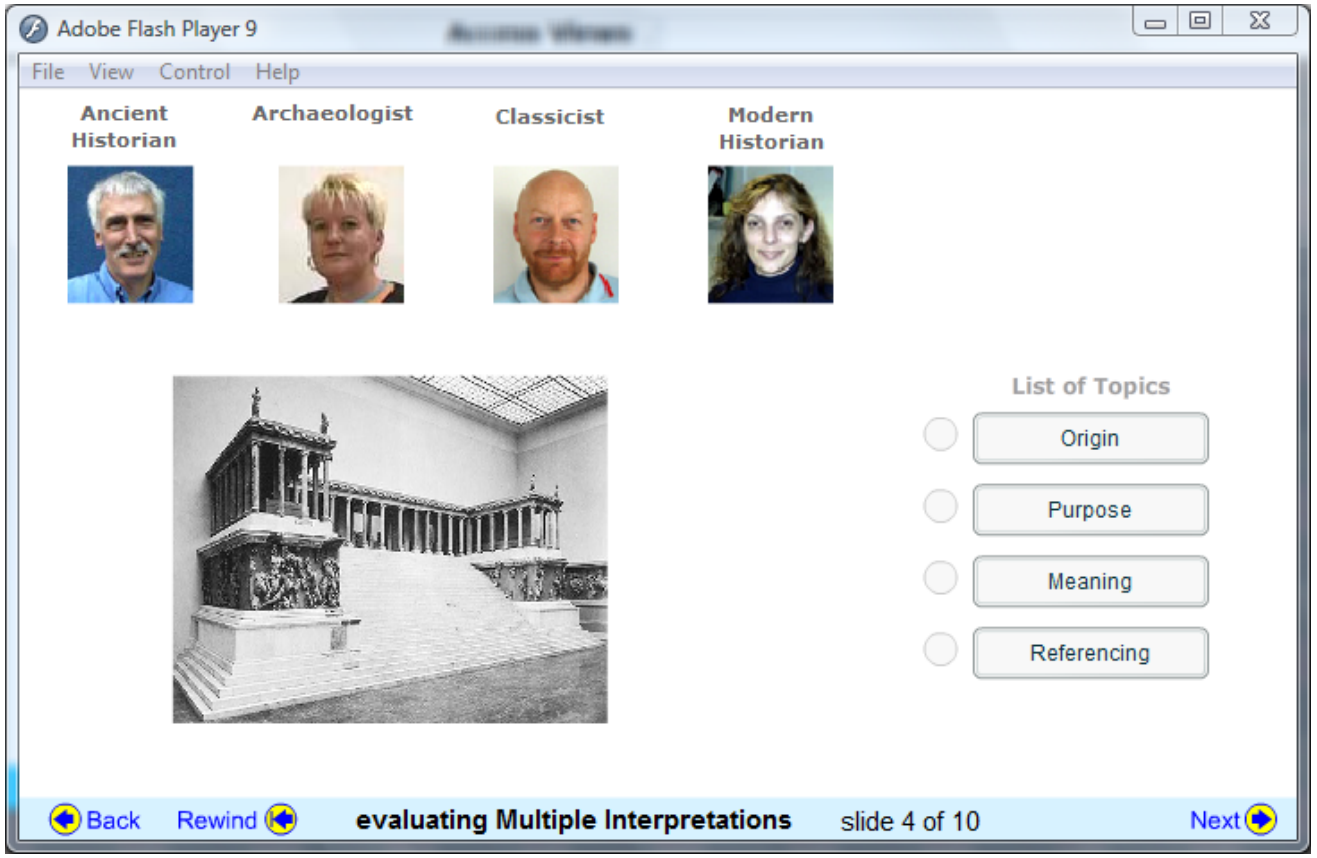
Second ‘Storyline’ or pedagogical pattern



‘Create screens’- surface structure



Learner view of finished learning object



GLO Maker

Generative Learning Object Maker

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Latest version:

Download GLO Maker v1.0 Installer (8.53 MB)

Installation help documentation:

- Installation guide for Fire Fox browser users
- Installation guide for Internet Explorer browser users
- Video Tutorial on Installing GLO Maker

Click on GLO FAQs to get answers to the main questions usually asked about Generative Learning Objects.

Previous version:

Summary

- How do we improve the effectiveness of teaching and learning?
- Use of learning objects
- Online lessons
- Transforming a course
- What is your goal? Choose the size and nature of the intervention to meet the target that you set.