Postgraduate Pedagogies Journal

Special Issue 2023

Postgraduate Pedagogies is an open-access journal devoted to articulating and sharing the perspectives of graduate teaching assistants (GTAs). We publish contributions that convey the experiences, reflections, and analyses of current and recent GTAs, those who work with GTAs, and those who support them. The journal offers theoretical reflections as well as empirically grounded articles and case-studies.

Twitter: @PGPedagogies
Enquiries: postgrad.pedagogies.journal@gmail.com

Contents

Introduction: Digital Learning Experiences and COVID-19: Insights and Perspectives from GTAs

Chiara La Sala
University of Leeds

In June 2021, I agreed with the doctoral college at the University of Leeds to organise a day of professional development dedicated to postgraduate research students who teach (in this volume, Graduate Teaching Assistants or 'GTAs' will be used to refer to these students, although there is no unified terminology across the different institutions in the UK). The event 'Postgraduate Teaching Experiences: What we can learn from them', which was part of the Festival of the Doctoral College, took place online and was structured in the following way. In the first session, I presented the findings and insights gained from the project 'Enhancing the engagement of postgraduate research students in teaching'.[1] The presentation was followed by a roundtable discussion on the enhancement of the pedagogic practice at the University of Leeds, with the aim of sharing a diversity of perspectives on the following points:

- The experience of being a GTA at the University of Leeds, exploring the extent to which GTAs feel valued and supported in their teaching context, and the level of control they feel they have over their classes and the wider teaching context.

- The working relationships between staff and GTAs from a staff perspective, exploring staff attitudes to GTAs, and whether student teaching benefits from GTA involvement and how staff might respond to greater GTA input.

- Student attitudes to GTAs and professional teaching staff: do undergraduates respond to the two groups differently? Do they have different experiences of these two groups?

In the final session of the event, GTAs presented on an aspect of their teaching experience during the COVID-19 pandemic. The session was about celebrating the teaching experience of GTAs and their contribution to teaching at the University of Leeds. Following the event, alongside the group of GTAs, we decided that a publication on the GTAs contribution to teaching during the COVID-19 pandemic would be a useful resource. The academic literature in this field is not extensive due to the recent nature of COVID-19 pandemic, and so it will take some time to understand its impact on higher education. Also, despite the recognition of the importance of GTAs to the successful delivery of university teaching in recent publications such as in this journal and in blogs (Cornell, 2020), their role in and contribution to the adaptation to online teaching in higher education is still to be investigated. This special issue attempts to explore the impact of the COVID-19 pandemic on teaching in Higher Education as well as lessons learnt from the experience of online teaching. This issue focuses on GTAs and their reflections on navigating a completely different teaching scenario. Furthermore, this publication aims to bring more understanding of the enhancement of the pedagogic practice in Higher Education through the engagement of GTAs.

[1] More information about this project can be found here: https://teachingexcellence.leeds.ac.uk/research/fellowships/enhancement-of-the-pedagogic-practice-at-leeds-university-through-the-engagement-of-postgraduate-research-students-in-teaching/

Each academic year, hundreds of GTAs are employed by Higher Education (HE) institutions. Despite being underfunded, on precarious contracts and often lacking adequate support, this community still makes a very positive contribution to teaching in HE by bringing innovation in research-based teaching and curriculum adaptation, design and delivery. A finding emerging from the surveys distributed to undergraduate students, postgraduate research students, and academic staff as part of the project 'Enhancing the engagement of postgraduate research students in teaching' relates to the unbalance between the support structures dedicated to undergraduate students and those dedicated to postgraduate research students. This unbalance was exacerbated during COVID-19, with GTAs having to deliver online teaching and not always receiving adequate support. However, findings from the same surveys show that GTAs can facilitate student engagement as well as gain skills and experience that will be essential for their future career, if provided with support and resources. Therefore, more can be done to support the professional development of the GTA community. This special issue moves toward that direction, evidencing the very valuable and important contribution to pedagogic practice that GTAs were able to bring during very challenging times.

COVID-19 has brought unprecedented challenges to the nature and forms of university teaching, not least with the shift to predominantly online and digital modes of delivery. The fast and unexpected move to online learning has accelerated the growth of a new hybrid model of education, with online education going hand in hand with traditional education. The pandemic has given us the opportunity to review current teaching practices and make the educational system more relevant to, and engaged with, the needs of increasingly diverse cohorts. While there are concerns among academic staff and students that an acceleration to online learning, with little training and insufficient bandwidth, might result in poor student learning experience, more positive assessments highlight the benefits that a new hybrid model of education can bring (Abu et al. 2021; Almendingen et al. 2021). Learning online can be effective in several ways, as long as access to technology is straightforward. In asynchronous learning settings, students can learn at their own pace and have more control over their learning process as well as the opportunity to revisit the content as needed. Learning time might also be reduced as students can work at their own pace and skip or accelerate through concepts according to their individual needs. Additionally, in live online learning sessions, novel learning technology can be used to further engage, assess and evaluate during the teaching activities. However, to maximize the benefits of online learning, educators need to provide an effective learning environment and use collaboration tools to promote inclusion, interaction and engagement with the content.

The purpose of this volume is to showcase the valuable contributions that GTAs have made to successful teaching delivery in this dramatically changed learning environment. GTAs occupy a unique position in the university context through their own learning experience as students, and through their diverse pathways to postgraduate studies. Winstone and Moore (2017: 496) describe their position as "a transitory space between previously held and aspirational identities". They have competences and characteristics which engage undergraduates in their learning experience effectively as well as having advanced skills in information technology, the motivation to learn, innovative thinking, a sense of teamwork, and collaboration skills (Ball et al. 2020: 338-345).

GTAs, bringing their skills and research expertise to the undergraduate students (UGs), have become important contributors to Higher Education. Extensive data on GTA teaching at the University of Leeds, which we gathered through cross-university focus groups and electronic surveys as part of the project 'Enhancing the engagement of postgraduate research students in teaching', shows the positive perception UGs have of GTAs and of the teaching they deliver. The following table shows the answers of 214 UGs to statements targeted at understanding how UGs benefit from GTA teaching. UGs were largely positive about the teaching delivered by GTAs. 79% of respondents were

positive about the fact they would prefer being taught by both GTAs and lecturers rather than by lecturers only. The response to the statement 'being taught by GTAs makes me feel I get less value for money for my tuition fees' is very interesting. 57% of UGs felt negatively about that statement, which means 57% of UGs did not feel that being taught by a GTA impacted on their sense of value for money, 24% were neutral about that statement (they neither agreed nor disagreed) and only 19% felt that being taught by GTAs affected their perception of their value for money.

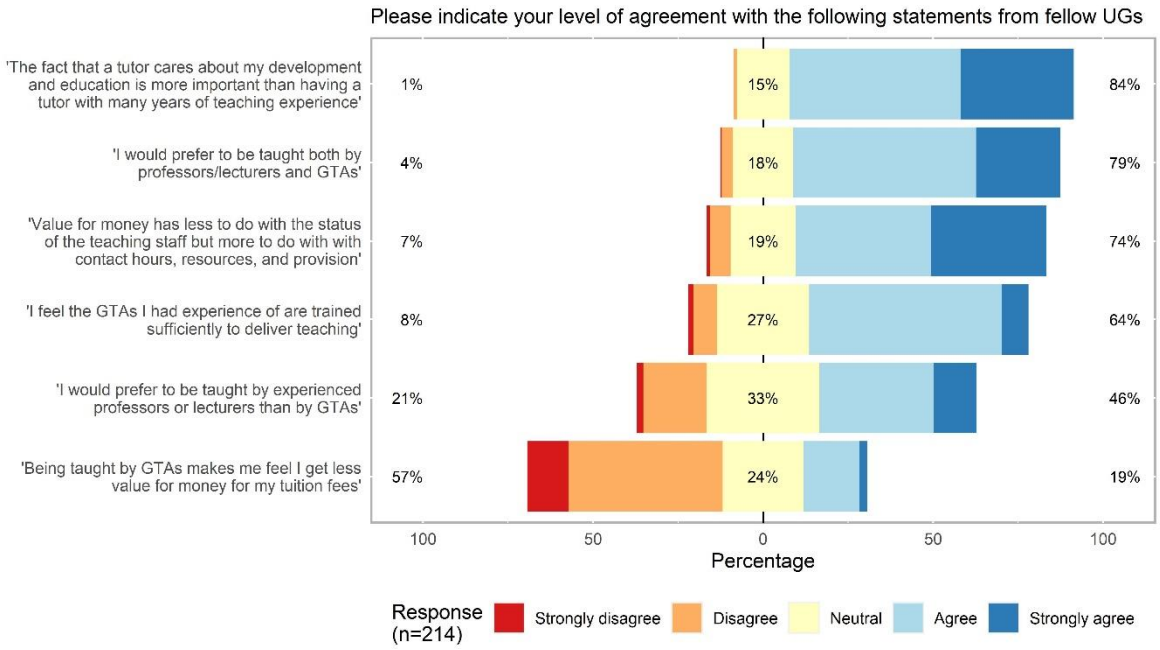

Figure 1: UG responses related to the benefit from GTA teaching (UG survey)

Results of the survey distributed to UGs to assess their perception of GTA teaching indicate that 80% of UG respondents agreed or strongly agreed that GTAs are passionate and enthusiastic about their teaching. Another interesting finding from the UG responses in their qualitative entries on good teaching is that an effective tutor does not simply impose knowledge on students but engages students in active learning activities. In the UG qualitative entries, GTAs were especially praised for creating online materials and being very helpful with online learning: "I have found GTAs very engaging, and they have produced excellent online lecture materials", "In such difficult times their importance has been noticed more than ever helping online learning go smoothly". The following table shows that the statement on creating interactive learning resources obtains the percentage of 79%, and that the statement 'fostering an engaging environment online' obtains the percentage of 75%.

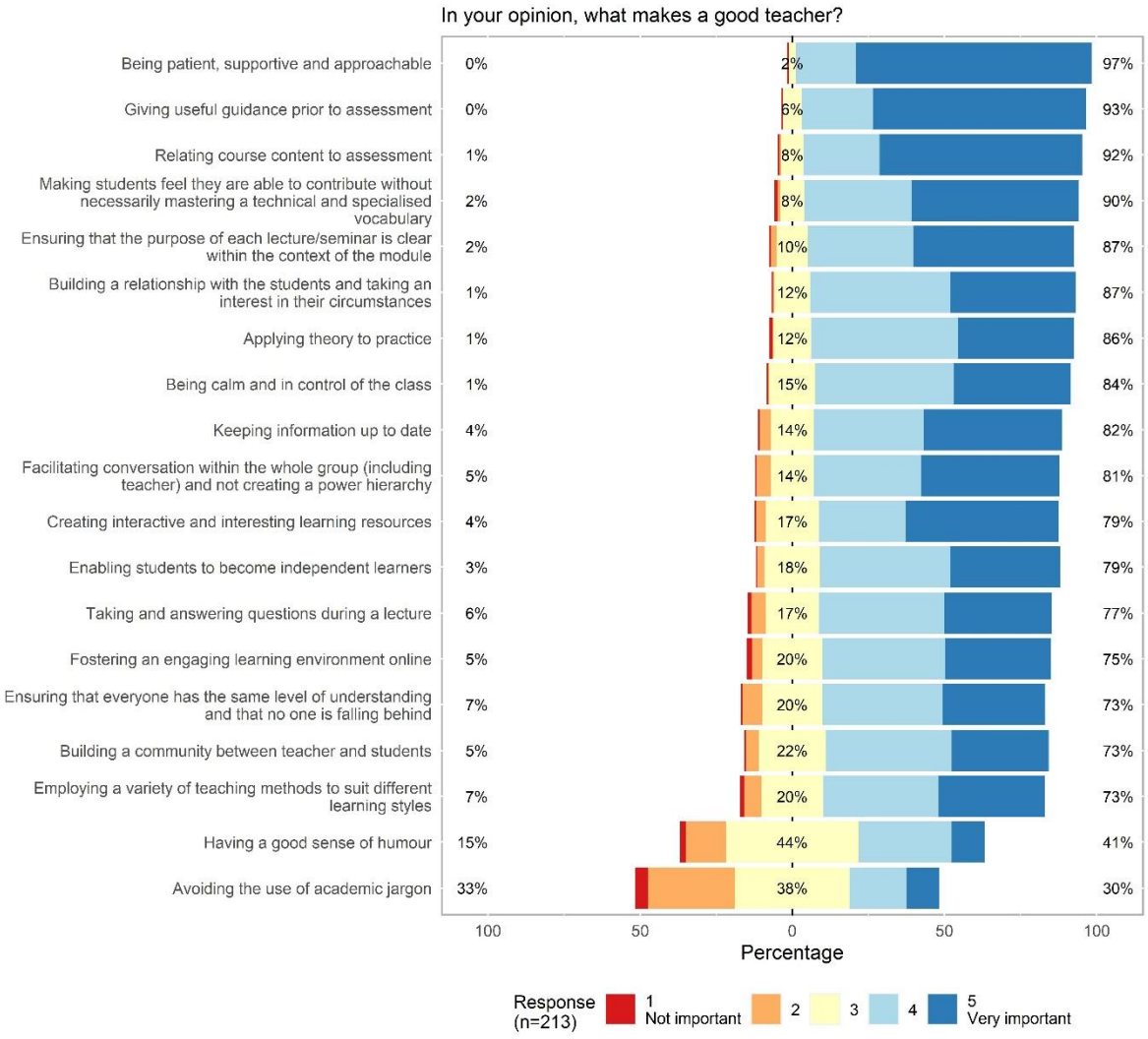

Figure 2: UG responses to the question of 'What makes a good teacher?' (UG survey)

GTA contribution to supporting and transforming online learning has received increased attention from scholars and practitioners (Muzaka, 2009; Standen 2018). In these challenging times, this volume aims to keep these conversations ongoing by evidencing the GTA positive input in the pedagogic practices in HE during the COVID-19 pandemic. With many universities in the UK and all over the world integrating online courses into their educational provision, we felt it was important to highlight the important role of GTAs in supporting and transforming online learning. This volume 1) highlights lessons learnt from the COVID-19 pandemic in adapting higher education teaching for an online environment and 2) examines the GTAs contribution to creating an effective online learning environment. Therefore, this volume draws on the diverse innovative and valuable experiences of GTAs in delivering and transforming teaching experiences during the COVID-19 pandemic. These experiences have the potential to contribute to long-term sustainable and positive innovations of teaching delivery across the university as a whole. From my own project, I have found that GTAs are a great asset for HE and can influence and improve pedagogic practices. Therefore, continuing this discussion through this special issue represents a very important and meaningful outcome of the project.

In this special issue, the authors examine crucial questions within the broad theme of innovative pedagogic practice in HE. This includes practical reflection on tools used in the teaching context

(embedding technology in the classroom and other teaching activities, promoting interaction and a sense of belonging through online teaching, and reflecting on the experience of the contingency teaching during COVID-19 in order to reshape face to face and traditional teaching). It also highlights wider discussions about supporting students with additional needs, embedding widening participation and inclusivity in the teaching practice as an international GTA and transferring pedagogical skills in public engagement settings.

The theme of inclusivity in teaching practices, which has been receiving increasing attention in HE pedagogy and scholarship (Collins et al. 2010; Danowitz and Tuitt 2011), is explored in the paper 'Inclusive teaching in a pandemic: The experience of an International Graduate Teaching Assistant'. Sara Kaizuka highlights the unique contributions International Graduate Teaching assistants can make in improving inclusive teaching practices in UK higher education. Furthermore, Kaizuka offers her reflection on the development process of her identity as an international GTA during the COVID-19 Pandemic.

The paper 'The Interplay Between Science Engagement and Science Education' brings an insight into how higher education can enhance widening participation events. The author, Alexandra Holmes, explores how the role of the postgraduate researcher has allowed her to deliver public engagement activities by approaching her audiences as a peer, rather than just a teacher, therefore encouraging a more inclusive and successful engagement and building student confidence in their ability to learn new and challenging topics.

Creating a sense of community and belonging where students feel accepted and connected is one of the most significant factors in students' success and retention in higher education (Pedler et al. 2022). This special issue also includes GTAs' perspectives on how sense of belonging was integrated in their teaching practice during the pandemic. The paper 'Teaching Research Skills from a distance – reflections of a GTA' by Johanna Tomczak reflects on the experience of a GTA delivering Research Skills seminars during the COVID-19 pandemic and how her approach has helped to create a sense of community to enhance students' learning experience, at a time where students were physically distanced.

The same topic is explored in the paper 'Together: Learning with and through a pandemic'. The paper investigates how teaching during the COVID-19 pandemic has provided an opportunity to create an inquiry into the pandemic situation itself through a project titled: 'Fine Art as a Life Practice: Lessons from PGR teaching under COVID-19 '. Through this project, Anna Douglas has encouraged a conscious attention to the affective context of relating and being present online, and reflects on searching for new ways to create a sense of being with and relating to each other.

Working in groups can improve student learning and prepare them for life experience (Taylor 2011). However, the COVID-19 pandemic has made group and team working particularly challenging. The paper 'Field skills through a screen – reflection on plant identification teaching during the COVID-19 pandemic' by Sebastian Stroud explores the impact of the pandemic on student teamwork through his experience of developing an innovative and immersive online module, 'Plant Identification'. By using a mixture of online learning tools and activities such as interactive image boards, group forums, and self-directed fieldwork, Stroud led and delivered an online programme of plant identification teaching to small groups. Students were able to discuss and explore findings via several channels and seek guidance in these tailored small-group sessions with GTAs.

The paper 'Give me a minute, I just need to put you into your groups' brings a GTA's reflection on group working during the COVID-19 pandemic**.** Drawing on experiences of the potential for isolation and uncertainty for students in breakout room spaces, Gemma Carr reimagined the digital space in

terms of material presentation, facilitating student empowerment, and communicating and managing across multiple breakout rooms concurrently. These strategies contributed towards positive student experiences, providing pedagogical insights into newer online teaching practices. We hope that this volume will serve the purpose of creating new knowledge in the field of online teaching and learning and therefore be of interest to researchers and practitioners working in digital education and innovative approaches to teaching and learning. GTAs ability to be present and deeply connected to their students is not a fixed condition, but a state that needs renegotiation, within the context and challenges of GTA teaching life. GTAs can influence and improve pedagogic practices in HE and facilitate the connection between research and education, and between UGs and academic staff. It is, therefore, important to empower them, to give them the opportunity to explore scholarship, and to connect their research with research around education.

Acknowledgements

I would like to thank Emma Peasland for her assistance with data analysis and the creation of the figures that illustrate this manuscript.

References

Abu, L., Chipfuwamiti, C., Costea, A., Kelly, A., Major, K., & Mulrooney, H. (2021) Staff and student perspectives of online teaching and learning; implications for belonging and engagement at university – a qualitative exploration. *Compass: Journal of Learning and Teaching,* 14(3), pp. 1-20. DOI: https://doi.org/10.21100/compass.v14i3.1219

Almendingen, K., Morseth MS.,Gjølstad, E., Brevik, A. & Tørris C. (2021) Student's experiences with online teaching following COVID-19 lockdown: A mixed methods explorative study. *PLoS ONE* 16(8): e0250378. DOI: https://doi.org/10.1371/journal. pone.0250378

Ball, V., Joyce, A. & Mills, C. (2020) "They just have more of a vibe of being 'one of us'": undergraduate law student perceptions of PhD tutors, *The Law Teacher*, 54(3), pp. 327-348. DOI: 10.1080/03069400.2019.1698212

Cho, Y., Kim, M., Svinicki, M.D., & Lowry Decker, M. (2011) Exploring teaching concerns and characteristics of graduate teaching assistants, *Teaching in Higher Education*, 16(3), pp. 267-279. DOI: 10.1080/13562517.2010.524920

Clark, L. (2021) Bridging the Power Gap: GTAs and Student-Staff Partnership. *Postgraduate Pedagogies*, 1(1), pp. 91-108.

Collins, A., Azmat, F. and Rentschler, R. (2019) 'Bringing everyone on the same journey': revisiting inclusion in higher education. *Studies in higher education*, 44(8), pp. 1475-1487.

Cornell, B. (2020) How best can we use Graduate Teaching Assistants during the COVID-19-19 pandemic? Available at: https://www.hepi.ac.uk/2020/06/15/how-can-we-best-use-graduate-teaching-assistants-during-the-COVID-19-19-pandemic/ [Accessed 13 December 2022]

Danowitz, M.A .& Tuitt, F. (2011) Enacting Inclusivity Through Engaged Pedagogy: A Higher Education Perspective. *Equity & Excellence in Education*, 44(1), pp 40-56. DOI: 10.1080/10665684.2011.539474

Nasser-Abu Alhija, F. & Fresko, B. (2018) Graduate teaching assistants: how well do their students think they do? *Assessment & Evaluation in Higher Education*, 43(6), pp. 943-954. DOI: 10.1080/02602938.2018.1423673

Pedler, M.L., Willis, R., & Nieuwoudt J.H. (2022) A sense of belonging at university: student retention, motivation and enjoyment. *Journal of Further and Higher Education*, 46(3), pp. 397-408. DOI: 10.1080/0309877X.2021.1955844

Ramsden, P. (2003) *Learning to Teach in Higher Education*. Routledge.

Standen, A. (2018) 'Where teaching meets research: Engaging postgraduate teaching assistants with research based education', in Tong, V.C.H., Standen, A, Sotiriou, M. (eds.) *Shaping Higher Education with Students: Connecting research and teaching*. UCL Press: London, pp. 41-52.

Taylor, A. (2011) Top 10 reasons students dislike working in small groups… and why I do it anyway. *Biochemistry and Molecular Biology Education*, *39*(3), pp. 219-220.

