Embedding Accredited Qualification and Work-Related Training Into Postgraduate Courses

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Abstract
It is accepted that discipline-based learning fosters student engagement with the subject, enhances subject-related skill proficiency, and ultimately supports job securement within the field. However, postgraduate student numbers have increased to record levels, meaning that graduates enter a highly competitive market for employment. It follows that postgraduate students who have obtained transferable skills and/or other extra-specialised training are more likely to be valued favourably by employers, compared to those who do not have such additional graduate attributes. Skills provision within MSc programmes has historically been delivered by academic teaching staff with limited input from external partners. However, courses which foster knowledge exchange between university, partners, and industry, are more relevant. Such an approach enables active and constructive learning, which reduces the gap between knowledge, and skills development for real-life challenges. In this paper, we describe our transdisciplinary triple helix approach which involves expert university academics, professional industrial partners, and training by an accredited government body. Our model embeds accredited certification as part of the curriculum and provides work-related learning opportunities, alongside future employer engagement. Student learning is therefore enriched by real-world activities and challenges. This paper is of importance as it showcases that authentic learning and skills provision better prepare students for a life beyond their degree. Our model can be used by other academics to support a "curriculum for life".

Keywords: Work-Related Training, External Certification, Employer Engagement

Introduction

Postgraduate student numbers have increased to record levels (Bolton, 2023), meaning students are in a competitive market after they have completed their studies. Students that have obtained sought after transferable skills or additional training will likely be more valued by employers (Nägele & Stalder, 2017). Universities need to support the employability of their students by including training from both within and outside academia. Taught courses which foster knowledge exchange between university, partners, and industry, are more relevant. This approach enables active and constructive learning, which reduces the gap between knowledge, and skills development for real-life challenges (Bada & Olusegun, 2015). Currently, there is lack of taught *in vivo* skills within the University of Glasgow curriculum. Integrating a triple helix of key stakeholders (Figure 1), we have developed a new *in vivo* research skills postgraduate course that embeds a UK government accredited external qualification in the field of animal experimentation (ScotPIL certificate), work-related learning from leading industrial professionals and training by designated university *in vivo* specialists. The course adopts real-world skills-based learning (McKinnon & Wood, 2012) and allows our students the opportunity to gain an additional transferable qualification.

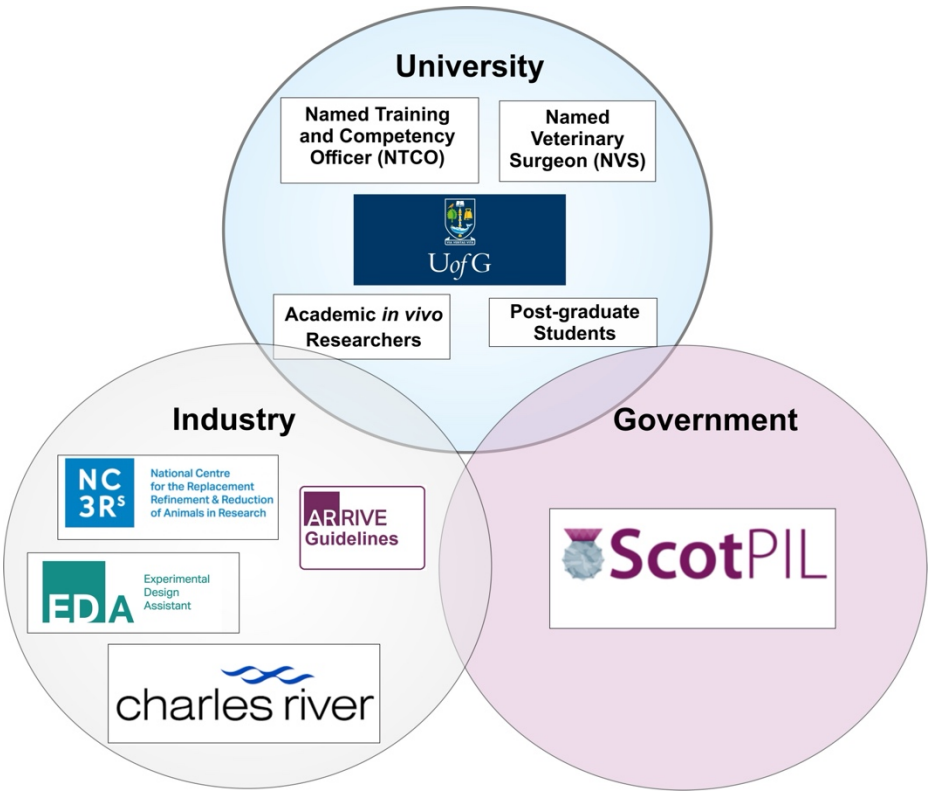

Figure 1: Highlights the Triple Helix of Key Stakeholders
Numerous stakeholders were involved in the course design and delivery. Expert university *in vivo* academics, professional industrial partners in the field of animal experimentation, and the accredited UK ScotPIL government licence.

Course Rationale

Animal research models are essential to our understanding of complex biological mechanisms and within the UK, the University of Glasgow is in the top ten organisations that uses animals for research purposes (Hobson, 2022). To allow our students greater access to this *in vivo* research-rich environment, we have created a new 20 credit optional course called

"In Vivo Research Skills" that feeds into multiple postgraduate programmes across the College of Medical, Veterinary and Life Sciences at the University of Glasgow, UK. We have embedded the UK ScotPIL personal licence exams as part of the course assessment. Successful completion of the exams allows students to obtain personal certification, meaning they can subsequently apply for their own UK Home Office Personal Licence, a recognised legal qualification. By embedding this accredited certification as part of the course assessment, students can gain a transferable qualification. In addition, the course is delivered at an optimum point during the academic year, directly before MSc dissertation projects. This means students who successfully obtain the certificate can be aligned with an *in vivo* research lab, have their licence activated and further enhance their *in vivo* research skills. This is clearly beneficial for subsequent employment or prospective PhD applications.

