**Into the Dragons’ Den: A project-based learning tool in Clinical Pharmacology education**

**Background and Aims**

Active learning encourages students to think about and apply what they are learning, helping to develop a deeper understanding of the subject which is crucial for promoting the development of higher-level thinking skills1. The UK’s first undergraduate Clinical Pharmacology BSc programme adheres to these principles to fulfil its aim of producing work-ready graduates. There is a focus on developing key competencies that include collaborative work, critical thinking, data handling, and presentation and problem-solving skills. Project-based learning provides an active learning experience for students to develop and hone these skills and to apply their knowledge2. To encourage development of these key competencies, we designed an innovative two-week project-based activity, Dragons’ Den, for first year students at the end of their first semester. Two successive cohorts have undertaken the Dragons’ Den project, which was in person for 2019/20 students and adapted to be online for 2020/21 students.

**Summary of Work and Outcomes**

The premise of the Dragons’ Den was that, due to NHS cuts, certain medicines were at risk of losing NHS funding. Students worked in previously established groups to ‘pitch’ in presentation format for a drug for the treatment of a specific disease (e.g. adalimumab for the treatment of rheumatoid arthritis) to retain NHS funding. Groups were also given simulated data from a mock clinical trial of their drug to analyse and present in a poster format. Presentations and posters were marked by “Dragons”, a mixture of industry, clinical and academic professionals. Marks did not contribute to any modular assessment but learners were required to participate.

Student self-assessed outcomes after the Dragons’ Den were compared between students doing the Dragons’ Den in person to those experiencing it online (**Table 1**). Both groups of learners enjoyed the experience, felt that they had learned a lot and reported increased presentation confidence and motivation to participate in the course. However, learners experiencing the Dragons’ Den online were less likely to report these benefits. Qualitative feedback highlighted that learners valued the project-based nature of learning, the application of their skills and being able to work as part of a team.

**Discussion**

Student feedback indicates that the Dragons’ Den project is a beneficial tool for the consolidation and application of knowledge, improves presentation skills and encourages course engagement. Comparison between the 2019/20 and 2020/21 cohorts suggests there is added benefit of the project as a live, on site event.

**Conclusion**

Project-based learning is a useful tool for encouraging student engagement, driving enthusiasm in pharmacology and developing teamworking and presentation skills

**References**

1. Michael J (2006) Where’s the evidence that active learning works? *Advances in Physiology Education.* 30(4); 159-167
2. Guo (2020) A review of project-based learning in higher education: Student outcomes and measures. International Journal of Educational Research. 102,101586

**Table 1. Student feedback on the Dragons’ Den**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | **% Positive** | | **% Neutral** | | **% Negative** | |
| **2019/20** | **2020/21** | **2019/20** | **2020/21** | **2019/20** | **2020/21** |
| **I enjoyed the Dragons’ Den Event** | 95 | 85 | 3 | 12 | 3 | 4 |
| **My semester 1 learning helped my contribution to Dragons’ Den** | 76 | 85 | 21 | 15 | 3 | 0 |
| **I learned a lot from participating in Dragons’ Den** | 84 | 73 | 11 | 27 | 5 | 0 |
| **My presentation confidence improved as a result of Dragons’ Den** | 86 | 65 | 14 | 27 | 0 | 8 |
| **My motivation to take part in the course improved as a result of Dragons’ Den** | 84 | 64 | 16 | 36 | 0 | 0 |

2019/20 cohort n= 40/56 (72% response rate)

2020/21 cohort n= 26/26 (100% response rate)