Valbona, M. (2009) The niche of Graduate Teaching Assistants (GTAs): perceptions and reflections. *Teaching in Higher Education*, 14(1), pp. 1-12. DOI: 10.1080/13562510802602400

Winstone, N. & Moore, D. (2017) Sometimes fish, sometimes fowl? Liminality, identity work and identity malleability in graduate teaching assistants. *Innovations in Education and Teaching International*, 54(5), pp. 494-502. DOI: 10.1080/14703297.2016.1194769

Field skills through a screen: Reflections on plant identification teaching during the COVID-19 pandemic

Sebastian Stroud
School of Biology, Faculty of Biological Sciences, University of Leeds

Abstract

Plant identification and ecology are often lacking in the curricula of life sciences programmes. However, for our University of Leeds MSc Biodiversity and Conservation students, it is a vital skill that industry holds in high regard due to the dearth of basic identification skills among many graduates. The COVID-19 pandemic made the possibility of running this module in person impossible. As such, I, as a graduate teaching assistant (GTA) developed an innovative and immersive online module that met the module's fieldwork requirements and learning objectives. By using online learning tools and activities such as interactive image boards, group workshops, and self-directed fieldwork, I led, designed, and delivered an online program of plant identification teaching.

Students were able to discuss and explore findings via several channels and seek guidance in tailored small-group sessions with myself and a colleague as dedicated GTA tutors. I interviewed six students who previously undertook the online plant identification module during the COVID-19 pandemic. Using a series of Likert scale questions and deductive thematic analysis, I reflect on the challenges and opportunities presented by the COVID-19 pandemic. Through the novel utilisation of online learning tools, this course can now better support our students in self-directed and peer-to-peer learning in botanical fieldwork and identification both online and in person. For the teaching of plant ecology, fieldwork will continue to be a staple in our educational toolbox. Results from interviews demonstrated students improved their awareness of plants and have retained and continued to develop plant knowledge. Novel tools such as distance learning technologies developed during the pandemic offer opportunities to enhance our learners' experience. Specifically, materials produced for online courses can be integrated into blended teaching approaches.

Introduction

Plant identification is often pruned from curricula of life sciences programmes, and many undergraduate biological science degrees in the UK may contain little plant biology content (Stroud et al., 2022). This is despite plants' vital contribution to society, culture, and the maintenance of our biosphere (Lev-Yadun et al., 2000). The teaching of ecology and plant biology is critical as a mechanism for understanding and curtailing the current and impending ecological and climate crises (Ruckelshaus et al., 2020; Steffen et al., 2015). Imparting students with a comprehensive understanding of botany and plant ecology is not simply the ability to correctly distinguish plants and recall specific species' ecology but a broad spectrum of understanding ranging from plant physiology, identification, taxonomy, ecology, and genetics to cellular plant biology. Botanical education should aim to impart this understanding of plants from form to function, physiology, and ecology, but also the role of plants within their social, economic, and cultural contexts (Stroud et al., 2022).

Within the UK, the last student enrolled on a bachelors botany degree was over a decade ago (Drea, 2011), whilst currently students in plant biology and science programmes are vastly outnumbered when compared to other bioscience programmes (Stroud et al., 2022). This trend of plant neglect in education is a symptom of a wider social and biological phenomenon that positions plants as the backdrop of life. Declines in plant knowledge have been documented across the globe, from the US as early as the 1960s (Godwin, 1968), to South Africa (Abrie, 2016), and Mexico (Saynes-Vásquez et al., 2016). This phenomenon was first formally identified in the research literature by US biologists and educators Wandersee and Schussler (1999), who titled the inability of a person to perceive plants in their environment, acknowledge their importance or appreciate their aesthetic and unique biological features as 'plant blindness'. It should be said, however, that this language places negative implications on those experiencing these phenomena and various alternative concepts such as fostering 'plant awareness' have been suggested (Bacon et al., 2021; Parsley, 2020).

Despite the lack of many university programmes offering comprehensive plant identification modules, at the University of Leeds, the BLGY5163M Plant Identification is a key component of the MSc Biodiversity and Conservation programme. This programme welcomes approximately 40 students annually from a variety of different backgrounds including those from arts and humanities. The module is centred around fieldwork spread over two weeks. The module was originally introduced after feedback was received from various conservation organisations, which highlighted that many of our graduates, whilst knowledgeable on ecological theory, lacked core skills in species identification, likely due to the extinction of botanical education within UK higher education (Stroud et al., 2022).

However, as with all in-person teaching, the COVID-19 pandemic and following national lockdowns made running this module in person impossible during the year 2020. In light of the pandemic, the transition to virtual teaching and learning represented a major challenge to those working within higher and environmental education, particularly given the extremely restricted timeline for teaching staff to make changes to their programmes (Bacon and Peacock, 2021). The result was that no in-person teaching was permitted at the University of Leeds for the remainder of the 2020/2021 academic year. The available options for remote teaching were via media delivery through the Virtual Learning Environment (specifically Minerva), Microsoft Teams or Zoom.

This left the teaching staff for the plant identification module in a dilemma, should they suspend the module for that current year, or radically redevelop the whole course to an online format? Knowing the significance of these skills from my research on botanical education, I believed that it was essential that this module still be delivered. Other graduate teaching assistants (GTAs) within the faculty and I felt we were able to support both student online learning and equip students with comparable plant identification skills. Additionally, I believed that the benefits of encouraging

students to spend time in nature and engage in outdoor activities such as plant surveying, might support their wellness and develop a sense of community during the pandemic.

It has been recognised that GTAs act as important contributors within higher education through their practice as assessors, tutorial leaders, and laboratory and field work demonstrators (Meadows et al., 2015). Within the context of this case study, the work of GTAs continues to be influential. I developed an innovative and immersive series of micro-lectures, practical sessions and workshops which met the fieldwork requirements and the module's learning objective: '*Identify the common UK plant families and species'*. By using a mixture of online learning tools and activities such as interactive image boards, pre-recorded micro-lectures, group forums, and self-directed COVID-19 secure fieldwork, students were able to discuss and explore findings via several channels and seek guidance in tailored small group sessions with GTAs. Before the module commenced, identification keys and magnifying hand lenses were sent to all students. From previous years I recognised that many students often wished to share their independent finds with the wider cohort; therefore, I also incorporated an online message board, Padlet, to facilitate this knowledge sharing.

I structured the module workshops around eight key plant families, which when combined cover a total of a third of the entire flora of the British Isles, to ensure that plenty of specimens would be available for workshops. These families were: *Brassicaceae* (cabbage), *Asteraceae* (daisy), *Fabaceae* (pea), *Apiaceae* (carrot), *Rosaceae* (rose), *Ranunculaceae* (buttercups), *Liliaceae* (lilies), and the *Geraniaceae* (geraniums). Each of these families' key identification features was discussed in an associated pre-recorded micro-lecture which students were asked to watch before the online interactive workshops (see Figure 1). The workshops were also focused on these respective key families alongside other key information on field botany, such as codes of practice and the ethics of collecting specimens. Students were directed to go into their local area and collect specimens which exhibited these key characteristics (Figure 1). These small group online workshops consisted of around five students, myself, and another GTA.

Figure 1: These small student online workshops were based on several key plant families, chosen to reflect broad coverage of plant species in the UK. Above is an example of one of many short micro-lectures detailing key family identification characteristics and providing examples of possible specimens students could collect for group sessions.

Aims and scope of this paper

As a postgraduate demonstrator and tutor, otherwise known as a Graduate Teaching Assistant (GTA), at the Faculty of Biological Sciences at the University of Leeds, I teach and lead various components of ecology and sustainability modules, including botanical field skills, plant ecology and urban green infrastructure. A primary aim that informs this teaching is to understand how to better equip today's students to combat the societal, environmental, and ecological challenges of the future using nature-based solutions of a botanical nature. As such, the scope of this paper is to explore different approaches to improve and innovate botanical pedagogy through an examination

of a university MSc botany module as a case study. The aim of this paper is 1) to report and reflect on students' experiences of plant identification module during the COVID-19 pandemic and the different online delivery methods used and 2) to discuss how their reflections can be implemented to improve future courses and teaching of undergraduate and postgraduate students.

Method

To meet the aims of this paper, eligible participants were students who have previously been enrolled on the postgraduate MSc Conservation programme during the COVID-19 pandemic and experienced online teaching of the plant identification module. This module takes place in May each year and is typically taught in practical workshops and field visits over two weeks. The module maintained the same structure and timetabling during the online teaching with online lectures in the morning (typically 1 hour), daily group workshops, and students' independent practical fieldwork in the afternoons.

To recruit these students, eligible individuals were contacted via LinkedIn, a professional networking platform, by requesting their participation in a short online interview. Of the 21 invitations extended, 14 (67%) students expressed an interest in being interviewed, with a final 6 (29%) students interviewed in total. Semi-structured interviews were conducted with the final sample by the author, in the autumn of 2022. Before interviews commenced participants were first presented with consent forms and a summary of the study aims; ethical approval was given by the Faculty of Biological Science Research Ethics Committee (Ethics reference: LTSBIO-042). In total, six 30-minute interviews were conducted with students who had previously undertaken the online plant identification component of this module; additionally, one of the students subsequently joined the module staff later in the next academic year to undertake fieldwork-based plant identification teaching.

I asked students to reflect on the challenges and opportunities presented by the COVID-19 pandemic, and if they felt supported in self-directed and peer-to-peer learning in botanical fieldwork and identification (both online and in-person). I also asked them to reflect on the use of online learning tools in the module. The module featured online resources such as an image board (PadLet, 2020), and encouraged the use of artificial intelligence (AI) based identification apps to explore plant diversity (PlantNet, PictureThis, GoogleLens), and pre-recorded micro-lectures (Figure 1). Interview guides were developed to capture student evaluations of these resources. The interviews also included a series of questions based on ranking responses on a 10-point Likert scale, which evaluated students' confidence in their ability to identify or notice various plant groups. These two vegetation groups were 1) *trees, shrubs, and ornamental plants* and 2) *grasses, spontaneous vegetation (weeds), and other plants*. The full details of the interview questions can be found in Appendix A. Each interviewee was asked to retrospectively rank their responses on the Likert scale at three different time stages: pre-course, directly post-course, and currently (two years post-course).

After deductive coding was applied to interviewee responses, thematic analysis was employed to identify and categorise patterns in the codes emerging from our participants' responses. Thematic analysis is a method of qualitative data analysis used to identify and analyse different patterns within data (Braun and Clarke, 2006). The thematic analysis uses six key stages for analysis and interpretation, including familiarisation, code formulation, generation of themes, theme review, theme definition and naming, and report formation (Braun and Clarke, 2006). This process was applied to all interviews conducted.

Results

Findings from the Likert scale responses (Figure 2) demonstrated that student interviewees (n=6) mostly did not feel confident in their ability to identify or notice plants before the module, with

students reporting a mean confidence of 3.3 (SD 1.88). However, there was a degree of variation with one student reporting they felt confident in their ability to identify plants (confidence score 7) before the module commenced. Students had a combined mean value for perception of the two vegetation categories 1) *trees, shrubs, and ornamental plants* and 2) *grasses, spontaneous vegetation (weeds), and other plants*) of 5.75 (SD 2.38).

Students reported an increase in their perception and ability to identify and recognise plants immediately after the online course, with the combined median score for both vegetation categories of 8 (SD 1.69) and their general confidence in identifying plants improving to 6.5 (SD 1.6). Encouragingly, students reported that this confidence did not diminish to the present day (two years post-learning), with the median score for confidence in plant identification improving (6.8, SD 1.21) and their ability to notice plants staying the same (8, SD 1.34).

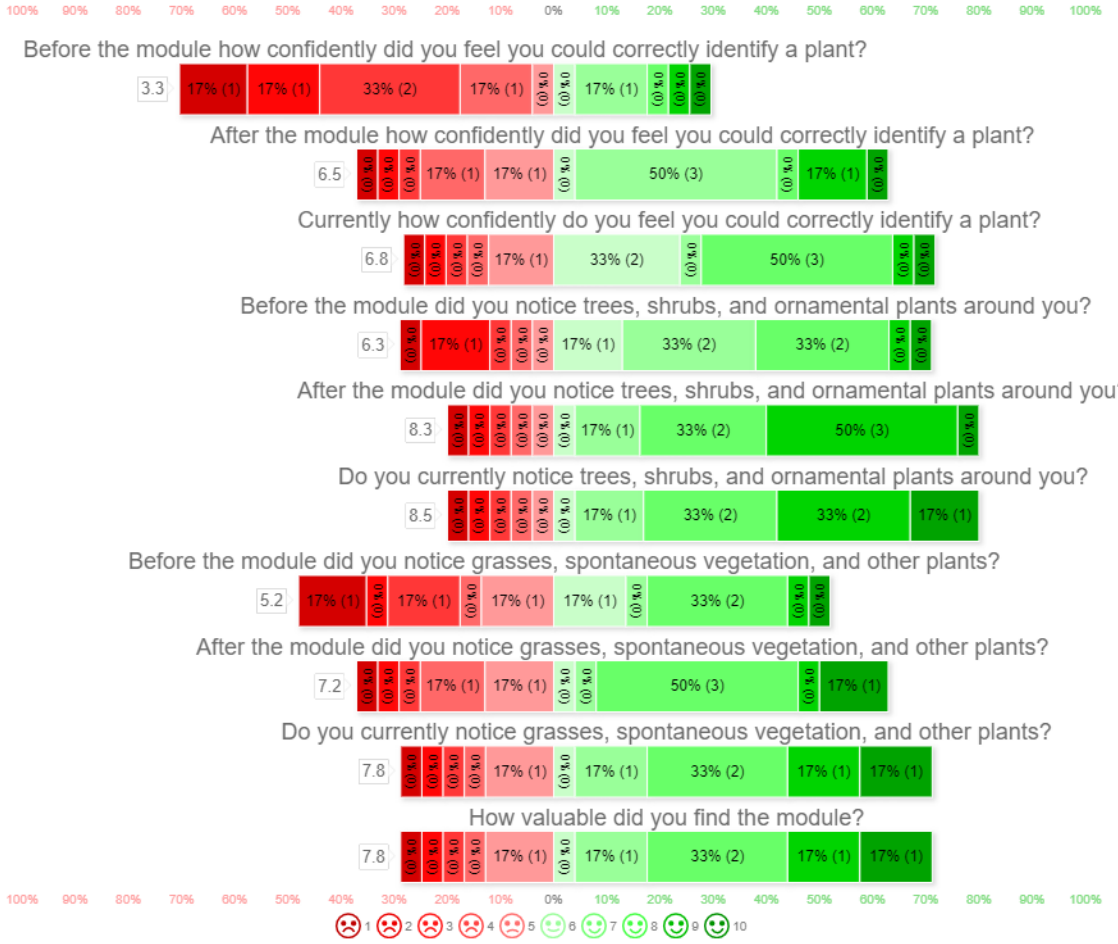

Figure 2: Results of the Likert scale questions regarding students' perceived ability to correctly identify plants and notice local vegetation prior, immediately after, and two years post an online plant identification course during the COVID-19 pandemic. Generally, students regarded their plant identification skills as poor before the series of online workshops but saw strong improvements which were maintained until the time of interviews two years post-teaching.

Students overall found the module to be useful when asked "*How valuable did you find the module?*", with scores ranging from 5-10, with a median of 8. Students reported that whilst they generally struggled to identify plants before the module, there was a large increase in their ability. When students' answers were totalled, their sum doubled from 20 points to 41 currently. Additionally, students also reported an increase in their awareness of the plants, either *trees, shrubs, and ornamental plants* or *grasses, spontaneous vegetation, and other plants*. Both plant groups

noted a marked increase, with 38 for *trees, shrubs, and ornamental plants* before the course, to 49 immediately post-course, and 51 currently. Whilst for *grasses, spontaneous vegetation, and other plants* increased from 31 before the course to 43 immediately post-course, and 47 at time of interview.

The thematic analysis of participant interviews yielded 88 different deductive codes, which were ascribed to 19 broad themes. These included themes focused on students' perceptions of the value of the module such as 'positive wellness value of teaching', content recalled by students from the module such as 'fundamental identification skills' to the challenges encountered with the online format including 'difficulty in engaging online and 'difficulty in observing identification features.' An example of quotes, codes and themes can be found in Table 1. The full list of responses and codes can be found in Appendix B.

Table 1: Example quotes from student interviews, codes, and themes of online plant identification. Some quotes have been edited for clarity and grammar.

Interview Extract	Codes	Theme
"…[group size] perhaps much bigger than that, it would have turned into a bit of a bit of a free for all."	Ability for all to engage	Accessibility of tools used
"Given that it was it had to be drafted of it as an emergency measure. I felt that it was it was adequate for my purposes."	Acknowledgement of limitations of COVID-19	Acknowledgement of limitations of COVID-19
"It certainly increased my enjoyment of being around plants and in natural environments. You certainly made me very aware of just how important plants are."	Developed appreciation of plants	Developed appreciation of plants
"…if you're out with a specific person, you every plant, you come across thinking that oh, this is this, and they can tell you why it's cool. And that gets you're interested in a bit more."	Lacks personal element of plant identification in field	Difficulty in engaging online
"…Like you can't touch or smell them, which I think in some plants that are essential to help you remember."	Missing tactile and sensory element of ID features	Difficulty in observing identification features
"You can't just then give it to someone and say "Oh, can you have a look at this? I can't find this particular feature on it". "	Difficulty in observing fine ID features	
"I thought it was useful, especially just get that first, general idea, because I had never really done any plant ID before other than identifying trees from books."	Value of course	Fundamental identification skills
"Because of the pandemic, it was quite nice to be able to do it in your local area and do the phase one map, because that actually meant that I tried harder to ID stuff."	Local sites more meaning	Independent exploration of local flora
"I imagine if we had it that normally, during the eight hours in the field of plant ID, you really get your eye in."	Shorter sessions than practicals	Limitation of module
"It helped me see different ways of tackling plant identification and learning new techniques, and also sharing knowledge with others."	Peer-to-peer learning support	Peer-to-peer learning
"The Padlet was unbelievably useful. Didn't that get absolutely rinsed? Yeah, I think it was people posting pictures of plants asking for species identification.	Padlet: useful beyond just scheduled session	Sharing of discoveries
"I think the online format was valuable, especially as we were all in different parts of the country seeing different plants and vegetation."	Seeing diversity of species	
"Yeah, I think I probably wouldn't have got this job that I've got now without having done that."	Employability and skills development	Skills used directly in employment
"Yeah, I definitely picked up a lot of transferable skills that I've, I've kept since during the module, and it's definitely helping me out, especially now."	Skills learnt during Plant ID translated to employment	

Many of the students accurately recalled the structure of the module including the specific details of the pre-recorded lectures, such as the families of plants, the set-up of small groups, and GTA led workshops, alongside the different online tools that were utilised such as the online message board and micro-lectures (Figure 3). One student described the workshops as a "*very free and easy open atmosphere, which was really helpful*". Another went as far as to say "*I probably wouldn't have got this job that I've got now without having done that* [the module]". Another student discussed the sense of appreciation they developed for the botanical world during the module, stating that "*day to day life it certainly increased my enjoyment of being around plants and in natural environments. You certainly made me very aware of just how important plants are*". Whilst another stated "*because of the pandemic, it was quite nice to be able to do it in your local area … I tried harder to ID stuff*".

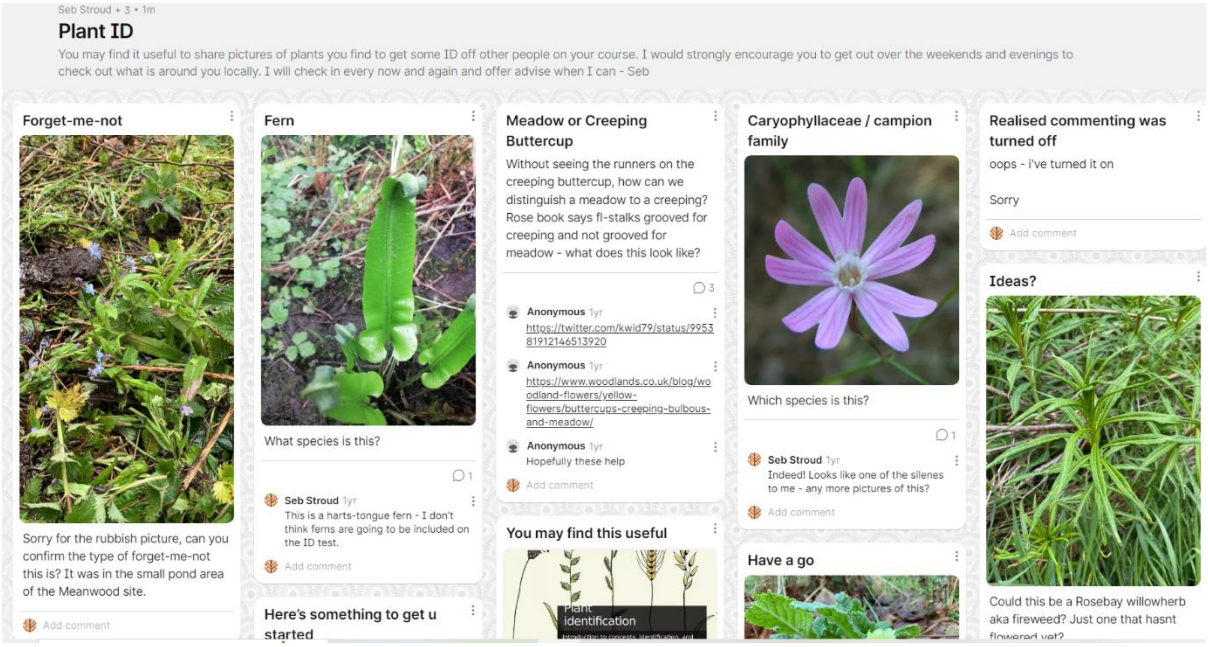

Figure 3: Padlet forum containing various examples of different students' finds and discoveries. Staff monitored the content and identifications of plants on these boards and suggested identification clues and tips, offered potential IDs, and set tasks and challenges.

Discussion

This paper set out to explore the extent to which an online learning approach designed by a GTA was effective in training master's students in plant identification and related skills in plant ecology, and how these approaches might continue to be implemented further in teaching. Out of all the students interviewed, half noted that they use their plant identification skills and understanding of plant ecology regularly in their current roles, with two being employed as botanical specialists within their respective industries. All the students stated that the method of delivery was effective given the restrictions enforced at the time during the COVID-19 pandemic. Students recalled that the ability to watch pre-recorded micro-lectures allowed them to engage in asynchronous learning. Enabling them to tackle the lectures at their own pace and if necessary, go back and rewatch content they did not understand, a finding that has been noted by others (Berlin and Weavera, 2022). However, some students did find difficulty engaging in the online format either due to accessibility issues such as poor internet connection or a more general lack of motivation due to the challenges faced with the lockdown measures (Shevlin et al., 2020).

