

3U N-Step Strand 1 Presentations

On a Smart-phone based Student Response System in a Distributed Classroom

Dr. Conor Brennan (DCU)

Examining the relationships between attendance, online engagement and assessment outcomes in undergraduates; an observational prospective, multicentre study.

Jane Holland (presenter) (RCSI)

Eric Clarke (RCSI)

Morag Monro (DCU)

Evelyn Kelleher (DCU)

Mark Glynn (DCU)

Background

Non-attendance is known to have a detrimental effect on performance, but traditional manual monitoring of attendance may be problematic. These methods are time-consuming, particularly with increasing student numbers, and recording errors are difficult to entirely eliminate. Automated capturing of online activity may be a more time-efficient manner of identifying struggling students at an early stage, allowing appropriate intervention and supports to be put in place as appropriate.

Summary of work

Our study utilised the Reports and Logs function within Moodle to identify on-line indicators of students who are struggling or disengaging from the course during the first semester of the academic year. Ethical approval was granted by RCSI Ethics Committee. There were three main student cohorts included within this study: (1) RCSI Foundation year (2) RCSI Junior Cycle (3) DCU School of Nursing.

Results

For the RCSI Junior Cycle students, data from 2 modules were included (NM and AS). A single cohort of 365 students undertook both modules, 30 of whom were repeating. Comparison of medians showed significant reductions in all parameters within the repeat student group. In NM, regression analysis showed continuous assessment had the largest effect size on summative examinations for both first-time and repeat student groups ($R^2 = 0.545$; $R^2 = 0.289$). Among repeat students, online access of lecture notes had a larger effect size than physical attendance at small group tutorials, while both these indices were less contributory ($R^2 < 0.1$) for first-time students. In AS, continuous assessment showed the largest effect size for first-time students ($R^2 = 0.585$), while online access of lecture notes was most contributory among repeat students ($R^2 = 0.35$).

Conclusions

Within the RCSI Junior Cycle cohort, effect sizes are most notable for continuous assessment, but online activity correlates with summative performance and is more predictive for outcomes among repeat students than physical attendance. These indices may be useful to screen at-risk students for individual intervention and support.

Guiding principles for the integration of communication skills and enquiry based collaborative learning into undergraduate STEM programmes.

Dr Bob Lawlor, Dept of Electronic Engineering, NUI Maynooth.

Dr Alison Farrell, Centre for Teaching and Learning, NUI Maynooth.

Dr Dermot Brabazon, School of Mechanical and Manufacturing Engineering, Dublin City University.

Dr Kevin Casey, Dept of Computer Science, DCU.

Dr Judith Strawbridge, School of Pharmacy, RCSI.

Our group project involves exploring interdisciplinary communication skills and collaborative learning across STEM disciplines. In order to examine the topic we completed a literature review and surveyed staff about their views on interdisciplinary communication and collaborative learning at undergraduate level. We also held two focus groups on the topic with 3U staff.

Though one of our intended project outcomes was the design model for interdisciplinary approaches to communication skills, as a result of the literature review we redefined our purposes and instead, in the first instance, focused on the development of guiding principles for the effective integration of intra- and interdisciplinary communication skills training into existing and future undergraduate STEM programmes.

Our research is influenced by the following models and theoretical frameworks: the US Boyer Commission of 1998; Cousin's and Meyer and Land's work on threshold concepts; the Healey and Jenkins, and the Boyle and Bradley models of undergraduate research; the Aalborg model of project and enquiry based learning; the work on transfer most recently by Moore in the States; by Wenger's work on communities of practice; and by pedagogical constructivist methods particularly the move from absolute to contextual knowing as based on the research of Marcia Baxter Magolda.

Mathematical Knowledge for Teaching for Pre-Service Teachers

Majella Dempsey (NUIM)

Angela Rickard (NUIM)

James Lovatt (DCU)

Brien Nolan (DCU)

Ann O'Shea (NUIM)

Abstract to be provided.

A study of the reasoning opportunities in undergraduate Calculus courses

Ciaran Mac an Bhaird (NUIM)

Brien Nolan (DCU)

Ann O'Shea (NUIM)

Kirsten Pfeiffer (NUIM)

In this talk we will discuss the analysis of data from three undergraduate calculus courses. This work uses the framework developed by Lithner (2008) which distinguishes between imitative reasoning (which is related to rote learning and mimicry of algorithms) and creative reasoning (which involves plausible mathematically-founded arguments). The analysis involves the examination of notes, assignments and examinations used in first year calculus courses in DCU and NUI Maynooth with the view to classifying the types of reasoning expected of students. We will consider both courses for specialist and non-specialist students.

