

## SWAP Projects

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**TITLE OF PROJECT:**

DEVELOPING A GENERIC DESIGN PATTERN TO ALLOW EASY RE-PURPOSING OF A REFLECTIVE PRACTICE LEARNING OBJECT

**INSTITUTION:**

London Metropolitan University

**PROJECT LEADERS:**

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**DISCIPLINE/DEPARTMENT:**

Faculty of Computing

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**CONTEXT:**

The purpose of this project is to build on a recent mini research project, funded by the Write Now CETL, which investigated the relationship between reflective writing skills and programming skills and aimed to encourage deep learning and to support and improve reflective report writing in first year computing students. A reflective practice learning object (RPLO) was developed, used and evaluated by students. However, as the learning object had been developed in a specific context, and currently embeds Java programming problem solving tasks, it is not easily adaptable for reuse.

The aim of this project is to discover an RPLO generic pattern and to design a template to support reflective writing. The template, which will include generic content and interactive components, will be embedded into a learning object creating tool. It is hoped that this will allow tutors to easily re-purpose the RPLO to suit a different topic or subject area.

In this project, we aim to collaborate with module leaders in order to elicit a reflective practice design pattern and then support them in the creation and deployment of contextualised RPLOs. In the first instance we aim to target first year students, enrolled on different computing courses and taking various programming modules, with the aim of supporting them in reflective practice writing tasks. However, it is hoped that the generic design pattern could be easily adapted to other ICT topics or subjects in other disciplines across the University.

**PROJECT OBJECTIVES:**

The main aim of this project is to design a generic pattern to support reflective practice, which will allow lecturers to easily repurpose and create reflective practice learning objects to suit different topics. The RPLOs will then be made available to as many first year students as possible in the Faculty and potentially to students in other disciplines.

The initial stage will involve research into current tools for creating learning objects and consultations with tutors, on various courses, to identify common content and useful interactive components. In the second phase of this project, a generic RPLO pattern will be embedded by a student/developer in the chosen tool. The third phase will be devoted to supporting tutors who will

be re-purposing the template to create RPLOs to be used in their own teaching contexts. It is hoped that new RPLOs will be available to students during the second half of the Spring semester to support them in their reflective assignments. At this fourth stage, students will also evaluate the RPLOs through questionnaires and the impact on learning will be also considered.

#### **DESCRIPTION OF PROJECT:**

##### **Research into suitable tools**

We evaluated a few tools that are designed for learning object reuse. However, we found that they are either not particularly user-friendly, especially for tutors with limited technical abilities, such as the open source tool RELOAD [1]; or they are limited in their interactive end result functionality and are mainly text-based, such as the Wiki type Editor MURLLO [2]. For this research project we chose to use the Generative Learning Objects Maker (GLO-Maker) tool that was developed by the Centre for Excellence in Teaching and Learning in Reusable Learning Objects (RLO-CETL) [3]. This tool is extendible, and offers the ability to expand its functionality by adding plug-ins and new components as necessary. It also has features to capture pedagogical patterns [4] as well as the content of a learning object.

##### **Designing a reflective practice pedagogical pattern**

The method of eliciting the reflective practice pedagogical pattern involved two processes: the evaluation of the RPLO content and structure by academics and a generative approach of identifying the hierarchical structure of the learning object. Lecturers who were interested in using the RPLO in their own teaching context evaluated the learning object in terms of its surface forms and its contents. An in-depth discussion took place with each lecturer to understand their needs and views. The second process was to apply an analytic approach to the RPLO itself to clarify the underlying hierarchical structure of the object and to elicit the pedagogical pattern (see Appendix).

##### **Extending the GLO-Maker functionality**

Evaluation of the GLO-Maker's authoring tool components suggested that the tool has a limited range of functionality and that it needed to be extended in order to provide the interactivity achieved by the original RPLO. Two new functionalities were identified. The *Drag-and-Drop* functionality was needed when the learner is asked to identify the four levels of reflection. This activity provides the learner with scaffolding/feedback. The development of this plug-in was reasonably straightforward. The development of the *Input-Output* plug-in was needed to allow learners to actively use the learning object by inputting their own text. The original RPLO provided sections where the users are requested to input their own solutions. The text was then kept in the memory of the learning object until it was extracted and presented again to allow the learners to compare their own solutions with the solution provided, or to reflect on their own writing. In order to achieve this functionality, the GLO-Maker tool needed to be upgraded twice by the RLO-CETL team to repair previously undetected faults. The new plug-ins and the pedagogical design pattern are now successfully embedded in the GLO-Maker tool and we are hoping that a new version will be released shortly for public use.

#### **ASSESSMENT OF IMPACT OF PROJECT:**

By the time the GLO-Maker was repaired the semester had finished. In addition, tutors were not able to try the improved tool and the new pattern themselves because of lack of necessary administrator rights to install the new version on their University computers, therefore only the project team had the opportunity to use and evaluate the tool. Nevertheless, because of close similarity, we were able to create new a RPLO in the context of Visual Basic (VB) programming (as opposed to Java programming). The VB-RPLO was used by 30 (out of 65) Business Information Technology BSc and Foundation students in the second semester of their first year. Eleven questionnaires were returned compared with 33 for the Java module last year. The results for the VB cohort were very similar to the Java cohort with the majority of students either agreeing or strongly agreeing to each of the closed questions presented online through the virtual learning environment. 73% of students said that they found the reflective practice learning object was either helpful or very helpful for writing the coursework report. 73% of students (89% of those who accessed it) either agreed or strongly agreed that the RPLO helped them to think/write reflectively.

8% of students either agreed or strongly agreed that they think that reflective practice helps their programming skills.

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**DISSEMINATION:**

Work-in-progress was presented at a workshop at the University of Greenwich in June 2010.

**AVAILABILITY OF PROJECT OUTCOMES**

Reflective Practice Learning Object for Visual Basic Programming Students

<http://learning.londonmet.ac.uk/computing/java/rp/vb/RPVB.html>

Hardbattle, D. and Fisher, K. (2010). A Generic Design Pattern for Learning Object Reuse. In: Graham, D. (ed.), *Proceedings of "e" Teaching and Learning 2010*, 1 June, University of Greenwich/HEA-ICS, pp 5-10.

**FUTURE PLANS FOR PROMOTING PROJECT WORK/OUTCOMES:**

Although the intention was for lecturers to use and evaluate the pedagogical sequence in the GLO-Maker themselves, and to create their own learning objects, only the authors have had the opportunity to do so at this stage. It is hoped that this will take place when the new version of the tool is released to the public. Further future research will involve working with lecturers in other Departments/Universities who have already expressed interest in repurposing the reflective practice learning object for their own teaching.

**REFERENCES:**

- [1] MURLLO - Management, Use and Re-purposing of Language Learning Objects. Available at: <http://www.elanguages.ac.uk/researchcommunity/projects/murillo/tools.html>
- [2] RELOAD Content Packaging & Metadata Editor Available at: <http://www.bolton.ac.uk/IEC/Educational%20Software/RELOAD%20Content%20Packagin.aspx>
- [3] RLO-CETL (2009). Generative Learning Objects (GLOs) Available at: <http://www.glomaker.org/about.html#v1>
- [4] Pedagogical Patterns Project (2006) Available at: <http://www.pedagogicalpatterns.org/>

## APPENDIX

An early version of the new reflective practice pedagogical sequence embedded in the GLO-Maker tool.