Some limitations of the methodology were the small number of interviews conducted, self-identification of skill levels, and selection bias (Heckman, 1990). Whilst we had a reasonable response rate to the initial invitation, it is likely the invitation attracted students who felt passionately about plant ecology generally, and it is these students who are likely to have engaged and benefitted the most from the module and continued to develop their skills to the present day. However, all except one participant reported low levels of confidence in their identification ability, and one noted low interest in plants generally (Figure 2). Further interviews with the wider cohort to better understand less engaged student perceptions could be beneficial to this work.

Within higher education, the tools, resources, and technologies at our disposal to teach students have rapidly developed in the last decade. New technologies are being experimented with in teaching settings continuously, from the use of 3D models, virtual and augmented reality experiences, and AI ID tools, to interactive lectures and social media engagement (Cooke et al., 2021). These can be novel, exciting tools which have multiple benefits including accessibility advantages (Morales et al., 2020). There are some additional specific challenges encountered when using an online format, such as observing plant identification features. Many features needed to correctly distinguish different species may be incredibly fine, or even microscopic. The limited tools provided to our students meant that some students might have not been able to correctly observe some of the distinguishing characteristics of the specimens being demonstrated. Some plants may be distinguished by their strong smells, tastes, and textured tissues (Table 1). These are experiences that could not be provided to students through a screen.

However, some students did note the advantage of online learning, such as being able to see a wider diversity of flora that had been gathered by their peers across geographic locations. This is where tools such as the online message board expanded learning capacity. Students from all areas of the UK were able to share the interesting local flora that they found, whilst other students compared similar species that they had noticed in their explorations. This created opportunities for dialogue and discussion around key identification features, facilitating and fuelling peer-to-peer and peer-to-GTA learning and independent inquiry. This was recalled by many of the students during their interviews. Some researchers have noted that educators within the field of ecology observed that many of their students were less involved in online sessions (Bacon and Peacock, 2021). However, I noted that many of the students were diligent and actively engaged in all the online learning activities; students mentioned that the small groups were engaging, allowing active discussion not only with other students but also with myself and the other GTA. Overall, all the students recall fond botanical memories of the module, stating that they did indeed believe that it had enhanced their plant identification skills and their career opportunities in future.

Previous research has indicated the value of nature connection and the development of sustainable attitudes through educational experiences (Krasny and Delia, 2015). Findings on nature connection, education, and exploration of people's local areas are well documented (Frantz and Mayer, 2014). Some students reported that the lack of an experienced botanist to engage them with interesting historical or ecological stories or the physical characteristics of plants in the field left them feeling demotivated within the module. Whilst students felt they could have gained more from their fieldwork, they all reflected positively on its value considering the circumstances of the pandemic. One observation from a student concerned gathering plants from the local area. They noted that they felt a greater connection to this space and therefore felt more motivated to understand the plants that were surrounding them. This motivation that would have been lacking if they had been on the field course not local to them.

Many studies have commented on the general malaise that some students experienced during the pandemic (Wester et al., 2021), due to the stress and uncertainty many people felt during this unprecedented event. Many students are likely to have been facing a suite of new challenges, from

financial struggles to competing for electronic devices with family members, all whilst trying to motivate themselves to study (Chiu, 2022). It is important to note that students remarked on the value of engaging with both nature and each other during the COVID-19 lockdowns. Various studies have quantified the impacts of green space and mental health (Astell-Burt et al., 2022), particularly for urban dwellers during lockdowns (Lin et al., 2023). Several students commented on lockdowns and the value of local exploration, implying that students' wellness likely directly benefitted from the module.

The plant identification module to this day has maintained various elements of the content and format delivered during the COVID-19 pandemic. Additionally, since the pandemic, the University of Leeds has introduced a further field course, the BLGY2265 Urban Ecology and Conservation Field Course. Two key components of this module feature extensive plant identification and plant ecology content, developed by me as a GTA, an opportunity likely not available if not for the success of previous modules. The development and inclusion of this content were in response to the growing concern from academics and myself around plant literacy (Brownlee et al., 2021; Stroud et al., 2022). Whilst most of the teaching of both modules is now delivered in person, they still feature the content and tools created for COVID-19 plant identification module. For example, pre-recorded micro-lectures are still a valuable resource for students to understand plant family characteristics, whilst the use of Padlet encourages peer-to-peer learning and sharing of images of unusual and difficult-to-identify plants. This study also aids in demonstrating the valuable role that GTAs have in developing and delivering taught content throughout the COVID-19 pandemic (McLaughlan, 2021). Within this case study, I was able to plan, design, and deliver a significant proportion of a 20-credit MSc module with relative freedom, a rare opportunity for a GTA. Overall, the opportunity enhanced both my pedagogic practice whilst also enabling an essential skills module for our students to continue with demonstratable success.

The opportunities and lessons learnt from our experiences of distance learning provided us as educators with an opportunity to help increase people's understanding of plant ecology and diversity wherever they may be (Bacon, 2023). One additional direct result of this module was the creation of a free online course on urban green infrastructure and biodiversity for the public. This course was developed in collaboration with the Royal Botanic Garden Edinburgh, and equips students with the skills and knowledge to make better-informed choices about the design and management of green spaces and urban areas for both people and nature (Stroud, 2022).

The COVID-19 pandemic has changed many elements of life from the increase in homeworking, to urban to rural flight, to medical practice. The world of higher education is no different and it has fundamentally changed and accelerated the way we seek to learn and teach. It is expected that much of the UK's higher education environment is not likely to return to conventional lecturing with blended and flipped learning (the viewing of digitized or online lectures as a pre-class activity with active learning experiences such as discussions in class time) featuring more prominently within institutions (Harris et al., 2021; Robson et al., 2022). Since the pandemic, various other studies and case studies have demonstrated similar successes with remote field and lab work; from semi-immersive virtual botanical field trips (Bacon, 2023), at-home laboratory for plant biology (Schnell et al., 2021), online student botanical competitions (BUC, 2023), to virtual internal medicine sub-internships (Holmberg et al., 2021). GTAs have played a significant role in the delivery of much of this content, as they do throughout much of higher education teaching (Muzaka, 2009; Shannon et al., 1998).

Whilst the University of Leeds has returned to mostly in-person teaching, we have seen significant changes in the manner and use of the technology and resource at our disposal. Using the material created and skills developed during the pandemic provided us with a suite of new strategies to help students achieve module learning outcomes, no matter where they are located. More broadly, micro-lectures and independent learning activities can able educators to engage in more engaging

practical or discussion-based activities in person. Models such as flipped learning are becoming a popular alternative to traditional teaching methods, and marry well with blended teaching approaches (Lage et al., 2000; Seery, 2015). The increased learning equity through flexibility of time, study pace, and place is an asset that botanical, and other, educators should aim to capitalise on to expand the currently declining teaching of the discipline post-pandemic.

Conclusion

This paper aimed to assess the effectiveness of our online learning approach for teaching plant identification during the COVID-19 pandemic. I found that across all our participants interviewed, there was consensus that the online delivery was effective at providing plant identification skills given the circumstances. All students improved their ability to identify plants and the increased frequency at which they notice plants in their environment, both immediately and two years after the module concluded. I found that the use of technology enables students to better share their discoveries and enhance their peer-to-peer learning during the pandemic. Collaborative identification efforts gave students a sense of connection during the COVID-19 lockdown. The tools effectively utilised during this time (pre-recorded lectures for independent students, online workshops, AI apps, and online boards) have subsequently been incorporated into the delivery of this module. However, the tactile element to plant identification that students were not able to replicate via an online medium. Students noted during the COVID-19 pandemic some of the most meaningful and valuable learning experiences were those that they were able to share with their peers and educators. Further interviews may help to capture a more comprehensive understanding of student perception and mitigate again the potential self-selection bias of our small sample size.

The increased learning equity and flexibility of blended learning is an asset to botany and field educators. We should aim to capitalise on and expand the declining teaching of the discipline post-pandemic by integrating online materials for blended learning. The days of hiking boots, waterproof trousers and sodden plant keys are far from over for the teaching of field botany, but the next generation of botanists could well have learnt their field skills through a screen.

Acknowledgements

A special thanks to Dr Samuel Hughes, Dr Stephen Compton, and Dr Rupert Quinell at the University of Leeds for their support during the pandemic and for facilitating the delivery of this module. A further thanks to Dr Christopher Hassall and the University of Leeds ethics committee for their helpful comments on study design and ethics application. Finally, a special thanks and gratitude is extended to the interviewees for sharing their time and valuable reflections.

This work was supported by the Panorama Natural Environment Research Council (NERC) Doctoral Training Partnership (DTP), under grant NE/S007458/1.

References

Abrie, A. L. (2016) The botanical content in the South African curriculum: A barren desert or a thriving forest? *South African Journal of Science,* 112(1-2)**,** pp. 01-07. DOI: http://dx.doi.org/10.17159/sajs.2016/20150127

Astell-Burt, T., Hartig, T., Eckermann, S., Nieuwenhuijsen, M., McMunn, A., Frumkin, H. & Feng, X. (2022) More green, less lonely? A longitudinal cohort study. *International journal of epidemiology,* 51(1)**,** pp. 99-110. DOI: https://doi.org/10.1093/ije/dyab089

Bacon, K. L. (2023) Investigating student experiences of botanical field work using a semi-immersive virtual botanical fieldtrip. *Journal of Biological Education***,** pp. 1-40. DOI: https://doi.org/10.1080/00219266.2023.2192733

Bacon, K. L. & Peacock, J. (2021) Sudden challenges in teaching ecology and aligned disciplines during a global pandemic: Reflections on the rapid move online and perspectives on moving forward. *Ecology and Evolution,* 11(8)**,** pp. 3551-3558. DOI: https://doi.org/10.1002/ece3.7090

Bacon, K. L., Stroud, S. & Peacock, J. (2021) Are you plant aware? *The Niche Magazine.* British Ecological Society.

Berlin, K. & Weavera, K. V. (2022) Teaching strategies students find helpful in online learning courses. *College Teaching,* 70(3)**,** pp. 319-327. DOI: https://doi.org/10.1080/87567555.2021.1940814

Braun, V. & Clarke, V. (2006) Using thematic analysis in psychology. *Qualitative research in psychology,* 3(2)**,** pp. 77-101. DOI: https://doi.org/10.1191/1478088706qp063oa

Brownlee, K., Parsley, K. M. & Sabel, J. L. (2021) An Analysis of plant awareness disparity within introductory Biology textbook images. *Journal of Biological Education***,** pp. 1-10. DOI: https://doi.org/10.1080/00219266.2021.1920301

BUC (2023) *Botanical Univeristy Challenge YouTube channel*. Available at: https://www.youtube.com/@BotanicalUniversityChallenge/streams [Accessed 24/04/2023 2023].

Chiu, T. K. F. (2022) Applying the self-determination theory (SDT) to explain student engagement in online learning during the COVID-19 pandemic. *Journal of Research on Technology in Education,* 54(sup1)**,** pp. S14-S30. DOI: https://doi.org/10.1080/15391523.2021.1891998

Cooke, J., Araya, Y., Bacon, K. L., Bagniewska, J. M., Batty, L. C., Bishop, T. R., Burns, M., Charalambous, M., Daversa, D. R. & Dougherty, L. R. (2021) Teaching and learning in ecology: A horizon scan of emerging challenges and solutions. *Oikos,* 130(1)**,** pp. 15-28. DOI: https://doi.org/10.1111/oik.07847

Drea, S. (2011) The End of the Botany Degree in the UK. *Bioscience education,* 17(1)**,** pp**.** 1-7. DOI: https://doi.org/10.3108/beej.17.2

Frantz, C. M. & Mayer, F. S. (2014) The mportance of connection to nature in assessing environmental education programs. *Studies in Educational Evaluation,* 41**,** 85-89. DOI: https://doi.org/10.1016/j.stueduc.2013.10.001

Godwin, H. (1968) Is Botany Dead? *Nature,* 220(5172)**,** pp. 1155-1156. DOI: https://doi.org/10.1038/2201155c0

Harris, R., Blundell-Birtill, P. & Pownall, M. (2021) " A more personal way to learn during such an isolating time": The value of live lectures in online teaching.'A practice report'. *Student Success,* 12(3)**,** pp. 113-117. DOI: https://doi.org/10.5204/ssj.1781

Heckman, J. J. (1990) Selection bias and self-selection. *Econometrics***,** pp. 201-224. London: Palgrave Macmillan UK

Holmberg, M. H., Dela Cruz, E., Longino, A., Longino, N., Çoruh, B. & Merel, S. E. (2021) Development of a single-institution virtual internal medicine subinternship with near-peer teaching in response to the COVID-19 pandemic. *Academic Medicine,* 96(12)**,** pp. 1706. DOI: https://doi.org/10.1097%2FACM.0000000000004219

Krasny, M. E. & Delia, J. (2015) Natural area stewardship as part of campus sustainability. *Journal of Cleaner Production,* 106**,** pp**.** 87-96. DOI: https://doi.org/10.1016/j.jclepro.2014.04.019

Lage, M. J., Platt, G. J. & Treglia, M. (2000) Inverting the classroom: A gateway to creating an inclusive learning environment. *The journal of economic education,* 31(1)**,** pp. 30-43. DOI: https://doi.org/10.1080/00220480009596759

Lev-Yadun, S., Gopher, A. & Abbo, S. (2000) The cradle of agriculture. *Science,* 288(5471)**,** pp. 1602-1603. DOI: https://doi.org/10.1126/science.288.5471.1602

Lin, B. B., Chang, C.-c., Astell-Burt, T., Feng, X., Gardner, J. & Andersson, E. (2023) Nature experience from yards provide an important space for mental health during Covid-19. *npj Urban Sustainability,* 3(1)**,** pp. 14. DOI: https://doi.org/10.1038/s42949-023-00094-0

McLaughlan, T. (2021) Facilitating factors in cultivating diverse online communities of practice: a case of international teaching assistants during the COVID-19 crisis. *The International Journal of Information and Learning Technology,* 38(2)**,** pp. 177-195. DOI: https://doi.org/10.1108/IJILT-05-2020-0074

Meadows, K. N., Olsen, K. C., Dimitrov, N. & Dawson, D. L. (2015) Evaluating the differential impact of teaching assistant training programs on international graduate student teaching. *Canadian Journal of Higher Education,* 45(3)**,** pp. 34-55. DOI: https://doi.org/10.47678/cjhe.v45i3.187557

Morales, N., Bisbee O'Connell, K., McNulty, S., Berkowitz, A., Bowser, G., Giamellaro, M. & Miriti, M. N. (2020) Promoting inclusion in ecological field experiences: Examining and overcoming barriers to a professional rite of passage. *The Bulletin of the Ecological Society of America,* 101(4)**,** pp. e01742. DOI: https://doi.org/10.1002/bes2.1742

Muzaka, V. (2009) The niche of graduate teaching assistants (GTAs): Perceptions and reflections. *Teaching in Higher Education,* 14(1)**,** pp. 1-12. DOI: https://doi.org/10.1080/13562510802602400

PadLet (2020) *PadLet Image board*. Available at: https://padlet.com/bs17sets3/plant-id-group-project-1513kpf8apxpco8a [2023].

Parsley, K. M. (2020) Plant awareness disparity: A case for renaming plant blindness. *Plants, People, Planet,* 2(6)**,** pp. 598-601. DOI: https://doi.org/10.1002/ppp3.10153

Robson, L., Gardner, B. & Dommett, E. J. (2022) The post-pandemic lecture: views from academic staff across the UK. *Education sciences,* 12(2)**,** pp. 123. DOI: https://doi.org/10.3390/educsci12020123

Ruckelshaus, M. H., Jackson, S. T., Mooney, H. A., Jacobs, K. L., Kassam, K.-A. S., Arroyo, M. T. K., Báldi, A., Bartuska, A. M., Boyd, J. & Joppa, L. N. (2020) The IPBES global assessment: Pathways to action. *Trends in Ecology & Evolution,* 35(5)**,** pp. 407-414. DOI: https://doi.org/10.1016/j.tree.2020.01.009

Saynes-Vásquez, A., Vibrans, H., Vergara-Silva, F. & Caballero, J. (2016) Intracultural differences in local botanical knowledge and knowledge loss among the Mexican Isthmus Zapotecs. *PloS one,* 11(3)**,** pp. e0151693. DOI: https://doi.org/10.1371/journal.pone.0151693

Schnell, L. J., Simpson, G. L., Suchan, D. M., Quere, W., Weger, H. G. & Davis, M. C. (2021) An at-home laboratory in plant biology designed to engage students in the process of science. *Ecology and Evolution,* 11(24)**,** pp. 17572-80. DOI: https://doi.org/10.1002/ece3.8441

Seery, M. K. (2015) Flipped learning in higher education chemistry: emerging trends and potential directions. *Chemistry Education Research and Practice,* 16(4)**,** pp. 758-768. Available at: https://doi.org/10.1039/C5RP00136F

Shannon, D. M., Twale, D. J. & Moore, M. S. (1998) TA teaching effectiveness: The impact of training and teaching experience. *The Journal of Higher Education,* 69(4)**,** pp. 440-466. DOI: https://doi.org/10.1080/00221546.1998.11775144

Shevlin, M., McBride, O., Murphy, J., Miller, J. G., Hartman, T. K., Levita, L., Mason, L., Martinez, A. P., McKay, R. & Stocks, T. V. A. (2020) Anxiety, depression, traumatic stress and COVID-19-related anxiety in the UK general population during the COVID-19 pandemic. *BJPsych open,* pp. 6(6). DOI: https://doi.org/10.1192/bjo.2020.109

Steffen, W., Broadgate, W., Deutsch, L., Gaffney, O. & Ludwig, C. (2015) The trajectory of the Anthropocene: the great acceleration. *The Anthropocene Review,* 2(1)**,** pp. 81-98. DOI: https://doi.org/10.1177/2053019614564785

Stroud, S. (2022) *Botany for the Built Environment*. RBGE PropaGate: Royal Botanic Gardens Edinburgh. Available at: https://propagatelearning.rbge.ac.uk/enrol/index.php?id=288 [Accessed May 2023].

Stroud, S., Fennell, M., Mitchley, J., Lydon, S., Peacock, J. & Bacon, K. L. (2022) The botanical education extinction and the fall of plant awareness. *Ecology and evolution,* 12(7)**,** pp. e9019. DOI: https://doi.org/10.1002/ece3.9019

Wandersee, J. H. & Schussler, E. E. (1999) Preventing plant blindness. *The American Biology Teacher,* 61(2)**,** pp. 82-86. DOI: https://doi.org/10.2307/4450624

Wester, E. R., Walsh, L. L., Arango-Caro, S. & Callis-Duehl, K. L. (2021) Student engagement declines in STEM undergraduates during COVID-19–driven remote learning. *Journal of microbiology & biology education,* 22(1)**,** pp. ev22i1-2385. DOI: https://doi.org/10.1128/jmbe.v22i1.2385

Appendices

Appendix A: Questions for semi-structured interviews.

Likert scale questions:

How confidently did you feel you could correctly identify a plant?

Would not be able to identify anything 1-10 Would be able to identify everything

Did you notice trees, shrubs, and ornamental plants around you?

Never notice 1-10 – notice nearly everything

Did you notice grasses, spontaneous vegetation (weeds), and other plants?

Never notice 1-10 – notice nearly everything

How valuable did you find the module?

I did not learn any valuable skills 1 – 10 I use the skills I learnt daily

Open questions for the interviews included the following:

Can you please briefly describe your recollection of how you were taught plant identification?

What did you find valuable about the delivery method?

What did you find challenging about the delivery method?

Do you think the method of delivery was effective?

Has this course enhanced your botanical identification skills and what has been the impact of this?

Appendix B: Student responses to interview questions with respective codes and themes.