To support employer engagement, this course brings in two external experts in the field of animal experimentation, namely Charles River Laboratories and the National Centre for the Replacement, Refinement and Reduction of Animals in Research (NC3Rs). During a two-day visit to Charles River Laboratories in Tranent, students obtained vital and authentic work-related experience in an industry that uses animals for research purposes. This enabled students to acknowledge the wider context in which this course exists and facilitate communication with potential employers. This high-quality, work-related learning allows students to visualise taught theory in practice (McKinnon & Wood, 2012). In addition, students received two external workshops ran by the NC3Rs. The NC3Rs mission is to help the worldwide research community identify, develop and use 3Rs technologies and approaches. In line with the NC3Rs ARRIVE guidelines, a unique assessment has been incorporated that addresses the poor reproducibility of *in vivo* research (Percie du Sert, 2017). Students design an experiment using the NC3Rs experimental design assistant (EDA) (https://eda.nc3rs.org.uk), a free web-based application that uses machine-readable flow diagrams and computer-based logical reasoning to assist robust animal experiments (Percie du Sert, 2017). Students must consider best practices, such as avoidance of bias, minimum use of animals and appropriate statistical tests. This is different from traditional assessments since it is an authentic learning opportunity that researchers themselves would use. The assessment also aligns with a recent NC3Rs report which reviewed the processes of animal research (Rawle, 2023). It detailed several recommendations, one of which was the role of universities. It stated, "*The NC3Rs Experimental Design Assistant (EDA) should be more widely used… universities should explore means to support development of more experts in statistics and experimental design, both to help and train researchers*". This course therefore supports this recommendation since students must consider the real-world challenges of using animals for research.

In addition, there is a practical element to the course which gives students immersive hands-on experience, facilitating experiential learning (Dewey, 2004). They undertake training in rodent postmortem examination and drug delivery routes using cadavers. This training is delivered by the Named Training and Competency Officer (NTCO) and Named Veterinary Surgeon (NVS) from the University of Glasgow. The NTCO is the designated official responsible for the education and training of anyone who uses animals within the establishment. The NVS must advise on the impact of the experimental procedures on the health and welfare of animals. Hence, the students are "*learning by doing*" (Dewey, 2004) from leading university experts. Not only this, but these are methods routinely used by *in vivo* biologists (Memon, 2018) and provide an important educational experience, which engages students through direct and active participation.

Ultimately, this course gives students skills and knowledge that are transferrable to their dissertation project and future career. It develops numerous graduate attributes, including being "*investigative*", "*independent and critical thinkers*", "*resourceful and responsible*", but importantly for animal research, the development of being "*ethically and socially aware*" of their responsibilities (University of Glasgow, Graduate Attributes, 2021 – 2025). These are fundamental graduate attributes important for their future careers.

Conclusions

Our goal is to enhance professional employability skills and improve graduate prospects. It is therefore important that we embed authentic training and qualifications into courses to help bridge the gap between theory and practice. We have engaged with external partnerships and have designed assessments that allow certification attainment and the practical application of certified skills. Only by transforming curricula in this way, will we ensure our students go onto fulfil their academic potential.

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References

Bada, S.O. & Olusegun, S. (2015). Constructivism learning theory: A paradigm for teaching and learning. Journal of Research & Method in Education, 5(6): 66–70.

Bolton, P. (2024). Higher Education Student Numbers. [Online]. https://researchbriefings.files.parliament.uk/documents/CBP-7857/CBP-7857.pdf [Accessed 14.02.24].

Dewey, J. (2004). Democracy and education: An introduction to the philosophy of education. Dover Publications, Inc.

Hafez, S.A. (2021). Design for assessment of dissection in anatomy laboratory based on group identification of structures and peer evaluation. Anatomical Sciences Education. 15(6): C1, 989-1154.

Hobson, H. (2022). Ten organisations account for half of all animal research in Great Britain in 2021. [Online] https://www.understandinganimalresearch.org.uk/news/ten-organisations-account-for-half-of-all-animal-research-in-great-britain-in-2021 [Accessed 13.02.24].

McKinnon, S. and Wood, B. (2012). Learning for the real world: preparing postgraduate design students for employment through embedding work-related learning in the curriculum, Proceedings of the International Conference on Engineering and Product Design Education (EPDE 2012), Artesis University College, Antwerp, Belgium.

Memon, I. (2018). Cadaver dissection is obsolete in medical training! A mis-interpreted notion. Medical Principles and Practice. 27:201– 210.

Nägele, C. & Stalder, B.E. (2017). Competence and the Need for Transferable Skills. In: Mulder, M. (eds) Competence-based Vocational and Professional Education. Technical and Vocational Education and Training: Issues, Concerns and Prospects, vol 23. Springer, Cham.

Percie du Sert, N. Bamsey, I., Bate, S.T., Berdoy, M., Clark, R.A., Cuthill, I.C., Fry, D., Karp, N.A., Macleod, M., Mood, L., Clare Stanford, S., Lings, B. (2017). The Experimental Design Assistant. Nature Methods, 14(11): 1024-5.

Rawle, F. (2023). The role of review and regulatory approvals processes for animal research in supporting implementation of the 3Rs. [Online] https://nc3rs.org.uk/sites/default/files/2023-02/Rawle%20project%20report.pdf [Accessed 13.02.24].

University of Glasgow, Graduate Attributes [Online] (2021 – 2025). https://www.gla.ac.uk/media/Media_183776_smxx.pdf [Accessed 15/04/2024].

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