Development of a Reusable Learning Object for Use in Teaching Structural Engineering

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Abstract

Reusable learning objects may be considered to be pre-developed digital learning activities that may be integrated into lessons, modules, and courses. Their advantages include their flexibility of content, their accessibility and the possibilities of using them as a means of evaluation. The aim of this project was to develop such an object for use in teaching structural engineering. A review of best practice in development of reusable learning objects was conducted, followed by a suitability analysis of various software packages available for use in the development of the resource.

A reusable learning object to be used in the teaching of the principle of second moment of area was developed. This interactive resource was made accessible through a virtual learning environment (Moodle) and accessed by students from engineering and non-engineering programmes in both AIT and GMIT, who provided feedback on the object via an online survey.

1   Reusable Learning Objects

RLOs, as described by Billings (2010), are pre-developed digital learning activities that can be integrated into lessons, modules, and courses while Clyde (2004) stated that RLOs may be "chunks" of content, they may also be simulations, communication tools, assessment activities and learning management tools.

Currently, one of the ways in which faculty concerned about teaching attempt to improve their students' learning experience is through the use of technology in the classroom, with the most popularly visible instance of this being distance or e-learning. But less visible to the public eye and more challenging are individual faculty members' design and development of a plethora of exciting, unique, and innovative technology-based learning objects and methodologies that can have a significant effect on student learning outcomes. RLOs can be thought of as instruction-oriented software application modules that are either used in a stand-alone mode or embedded in larger applications such as online e-learning courses (Reisman 2009).

In recent years, the notion of RLOs or learning resources, have received significant attention in education communities. Initially inspired by object oriented programming practice in computer science, the idea appears to have materialised from traditional, instructional software design approaches issuing from professionals attempting to articulate more effective and economical strategies for management and reuse of resources in networked environments (Churchill 2007).

2 Development of Reusable Learning Object for use in Teaching Structural Engineering

A review of best practice in the development of reusable learning objects identified the CISCO Reusable Learning Object Strategy as an appropriate approach to the development of such resources and thus was adopted in this project. Further, suitability analysis of selected commercially available software packages to be used in the development of this resource considered parameters such as functionality, ease of use, developer's expertise, visual impact, compatibility and cost. This led to the adoption of Google sketchup for developing the images and animation; Camtasia for recording and creating the tutorial video segments; Adobe Acobat was used for supporting documentation, while Articulate – an add-on to MS Powerpoint – was used as the host platform for all of the elements of the learning object. The learning object was then hosted in the Moodle Virtual Learning Environment. The object was successfully developed, reviewed and updated following user feedback. Figure 1 shows some screenshots from the finished reusable learning object.
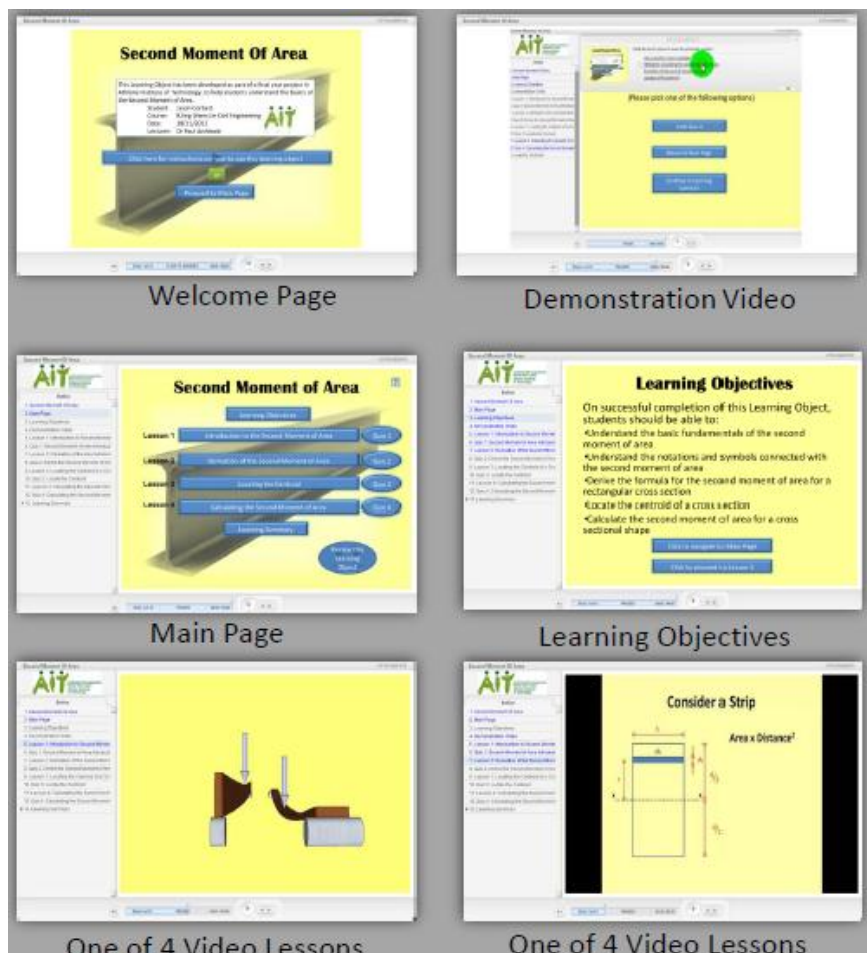

Figure 1 Screenshots from Completed Reusable Learning Object

Conclusions

A reusable learning object was successfully developed for use in teaching the principle of second moment of area in structural engineering. This object utilised a number of commercially available software packages to create an interactive resource which was then made available to selected students via the virtual learning environment, Moodle. Feedback from students who used the resource was generally quite positive in terms of its use as a support tool for both contemporaneous teaching and learning and also for revision purposes.

References

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