Student Numeracy Support Using Bespoke Reusable Learning Objects

Chrystalla Ferrier
Faculty of Science and Technology

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Introduction

Numeracy and data handling are areas that many life sciences undergraduate students find challenging, but most career pathways from these courses require competence in the performance and application of a specified range of data manipulations. There has long been awareness amongst higher education staff that the numeracy skills of those entering undergraduate degree programmes have declined over the years and that entrance qualifications do not always correlate with mathematical ability [1]. Poor undergraduate module performance where numeracy skills are required can also be attributed to lack of student mathematics confidence which in some cases leads to excessive anxiety [2][3].

A recent small study with Level 6 BSc Biomedical Sciences students at the University of Westminster found a highly positive response from students to the provision of worked calculations to a selection of numeracy problems, which they were able to access via the virtual learning environment throughout the duration of a module. Most reported to using this in preparation for a summative data handling test and in subsequent student questionnaires 72% (n = 25) felt that its provision had improved their test performance.

Reusable learning objects (RLOs) provide a means for students to repeatedly access learning material and their studies.

Methods

Staff from the School of Life Sciences were asked to contribute one numeracy example, in a standard format (Figure 1).

Discussion

The development of this RLO as a joint staff venture represents just one aspect of student numeracy support available in our School. Numeracy is embedded into generic academic tutorials for new starters at Level 4 and optional additional ‘drop in’ sessions will be available this year.

Collaborating with graduates from another School has been essential as there is limited local expertise in the use of Adobe Flash. The programmers had previously produced RLOs for their final year research projects. Initially they produced a selection of examples, the nature of the programming meant that the examples had to be converted into a second standard format, and multiple choice answers provided. Some of the examples contained more that one question and often a series of sequential questions, this was not a problem with respect to the programming. Very lengthy examples however were split into appropriate separate subject headings so as to avoid excessive pages which may prove difficult to follow.

The fact that there is often more than one correct means of calculating the answer to a numerical problem is emphasised in the RLO (Figure 1). Transcriptions from the original example being put into a new format for the programmers to the programmers themselves obtaining feedback from School of Life Sciences staff. Repeated transcriptions from the original example into a new format for the programmers to the programmers themselves transcribing the examples into the RLO programme can result in minor errors. Thorough checks before final release are time consuming but essential to avoid unnecessary confusion for students using the RLO.

The importance of piloting such a resource to ensure alignment with numeracy teaching across the School cannot be overstated. Suggestions from the pilot meeting were the production of separate RLOs appropriate for each level of study and/or the production of separate subject specific RLOs containing many worked examples. Increasing student interaction with the RLO may also be required to improve effectiveness. To inform the next stages of this project we will await student feedback on the usability and usefulness of this resource in addition to the analysis of marks for assessments requiring numeracy skills.

Results

Figure 2 provides examples of screen shots from the completed RLO including the contents page. Users can select any example, they are asked to attempt each question first then select one of the four answer options. On selection a ‘correct’ or ‘not correct’ screen appears, but in either case the next pages display one method of calculating the example plus application comments at the end. The RLO will be available for student use from the 2011/2012 academic year.

References