2015-01-14

Online Resource Platform for Mathematics Education

Marisa Llorens  
*Technological University Dublin, marisa.llorens@dit.ie*

Edmund Nevin  
*Dublin Institute of Technology, edmund.nevin@dit.ie*

Eileen Mageean  
*Dublin Institute of Technology, eileen.mageean@dit.ie*

Follow this and additional works at: [https://arrow.dit.ie/engschcivoth](https://arrow.dit.ie/engschcivoth)  
Part of the [Civil and Environmental Engineering Commons](https://arrow.dit.ie/engschcivoth)

Recommended Citation  

This Other is brought to you for free and open access by the School of Civil and Structural Engineering at ARROW@TU Dublin. It has been accepted for inclusion in Other resources by an authorized administrator of ARROW@TU Dublin. For more information, please contact yvonne.desmond@dit.ie, arrow.admin@dit.ie, brian.widdis@dit.ie.

This work is licensed under a Creative Commons Attribution-Noncommercial-Share Alike 3.0 License.
Rationale for Project

European Context:
- European Higher Education Area (EHEA)* Encourages the development of new competencies and skills through active learning methodologies.

Vick Context:
- National Strategy for Higher Education to 2030 (DES 2011):
  - Emphasised the need for teachers in higher education to...
  - stimulate active, not passive learning
- It points to the need to...
  - create a process of active learning by posing problems, challenging student answers, and encouraging students to apply the information and concepts

DIT Context:
- College of Engineering and Built Environment (DIT 2011):
  - Response to DIT Strategy on Student Engagement.
  - Use modern technology to support student learning.
  - Increase diversity of learning experience.

Introduction

The aim of this project was to develop and explore the use of a Shareable Content Object Reference Model (SCORM) integrating a web-based platform for the study of mathematics as part of an active learning environment. The platform was designed to provide active support to engineering students especially those in their first year of study. Early use of the platform can identify possible areas of weakness and provide the self-learning environment required for students to become more proficient in areas where they are lacking key skills or are finding concepts difficult to understand.

The platform consists of a set of tests and applications for the study of engineering mathematics. The tests can adapt and change depending on the answers provided by the student, including video feedback for incorrect answers before the student progresses to the next question. Based on the idea that teaching is a conceptual best way to learn that concept, the students become actively involved in the platform as they create the videos that provide feedback to the other users of the platform. This active learning, constructivist approach provides an environment of achievement and ownership that allows students of all levels to enjoy the learning experience.

"Tell me and I forget, teach me and I may remember. Involve me and I learn!"
- Benjamin Franklin

Methodology

The approach taken for this project follows the design-based approach described by Reeves (Reeves et al. 2004) and is illustrated in Figure 1.

- Stage 1: Conceptualisation
  - Core mathematical concepts which are proving difficult to understand are initially identified using either a standard Math's Diagnostic Test (MDT) or through a student survey.
  - Stage 2: Development
    - A set of online quizzes consisting of quizzes created by the lecturer and feedback videos which are assembled into packages.
    - The SCORM run time system communicates with the learning management system (LMS) and feedback videos which are assembled into packages.

Stage 1: Conceptualisation

Stage 2: Development

Implementation

Phase 1: Student as co-creator
- Solutions to basic mathematics problems are recorded as videos.
- Consequently, students determine their own learning by exploring rather than receiving knowledge.
- The quizzes were created using Wondershare QuizCreator

Phase 2: Creating the online resource platform
- Online resources (i.e. quizzes) are created with student content (i.e. feedback videos).

Phase 3: Feedback Pathway
- Online resources are delivered to students through surveys and focus groups.

Benefits of Intervention

Benefits of Intervention (Phase 1):
- The students core competencies improve i.e. confidence and make them more ambitious
- Students are more empowered by their participation.
- Students are more empowered by their participation.

Benefits of Intervention (Phase 2):
- Web-based platform available to DIT students across multiple programmes and stages.
- Encourages self-learning.
- Completed at student’s own pace.
- Available 24/7 from any web-enabled device.

Summary & Future Work

- The platform can be prolonged over time:
  - Self-improving
  - Self-regenerating
  - Shared across programmes and stages
- Multidisciplinary opportunities to extend the project into other technical based modules.
- Expertise gained to be used to create interventions and support in areas where a lecturer may identify specific issues.

Acknowledgements

Dr Brian Boyle Head of Learning Development, College of Engineering and Built Environment, DIT Bolton Street.

Dissemination Outputs


References


Dr Brian Boyle Head of Learning Development, College of Engineering and Built Environment, DIT Bolton Street. The Learning Teaching & Technology Centre (LTTC). DIT. All the students who participated so enthusiastically.