Interview extract	Codes	Theme
[group size] perhaps much bigger than that, it would have turned into a bit of a bit of a free for all.	Ability for all to engage	Accessibility of tools used
[prerecorded lecture] so you can go through it in your own time	Asynchronous learning	
I liked the small groups with the teams calls	Small group: ability for all to engage	
That's, that would have been great, obviously wasn't possible at the time. Basically, I don't think all of plant ID needs to be done in person	Acknowledgement of limitations of covid	Acknowledgement of limitations of covid
Given that it was it had to be drafted of it as an emergency measure. I felt that it was it was adequate for my purposes.	Acknowledgement of limitations of covid	
It certainly increase my enjoyment of being around plants and in natural environments. You certainly made me very aware of just how important plants are.	Developed appreciation of plants	Developed appreciation of plants
Yeah, I definitely think it improved that, definitely think that it can get the ball rolling with my interest	Developed appreciation of plants	
I wasn't very, like self driven and motivated to get better at it.	Difficulty in engaging online	Difficulty in engaging online
if you're out with a specific person, you every plant, you come across thinking that oh, this is this, and they can tell you why it's cool. And that gets you're interested in a bit more.	Lacks personal element of plant identification in field	
the pandemic might have had an effect on my motivation.	Impacts of pandemic on mental health: negative	
You can only really look at specimens are shown, you know, you can't be able to remember particular species by any other sense Like you can't touch or smell them, which I think in some, some plants that are essential to help you remember.	Difficulty in observing fine ID features Missing tactile and sensory element of ID features	Difficulty in observing ID features
You weren't in like a lab with other people you couldn't physically show apart from up to a camera	Difficulty in observing fine ID features	
You can't just then give it to someone and say "Oh, can you have a look at this? I can't find this particular feature on it".	Difficulty in observing fine ID features	
It was hard to get across on online formats, like taking like a blurry photo of the part of a plant.	Difficulty in observing fine ID features	
I think, how to identify families	Identification of families	Fundamental identification skills
And then in the specific breakouts, we kind of had we focused on like one or two families per like, seminar type thing.	Identification of families	
So the online stuff was, like, general information about working things out families	Recall of families	
My recollection is sort of going out in the mornings, collecting other plants that I thought were in certain families.	Recall on families	
I thought it was useful, especially just to sort of get that first like, general idea, because I had never really done any plant ID before other than, like, identifying trees, like from books	Value of course	
So I thought that was really useful just to have that sort of broad overview of obvious families.	Recall of families	
So it was like, you know, go out into your local area and find a pea or something	Fieldwork component	Independent exploration of local flora
because of the pandemic, it was quite nice to be able to do it in your local area and do the phase one map, because that actually meant that I tried harder to ID stuff,	Local sites more meaning	

I imagine if we had it that normally, during the eight hours in the field of plant ID, you really get your eye in	Shorter sessions that practicals	Limitation of module
And I think maybe only doing the couple of sessions that we did. Maybe it didn't go in that much	Limitation of time for practicals	
[Due to poor internet] So the delivery of the teaching was also there's not always as smooth as it would be in person	Internet accessibility issues	
helped me see different different ways of tackling plant identification and learning new techniques, and also sharing knowledge with others	Peer to peer learning	Peer to peer learning
And then we'd come back and talk to each other about how we did it [identified a plant]	Peer to peer learning	
you could sort of bounce off each other and learn off each other.	Peer to peer learning	
[small group size] I found that quite useful, because it meant that there was only four or five of us in the conversation, which was good	Small group: valuable	
Value of padlet: novel new tool	Padlet: useful beyond just scheduled session	Sharing of discoveries
So if you brought a different species, you've looked at five separate species, whereas I feel like if it was just in a big room, or whatever, I think I'd probably just be focusing on myself	Peer to peer learning	
I feel like if it was just in a big room, or whatever, I think I'd probably just be focusing on myself.	Greater diversity of specimens to look at - different locations	
I think the online format was valuable, because especially as we were all in different parts of the country seeing is obviously different plants and vegetation stuff around the country seeing different examples	Seeing diversity of species	
Yeah, I think I probably wouldn't have got this job that I've got now without having done that.	Employability and skills development	Skills used directly in empolyment
And now, I still use that ID in my current job as well.	Skills learnt during Plant ID translated to employment	
Yeah, of course, like, just the family stuff, like the font like the fact that I can identify like a cabbage family or a rose family and stuff. I think that I think that quite helped me out a lot.	Skills learnt during Plant ID translated to employment	
Yeah, I definitely picked up a lot of transferable skills that I've, I've kept since during the module, and it's definitely helping me out, especially now	Skills learnt during Plant ID translated to employment	
it's although I don't really use the keys and stuff, I usually use more like those apps where you can take photos	Use of identification apps	
I use that a lot, because with my job, it's quick ID. But then I also when I do use those apps, I know to double check the ID. So I look on Wikipedia wherever it is and read why the description of the plants and see if it does have you know,	Skills learnt during Plant ID translated to employment	
I think it would have been, you know, ideally, we would have had maybe like to do it maybe halfway through what was the end? Kind	Suggestions for group field	Suggestions for improvements
ideally, we would have had maybe like to do it maybe halfway through what was the end?	Lack element of face-to-face expert interaction	
So it's maybe that access to you can't really prove that online. But I feel like if we didn't have more time	Timescale of course challenging	
I guess the normal trip trips out and stuff were really honed in those skills a lot more. So I feel like maybe I missed out on honing those.	Lack of trips for module	
Yeah, knowing what every plant is.		
Going out in the morning, trying to find plants from certain families, especially given like the location here in Portsmouth. So In the city.	Unequal access to plants	Unequal access to materials
So it's maybe that access to you can't really prove that online		
The Padlet was unbelievably useful. Didn't that get absolutely rinsed? Yeah, I think it was people posting pictures of plants asking for species identification. Other people could get involved help point out those characteristics that were important for identification for that particular plan, or group of plants	Specific purpose of Padlet	Use of novel teaching tools

There was a good critical mass behind that. And that really helped to get it going. And it was just like, yeah, open atmosphere. Okay, great.	Use of padlet - helpful	
The might be some diagrams, I remember that the the format was we all had specific specimens highlighting particular characteristics, and then we put them through them one by one and see how they do general scheme of things. In terms of other tools. I can just remember things on the screen. That's fine.	Uncertainty in recalling structure	Vague recollection of module
The might be some diagrams, I remember that the the format was we all had specific specimens highlighting particular characteristics, and then we put them through them one by one and see how they do general scheme of things. In terms of other tools. I can just remember things on the screen. That's fine.	Did not recall specifics	

Inclusive teaching in a pandemic: The experience of an International Graduate Teaching Assistant

Sara Kaizuka
University of Leeds

Abstract

The purpose of this paper is to highlight the unique contributions International Graduate Teaching Assistants (IGTAs) can make in improving inclusive teaching practices in UK Higher Education (UK HE). In addition, this paper identifies four unique challenges IGTAs face in taking up a teaching position in UK HE – the lack of support from their supervisors, limited subjects they can teach, problems with credibility, and language barrier. This paper will use the author's personal experience of teaching an international politics module as an IGTA both during and after the COVID-19 pandemic related restrictions to analyse the unique contributions IGTAs may be able to offer in internationalising the curriculum. Through synthesising this experience with current literature on GTAs, this paper identifies the importance of supervisors and training in preparing IGTA for their role. This paper aims to encourage more international PGRs to become IGTAs.

Introduction

This paper argues how more international postgraduate research students (IPGRs) should be encouraged to work as graduate teaching assistants (GTAs) in the UK higher education (HE) sector. UK HE, once comprising of just a handful of the population, has grown dramatically in recent years in terms of student numbers and diversity of its cohort. Degree holders once accounted for just 3.4% of the UK population in the post-war period. But by 2000, their numbers had grown to one third of the population (Bolton, 2012: 14), and they continue to increase (Bolton, 2021: 9). Such an increase in student population size in UK HE has also resulted in diversification of the student cohort. For instance, there is an acceptance gap between those from disadvantaged backgrounds – measured by their ethnicity and eligibility for Free School Meals, and the most advantaged saw continued decline in acceptance rates (UCAS, 2020: 6 & 16). While such change is cause for celebration, it also means there is a growing need to develop more inclusive teaching environments.

However, creating a truly inclusive teaching environment has proven difficult. There have been attempts to support academics in designing inclusive lessons such as the publication of a book by Grace and Gravestock (2009) titled *Inclusivity and Diversity: Meeting the Needs of All Students*. However, changes to teaching practices are increasingly seen as insufficient and discussions have progressed to focus on the limited diversity among teaching staff. While surface-level diversification may seem inadequate, a survey by Times Higher Education found "lack of [HE] role models representing all ethnic groups" may lead to attainment gaps between minority and non-minority students (Bothwell, 2019). This paper argues that to tackle this issue, International Graduate Teaching Assistants (IGTAs) could play a crucial role.

IGTAs are critical as they can help diversify the teaching cohort, at least in the short-term. Data shows that PGRs made up 4.4% of the total student cohort in the year 2019/2020, a relatively consistent figure throughout the years (Higher Education Statistics Agency, 2021d). There was a total of 110,675 PGRs studying in the UK (Higher Education Statistics Agency, 2021d), and 45,575 students were IPGRs (Higher Education Statistics Agency, 2021b). Thus, 41.2% or nearly half of all PGRs studying in the UK were IPGRs. Considering both the consistent share of PGRs and the high share of IPGRs, they are a reliable pool of diverse teaching staff in UK HE. While there needs to be continued efforts to diversify the academic staff on long-term contracts, in the immediate-term, IGTAs have an important part to play in creating an international learning experience for students. Furthermore, there needs to be better understandings of the barriers IPGRs face when trying to become IGTAs, which differs from that of home GTAs.

This paper argues that IGTAs can be vital role models and can help diversify the teaching staff. I use my personal experience as an IGTA to illustrate some of IGTAs strengths and unique challenges. The paper is split in two - the first half focuses on the existing literature and data on GTAs and the unique challenges faced by IGTAs. The second half is a case study on my own experience as an IGTA at the School of Politics and International Relations at the University of Leeds. I will explore how my unique international experience informed my teaching practices and examine the importance of my supervisors and training which helped me to become an IGTA. Following the footsteps of Alex Hastie (2021) who encouraged working-class PGRs to become GTAs in the first volume of *Postgraduate Pedagogies*, it is hoped that this paper will help encourage more IPGRs to become IGTAs.

Finding exact figures of GTAs is a challenge as this data is not collected at either university or national level, and there is no clear definition of PGRs who teach. For example, York University calls PGRs who teach 'GTAs', while the University of Leeds calls them 'Teaching Assistants (TAs)'. Lack of a unified terminology makes it difficult to assess data collected by some researchers on the topic of IGTAs. For instance, the closest research that analysed IGTAs and their experience of teaching in UK HE is one conducted by Winter et al. (2015) who sent out surveys to PGRs who were on a GTA course. While this is a sound methodology, it does mean that PGRs who are not on a formal GTA

courses may have been left out of the data collection. Additionally, the PGR identity has been said to play an important role in their development as teachers in the literature (Fotovatian and Miller, 2014; Jazvac-Martek, 2009; McAlpine, Javac-Martek and Hopwood, 2009; Watts, 2009). However, PGRs still in some cases struggle to form a clear identity as they exist in the space between staff and student (Compton and Tran, 2017; Teague, 2021). Straddling two identities means some PGRs may not even identify as a GTA.

Despite these limitations, an approximation of the number of GTAs can be made based on the study by Winter et al. (2015). According to their research, 41% of those participating in a GTA course were IGTAs (Winter et al., 2015), a considerable number of IPGRs thus teach and have gained limited academic attention. At present, diversity among academic staff is limited with only 18% being BAME, and the proportion becomes even smaller among professors of whom just 11% are BAME (Higher Education Statistics Agency, 2021a). Compounding this issue is the fact that fewer BAME students pursue a PhD compared to their white peers (Khan and Cowell, 2020). This translates to fewer BAME academics in the future. Furthermore, since it takes five to seven years for a lecturer to be promoted to a senior lectureship, which is a grade below to that of a professorship, it will take decades to narrow the current gap in the number of BAME professors (National Careers Service, 2021; University of Leeds, 2021c). Thus, in the short-term, to ensure more undergraduate students are taught by ethnically diverse teachers, universities will need to rely on PGRs. In sum, in the current limitation of representation and diversity in academia, IGTAs may become key role models for undergraduate students. However, the next section will outline how IPGRs require more active encouragement to take up teaching positions.

Challenges for IGTAs

IPGRs face challenges *before* they start teaching. This is in addition to the challenges they face *while* they teach. There is an opportunity gap between domestic PGRs and IPGRs. The study by Winter et al. (2015) found that IPGRs were far less likely to have an opportunity to teach compared to their domestic peers. While only 47.9% of IPGRs were offered teaching roles, 70.7% of UK students were given the opportunity (Winter et al., 2015).

This paper identifies four key reasons for this gap. The first concerns the role played by the supervisor. Winter et al. (2015) found that 75% of respondents stated that the support from their supervisors was a key reason for pursuing teaching. Conversely, lack of support can discourage application for roles. In other words, there is a systematic problem as well as an emotional and subjective one. The systematic issue stems from the fact that supervisors are usually consulted or are asked to be referees in the application process. Supervisors may refuse to be referees as some supervisors may prefer their PGRs to focus on their research rather than teaching (Bok, 2013). However, this alone does not explain why there is such a significant gap between international and domestic students as supervisor support will be equally important for both.

The second possible explanation is that it is challenging to find a teaching course which aligns with the research focus of the international PGR. Studies point that international academics (especially female academics) are often siloed to teach subjects that are related to their nationality or race (Skachkova, 2007: 705-706). This means that some IPGRs may find difficult to apply to teach subjects that do not relate to their research. While there is no available research findings or data as to what degree this happens and how much this affects PGRs, it may still explain the opportunity gap between domestic and IPGRs.

The third issue faced by IGTAs is that their teaching credentials may be questioned more often than their domestic peers. For many IPGRs, English is either not their first language or they may have a distinct accent which may delegitimise their credential as a teacher (Skachkova, 2007: 707-709).

There are, of course, ways in which a similar issue can affect a domestic PGR. For example, a British PGR who studies translation in the UK may find it harder to teach Japanese if there is a Japanese PGR who also studies the same subject. In this case, the UK PGR may be seen as less credible compared to a native speaker. In a study by Skachkova (2007: 710), they show how Japanese academics teaching Japanese in the United States noted this advantage when teaching, as compared to American teaching staff.

However, the fourth and perhaps greatest barrier that exists which prevent IPGRs from teaching is their lack of confidence in teaching in a foreign context. English proficiency has been raised multiple times by IPGRs as one of the biggest challenges they face while completing their doctorates (Andrade, 2006). Considering that the majority of classes in the UK are taught in English and many of the students are native English speakers, this fact may be creating a sense of hesitation among IPGRs and prohibits them from applying. In addition to these concerns, IPGRs may be struggling to adapt to a new culture and new academic requirements, as well as having to live in a new location far from their family and friends (Jindal-Snape and Ingram, 2013: 17; Le and Gardner, 2010: 260). These factors combined form a unique barrier against IPGRs from applying for teaching roles.

In sum, these four explanations may be insufficient in explaining the opportunity gap when viewed in isolation. However, when combined it makes a strong argument as to why this gap exists. Lack of encouragement from supervisors, lack of suitable subjects to teach and a higher likelihood of their teaching credentials to be questioned, coupled with the pressure to teach in a second language, and the stress of adapting into the UK HE may together create a sense that teaching is not for them.

Individually, these issues are not unsolvable. For example, at the University of Leeds, supervisors are required to go through a central training process to supervise students. Supporting or encouraging international students to teach may be included within such training programmes. Teaching opportunities could be more widely shared between schools so that IPGRs could choose to apply from a broader selection of modules. Universities could develop a teaching workshop aimed at training PGRs who are not confident in teaching in English. In the following section, this paper will argue for the benefits of IGTAs. This argument will be drawn from my personal experience of teaching. By doing so, this paper aims to contribute to the growing literature on the rationale for hiring IPGRs to become IGTAs as presented in the literature review by Ban (2023). Similar to the findings of this paper, Ban (2023: 49) finds that by hiring IPGRs, universities benefit from "internationalisation at home". The additional contribution this paper makes is to argue that by having IGTAs, such internationalisation can strengthen support for international student teachers as well as diversify the curriculum by introducing minority voices.

I am an IGTA from Japan who teaches at the University of Leeds, and English is my second language. Being part of the 13% of all academic staff who are BAME (University of Leeds, 2021b), and teaching politics (part of social studies), a subject field with just 11% of students being ethnically Asian (Higher Education Statistics Agency, 2021c), I remain a minority within the field. This is important to consider in the subsequent section in which I discuss how my knowledge of Japan in the classroom helped broaden the knowledge of the students. It also acts as a caution as to how representative my experience can be as compared to other IGTAs who may share the same ethnicity, as others may face different challenges and strengths to the ones expressed in this paper.

While my own experience echoes that of other IGTAs from some literature, such as pursuing teaching to gain financial security and experience (Park, 2004: 349), there are some notable differences. For example, I had little to no difficulty teaching in English, despite this being the focus of other studies on IGTAs (see Yule (1992) and Yule and Hoffman (1990)). Unlike those mentioned in the literature (Skachkova, 2007), my research does not involve Japan nor do I teach my own language or culture. Thus, the kind of advantages noted by Skachkova (2007: 705-706, 710) of an ethnic minority female academic teaching subjects related to her own language or culture does not apply in my case.

Still, I believe that by having minority staff teach politics helps diversify students' perspective of politics, shifting it from a Western focus to include broader perspectives. In the field of politics and international relations, this over-representation of Western perspectives has been identified as an issue (Acharya and Buzan, 2007). As an IGTA, bringing in international perspectives to the class was my primary contribution to the university experience for students. There is a clear pedagogical advantage to expose students to diverse perspectives as it has been found to help students appreciate the complex nature of issues, advance their ability to interact with people from different backgrounds, and help foster a sense that they are part of a more diverse in-group (Hurtado et al., 1999: 40-43; Milem, 2003: 137-138). I hope that through this small contribution, I will inform future school-wide or university-wide policy change that will help further internationalisation in this institution (Luxon and Peelo, 2009: 54).

The following section explores how my experience teaching an International Politics module as an IGTA enabled me to notice the IT skills gap among international students and diversify the curriculum by actively incorporating international case studies.

I became an IGTA teaching a module aimed at first-year undergraduate students titled 'International Politics'. I taught this module twice, during and after pandemic-related restrictions were in force, thus enabling me to draw lessons from both online and face-to-face teaching. The section will first explore how IGTAs may have better understanding of potential IT skills gap which stems from differing level of use of the internet leading up to pursuing HE. This will be followed by a discussion of how IGTAs are able to diversify perspectives by introducing students to different norms.

The IT skills gap: Differences in international education practices

One of the key contributions that IGTAs will likely be able to bring is their first-hand knowledge of different education systems and practices of different countries. For example, most courses in the UK HE expects students to use internet sources in their research and assignments. Even before the pandemic, there was an assumption in UK HE that students will be able to access materials online, with the majority of university correspondence and reading assignments being distributed online.

However, internet use in education is far from a universal practice. For example, Japan is extremely technologically advanced, boasting famous technology companies like Sony and Hitachi. Internet infrastructure is also highly developed with around a 90% adoption rate, roughly the same as that of the UK. The internet speed is much faster in Japan, averaging 137.19mbps, compared to 63.74mpbs in the UK (Speedtest, 2022). Yet, Japan ranks among the lowest when it comes to internet use during school hours. According to the Programme for International Student Assessment (PISA), Japanese students spend only 25.6 minutes using the internet at school, far less than British students who spent 47.7 minutes (OECD, 2019). While this data does not represent university students, and when it comes to internet use *outside* of school, the duration does increase; it still indicates that IT use in schools is limited. When this is applied to students from developing countries, or mature students who may not have been taught to use the internet in their studies, it becomes clear that this could potential pose a divide in IT skills among students, which may be overlooked by domestic GTAs accustomed to using online sources.

This is where the personal experience of IGTAs becomes important. I went through the Japanese compulsory education system and experienced first-hand the steep learning curve of being suddenly required to use online sources in UK HE. Such lived experience helped me explain in detail where students can find information online accompanied by guidance on how to access the information. This was of particular importance when seminars were delivered online, and teaching staff were forced to share all relevant materials online. To reduce any potential IT skills gap, I took screenshots

of where students can access relevant materials and included step-by-step guidance to accompany the images. This was of importance to new academic staff as well, as they were often unfamiliar with the university websites and therefore benefited from my support in navigating the online platform. In short, IGTAs may be more familiar with potential gaps in IT skills which allows them to take preventative action to ensure that all students can access relevant materials online, a point worth bearing in mind in post-COVID-19 learning environments.

Enriching learning experience through cases studies

The existing literature focuses on the unique advantage IGTAs may have in linguistic and cultural understanding (Skachkova, 2007), but similar advantages can be found when IGTAs are able to bring unique case studies that show a different perspective to their teaching . In my seminars, I was able to use a case study from my country and challenge prevailing discourses developed in the West. Presenting an alternative perspective helped students broaden their understanding of the topic and encouraged international students to share examples from their own country. One week, students were set a reading by Greitens (2017: 423) which included a brief mention of the Fukushima nuclear disaster in Japan. The "deep approach", according to Biggs and Tang (2011: 26-27), is a method in which students are encouraged to interact with academic materials at a deeper level by actively linking together what they learn in the classroom with what they learn from their reading. Applying such approach to my teaching, I expanded on the topic in my seminar. I used data on energy sources in Japan from the International Energy Agency (2022) and emphasised how this disaster shifted the energy supply of Japan away from nuclear power. I added that despite environmental perspectives, it is important for Japan to be able to move away from coal-powered energy to nuclear energy, and that the Fukushima disaster solidified the Japanese public in opposing nuclear power altogether (Klein, 2022). Using the unique case study of Japan helped bring complexity and nuance to the debate over nuclear power. I chose the Japanese case study for two reasons: 1) it was mentioned in the reading material, and 2) I was aware of the wider political and economic challenges surrounding the topic, which set Japan apart from other countries. Thus, IGTAs may be in a better position to bring more international examples in their teaching which in turn will provide a more global educational experience to all students.

However, it is important to emphasise that I would not have been able to teach as an IGTA without prior support and training. The following sections will explore the important role of supervisors and training which help IPGRs to become IGTAs.

Role of Supervisors

Winter et al. (2015) argued that supervisors play a significant role in PGRs' decision to become a GTA. This section will add to this work by discussing the important role my supervisors played in my own decision to teach. From the outset of my PhD programme, both of my supervisors encouraged me to teach. Before I started teaching as a TA, I had doubts about my ability to teach, similar to the concerns expressed in the study by Skachkova (2007: 705-710). In the first meeting I had with my supervisors, I expressed my desire to teach. Not only did they share advice on the training opportunities offered by the university, but one of my supervisors immediately gave me the opportunity to deliver a politics workshop for A-level students. Their encouragement and giving me the opportunity to teach provided a crucial first step into gaining the much needed confidence and experience. While my supervisors played a critical role in introducing me to teaching, the training offered by the university helped develop my teaching skills.

Training to teach

At the HE-level, there are no formal ways in which academics are taught to teach. However, I felt I needed training as I had the added apprehension of teaching in English, and in particular teaching politics in the UK in my second language. In my first year as a PGR, I participated in a *Foundations in Teaching* workshop. This was a mandatory half-day workshop for PGRs planning on becoming GTAs. While I found the workshop helpful in learning the basics of pedagogic practices, I felt I required further training as an IPGR with no prior experience in teaching. With the support and encouragement of my supervisors, I started working as an Education Outreach Fellow, a role open to current postgraduate students, to deliver academic workshops with the aim of widening participation among disadvantaged students. In designing and delivering politics workshops for A-level students, I was taught to use clearly defined learning objectives and outcomes as advocated by classic works by Bloom (1956) and Mager (1990). These objectives were of particular importance when collecting student feedback on the workshops as it asked students to evaluate if they had achieved the learning goals. The learning objectives and outcomes remain the first and last things I cover in every class that I have taught.

Working as an Education Outreach Fellow helped me form networks with other educational charity organisations in the area. I was further introduced to tutor work for the Linacre Institute which aims to advance educational opportunities to A-level students in the North. Through tutoring, I gained in-depth understanding of current limitations in the UK education system, which includes the limited focus on writing up to the post-16 level. One-to-one discussions with A-level students from state schools in the North helped me realise that students had little opportunity to have their writing assessed despite this being a key assessment at UK HE.