An exploration of student views and expectations about a new integrated pharmacy programme for Ireland.

Judith Strawbridge (Presenter) School of Pharmacy, Royal College of Surgeons in Ireland

Mark Philbin, School of Nursing and Human Studies, Dublin City University

Paul Gallagher, School of Pharmacy, Royal College of Surgeons in Ireland

Internationally educators are reflecting on the challenges of designing integrated curricula for healthcare professionals. The Pharmaceutical Society of Ireland commissioned a scoping review of education of pharmacists in Ireland which led to the recommendation for a 5 year fully integrated pharmacy programme. This study was conducted to understand students' needs to inform the design of the new integrated pharmacy programme nationally. The study was designed to determine students' expectations of an integrated programme and their perception of the merits, value and challenges of studying pharmacy through an integrated programme. A qualitative approach using modified grounded theory was used to explore students' opinions. Nine focus groups were conducted across each of the three institutions delivering pharmacy programmes in Ireland. The student representative on the National Forum was also interviewed. Thematic analysis revealed that students recognised that the role of the pharmacist is changing and felt that an integrated programme would provide better context for learning and preparedness for practice. Students had an expectation that experiential learning would be provided in all sectors in an equitable and transparent manner. There was strong support for optional subjects, placements overseas and interprofessional education. Students identified that fiscal constraints were a potential barrier and might impact on the attractiveness of the degree. Exploring student views and expectations is an important aspect of student-centred curriculum design. This study has informed the development of the integrated pharmacy programme in Ireland at National level, and will be of interest to those involved in curriculum design further afield.

The role of metacognition in mathematical reasoning and problem-solving

Michelle Flood (RCSI)

Frank Doyle (RCSI)

David Wraith (NUIM)

This is an exploratory pilot project investigating the metacognitive skills of university level students with different educational backgrounds. Metacognition means thinking about thinking, and the act of consciously exerting control over one's thought processes when engaging with a task. It includes behaviours such as predicting, planning, revising, selecting, classifying and checking, allowing individuals to be successful in problem solving situations. Participants were recruited in three different groups, with each group consisting of at least six members with a particular educational background. Each volunteer was asked to work on a collection of six mathematical problems using a think-aloud protocol, which will allow an analysis of the problem-solving and metacognitive skills displayed.

Emerging themes from a narrative inquiry on culturally and linguistically diverse students' experiences with STEM assessments.

Eloise Tan (DCU),

Aneta Hayes (RCSI)

Abstract to be provided.

3U N-Step Strand 2

Transitions in STEM - Great expectations or hard times?

Dr Tugba Aysel (3U NStep Strand 2 research assistant)

Dr Thérèse Dooley (St. Patrick's College, Drumcondra)

While student preparedness for third-level education is hampered by the 'race for points', it is encouraging that steps are being considered to address transition issues (e.g., HEA/NCCA, 2011; DES, 2014). In terms of STEM subjects, the focus of research tends to be measures that are put in place to address perceived gaps in knowledge of third-level students. However, there is relatively little research on the role that second-level teachers might play in dealing with transition issues in STEM. In this presentation we discuss how communication by educators across the system might be enhanced in order to ease the difficulties that students experience in STEM as they move from one level to the next. We hope that the session will be discursive in nature, thus allowing for further insights into this topic.

Student response systems

Dr Conor Brennan (Dublin City University)

Student response systems, such as clickers, offer several important pedagogical benefits including improved student learning, increased student interaction, improved student attendance, better student satisfaction and the creation of an enjoyable learning atmosphere. Most notably, they provide a mechanism for anonymous submission, thus allowing students to respond without the fear of being identified. While several different types of such systems exist, most of them have several drawbacks associated with them. These include (i) limited input capabilities, as they typically only offer a multiple-choice option and/or a numerical and textual based submission, (ii) practical issues in terms of portability, as the lecturer is typically responsible for having to carry a large number of devices to the classroom, and (iii) lack of suitability for distributed classrooms, as most systems employ short range infra-red communication that restricts their use to the physical classroom. Here, we propose and implement a smart phone based student response system that overcomes these issues. This new system builds upon existing work by the authors, whereby a tablet-based system was developed for in-class use. The talk focuses on two key aspects – the first relates to modifications to the existing tablet-based solution and the second is the evaluation of the new system in a distributed classroom setting.