# Enhancing teaching practice in a cross-disciplinary subject using Positive Pedagogy approaches

**Priyank Shukla[1,2], Stephen McClean[2] and Elizabeth Hidson[3]**

1. Northern Ireland Centre for Stratified Medicine, Biomedical Sciences Research Institute, Ulster University, C-TRIC Building, Altnagelvin Area Hospital, Glenshane Road, Derry/Londonderry, BT47 6SB, UK

2. School of Biomedical Sciences, Ulster University, Cromore Road, Coleraine, BT52 1SA, UK

3. Faculty of Education and Society, University of Sunderland, St Peter's Campus, Sunderland, SR6 0DD, UK

Ulster University

Faculty of Life and Health Sciences

ulster.ac.uk

## Introduction

### THE PRESSURE OF MULTI-DISCIPLINARY STEM STUDIES

Multi-disciplinary courses such as Personalised Medicine also involve cross-disciplinary subjects such as Computer Science.

Students are challenged by the breadth of skills needed in a multi-disciplinary course. They find computer programming stressful.

Teaching and learning needed to change to reduce the stress and anxiety reported by students and therefore improve wellbeing.

## Objectives

This project aimed to identify the aspects of the teaching, assessment and feedback approaches (Race, 2015) that contribute to improving student self-confidence, wellbeing, and preparedness for the job sector after graduation.

## Methods

### CHANGING PROGRAMMING PEDAGOGY

**WORKSHOPS & TUTORIALS**

Introducing more student-centred (Wright, 2011) and active learning approaches was key to our strategy to improve student wellbeing. The first step in the new model was to introduce a basic concepts workshop to learn new programming skills. Students were then given a problem-based learning task to solve in the follow-up tutorial, which was based on the learning in the previous workshop.

**OPEN-BOOK ASSESSMENT**

Using an open-book practical assessment model meant that students could concentrate on applying the skills to the task at hand rather than being anxious about memorising coding structures and syntax. We targeted student self-confidence with this change.

**FEED-FORWARD FEEDBACK**

Feedback now used an open feed-forward model via open class discussion. The lecturer assessed the open-book practical tests, compiled an overview to share with the group and used anonymous examples to highlight aspects of strength or development. Students were asked to comment, question and apply understanding to other examples.

## Results

Students' responses to what they thought about computer programming (Fig. 1) tended to be either **cognitive** (relating to the challenge of the subject) or **affective** (focused on their emotional response).

By the end of the module, students' responses were more focused on the cognitive aspects of learning programming and less on the stress or anxiety they felt about it (Fig. 1).

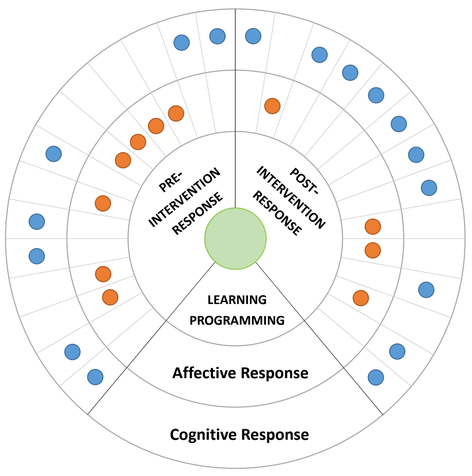
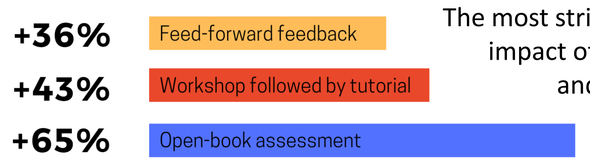



Figure 1: Spectrum display chart of qualitative responses.

At the end of the module, the number of students reporting that they found programing stressful had reduced by 29%; the number of students reporting that they felt anxious about learning programming had reduced by 22%.




The most striking finding from our study was the impact of the different teaching, assessment and feedback approaches on students' levels of **confidence** in their ability to learn programming (Fig. 2).

Figure 2: Bar chart of quantitative increase in reported confidence levels.

## Conclusions

**STRUCTURE & ORGANISATION**

We found that a review of the structural elements of the module could facilitate our aim to design learning with the goal of reducing stress and anxiety and therefore increasing student wellbeing.

**CHANGE PERCEPTIONS**

Changing the concept of the mode of learning from lecture-followed-by-practical to workshop-followed-by-tutorial increased the demand for students to be active participants right from the beginning.

**COGNITIVE DEMANDS**

Change the cognitive demands of assessment and feedback so that students focus on a more authentic problem-based learning approach, using the skills and resources they have developed on the module. Open book assessment followed by feeding forward with open class discussion is an essential and iterative part of this process.

## References

Race, P. (2015). *The lecturer's toolkit: A Practical Guide to Learning, Teaching and Assessment*. 4th ed. London: Routledge.

Wright, G. B. (2011). Student-Centered Learning in Higher Education. *International Journal of Teaching in Higher Education*. 23 (3), pp.92-97.

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