This knowledge was further cemented when I attended the School of Politics and International studies' committee meetings that were open to PGRs. Discussions were often focused on challenges in teaching writing skills to undergraduate students. While the university does offer support through workshops delivered by the university library services, students are often not signposted to such services, and it requires the students to be proactive in identifying their academic problems and applying for the workshops. While signposting students to such services is important (Henderson, Shure and Adamecz-Völgyi, 2020: 746-747), as long as it is not a compulsory component of their curriculum, not all students will access the services. Such insight into the realities of the UK education system and the potential barriers faced by disadvantaged groups of students was something that I, as an international student, was only made aware through these outreach programmes.

That being said, the university does offer additional training to help PGRs incorporate inclusive teaching practices. For example, the university offers a workshop called *Everyday Inclusive Teaching* (University of Leeds, 2021a). This workshop taught me how to re-design educational material so that it was inclusive to diverse needs such as those with disabilities or for international students. Examples included using appropriately sized and coloured fonts on PowerPoint slides, including Alt texts to images and using plain English. While the university notifies teaching staff in advance of any disabilities that students want to disclose and ones that require adjustments to teaching delivery, fewer adjustments are required if the teaching materials are designed in accordance with inclusivity requirements to begin with. Thus, while the university offers training to help prepare PGRs to teach, IPGRs and especially those with little prior experience in teaching may require more opportunities to develop their teaching skills and better understanding of the challenges to the current UK education system.

Conclusion

This paper has shown three unique strengths IGTAs hold. IGTAs are in a prime position to increase diversity among teaching staff, understand diverse student needs, and help provide an international learning experience for students by bringing in diverse perspectives. The barriers against IGTAs such as language barriers, lack of supervisor support, or problems over credibility can be easily overcome by better formal teaching training and encouraging supervisors to support IPGRs in pursing teaching roles. The experience discussed here is merely one of many and similar strengths may be found among domestic GTAs. However, the main aim of this paper is to make the case that IGTAs can make a positive change to the UK HE. I hope that I have been successful in persuading other IPGRs to teach.

References

Acharya, A. & Buzan, B. (2007) Why is there no non-Western international relations theory? An introduction. *International relations of the Asia-Pacific,* 7 (3)*,* pp. 287-312. DOI: https://doi.org/10.1093/irap/lcm012

Andrade, M. S. (2006) International students in English-speaking universities: Adjustment factors. *Journal of Research in International Education,* 5 (2)*,* pp. 131-154. DOI: https://doi.org/10.1177/1475240906065589

Ban, X. (2023) 'From international PGR students to international GTAs: Academic rationales for international GTA recruitment in UK higher education institutions'. *Postgraduate Pedagogies*, 3 (1), pp. 18-71. DOI: https://journals.studentengagement.org.uk/index.php/gtateach/article/view/1205

Biggs, J. & Tang, C. (2011) *Teaching for Quality Learning at University*. (4th ed.). Berkshire: Society for Research into Higher Education & Open University Press.

Bloom, B. S. (Ed.) (1956) *Taxonomy of Educational Objectives : The Classification of Educational Goals. Handbook 1, Cognitive Domain* (1st ed.). London: Longman Group Ltd.

Bok, D. (2013) *We Must Prepare Ph.D. Students for the Complicated Art of Teaching*. Available at: https://marktomforde.com/academic/gradstudents/images/Preparing-Grad-Students-To-Teach.pdf. (Accessed: 16 September 2021)

Bolton, P. (2012) *Education: Historical statistics.* London: House of Commons Library.

Bolton, P. (2021) *Higher education student numbers*. London: House of Commons Library.

Bothwell, E. (2019). *Lack of role models 'key cause' of ethnic minority attainment gap*. Available at: https://www.timeshighereducation.com/news/lack-role-models-key-cause-ethnic-minority-attainment-gap. (Accessed: 09 January 2022)

Compton, M. & Tran, D. (2017) 'Liminal space or in limbo? Post Graduate Researchers and their personal pie charts of identity'. *Compass: Journal of Learning and Teaching,* 10 (3). DOI: oi.org/10.21100/compass.v10i3.620

Fotovatian, S. & Miller, J. (2014) 'Constructing an institutional identity in university tea rooms: the international PhD student experience'. *Higher Education Research and Development,* 33 (2)*,* 2 pp. 86-297. DOI: https://doi.org/10.1080/07294360.2013.832154

Grace, S. & Gravestock, P. (2009) *Inclusion and Diversity: Meeting the needs of all students*. New York: Routledge.

Greitens, S. C. (2017) 'Proliferation of weapons of mass destruction'. In J. Baylis, S. Smith & P. Owens (Eds), *The Globalisation of World Politics: An Introduction to International Relations* (7th ed., pp. 419-433). Oxford: Oxford University Press.

Hastie, A. (2021) 'Class Act: Reflections on a working-class academic sense of self as a Graduate Teaching Assistant'. *Postgraduate Pedagogies,* 1 (1)*,* pp. 27-46. DOI: https://journals.studentengagement.org.uk/index.php/gtateach/article/view/1055

Henderson, M., Shure, N. & Adamecz-Völgyi, A. (2020) 'Moving on up: 'first in family' university graduates in England'. *Oxford Review of Education,* 46 (6)*,* pp. 734-751. DOI: https://doi.org/10.1080/03054985.2020.1784714

Higher Education Statistics Agency (2021a) *Higher Education Staff Statistics: UK 2019/20*. Available at: https://www.hesa.ac.uk/news/19-01-2021/sb259-higher-education-staff-statistics. (Accessed: 09 January 2021)

Higher Education Statistics Agency (2021b) *Table 11 - HE student enrolments by domicile and region of HE provider 2014/15 to 2019/20*. Available at: https://www.hesa.ac.uk/data-and-analysis/students/table-11. (Accessed: 17 September 2021)

Higher Education Statistics Agency (2021c) *Table 24 - UK domiciled undergraduate students of known ethnicity by subject area and ethnicity 2014/15 to 2018/19*. Available at: https://www.hesa.ac.uk/data-and-analysis/students/table-24. (Accessed: 20 September 2021).

Higher Education Statistics Agency (2021d) *Who's studying in HE?* Available at: https://www.hesa.ac.uk/data-and-analysis/students/whos-in-he. (Accessed: 17 September 2021)

Hurtado, S., Milem, J. F., Clayton-Pedersen, A. & Allen, W. (1999) *Enacting Diverse Learning Environments: Improving the Climate for Racial/Ethnic Diversity in Higher Education*. Washington D.C.: The George Washington University.

International Energy Agency (2022) *Japan*. Available at: https://www.iea.org/countries/japan. (Accessed: 10 January 2022)

Jazvac-Martek, M. (2009) 'Oscillating role identities: the academic experiences of education doctoral students'. *Innovations in Education and Teaching International,* 46 (3)*,* pp.253-264. DOI: https://doi.org/10.1080/14703290903068862

Jindal-Snape, D. & Ingram, R. (2013) 'Understanding and Supporting Triple Transitions of International Doctoral Students: ELT And SuReCom Models'. *Perspectives in Applied Academic Practice,* 1 (1)*,* pp.17-24. DOI: https://doi.org/10.14297/jpaap.v1i1.39

Khan, Y. & Cowell, J. (2020) *Black applicants least likely to be offered PhD places*. Available at: https://www.bbc.co.uk/news/education-54934953. (Accessed: 27 September 2021)

Klein, C. (2022) *Opinion on future nuclear power generation Japan 2021*. Available at: https://www.statista.com/statistics/1198838/japan-opinion-nuclear-power-future/#:~:text=Opinion%20on%20future%20nuclear%20power%20generation%20Japan%202021&text=According%20to%20a%20survey%20conducted,gradually%20abolish%20nuclear%20power%20generation. (Accessed: 21 July 2022)

Le, T. & Gardner, S. K. (2010) 'Understanding the Doctoral Experience of Asian International Students in the Science, Technology, Engineering, and Mathematics (STEM) Fields: An Exploration of One Institutional Context'. *Journal of college student development,* 51 (3)*,* pp.252-264. DOI: https://doi.org/10.1353/csd.0.0127

Luxon, T. & Peelo, M. (2009) 'Internationalisation: its implications for curriculum design and course development in UK higher education '. *Innovations in Education and Teaching International* 46 (1)*,* pp.51-60. DOI: https://doi.org/10.1080/14703290802646172

Mager, R. F. (1990) *Preparing instructional objectives*. (2nd ed.). London: Kogan Page.

McAlpine, L., Javac-Martek, M. and Hopwood, N. (2009) 'Doctoral student experience in Education: Activities and difficulties influencing identity development'. Available at: http://www.dspace.cam.ac.uk/handle/1810/224921. (Accessed: 28 July 2022)

Milem, J. F. (2003) 'The Educational Benefits of Diversity: Evidence from Multiple Sectors'. In M. J. Chang, D. Witt, J. Jones and K. Hakuta (Eds), *Compelling interest: Examining the evidence on racial dynamics in higher education* (pp.126-169). Stanford: Stanford University Press.

National Careers Service (2021) *Higher education lecturer*. Available at: https://nationalcareers.service.gov.uk/job-profiles/higher-education-lecturerhttps://nationalcareers.service.gov.uk/job-profiles/higher-education-lecturer. (Accessed: 28 September 2021)

OECD (2019) PISA 2018 Results (Volume II): Where All Students Can Succeed. Paris: OECD.

Park, C. (2004). 'The graduate teaching assistant (GTA): lessons from North American experience'. *Teaching in Higher Education* 9 (3), pp. 349-361. DOI: https://doi.org/10.1080/1356251042000216660

Skachkova, P. (2007) 'Academic careers of immigrant women professors in the U.S'. *Higher education,* 53 (6)*,* pp. 697-738. DOI: https://doi.org/10.1007/s10734-005-1976-4

Speedtest (2022) *Speedtest Global Index*. Available at: https://www.speedtest.net/global-index. (Accessed: 18 July 2022)

Teague, R. (2021) *Staff or students? PhD students face the worst of both worlds in lockdown*. Available at: https://www.timeshighereducation.com/blog/staff-or-students-phd-students-face-worst-both-worlds-lockdown. (Accessed: 28 July 2022)

Tyler, A. (1992) 'Discourse Structure and the Perception of Incoherence in International Teaching Assistant's Spoken Discourse'. 26 (4), pp. 713-729. DOI: https://doi.org/10.2307/3586870

UCAS (2020) What happened to the COVID cohort?: Lessons for levelling up in 2021 and beyond. Cheltenham: UCAS.

University of Leeds (2021a) *Online Courses*. Available at: https://inclusiveteaching.leeds.ac.uk/training-development/online-courses/. (Accessed: 19 July 2022)

University of Leeds (2021b) *Staff by ethnicity*. Available at: https://equality.leeds.ac.uk/1-in-9-staff-identify-as-bame/. (Aaccessed: 28 September 2021)

University of Leeds (2021c) *What is a Professor?* Available at: https://professors.leeds.ac.uk/what-is-a-professor/. (Accessed: 28 September 2021)

Watts, J. H. (2009) 'From professional to PhD student: challenges of status transition'. *Teaching in Higher Education,* 14 (6)*,* pp. 687-691. DOI: https://doi.org/10.1080/13562510903315357

Winter, J., Turner, R., Gedye, S., Nash, P. & Grant, V. (2015) 'Graduate teaching assistants: responding to the challenges of internationalisation'. *The international journal for academic development,* 20 (1)*,* pp. 33-45. DOI: https://doi.org/10.1080/1360144X.2014.986661

Yule, G. & Hoffman, P. (1990) 'Predicting Success for International Teaching Assistants in a U.S. University'. *TESOL Quarterly* 24 (2), pp. 227-244. DOI: https://doi.org/10.2307/3586900

The Interplay Between Science Engagement and Science Education

Alexandra Holmes
University of Leeds

Abstract

Through my experience as a postgraduate demonstrator, I have seen that teaching and public engagement are very similar practices; both require the sharing of knowledge and experience and the realisation of benefit. These two practices are often treated as distinct, with little wisdom shared between different practitioners, despite the recent move in education towards engagement-based values. To address this, I focused on implementing pedagogical tools in a series of public engagement sessions that took place online due to COVID-19. These comprised of school talks to students considering studying science at university, with the aim of introducing them to lecture-style classes and active research. My perspectives as a postgraduate during the delivery of these sessions allowed me to identify important or obscure parts of these topics that would be relevant to my audience, and how best to introduce them. Additionally, as a postgraduate researcher, I was able to approach my audiences as a peer, rather than a 'teacher', and encourage more successful engagement. I used several tools such as the BOPPPS (bridge-in, objectives, pre-test, participatory learning activity, post-test, and summary) model for lesson design and took advantage of the online setting through quizzes. These were effective, resulting in an engaged audience and 94% of the students believing biophysics is an interesting area of research following the session when prior to the session 68% had not heard of it, as measured through quiz responses.

Introduction

Science education and science engagement are two sides of the same coin. Both are performed with the goal of providing students or the audience with skills, understanding and appreciation of scientific findings and processes. However, each of these are often viewed as discrete enterprises when it comes to actual education or engagement practice, perhaps due to the relatively modern acknowledgement of science communication and engagement as a discipline (Logan, 2001; Trench and Bucchi, 2010), or perhaps due to the perception of the different requirements needed for formal and informal education (Ainsworth and Eaton, 2010).

Formal education can be summarised as "intentional, organised and structured", whereas informal and non-formal learning are typically seen as less intentional and not following a structured educational intervention, such as a curriculum (Ainsworth and Eaton, 2010: 10). The intentional and organised aspects of formal learning have led to the development of specific ideologies and techniques in science education. Similarly, the field of science engagement has developed its own set of conventions and theories that consider themselves to be distinct from teaching. This can be exemplified by the move away from the "deficit model" (i.e. that the audience is deficient in understanding and must have the information presented to them by an expert) and the adoption of the "dialogue model" (i.e. that the audience has pre-formed conceptions and ideas that can be supplemented by information from an expert, and that the audience can provide information to the expert) (Reincke et al., 2020).

Despite how each of these fields might be viewed, having worked in both and developed my own practices, I believe that considering these as two distinct activities does a disservice to both, particularly as in recent years, education is more explicitly valuing engaged and active learning. This shift in thinking requires innovation and creativity in the development and delivery of teaching activities and will be unfamiliar to some educators. However, pre-existing science engagement techniques could be used as a framework to achieve these educational aims. This illustrates that science education and engagement are united in their objectives and descriptions, which can be seen from the National Coordinating Centre for Public Engagement's definition of public engagement:

> "Public engagement describes the myriad of ways in which the activity and benefits of higher education and research can be shared with the public. Engagement is by definition a two-way process, involving interaction and listening, with the goal of generating mutual benefit."
> (National Co-ordinating Centre for Public Engagement, n.d.)

Many of the aspects of both pedagogy and science engagement should be adopted by practitioners of the other. For example, a formal understanding of how people learn and engage with material is essential for science communicators to meet their aims, and classroom techniques can be exploited to create a familiar environment for audiences. On the other side, there are a wealth of ways in which engagement practices enhance teaching; through promoting creativity, demonstrations and considering the audience's response and interest in the subject.

Through blending my understanding and experience in both of these areas, I developed an innovative strategy to approach and deliver a series of educational sessions for prospective undergraduate students through the STEM outreach team at the University of Leeds. These sessions focused on the research area of my PhD, biophysics, which is where physics and chemistry techniques are applied to the study of biological systems. This case study describes and evaluates

how I combined the strengths and limitations of both practices at every stage of the project, to provide a successful learning intervention for 6 classes of students, which can hopefully be used to inspire practitioners in each of these fields to broaden their approaches.

Project Specifications

In my role as a postgraduate demonstrator, I was invited to plan and perform a number of learning activities through STEM@Leeds, the STEM outreach team at the University of Leeds. The primary activities for this case study were aimed at A-Level students considering Higher Education study to introduce them to university-style teaching and an area of active research. These activities were scheduled to be hour long online sessions due to the COVID-19 pandemic. I worked with the organisations Generating Genius, which supports BAME students pursue STEM careers, and In2Science, which promotes social mobility and diversity in STEM, and Huntington High School, York.

At A-Level, students do not necessarily study all scientific subjects. However, if they studied biology, they should be familiar with the concepts of cells and their structure, including membranes, and proteins and their role as enzymes. In chemistry, their knowledge should cover the structure of amino acids and their physics education should have introduced them to Newton's laws of motion, including dynamics and energy (Department for Education, 2014), all of which are important for understanding the content of the biophysics material I would be teaching them.

Here, I will discuss how each stage of developing and delivering pedagogical or public engagement activities is approached in education and engagement contexts to highlight their differences or similarities, and how I have unified them to achieve a combined method for aim and objective mapping, session planning, activity delivery, assessment, and evaluation.

Generally, the planning of public engagement and teaching activities follows a similar path of defining the aims, aligning these to specific objectives and then developing activities to meet the objectives through engaging different levels of knowledge and enquiry (Hundey et al., 2016; Wolf, 2007). However, in my own exposure to science communication, there has been less emphasis on using scholarship and theory to guide the planning of activities or mapping of objectives. Instead, rubrics such as the General Impact Framework (Kuruvilla et al., 2006) are commonly used, which focus on the broad impact types, such as "conceptual" (i.e. communicating scientific meaning and concepts), "instrumental" (i.e. influencing policy) and "capacity building" (i.e. altering behaviour and teaching skills), matched to outcomes such as "inspiring wonder", "provoking challenge" or "empowering" the intended audience. Although teaching objectives can fall into the same framework as this, there tends to be a more extended process for aim and objective development, as outlined by Moon (2002). The aim provided to me by STEM@Leeds was to introduce the students to research-based teaching, and so I translated this aim into two objectives: to introduce the students to university-style lecturing and an area of active research they may not be familiar with. In terms of public engagement outcomes, this covered both 'conceptual' and 'capacity building' impacts, in that I aimed to articulate scientific concepts and methods to them and teach them skills need for university-style lectures, with the overall hope of leading them towards higher education.

Session Planning

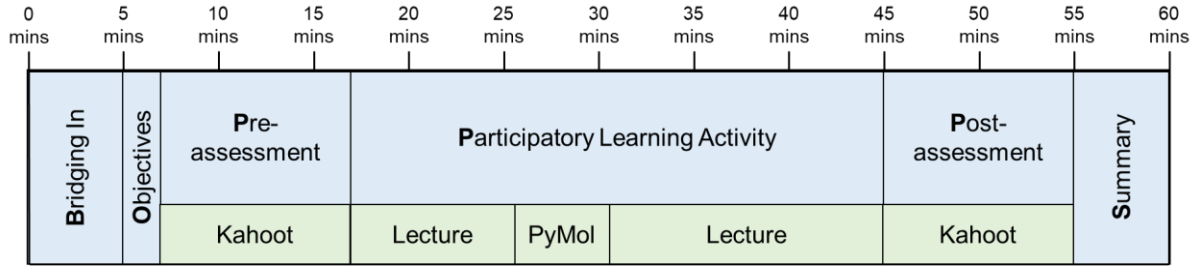

Figure 1. The Session Outline as Developed Using the BOPPPS Model. The order and timings of the sections of the BOPPPS model (light blue) alongside the digital component the students interacted with (light green).

Session design can differ substantially between outreach and educational activities, as outreach activities can have many different formats which are not necessarily experienced simultaneously by each audience member. For example, events I have contributed to through Pint of Science, an international science festival that brings science to informal settings, can involve multiple talks with 'free time' between them to engage in science-based games, or 'carousel-based' formats where the audience moves from stall to stall as at science festivals. Traditionally, teaching tends to rely on moving through the subject matter together to cover the content and ensure all the objectives are met, although the move to online teaching has allowed more exploration of asynchronous learning (Brady and Pradhan, 2020), albeit typically with a pre-determined order of content.

To unite these different aspects, I chose to use the BOPPPS model to structure my sessions (Pattison and Day, 2006). The BOPPPS model consists of bridging into the topic area, outlining the objectives of the session, a pre-test, followed by a participatory learning activity, a post-test and a summary section (Pattison and Day, 2006) (Fig. 1). I felt that this choice was a creative way of merging education and engagement while maintaining the best aspects of each. The sequential tasks allow for the educational journey to be preserved, whereas the division of the session into specific tasks and activities allows students to opt in and out of certain elements then join as the next activity starts, much like a science engagement activity. Additionally, as this was screen-based work and the attention span for this format is much shorter than in traditional classroom environments (Brame, 2016), I hoped that adopting a model that lends itself to multiple shorter sequential activities would keep the students engaged throughout the session.

Activities

'Bridging into' the topic is a term used in educational contexts but despite not often being explicitly named, it is a concept not uncommon in science engagement practice. Understanding the pre-existing knowledge of the audience is essential for engaging them and identifying any misconceptions the person delivering the session might be able to address. Biophysics is not taught at A-level, or typically at undergraduate level. Bridging into the area from physics and biology helped the students engage with what might have otherwise been an unfamiliar subject. Although this research may not have been of particular interest for all students, I explained that during courses you might be exposed to different topics and need to be able to extract the relevant information. Much like in other outreach activities, I saw that bridging in led to increased confidence in the

students, as they asked insightful questions rather than assuming they had no underlying knowledge.

An innovative part of my session design was the use of Kahoot! quizzes to bridge into the biophysics topic area, perform the assessments and evaluate whether the objectives were met. Kahoot! is a game-based learning platform where students join a pre-designed quiz consisting of multiple choice, free-typing, puzzle, polling and word-cloud questions (Licorish et al., 2018; Wang and Tahir, 2020). These questions can be summative (i.e., give the student points and be marked right or wrong), or formative (i.e., provide information to the group and educator). Alongside the correct choice, the speed of the answer can contribute to the students' ranking on an anonymised scoreboard. I chose to use Kahoot! as the use of gamification is increasing in education (Dichev and Dicheva, 2017), and can engage students with an unfamiliar topic and motivate them to pay attention throughout the session (Licorish et al., 2018; Wang and Tahir, 2020). I designed each of the two Kahoot! quizzes to have up to 5 questions with a mixture of formats and topics covered in the session (Table 1). This activity was very well received by the students and the results are discussed in the evaluation section of this case study.

