

'Narrowing the Gap' – Supplementary Chemistry Tutorials for non A-level students of Pharmacy and Pharmaceutical Bioscience

Introduction

- Students who have not completed A level Chemistry struggle with some of the Chemistry content in the first semester of first year. This includes students entering on:
 - Irish Leaving certificate
 - Access Courses
 - BTEC
 - International qualifications
- "A diverse university community" (Ulster University Five and Fifty Strategy)
- The Ulster University Learning and Teaching Strategy is closely aligned with widening participation encompassing "Flexible learning provision and communities in order to respond to student diversity and preferences" (Ulster University Learning and Teaching Strategy)

Aim and Objectives

Aim: To 'narrow the gap' between students who had previously studied A level Chemistry and those who had taken an alternative route.

Objectives:

- Increase students' confidence, knowledge and ability to "speak out" in class, to ask questions and be part of the discussion. Confidence in the long term has been correlated with success for first year students (Trueman and Hartley, 1996).
- Encourage teamwork, time management, oral and written communication skills which are all factors for success with first year students (Goldfinch and Hughes, 2007).
- Allow students to "put their knowledge to work", 'to demonstrate their understanding' and to "reflect, hypothesise, solve" (Biggs and Tang, 2011).
- Increase student support both academically and pastorally.

Methods

- Subject areas within the CCEA (NI) A level syllabus were identified and aligned with the first year, first semester module chemistry components (CCEA, 2019).
- Questionnaire was sent to all first-year students at the start of semester 1 to determine what the needs were.
- The A level Factfile covered each week consisted of:
 - Learning objectives for the subject
 - Background theory of the subject area
 - Worked examples
 - Questions and answers
- Monitored:
 - Meetings with the PhD student tutor twice a week to discuss material to be covered and any feedback from students
 - Informal discussions with students
 - Minute papers
 - Teaching assessment questionnaires

Results

- Fail rate for the exam decreased from 21.3% to 6.1% in the first academic year after implementation.

PhD Tutor Testimonial:

"I felt that the tutorials provided an informal environment for students to improve their chemistry knowledge. The students were allowed to suggest topic areas and we would then cover those subjects throughout the sessions. The students engaged well and improved as the weeks went on."

Student Testimonials:

"The extra Chemistry Tutorials are very helpful and are well executed. There are topics I was not too sure of before that have been covered in the tutorials and I now have a greater understanding of them."

"I find the Chemistry Tutorials extremely helpful and always feel a lot more confident about the topics covered when I leave the class. The PhD Student is a fantastic teacher also. I really appreciate the help."

"The extra Chemistry Tutorials are great. The topics are related to the content we study. These tutorials help to breakdown certain lecture content to ascertain what is being asked in the Class Tests and exam. The PhD Student is enthusiastic and tries to help us with different scenarios"

Conclusions

- Based on feedback and exam results, the supplementary Chemistry Tutorials were deemed a success.
- Now part of the practice within the first-year cohort.
- This practice is transferrable either as Chemistry in other programmes or as a different subject area such as Mathematics (Andernton et al, 2017) which is frequently seen as a challenge in teaching first year students across numerous disciplines (Nuffield Foundation, 2011).

References/Authors

- Andernton, R., Hine, G. and Joyce, C. (2017) Secondary School mathematics and science matters: Academic performance for secondary students transitioning into university allied health and sciences courses, *International Journal of Innovation in Science and Mathematics Education*, 25 (1), 34-37.
- Biggs, J. and Tang, C. (2011) *Teaching for Quality Learning at University*, 4th edn, Buckingham: Open University Press.
- CCEA GCE Chemistry Syllabus, (2019). Chemistry Microsite > Specification, [online] Rewordlearning.org.uk. Available at: https://www.rewordlearning.org.uk/microsites/chemistry/revised_gce/specification/
- Goldfinch, J. and Hughes, M. (2007). Skills, learning styles and success of first-year undergraduates. *Active learning in higher education*, 8 (3), 259-273.
- Nuffieldfoundation.org. (2011). Two thirds of students lack the mathematical knowledge required for their university course. [online] Available at: <https://www.nuffieldfoundation.org/item/1388>
- Trueman, M. and Hartley, J. (1996) A Comparison between the time-management skills and academic performance of mature and traditional-entry university students. *Higher Education* 32 (2), 199-215.
- The Ulster University's Five and Fifty Strategic Plan - Vision & Mission encourages <http://www.ulster.ac.uk/~/media/ulster/5and50/5and50strategy.pdf>
- The Ulster University Learning and Teaching Strategy https://www.ulster.ac.uk/_data/assets/pdf_file/0006/132396/Learning_TeachingStrategyGraphicsVersion.pdf
- Author:
Dr Heather M. Coleman
Lecturer in Pharmaceutical Chemistry
School of Pharmacy and Pharmaceutical Sciences
Faculty of Life and Health Sciences
T: +44(0)2870123409
E: h.coleman@ulster.ac.uk
W: <http://www.science.ulster.ac.uk/pharmacy>