Pre-assessment			
Question	**Question type**	**Answers (correct in bold)**	**Aligned skill from Bloom's taxonomy**
Where are you from?	Free typing	-	-
What is your favourite science subject at school?	Poll	Biology	-
		Chemistry	
		Physics	
		Maths	
What does *E. coli* stand for?	Multiple choice	**Escherichia coli**	-
		Ewwww coli	
		Esherricha coli	
		Elegans coli	
Who discovered what DNA looks like?	Multiple Choice	Holmes and Watson	-
		Watson and Crick and Franklin	
		Dorothy Hodgkin	
		Jiminy Cricket	
What do you think of "biophysics"?	Free typing	-	-

Post-assessment			
Question	**Question type**	**Answers (correct in bold)**	**Aligned skill from Bloom's taxonomy**
Which of these isn't a potential way of using this research technique?	Multiple choice	**Studying slow cellular processes**	Remember and understand
		Developing drugs	
		Predicting protein properties	
		Studying solutions and mixtures	
How would you set up a membrane protein simulation?	Drag and drop ordering	1. Take the protein coordinates 2. Add water, salt and lipids 3. Apply Newton's laws of motion 4. Mix in a supercomputer	Remember and apply
Which of these should be a researcher priority?	Poll	Malaria, as it is the most deadly	Analyse and evaluate
		Toxoplasmosis, as it is the most widespread	
		Leishmaniasis, as it can take years to heal from even mild forms	
		Trypanosomiasis, as infection of livestock can impact food security	
What do you think of "biophysics"?	Free typing	-	-

Participatory Learning Activity

The learning activity was initially a lecture delivered through screen-sharing a PowerPoint, with the option for students to ask questions throughout, either directly to me or in the general chat feature. This was made up of an introduction to myself and my journey into higher education, an introduction to biophysics drawing on biology and physics concepts from secondary school education, followed by an example of one of my research findings. Here was where the interplay between science education and engagement was very instrumental, as often lectures are designed to get across the necessary information and act as a resource for further solo study. In this instance, however, the students would not be required to review the information at a later date, therefore more science communication style strategies could be used, as described below, which could be applied to other lectures and topics.

Story-telling techniques are an incredibly useful technique in science engagement, as they have been shown to increase the retention of scientific detail and concepts (Dahlstrom, 2014), as well as create a rapport between the audience and the presenter (Riedlinger et al., 2019). I used these techniques throughout my talk to introduce detail and obstacles, as well as keep the information in a

clear narrative. For instance, rather than describe the progress of the research project I worked on, I framed myself as the central character and described my feelings, experiences and personal progress through the projects using a narrative arc (Joubert et al., 2019). This is novel in educational settings, as the relationship between the presenter and the audience is often not as well explored, and there is often less emphasis on two-way communication (Ainsworth and Eaton, 2010). However, establishing and maintaining a rapport, for instance through personal stories, is essential for engagement as the barrier between a supposed expert and the audience is reduced (Maddalena and Reilly, 2018). I used this style throughout my learning activity. When discussing more abstract findings, I used analogies where the components were framed in narrative style, for example casting specific proteins as protagonists, antagonists, or helpers to provide a different style of content delivery.

After running this activity for the first time, I realised the central "participatory learning activity" was too long as attention in the students reduced and the scores in the quiz questions on the later topics were lower. Therefore, I modified my materials and plan for the later sessions by introducing a section in the middle of the lecture where I changed computer programmes to PyMol (DeLano, 2002) and explored a 3D protein structure with the students to maintain engagement. I also modified some of my slides to keep them accessible. This improved the quiz answers and I saw increased communication in the chat, indicating maintained attention.

Assessment

Assessment is a major component of education as the majority of formal learning interventions are in preparation for examination of the students' knowledge (Ainsworth and Eaton, 2010). Although not every assessment is summative and leads to a grade or qualification, every test is useful for students to understand their attainment and receive feedback on how to improve. As feedback is a cornerstone of education, it was easy to draw on the extensive research into assessment and feedback principles to shape these sessions (Sadler, 1989; Voelkel et al., 2020). However, in science engagement, assessment of the audience's understanding is very rare as the intended impacts do not encompass gaining specific understanding, and so there is minimal assessment-based scholarship to draw on. The assessment of this session fell more into engagement-based needs, as there is no final summative exam. Rather, I wanted to understand whether the session had effectively introduced the students to university-style lectures and an area of active research. Therefore, a true blending of approaches could take place, including education-based assessment and feedback techniques, but 'disguising' these in a fun and engaging format that felt more enjoyable than formal assessment.

In this work, the primary mode of assessment was embedded into the Kahoot! quizzes. These were particularly valuable in this kind of session as they are quick and provide instant correct or incorrect feedback and an indication of how many of their peers answered similarly. As the majority of the questions were multiple-choice, it initially seemed that it would be difficult to assess the higher order skills in the students as defined by Bloom's taxonomy (apply, analyse, evaluate, create) (Bloom et al., 1956). However, I followed the work of Atkinson and Meadows (2018) and wrote my questions to assess higher order skills through a mixture of question types (Table 1). Firstly, using scenario-based question stems, such as "how would you put together a membrane protein simulation?" so the students needed to apply their biology knowledge and remember simulation details. Secondly, I used data-based questions where I provided disease prevalence and mortality data and asked which could be a highest research priority. To answer this question, the students had

to analyse the data and evaluate the reason for priority. Their response to these questions was positive, and it guided some of their later discussion about long-term research impact.

Evaluation

Both science communication and education rely heavily on evaluation to assess how well the objectives and aims of the sessions have been met. Traditionally, these take the form of feedback sheets and surveys with the option of feedback (Ziegler et al., 2021). However, these methods often have a low uptake and return rate compared to the number of individuals who have engaged in it (Jones et al., 2013). This can be detrimental to the continued development of the session, as it can lead to overrepresentation of a limited number of viewpoints. I somewhat overcame this by embedding the evaluation into the online quiz. Many of the aspects that make Kahoot! a good assessment platform are also valuable for evaluation, for example, through the use of anonymity. In the pre- and post-tests, I used free-typing questions to ask what the students thought of biophysics to evaluate whether I had met my objective of introducing them to a current research-area. I also used the results from the quiz questions to gauge if the information was presented well enough to allow the students to get the right answers.

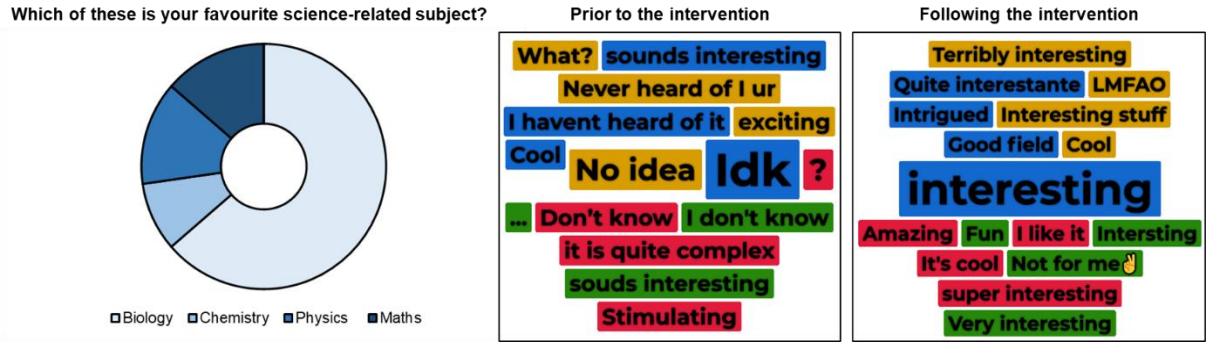

Figure 2. The Opinions of the Students on Different Science Subjects. Kahoot! was used to ask the students which their favourite science-related subject was using a poll style question, and their responses to a free-typing question asking their thoughts on biophysics as a research area before and after the session were recorded and intended for thematic analysis.

The free typing questions with the prompt of "what do you think of biophysics?" were intended for thematic analysis, but there was a large amount of consistency in the results, so quantitative analysis methods were used. The responses showed that 68% of the students had not heard of biophysics prior to the session. Comparatively, 94% of the students indicated that they thought biophysics was an interesting area of research following the lecture (Fig. 2). This was particularly remarkable, as prior to the session, only 13.6% of the students indicated that physics was their favourite science-related subject (13.6% maths, 9.1% chemistry and 63.6% biology), and therefore I did not anticipate that so many would be engaged by the material. Understanding the interests of the students may have been an integral part of this success as I was able to tailor my delivery to the majority of the students by emphasising the biological aspects of the research once I knew that the majority favoured this subject. This is another area from which education practice can learn from science engagement as it is typically guided by the interests of the audience as opposed to the objectives.

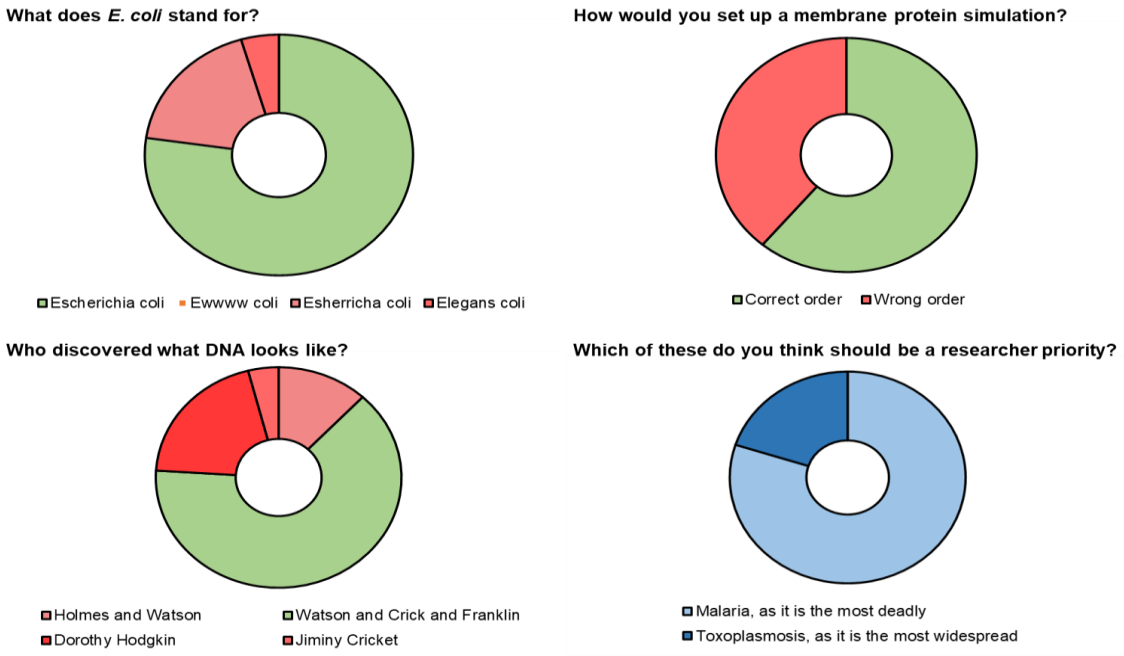

Figure 3. The Results of the Post-Assessment Questions. Kahoot! was used to assess the students following the participatory learning activity. The green regions on the right-hand side of the graphs are used to indicate a correct response from the students, whereas red is used for incorrect answers. Blue is used for informative rather than summative questions.

The assessment of the students also allowed further evaluation of the session (Fig. 3), as their attainment indicated what topics and skills were the best understood by the students. The questions "what does E. coli stand for?" and "who discovered what DNA looks like?" assessed the understanding and remembering skills of the students. The attainment was very high for these questions with 77.3% of students picking Escherichia coli and 64% selecting Watson, Crick and Franklin. However, these are topics that are likely to be covered during their schooling and so it isn't clear if these high marks were due to my instruction or prior knowledge. The question "how would you set up a membrane protein simulation?" relied on knowledge gained from my session. That 61.1% of students answered correctly indicates that they remembered details and were able to apply them to the situation posed in the question. The success rate of this question was lower than the prior two which may be due to the unfamiliar content and the higher-order skills being assessed, but the high attainment indicates that students were able to engage with the new information presented to them. Finally, the question "which of these do you think should be a researcher priority?" assessed the students evaluating and applying skills as they had to interpret mortality and prevalence data and the reasoning presented to them. This was not marked "right" or "wrong" as all the options were subjective, but it was interesting to see the mortality be rated as a higher priority than prevalence, which was used to inform future sessions to focus the materials and content on the biological relevance of the topic area.

Limitations

These findings demonstrate how engagement techniques can be combined with educational practice to achieve module outcomes, while prioritising the interests of the students. However, this evaluation strategy was limited as it was primarily quantitative and so did not provide me with substantial understanding of the student's thoughts and experience of the session. Additionally, the qualitative information from the free-typing questions were not particularly detailed, either due to lack of specificity in responses or short answers from the students. Therefore, it is difficult to understand which activities or topics were most engaging or which could be improved and which strategies were most useful for the students. For a better understanding of most engaging activities and topics, and of most useful strategies for students, free-typing questions might not be the best ways to get feedback. More structured questions would be more effective for this purpose. Additionally, the limited access to students from external institutions and the limited number of attendees meant reduced opportunities to follow up on any of the insights from the feedback with the students. In future, when applied to undergraduate students of my own institution, the strategy used in this work will be adapted by taking a mixed methods approach to enhance the qualitative data collection, perhaps through combining focus groups or interviews and the in-session feedback.

Concluding thoughts

The integration of science education and engagement practices is an emerging, yet successful strategy for the planning, delivery, assessment, and evaluation of teaching sessions. Incorporating aspects of both, from more structured and scholarship-based elements of pedagogical practice alongside the more flexible, informal techniques used in science communication, led to teaching interventions that were simultaneously engaging and interesting for students, while equipping them with higher-order skills and information for their subject area. Although these sessions were held with A-level aged students, these techniques could be applicable in other educational settings and I hope that these findings encourage others looking for ways to expand their practice into more engagement-focused teaching approaches.

References

Atkinson, M and Meadows, K.N. (2018) Writing Multiple-Choice Questions to Assess Higher Order Thinking. Available at: https://teaching.uwo.ca/pdf/programs/Writing-Higher-Order-MCQ-Fall-2018.pdf [Accessed 15 November 2019]

Ainsworth, H. & Eaton, S. (2010) *Formal, non-formal and informal learning in the sciences*. Calgary: Onate Press.

Anon n.d. What is public engagement? National Co-ordinating Centre for Public Engagement. Available at: https://www.publicengagement.ac.uk/about-engagement/what-public-engagement [Accessed 1 September 2022]

Bloom, B.S., Engelhart, M.D., Furst, E.J., Hill, W.H. & Krathwohl, D.R.A. (1956) *Taxonomy of Educational Objectives The Classification of Educational Goals.* New York David McKay.

Brady, A.K. & Pradhan, D. (2020) Learning without Borders: Asynchronous and Distance Learning in the Age of COVID-19 and Beyond. *ATS Scholar*, 1(3), pp.233–242. DOI: 10.34197/ats-scholar.2020-0046PS

Brame, C.J. (2016) Effective educational videos: Principles and guidelines for maximizing student learning from video content. *CBE Life Sciences Education*, 15(4), es6.1-es6.6. DOI: 10.1187/cbe.16-03-0125

Dahlstrom, M.F. (2014) Using narratives and storytelling to communicate science with nonexpert audiences. *Proceedings of the National Academy of Sciences of the United States of America*, 111(supplement_4), pp.13614–13620. DOI: 10.1073/pnas.1320645111

DeLano, W. (2002) Pymol: An Open-Source Molecular Graphics Tool. *CCP4 Newsletter On Protein Crystallography*, 40.

Department for Education. (2014) GCE AS and A level subject content for biology, chemistry, physics and psychology. *National curriculum*, (April), p.11.

Dichev, C. & Dicheva, D. (2017) Gamifying education: what is known, what is believed and what remains uncertain: a critical review. *International Journal of Educational Technology in Higher Education*, 14(1), p.9. DOI: 10.1186/s41239-017-0042-5

Hundey, E.J., Olker, J.H., Carreira, C., Daigle, R.M., Elgin, A.K., Finiguerra, M., Gownaris, N.J., Hayes, N., Heffner, L., Roxanna Razavi, N., Shirey, P.D., Tolar, B.B. & Wood-Charlson, E.M. (2016) A Shifting Tide: Recommendations for Incorporating Science Communication into Graduate Training. *Limnology and Oceanography Bulletin*, 25(4), pp.109–116. DOI: 10.1002/lob.10151

Jones, T.L., Baxter, M. & Khanduja, V. (2013) A quick guide to survey research. *Annals of the Royal College of Surgeons of England*, 95(1), pp.5–7. DOI: 10.1308/003588413X13511609956372

Joubert, M., Davis, L. & Metcalfe, J. (2019) Storytelling: the soul of science communication. *Journal of Science Communication*, 18(5), E. DOI: 10.22323/2.18050501

Kuruvilla, S., Mays, N., Pleasant, A. & Walt, G. (2006) Describing the impact of health research: A Research Impact Framework. *BMC Health Services Research*, 6(1), p.134. DOI: 10.1186/1472-6963-6-134

Licorish, S.A., Owen, H.E., Daniel, B. & George, J.L. (2018) Students' perception of Kahoot!'s influence on teaching and learning. *Research and Practice in Technology Enhanced Learning*, 13(1), p.9. DOI: 10.1186/s41039-018-0078-8

Logan, R.A. (2001) Science Mass Communication: Its conceptual history. *Science Communication*, 23(2), pp.135–163. DOI: 10.1177/1075547001023002004

Maddalena, K. & Reilly, C.A. (2018) Dissolving the Divide between Expert and Public. *In*: *Scientific Communication*. Routledge, pp.219–238. DOI: 10.4324/9781315160191-11

Moon, J. (2002) *The Module and Programme Development Handbook: A Practical Guide to Linking Levels, Outcomes and Assessment Criteria*. Taylor & Francis Group.

Pattison, P. & Day, R.W.C. (2006) Instructional Skills Workshop (Isw) Handbook For Participants. Available at: https://www.algonquincollege.com/profres/files/2013/11/Instructional-Skills-Workshop-ISW-Handbook-for-Participants1.pdf [Accessed 15 November 2019]

Reincke, C.M., Bredenoord, A.L. & van Mil, M.H. (2020) From deficit to dialogue in science communication. *EMBO reports*, 21(9), p.e51278. DOI: 10.15252/embr.202051278

Riedlinger, M., Metcalfe, J., Baram-Tsabari, A., Entradas, M., Joubert, M. & Massarani, L. (2019) Telling stories in science communication: Case studies of scholar-practitioner collaboration. *Journal of Science Communication*, 18(5), p.N01. DOI: 10.22323/2.18050801

Sadler, D.R. (1989) Formative assessment and the design of instructional systems. *Instructional Science*, 18(2), pp.119–144. DOI: 10.1007/BF00117714

Trench, B. & Bucchi, M. (2010) Science communication, an emerging discipline. *Journal of Science Communication*, 9(3), pp.1–5. DOI: 10.22323/2.09030303

Voelkel, S., Varga-Atkins, T. & Mello, L. V. (2020) Students tell us what good written feedback looks like. *FEBS Open Bio*, 10(5), pp. 692–706. DOI: 10.1002/2211-5463.12841

Wang, A.I. & Tahir, R. (2020) The effect of using Kahoot! for learning – A literature review. *Computers and Education*, 149, pp. 1-22. DOI: 10.1016/j.compedu.2020.103818

Wolf, P. (2007) A model for facilitating curriculum development in higher education: A faculty-driven, data-informed, and educational developer–supported approach. *New Directions for Teaching and Learning*, 112, pp. 15–20. DOI: 10.1002/tl.294

Ziegler, R., Hedder, I.R. & Fischer, L. (2021) Evaluation of Science Communication: Current Practices, Challenges, and Future Implications. *Frontiers in Communication*, 6, pp. 1-6. DOI: 10.3389/fcomm.2021.669744/full

Teaching Research Skills from a distance – reflections of an international student and PGR

Johanna Tomczak
University of Leeds

Abstract

Research Skills are a core module in the undergraduate psychology curriculum at the University of Leeds. Before the COVID-19 pandemic, all teaching sessions took place on campus, from big groups for lectures to small groups (up to 12 students) for seminars. With the outbreak of the coronavirus, these moved online and I, as a seminar leader, found myself facilitating learning sessions in research skills from a distance. In this article, I will reflect on my experience of delivering these seminars online as both an international student and a postgraduate researcher. With this double lens in mind, I will consider interactions between students and myself, the sense of belonging and the role of feedback in the online learning process. While facilitating the 'Research Skills' small-group sessions did not leave me a lot of freedom in designing my own seminar, I managed to get students to collaborate on specific tasks, give comprehensive feedback on their assignments and provide them with material they could work through in their own time. In a time where students were physically distanced, my approach helped to create a sense of community to enhance students' learning experience.

Introduction

The COVID-19 pandemic and the following lockdowns caused universities all over the world to review and reorganise their teaching and learning to be carried out online (Arday, 2022). This brought several challenges for everyone involved, from students to tutors to postgraduate teaching assistants. Indeed, the latter, who find themselves in the liminal space between students and established academics, often play a major role in the delivery of undergraduate and postgraduate teaching (Compton & Tran, 2017), but their voices are rarely included when it comes to judging the effectiveness of Higher Education teaching and the fostering of a learning community for students. In this reflective piece of writing, I position myself as an international postgraduate researcher teaching at undergraduate level at the University of Leeds, both before and during the pandemic. First, I will analyse my own context, before reflecting on how this has informed my approach towards learning and teaching. Finally, I will emphasise the role feedback plays in the student learning experience and how this was, in my case, influenced by the fact that all teaching was delivered online for the 2020-2021 cohort of undergraduate students in the School of Psychology.

Student, researcher and teacher

As argued in Tomczak (2021), the term 'PhD student' might only describe part of the truth for postgraduate researchers. While, strictly considered, PhD students are still 'students', learning how to do research, they are also already 'researchers' and as I argue in this article, they are also 'teachers' in their role in undergraduate and postgraduate teaching. Our position in that way is unique, as both learning and teaching are part of our daily responsibilities, and we can use our own and current learning experience to inform our own and current teaching practice. In my case, this point of view enabled me to think about the research topic I chose for my PhD as an example and inspiration for the first-year undergraduate students I was teaching. Indeed, several students were very interested in hearing about my research and approached me to ask questions about it, which they probably would not have been able to do with their lecturers and tutors. As Dolan and Johnson (2010) stated, undergraduate students perceive postgraduate students as more approachable than more senior members of the faculty. This observation might not even be linked to the person who teaches their class, but more to the class itself, as postgraduate researchers usually facilitate small group sessions that allow for more interaction and rapport between the teacher and the students. To me, it was important to give my students the opportunity to have someone to talk to about research in general, but also about their studies and provide sufficient time for questions. As suggested by Aktar and Oxley (2019), bringing research to the classroom can have a positive effect on student engagement, as learners are able to see how knowledge is generated and become more motivated to engage in research activities themselves. At the same time, I was able to understand what my students were dealing with – starting their studies of psychology and living a more independent life away from their families – as the time when I started my studies was still very fresh in my mind.

Having been able to do a German Abitur and a French Baccalaureate (both A-level equivalents) in Germany, it allowed me to use my language skills further and start my undergraduate degree in France. Three years later, after successful completion, I moved to Leeds in 2019, where I started my PhD and teaching in the Research Skills 1 and 2 modules at the School of Psychology at the same time. Having experience of these three different educational systems has contributed largely to my own understanding of Higher Education and the atmosphere I want to create in my classroom for an ideal student learning experience. Besides, I was able to inspire students to look out for tangible opportunities internationally, which they may not have thought about before. A few students thanked me for this perspective I allowed them to take and have decided to study a year abroad during their degree. As Elliott and Marie (2021) suggest, postgraduate researchers who teach find themselves in a place where they can best navigate between the positions of staff and students. This

was exactly my experience, as being responsible for a group of students allowed me to grow into the role of a teacher, although I still considered myself a student.

Delivering Research Skills online

From 2019 to 2022, I taught first-year undergraduate psychology students as a seminar leader in the Research Skills 1 and 2 modules. These modules combine lectures and practicals (both taught by senior academics), computer-based learning sessions (taught by postgraduate teaching assistants) and seminars (taught by postgraduate researchers). While the lectures concentrate on research methodology and statistics, the practicals give students the opportunity to carry out a simple research study. Students then hand in a report (similar to a short journal article) about the study they carried out and the data they analysed. Seminars take place a week before a report is due as a final opportunity for students to talk about methods and rationale of the study and to review relevant content from their recent lecture for their report.

After almost a year of teaching on campus, these small-groups sessions were delivered entirely online and I, as a postgraduate teaching assistant, had to find a way of delivering the same content, without forgoing the standard of the interactions and discussions in the in-person seminars. The School of Psychology asked us to facilitate the monthly seminars on Microsoft Teams and while we were given the content to cover during these sessions, there was always time allocated for questions and discussions. To engage students and enhance their learning experience, Colaiacomo and Havemann (2022) suggest collecting ideas for activities and interactive workshops from the students, which can be found on their blog referenced in their article. However, simply communicating with students, being compassionate and human, and actively building relationships with them can already have a positive impact on their engagement and even raise their marks (Glazier, 2021).

To create the space for reflection, I asked my students at the beginning of the academic year 2020/2021 to share with the class in the chat any aspects of their studies they were particularly looking forward to and any aspects they were particularly worried about. While I was happy to see that the students were excited about some subjects, I was more interested in their fears, as these would give me a good idea of how I could support them best, even from a distance. As shown in past literature (Macher et al., 2012), students were mostly concerned about their upcoming statistics classes and felt they would not be good enough to pass this module. They told me about their computer-based learning sessions and how difficult it was for them to use the statistical software SPSS to answer their research questions designed by their tutors.

The Research Skills seminars were delivered in preparation of several research reports which students had to hand in for me to mark. As the module progressed, students were asked to move from descriptive statistics to the use of inferential statistics. While the statistical knowledge and skills were covered mainly during the lectures of the same module, the first aim of the seminar was to create a place where students could ask questions about anything they had not understood, in order to be able to confidently write their reports. To facilitate the discussion between them and encourage the more introverted students to communicate with each other, I regularly used the break-out room function of Microsoft Teams. This enabled students to work in small groups in separate virtual rooms, where they could discuss their questions with their peers, before we would come back to the 'main room' and I would help with any remaining questions.

On a more theoretical level, according to Marton and Säljö (1976), there are two ways of engaging with new, difficult concepts: a surface-level processing and a deep-level processing. As suggested by these terms, a surface-level processing only concentrates on recalling as much information as possible, whereas a deep-level processing enables students to understand mechanisms behind

concepts through reflection. To complete Marton's and Säljö's theory, Entwistle (1988) added a strategic approach to learning, which he described as the "hope for success" which allows students to navigate between the deep and surface learning approaches for more efficient outcomes. During my seminars, I encouraged students to use a deep approach to learning, which has been shown to increase their success of reaching learning outcomes (Gibbs & Coffey, 2004), by minimising the time they have to listen to me, but instead help them to work through material independently or only with the help of other students. In an online context, this often included some ice-breaking before we could start activities in small groups, as students were hesitant to talk to each other. I would join students in the break-out rooms, introduce them to each other and help facilitate the communication to start with. By listening carefully to their questions at the end of group activities, as Marton and Säljö (1976) did when asking students to describe their learning process, I was able to tell when students engaged on a deep level with the content of the seminar or when I needed to prompt them further.

The first aim of the seminars, as described above, was to make sure students had access to all the resources they needed to write their next research report and give them a place to ask questions. The second aim was to reflect on any feedback students had received on their last research report and in the next section of this reflective piece, I will discuss my own approach to providing feedback.

Assessment and Feedback

As someone receiving regular feedback on written work from my supervisors, I had my own ideas of what constructive feedback should look like and how it should be delivered. I knew it had to be both encouraging but also challenge students to go beyond what they had already learned. This process called 'scaffolding' was first theorised by Wood et al. (1976), who described how an adult, or 'expert', could help facilitate learning by choosing an activity that goes just beyond of what a child, or the less experienced person, would be capable of doing. In my teaching role, I was responsible for marking students' reports in their Research Skills 1 and 2 modules (three reports per semester) but did not take part in the process of designing these assessments and their marking criteria. However, I used every opportunity I had during seminars to provide students with feedback about their work in class, in addition to the more formal feedback for their reports. For the assessment of the reports, all postgraduate researchers teaching the seminars received specific training at the beginning of the semester by marking an example report and comparing their feedback. From my own experience, I knew that written and asynchronous feedback was received in a different way than oral and synchronous feedback (be it face to face or from a distance). While written feedback can be misunderstood, misleading or just appear quite negative, oral and synchronous feedback gives students the opportunity to ask for clarification by turning it into an activity for the entire class. In my own experience, it also allowed me as the teacher to reconsider my wording, to make sure to always include some positive feedback and to pay attention to how students received the feedback in general. For this reason, I took additional care of planning enough time for group feedback during the seminar and giving students the time to reflect on feedback.

Brown (2005: 82) claimed that assessment and feedback, as part of a continuous progression for students, "should be learner-centred […] and should reflect a learner-centred curriculum" and should create opportunities for tutors to provide constructive feed-forward comments on the learners' achievements. Part of the assessment of students' reports involved assessing the amount and choice of literature they used to support their argument, and allowed for a lot of variability between students. In addition, as the HEA (2017: 15) suggested, I provided students with an 'educational rationale', which explained how and why they were going to be assessed and how this feeds into their general curriculum.

For the academic year 2020/2021, the School of Psychology started using a reflective feedback sheet for students' reports, where they were asked to copy feedback they had received previously, reflect on how they addressed these points and asked them which aspect of their report they would particularly value feedback on. In my seminars, I noticed that the students who engaged with it generally made more progress during the module, as they were encouraged to review feedback from their last report and think critically about it, before submitting their next piece of work. This observation is in line with the findings of Harris et al. (2022), who claim that the implementation of this type of feedback sheet is perceived as a positive change by students, due to its reflective nature. While this feedback sheet was not assessed, I insisted that students should include it in their report, in order for them to better engage with, and reflect on, received feedback. Compared to the previous year, where this feedback sheet was not used, I noticed more students were able to answer their own questions independently, by engaging with the reflective feedback sheet and they were less reliant on the educator's support.

Conclusion

To conclude, I would like to argue that the move to online teaching was not only a challenge, but also an opportunity to question and adjust our teaching practice in Higher Education. Indeed, whether the future of learning and teaching is campus-based or online-based, educators should apply the same theories to the learning environment we want to create. Communication between students and between tutors and students is essential for a healthy learning environment, be it face to face or online, as this enables students to learn from their peers and to further engage with feedback respectively. Through my own experience as a student, researcher and teacher, I was able to create a learning community for students, where they felt connected enough to talk to each other, solve problems and answer questions in groups, and reflect on feedback regularly.

References

Aktar, T., & Oxley, L. (2019) Promoting student engagement by strengthening the link between research and teaching in Higher Education: an early career researcher perspective. *Higher Education Pedagogies*, 4(1), pp. 167-179, DOI: 10.1080/23752696.2019.1669205

Arday, J. (2022) COVID-19 and higher education: The Times They Are A'Changin. *Educational Review*, 74(3), pp. 365-377. DOI: 10.1080/00131911.2022.2076462

Brown, S. (2005) Assessment for learning. *Learning and Teaching in Higher Education*, 1, pp. 81-89.

Colaiacomo, S., & Havemann, L. (2022) IDEAS (Inspirations for Digital Engagement Activities) to support the teaching practice of early career academics. *Postgraduate Pedagogies*, 2(1), pp. 156-171.

Compton, M. & Tran, D. (2017) Liminal space or in limbo? Post Graduate Researchers and their personal pie charts of identity. 10(3), pp. 1-14. DOI: https://doi.org/10.21100/compass.v10i3.620

Dolan, E. L. & Johnson, D. (2010) The Undergraduate–Postgraduate–Faculty triad: Unique functions and tensions associated with undergraduate research experiences at research universities. *Life Sciences Education*, 9(4), pp. 543-553. DOI: 10.1187/cbe.10-03-0052

Elliott, M. I. & Marie, J. (2021) GTAs, Representation, and Student-Staff Partnership Work. *Postgraduate Pedagogies*, 1(1), pp. 71-90.

Entwistle, N. & Waterston, S. (1988) Approaches to studying and levels of processing in university students. *British Journal of Educational Psychology*, 58, pp. 258-265. DOI: https://doi.org/10.1111/j.2044-8279.1988.tb00901.x

Gibbs, G. & Coffey, M. (2004) The impact of training of university teachers on their teaching skills, their approach to teaching and the approach to learning of their students. *Active Learning in Higher Education*, 5(1), pp. 87-100. DOI: 10.1177/1469787404040463

Glazier, R. (2021) Making Human Connections in Online Teaching. *PS: Political Science & Politics*, 54(1), pp. 175-176. DOI:10.1017/S1049096520001535

Harris, R., Blundell-Birtill, P. & Pownall, M. (2022) Development and evaluation of two interventions to improve students' reflection on feedback. *Assessment and Evaluation in Higher Education*, pp. 1-14. DOI: 10.1080/02602938.2022.2107999

HEA (2017) *Assessment and feedback in higher education – a review of literature for the Higher Education Academy*. York, Higher Education Academy.

Macher, D., Paechter, M., Papousek, I. & Ruggeri, K. (2012) Statistics anxiety, trait anxiety, learning behavior, and academic performance. *European Journal of Psychology of Education*, 27, pp. 483-498. DOI 10.1007/s10212-011-0090-5

Marton, F. & Säljö, R. (1976) On qualitative differences in learning: I – Outcome and Process. *Educational Psychology*, 46(1), pp. 4-11. DOI 10.1111/j.2044-8279.1976.tb02980.x

Tomczak, J. (2021) Transforming and being transformed – an eclectic learning journey. *Sentio*, (3), pp. 90-92.

Wood, D., Bruner, J. & Ross, G. (1976) The role of tutoring in problem-solving. *Journal of Child Psychology and Psychiatry*, 17(2), pp. 89-100. DOI: https://doi.org/10.1111/j.1469-7610.1976.tb00381.x

‘Give me a minute, I just need to put you into your groups’: transferring group activities to the online space using breakout rooms

Gemma Carr
University of Leeds

Abstract

Transitions to online learning as a result of the COVID-19 pandemic challenged how group-based activities were delivered. This paper explores how a quantitative social research design project allowed insights into digital pedagogy. Transition to group working in breakout rooms required planning to be centred on an imagined student learning experience. As a Graduate Teaching Assistant (GTA), this included understanding the dynamics by group, supporting learning in the digital space, presenting accessible materials, facilitating the learning process across multiple groups, and (re)planning teaching sessions successfully for the online milieu. Breakout rooms are dispersed digital learning spaces and were in use at a time when students were experiencing significant declines in mental health, challenges with digital exclusion, disengagement, and a lack of online confidence in peer-to-peer relationships (Peper et al., 2021; Savage et al., 2020). Addressing these key factors required a more student-centred planning approach, based on individual and group needs, in ways which were not seen within face-to-face delivery. Drawing on experiences of the potential for isolation and uncertainty for students in breakout room spaces, I reimagined the digital space in terms of material presentation, facilitating student empowerment, and communicating and managing across multiple breakout rooms concurrently. These strategies contributed towards positive student experiences, providing pedagogical insights into newer online teaching practices for GTAs.

Introduction

Online learning is nothing new. Online methods have been a main source of learning for institutions such as the Open University since 1969 (LSBF, 2019). Yet when the COVID-19 pandemic hit, students and teachers were propelled into an uncertain chaos. The move from face-to-face learning shifted quickly to online, enabling students to continue with their learning. Whilst many students embraced the move and adapted with ease, difficulties arose across degree programmes. Lab work, for example, was suspended causing delays and difficulties for students who were based in STEM subjects (Sonbuchner et al., 2021). Social sciences and humanities however, continued to some extent, yet modifications of delivery needed to be planned and executed with some precision to enable students to continue with required module outcomes. Further, GTAs had to quickly adapt their pedagogical approach to ensure delivery of materials remained consistent and met module and teaching outcomes.

This reflective paper examines my experience as a GTA in a Scottish university, teaching on a research methods module. The module at hand required students to work as part of a group, designing and researching their own quantitative topic. Pre-COVID, this module enabled students to utilise a variety of different methods, including observation, parametric tests, and questionnaires. However, in addition to moving online, students had to remain socially distant, which further prevented different methods being employed. This limited scope meant students in this cohort all used online questionnaire methods as a group, and then analysed their data in the software package SPSS (Statistical Package for the Social Sciences) individually, as part of their individual assignments. Teaching was delivered via MS Teams, with students working in breakout rooms in their groups.

History and experience

The history of distance learning stems back from as early as the 1700's (LSBF, 2019). In the modern millennia however, distance learning has grown at a significant pace with access to resources such as the internet and online university systems. Nevertheless, when the switch to online learning occurred during the pandemic, student engagement was said to be at an all-time low, with many expressing their disappointment at the move to online (Abbasi et al., 2020; Howard et al., 2021). In part, this feeling was due to a variety of different reasons, such as poor internet connection, lack of adequate space, no privacy, electrical equipment not meeting the requirements of software, unfamiliarity with video platforms, unclear expectations, accessibility needs not being met, feeling uncomfortable using video cameras and/or speaking out using microphones (Alfadhel and Alorani, 2021; Bashir et al., 2021; Sahu, 2020).

At the start of the pandemic, I had one year's teaching experience as a GTA, allowing me to re-plan my sessions using the knowledge I had gained previously. Although I had no prior familiarity with the MS Teams software, I was fortunate enough to be offered some online training prior to teaching online. As the module I was working on required students to work in groups, it was important for me to understand how to operate breakout rooms. Although a relatively easy task, using breakout rooms as a main function caused several issues in teaching.

Planning and delivery of the sessions

Previous experience of this module meant that planning sessions required minimal time as previous materials were available to me and I knew the necessary teaching outcomes. Nevertheless, there were new challenges to contend with, which I could not foresee prior to the first online session. Lee et al. (2021) argue online teaching delivery is specifically designed to account for technological

characteristics and is designed to be pre-planned. The pandemic, however, saw an emergency shift into digital spaces, and those who had not taught online before had to reimagine teaching delivery.

The seminar group consisted of twenty-eight 2nd year students who had previously worked together and I had taught in their first year on another research module. In this regard, the students had some familiarity with my pedagogical methods and with each other. Beqiri et al. (2009: 97) state "in the traditional classroom setting, although students may frequently struggle to solve a difficult problem, they also enjoy access to immediate help from the instructor or peers". I was aware that in the online environment, students were still likely to have some element of comfort as they were already familiar with me and their peers. However, this did not deter from the fact that the first session required some further in-depth discussion on how the seminars had been planned and how they would work in practice. This included reassuring the students that the online delivery was new to both me and them, and that any issues arising would be dealt with, where possible. All sessions began with recapping content provided in the lectures. The students also had the opportunity to ask me questions before they had been placed in the breakout rooms. Students were reminded at the start of each session that I would enter each breakout room throughout the seminar. This enabled me to monitor student participation and engagement with each other and to allow students to ask questions.

Breakout rooms on MS Teams enable the session leader to place students into separate groups, separate from the main room. Rooms are created either automatically by inputting how many rooms are required, with the software assigning students to rooms at random, or by manual input (Microsoft, 2022). Students within this module were assigned to a group manually and this process needed to be repeated at the beginning of each session. Within the rooms, students still have all the features that the main room provides such as chat, raise hand, microphone, and video. Students also have access to the chat within the main room. Therefore, during the seminar, they could ask me any questions whilst the session was ongoing or invite me to enter the breakout room.

The training session provided by university staff was informative and gave me some confidence to navigate the software. That said, issues still arose. Placing students into breakout rooms also took time as there were twenty-eight students. To simplify the process, I made a chart which listed each student in their group, however the design of MS Teams meant that students were placed into their groups by being manually assigned as they appeared on the MS Teams participant list. The process, however, became easier as the weeks progressed as I would start to assign students to their breakout room as soon as they entered the session. Nevertheless, this was not always a seamless process. Many of the students on the research module were already waiting for the session to start when I arrived, despite being five minutes early; they were eager to learn! Challenges also arose when students were absent from the sessions and this caused difficulties when there was only one member of a group present. This presented me with an opportunity to speak with the student on a one-to-one basis, enquiring how group work was going; making sure that the student had the necessary resources to continue with their group research task.

Agustina and Suharya (2021: 42) state that the use of breakout rooms facilitates student-led tasks and group work. Working online in small groups can promote confidence and a sense of security as there is physical and digital space between the students and teacher (Agustina and Suharya, 2021: 44). As this module required students to work on their own research topic, it was designed as a self-directed, student-led approach of independent study. This meant that my interactions with each group varied according to what guidance they required. My pedagogical approach, therefore, had to be adapted within each group: Having previously taught this module in a classroom setting, students appeared to be more engaged in their breakout groups compared to face-to-face sessions in the previous year. Students appeared to be more confident in asking questions and making use of the

additional opportunity to discuss the task. In this experience, I found learning in the digital space can provide many positives for student engagement. The absence of physical presence of the tutor can provide the students with a *safer* space to work at their own pace. They are completely self-accountable to complete their work without the constant supervision of the tutor. However, not all students may feel comfortable working in the digital space, and challenges can arise when technology fails to support the online learning platform.

Moreover, these issues were likely to contribute to the decline in student mental health with many students reported being 'scared and confused' regarding lockdown rules (Stubley, 2020). I recognised the emergent uncertainty concerning moving learning onto online platforms and this was a particular concern in relation to group tasks (Peper et al., 2021). To assure students, each session began with enquiring about their wellbeing and reaffirming that I was available to answer any questions in relation to their learning. Students were advised in each session that they could contact me outside of the seminar.

In my own experience of operating breakout rooms, additional challenges arose when students did not have access to the most up to date version of MS Teams, and where their device did not support the function itself. Those who were using mobile phones for instance could not access the breakout rooms. When this occurred, I had to manage these students separately. This included speaking with their group and asking them to use chat function or email to communicate with the student who could not join the breakout room. There were further issues when students could not gain access to the session itself because of limited or poor Wi-Fi connection. It is likely that students who did experience technical issues were frustrated and this could have caused disengagement from the module.

Monitoring group work in breakout rooms

Unlike the classroom space, the digital environment is less personal. In a classroom the tutor may move around each group to see if any guidance is required, or if the group needs to ask any questions. The tutor's presence is continual throughout the face-to-face session. Breakout rooms, however, remove the personal factors and in some instances when I joined students in their groups, I felt there was an element of intrusion. Overall, all groups were ready with questions regarding their project, which ranged from styles of questions to use, how to complete their ethics forms, guidance on recruitment, and length of questionnaires. If students had no questions, I engaged with them by asking questions to monitor the stages of group work and to maintain the 'digital' relationship, in addition to offering assurance that I was engaged with their learning as much as them. Additionally, assuring the students that this was a new experience for myself facilitated the learning experience as the students appeared to feel comfortable and able to express their concerns freely.

It is suggested that within a face-to-face setting, the relationship between student and teacher is accepted as a given; with feedback being readily available (Dumford and Miller, 2018; Wijekumar et al., 2006). In the digital learning environment, the delivery of feedback and guidance needs to be adjusted to suit the milieu (Dumford and Miller, 2018: 453). In all sessions my camera and microphone were switched on, so students could grasp some sense of my body language. Therefore, when feedback and guidance were required, students could read my cues (Irani, 2019: 4). Nevertheless, most of the students in this cohort did not have their cameras switched on. Not being able to see the student created some barriers when communicating as I was unable to gauge how my feedback and guidance was being understood. At the beginning of each session, I tried to overcome this barrier by encouraging them to use the chat function, the raise hand feature, the microphone, and reminded them they could contact me outside of the session if they needed further guidance and support.

Although working in the digital space is said to hinder the process of group work (Dumford and Miller, 2018), the use of breakout room provides some positives to online teaching and learning (Agustina and Suharya, 2021: 45). There is a clear shift from the role of the teacher being at the centre of learning which empowers the student to be at the centre (Agustina and Suharya, 2021: 45). As such, breakout rooms further enable students to work collaboratively and to use a self-directed approach, as the teacher is effectively removed from the teaching space for a period of time. This was evident in my experience with students appearing to be engaged with their research projects with minimal interruption from myself.

Teaching in personal spaces

The digital environment can make students feeler safer but can also be invasive. Carr and Tatham (2021) illustrate that online platforms diminish the private divide between individuals. Face to face teaching does not give access to the private spaces of individuals. In a classroom, students can make assumptions about the tutor based on their appearance and body language (Carr and Tatham, 2021: 11; Knapik, 2006). Digital spaces, however, recreate these assumptions as students can see into the tutor's private space. In the digital setting, students only see a limited view of the tutor (Carr and Tatham, 2021). Similarly, tutors may see into the private spaces of students such as viewing an unmade bed or personal photographs on their walls. Such insights influence both student and tutor to make assumptions about one another. However, as previously mentioned, students had already been taught by me in another module, and so a relationship had already been established.

In your own space you are likely to feel more at ease than when you are learning in a classroom (Irani, 2019: 5). As noted earlier, students were less likely to have their cameras switched on within the session. Speaking with fellow GTAs, there were debates regarding the 'pros' and 'cons' of having the camera on during the online sessions. However, within the institution I was working for, this was not an issue that caused concern. Students needed to feel comfortable in such settings and therefore it was at their discretion to decide if they wished to have their cameras switched on. Having the camera on in the online learning space can cause some distractions. Human nature makes us inquisitive beings and background interactions online can lead to students and teachers being distracted (Peper et al., 2021). In my experience, not having cameras switched on could have contributed to increased student engagement. In this regard, being present in their own space, with the privacy of no camera use, contributed to positive outcomes in learning.

Conclusion

Whilst online teaching delivery is not a new concept, many GTAs were faced with moving to online platforms during COVID-19. Modules that had been designed for face-to-face delivery became adaptable overnight, as teaching staff had to navigate the complex issues of online delivery. Moving into the digital teaching space meant I had to reimagine the student experience. Delivery of materials and communication was paramount to the planning process, and this included offering more opportunities for students to ask questions and to receive ongoing feedback.

Operating breakout rooms presented some small organisational issues such as the time taken to place each student in their groups, problems with technology, and lack of in-person rapport. These challenges meant I had to quickly reimagine how I interact in group sessions. In general, students felt comfortable working in private group spaces in the virtual space as there were less distractions than in a physical classroom. My physical absence was transformed into the virtual, meaning I had to

adapt my teaching sessions. At best, this presented as a positive outcome for students as it is likely they felt more comfortable within their own spaces.

Moving into personal spaces crosses boundaries between private divides. In this experience however, camera usage was not generally used by students. This provided them with privacy and facilitated their learning, allowing them to focus on the tasks required. Overall, my experience was positive as students took on the self-directed learning approach which was required of them. As such, my interactions in breakout rooms contributed to students feeling empowered as they felt comfortable asking questions and engaged with each other in their private spaces.

Teaching in online spaces can be a positive experience for GTAs as it enables them to reimage their teaching practices and their course delivery. Breakout rooms in particular can facilitate student group learning as the distance between the GTA and students may increase student confidence in a less invasive private space. GTAs should consider student preferences for camera use and the benefits of fewer background distractions.

References

Abbasi, S., Ayoob, T., Malik, A. & Memon, S.I. (2020) Perceptions of students e-learning during COVID-19 at a private medical college. *Pakistan Journal of Medical Sciences,* 36(4), pp. S57-S61. DOI: https://doi.org/10.12669%2Fpjms.36.COVID19-S4.2766

Agustina, E. & Suharya, T. (2021) Zoom breakout room for students' collaborative skill enhancement in history learning during COVID-19 outbreak. *International Journal of Research in Counseling and Education,* 5(1), pp. 41-46. DOI: https://doi.org/10.24036/00430za0002

Alfadhel, L. & Alorani, L. (2021) Family roles in their children's education: a critical discussion of the future roles of families in educating their child with special educational needs and disabilities. *Hillary Place Papers*, 9 Available from: https://hp:education.leeds.ac.uk/issues/issue-six-2020-2021/ [Accessed 1 September 2022].

Bashir, A., Bashir, S., Rana, K., Lambert, P. & Vernallis, A. (2021) Post-COVID-19 adaptations; the shifts towards online learning, hybrid course delivery and the implications for biosciences courses in the higher education setting. *Frontiers in Education,* 6, pp. 1-13. DOI: https://doi.org/10.3389/feduc.2021.711619

Beqiri, M.S., Chase, N.M. & Bishka, A. (2009) Online course delivery: an empiricial investigation of factors affecting student satisfaction. *Journal of Education for Business,* 85(2), pp. 95-100. DOI: 10.1080/08832320903258527

Carr, G. & Tatham, K. (2021) 'Excuse me, I have a delivery' The [re] construction of interview 'space' in the COVID-19 pandemic. *Hillary Place Papers*, 9. Available from: https://hp:education.leeds.ac.uk/issues/issue-six-2020-2021/ [Accessed 15 May 2022]

Dumford, A.D. & Miller, A.L. (2018) Online learning in higher education: exploring advantages and disadvantages for engagment. *Journal of Computing in Higher Education,* 30(3), pp. 452-465. DOI: https://doi.org/10.1007/s12528-018-9179-z

Howard, E., Khan, A., K., & Lockyer, C. (2021) *Learning during the pandemic: review of research from England*. Available from: https://www.gov.uk/government/publications/learning-during-the-pandemic/learning-during-the-pandemic-review-of-research-from-england [Accessed 31 August 2021]

Irani, E. (2019) The use of videoconferencing for qualitative interviewing: opportunities, challenges, and considerations. *Clinical Nursing Research,* 28(1), pp. 3-8. DOI: https://doi.org/10.1177/1054773818803170

Knapik, M. (2006) The qualitative research interview: participants responsive participation in knowledge making. *The international Journal of Qualitative Methods,* 5(3), pp. 77-93. DOI: https://doi.org/10.1177/160940690600500308

Lee, K., Fanguy, M., Bligh, B. & Lu, X.S. (2021) Adoption of online teaching during the COVID-19 pandemic: a systematic analysis of changes in university activity. *Educational Review*, 74(3), pp. 460-483. DOI: https://doi.org/10.1080/00131911.2021.1978401

LSBF (2019) *The history of online learning - a guide*. Available from: https://www.lsbf.org.uk/blog/online-learning/the-history-of-online-learning-a-guide [Accessed 31 August 2022].

Microsoft (2022) *Use breakout rooms in teams meetings*. Available from: https://support.microsoft.com/en-us/office/use-breakout-rooms-in-teams-meetings-7de1f48a-da07-466c-a5ab-4ebace28e461[Accessed 5 September 2022]

Peper, E., Wilson, V., Martin, M., Rosegard, E. and Harvey, R. (2021) Avoid zoom fatgue, be present and learn. *NeuroRegulation,* 8(1), pp. 47-56. DOI: doi:10.15540/nr.8.1.47

Sahu, P. (2020) Closure of universities due to coronavirus disease 2019 [COVID-19]: impact on education and mental health of student and academic staff. *Cureus,* 12(4), pp. 1-6. DOI: https://doi.org/10.7759%2Fcureus.7541

Savage, M.J., James, R., Magostro, D., Donaldson, L.C.H., Nevill, M. & Hennis, J. (2020) Mental health and movement behaviour during the COVID-19 pandemic in UK university students: Prospective cohort study. *Mental Health and Physical Activity,* 19, 100357. Available from: https://irep.ntu.ac.uk/id/eprint/41003/1/1370748_a1190_Magistro.pdf

Sonbuchner, T.M., Mundorff, E.C., Lee, J., Wei, S. and Novick, A. (2021) Triage and recovery of STEM laboratory skills. *Journal of Microbiology and Biology Education*, 22(1), DOI: https://doi.org/10.1128/jmbe.v22i1.2565

Stubley, P. (2020) Coronavirus: students 'scared and confused' as university halls locked down 'without warning'. *Independent.* Available from: https://www.independent.co.uk/news/uk/home-news/manchester-university-lockdown-students-police-coronavirus-b632513.html [Accessed 19 June 2023]

Wijekumar, K., Ferguson, L. & Wagoner, D. (2006) Problems with assessment validity and reliability in web-based distance learning enviroments and solutions. *Journal of Educational Multimedia and Hypermedia,* 15(2), pp. 199-215. Available from: https://www.learntechlib.org/primary/p/6259/

Fine Art as a Life Practice: Lessons from PGR teaching under COVID-19

Anna Douglas
University of Leeds

Abstract

During the unprecedented COVID-19 pandemic, Higher Education fine art arts educators were compelled to re-think their studio teaching methods. As a PGR instructor new to teaching, I took this as an opportunity to enter into a curious and creative inquiry with my first-year students into the pandemic situation itself, through a project titled: 'Engaging, Encountering, and Distancing: Masks, Masking, Masquerading'. This article draws on my reflexive research conducted throughout my first term teaching in the School of Fine Art, Art History and Cultural and Media Studies, at the University of Leeds. My students were supported to think of themselves as context-specific artist researchers, gaining experience of social and visual research, to engage in haptic experiments with materials, to investigate their immediate habitat, and to make new work mediated by the online environment. The project encouraged students to attend to the affective, making conscious modes of relating and having presence online, searching for new ways to create a sense of being with and relating to each other. As a consequence of teaching online, I came to question what is specific about the pedagogical premise and methods of fine art teaching, with an emphasis on 'the studio' as a making and relational space, and the importance placed on embodiment in the student/lecturer relationship and learning experience of 1-2-1 tutor/student tutorials, and studio group crits. Whilst fine art lecturers are relieved to be back in the physical studio, teaching under COVID-19 has enabled us to appreciate the specificities of a fine art pedagogy and its social importance, and to value a fine art education as a life practice.

Introduction

Teams, Zoom, Skype, Blackboard Collaborate - back in August 2020, I was an innocent. By September, these online conference platforms were our studio. I had entered the summer feeling confident about the next academic year. I had six first-year fine art workshops planned for ten students, that would be delivered three times with three different groups. Working in one of the school's art studios, my students and I would explore the themes of togetherness and collaboration. Then, the announcement came. First from the Government, swiftly followed by the University. Within a week I was working to 'the rule of six' with restricted face-to-face teaching.

In this article I reflect on my experience teaching as a PGR tutor on the BA Hons First Year Fine art programme adapting to meet COVID-19 restrictions by establishing teaching as an online co-learning research project. I introduce the context of studio-based teaching as it has come to be a core, though informal pedagogy of fine art education. Under ever shifting pandemic restrictions, all face-to-face art teaching ceased within four weeks of the 2020 academic year. I go on to describe how I made a shift to online teaching, outlining my design for the three-week *Engagement: Making Art Now* programme. Full of fear for the unknown of online teaching and knowing that my students were also anxious (though simultaneously more digitally aware than myself), I applied for fast track University ethics clearance and designed this foundational first year programme as a research project for us all. Drawing on an autoethnographic/Constructivist Grounded Theory method (CGT) framework, I invited students to engage in a cycle of reflexive creative activities with me, some of which I describe below, to address the unique context of making art and being an emerging artist under COVID-19 measures. Throughout each three-week teaching cycle, I observed my feelings navigating the pandemic and my fearful state teaching online, authoring a reflective journal after each session. I also invited the students to keep a weekly reflective log, which at the end of our cycle together they submitted to me as non-assessed work.

Towards the end of the nine-week programme, I invited all of the students to join me in a focus group. The questions were derived from my field note observations taken during each of our workshops, as well as my own and the students' weekly reflective logs. I transcribed the audio recording of our three-hour session and subjected this to a CGT method of interactive coding in which patterns of themes are iteratively identified (see details below).

Writing here, I incorporate my own and my students' experiences and perspectives on the day-to-day situation during the pandemic. I highlight the importance of embodiment and materiality to the teaching of fine art, and suggest that focusing on attunement and relationality (between tutors, students, and artworks) could aid students as they return to the post-pandemic studio. Being physically together offers advantages like peer learning, developing critical thinking, intersubjective social interaction, and knowledge acquisition through hands-on creation. Furthermore, I suggest that the pandemic has enabled tutors to recognise and now advocate for the unique strengths and properties of a fine art education that equips students to enter the post-university world. Students graduate with enhanced capabilities including adeptly handling uncertainty, demonstrating innovation and resourcefulness, applying critical thinking, and sensitively adapting to their surroundings, which prepares them to navigate the contemporary world.

Where is the Pedagogy in Fine Art Education?

The UK has a variety of art and design curricula. Despite there being a national representative body, the Council for Higher Education in Art and Design (CHEAD), the differences in teaching context, including *who* is teaching, *what* is being taught, *how* teaching is delivered, and *where* teaching takes place is largely undetermined. This lack of conformity has underpinned post-war fine art education

and is widely regarded as both the privilege of receiving a fine art education and of providing it. Variations in pedagogical method as well as art medium specificity (i.e., painting, sculpture, photography, film, performance, etc.) is what attracts students. This disposition has been fiercely defended by fine art educators who commonly work against attempts to rationalise HE art education (Harrison, 2014).

Up until the 1960s, art colleges were principally staffed by professional male artists, teaching part-time to support their own artistic practice (Green, 1989). It is not uncommon for the orientation, conceptual focus, taught mediums, material accessibility, and values of an art school to be influenced by the personal interests of Heads of Schools and staff. Schools of Fine art and individual departments within schools were commonly led by charismatic male figures who determined the ethos of the college overall, its course intake and its structure (Robinson, 2021).

The *Coldstream Report* of 1960 and 1970 brought about the most significant changes to date in Higher Education art and design. It represented a shift between an educational system based on disciplined studies of techniques and crafts, often determined by an individual artist's professional interests, to one based on conceptual thinking, historical and contextual awareness, analytical skills and design, and included a clearer definition of core medium for Art and Design disciplines (Kill, 2005). Initially introduced to provide degree equivalence, the report intended to elevate and lend academic credibility to a curriculum rooted in studio practice by introducing the compulsory study of History of Art and Design and Complementary Studies, now better known as Critical and Contextual Studies (CCS) (Smith, 2015).

For art educationalist, Rebekka Kill, the report's legacy was "simultaneously valuable and catastrophic" for art education in that it both "validated and assimilated avant-garde practices in art colleges" – namely, the idea of the studio and studio practices as distinct from wider cultural context and practices (Kill, 2005: 1). For Kill, the report instituted a bias in favour of particular understandings of what constitutes academic discipline, which has come to determine the theory-led notion of critical thinking and writing.

The value of CCS in the teaching of creative subjects is today debated in all fields of art and design education. Over the last twenty years, the idea of art as lacking the academic rigour of other humanities subjects (that fuelled the *Coldstream Report* in the first place) has come under significant fire. In summary, the modes that were once considered the preserve and contribution of CCS, namely research rigour, with an emphasis on cultural and historical context are, it is argued, at the core of practicing art and design in any case. It is not that practicing art is *not* academically rigorous, so much as the values of what constitutes this 'rigour' are biased towards written based 'academic' disciplines. There is now a renewed enthusiasm in the broader field of art and design education and what is termed 'studio-based teaching', to promote art and design practices as forms of research in their own right, with or without written-based exegesis as part of the reflexive practice (Marshall, 2010).

However, despite these pedagogical assertions, what is nevertheless striking is the absence in Higher Education of an articulation of fine art pedagogy. Whilst the male 'master' tutor may now be a thing of the past, there is still remarkably little articulation of art teaching *as* pedagogical, in contrast to it being determined by unspoken ideas of studio-based teaching led by artist tutors.

What constitutes the studio in this hidden form of pedagogy? Is it a bounded, physical site of production (the fetishized artist's studio)? Does the studio point to, and stand in for, a way of doing and being? Is it a form of identity for student artists? The "tornadic impact" (Sabol, 2022: 132) of COVID-19, I propose, has impacted on studio practice-based teaching in ways that has prompted all of us in art education to re-consider what 'being in the studio' has meant and might mean in the

future. Many fine art educators are now considering whether the studio is not an expanded space of production, temporality, context and identity formation, a place of community, belonging and place-making.

COVID-19 Measures and University Policy

I commenced teaching under the UK Government's COVID 'rule of six'. The rule applied across all indoor and outdoor settings and enabled the police to disperse gatherings of over six people and issue fines accordingly. From September 2020, the University of Leeds implemented a blended teaching strategy. Disciplines arguing for the centrality of practice-based work (notably STEM and medical subjects and art and design) kept facilities open with limited access whilst lecture-based courses moved entirely online. In the Fine Art department, the artist studios, technical workshops, and AV suites became socially distance compliant. This significantly limited the number of students across the entire three-year degree programme able to access facilities at any given time. De-densification meant students were permitted to come into the fine art department one out of every three weeks for a limited range of workshops, studio based teaching, and personal studio time. From the outset, first year tutors decided if they would teach face-to-face or due to personal circumstances work entirely online.

Between September and the beginning of November, cities and regions across England were increasingly subjected to varied localised COVID-19 tiering measures in response to the fluctuating yet growing infection rates. This resulted in a great variety of social restriction measures governing citizen mobility and public and institutional access. Universities across the country were variously affected, resulting in staggered opening and access policies. By the end of October, the city of Leeds was required to adhere to what at that time was the highest of pandemic tiers. On 2nd November, the city entered Tier 3. Three days later, a second national lock down was imposed, and all universities closed their doors to face-to-face teaching. Fine art education at the University of Leeds would move wholly online.

Pre-COVID-19, the University of Leeds had initiated a digital investment strategy in which digital tools were to be integrated into the teaching/learning 'experience' and incorporated into classroom-based teaching principally to provide learners with enhanced opportunities to "engage, collaborate and learn in creative ways" (University of Leeds, 2022) on and off site, through platforms such as Padlet, Blackboard Collaborate as well as digital classroom spaces. Until the pandemic, however, Fine art teaching staff had remained largely uninfluenced by, and arguably resistant, to teaching digitally. Staff and students' use of digital platforms was principally for making artwork or for administrative and assessment purposes only. Teaching was effectively conducted as a face-to-face process, encompassing technical workshops, one-on-one tutorials, professional artist talks, and studio-based group critiques. Moreover, art students expected that their art would be produced in a physical workspace (studio, workshop, or AV suite), and it would be distributed as a temporal, spatial and physical object or process (i.e. displayed in a physical space), in contrast to online distribution. Under COVID-19 measures all this would rapidly change.

Fine Art Adaptations

For the first four weeks of the autumn semester, and with no formal preparation from the University, fine art tutors were required to adapt their pre-pandemic studio-based teaching programmes to accommodate social distancing. By November, they were teaching wholly online. Neither the University nor any arts teaching professional body stepped in to support this stressful

transition, unlike the support offered to many school-based art teachers in the USA and Australia (Coleman & MacDonald, 2020). As a sessional PGR tutor, I was working in a fluctuating and uncertain pandemic environment. I received neither technical training, software access, pedagogical support, nor the hardware for teaching online. All staff meetings ground to a halt as staff effectively retreated in isolated survival mode (Sabol, 2022). Effectively, I was on my own in a 'sink or swim' situation. I chose to try to swim.

COVID-19, Students and Adaptive Behaviours

At Leeds, first year students live in mixed degree programme halls of residence. From September 2020 through to the end of term in June 2021, student flats were re-designed as 'bubbles' of six. From the outset, socialisation with other first-year fine art students was entirely limited to those who met during formal face-to-face teaching in COVID compliant groups of six students. From November 5th, however, in line with national government policy, all students were confined to their place of residence full-time – for living, learning *and* making art. For our fine art students, meeting with fellow young artists could only be achieved via formal online teaching channels (i.e. Teams based seminars), supplemented by student initiated social media contact, including a Facebook messenger 'support network', and a Snapchat channel to keep in touch and "at first to moan about the situation and the university's lack of support" (quote from student interview). Progressively, these online groups became a vital emotional as well as creative support network. Following the Christmas vacation (when pandemic social restrictions were relaxed), another surge in COVID-19 resulted in renewed university restrictions. Some students returned to halls, whilst others stayed back at their parental homes. In both situations, the second semester commenced as a fully online fine art programme.

Fine art education is founded on a deep level of collegiate support that is facilitated via the collective studio environment, in which emerging artists make work under the curious and supportive observation of their peers. This is the unique 'studio culture' of fine art, which often persists into professional life for artists working in community-based studios. Ostensibly, from the start of the year, this form of praxis, which manifests as a social, physical and community space, had been compromised (Marshall, 2010). By contrast, and in effect, for the more confident and adaptable fine art students, their 'bubble' residential flats evolved into hybrid spaces. Within these spaces, bedrooms, kitchens, and even bathrooms were repurposed as studio areas, galleries, and sites for installation and performance.

At 4 am one morning, one student I taught - a determined young Greek student, living away from home for the first time - erected a complex textile-based installation and photographed it with makeshift lighting in her shared kitchen. Another student transformed her small shower cubicle into a reflective installation using baking foil, accompanied by sonic elements created by the dripping taps. Students involved fellow non-fine art residents as both participants in and audiences for their art productions—ranging from performers willing to be painted blue, to others dressing up and being photographed in makeshift bedroom photo studios. For those staying at their family homes, replicating a studio-like space might have been feasible, involving adaptations of bedrooms or family dining rooms, among other options. However, this was not always achievable, leading many to ultimately return to Leeds despite stricter social distancing measures.

While student ingenuity and adaptability over the year was astonishing, many also found producing art in small studio bedrooms a trying experience:

> "It's like everything is done from my bed…I sleep on it, watch films, communicate with friends via social media, eat on it sometimes and make art from it. There's no demarcation between work, socialisation and sleep. And I wonder if this isn't the reason I feel so artistically directionless at times and can't sleep".

Today, whilst students are at liberty to move around and be in their physical art studios, levels of studio attendance remain low. Could this be a result of the pandemic's disruption, along with the prevalence and dependence on online platforms in which social communication, entertainment, news, college work, and even art making occur in digital spaces?

The Shifting Sands of Pedagogical Practice

Over ten weeks from late September to early December, I taught eighteen first-year fine art students in a module titled '*Engagements: Making Art Now*'. Students were divided into groups of six and worked with a tutor over a three-week cycle in response to a project brief. During this period, I deployed blended learning with one face-to-face class to launch the project brief once every three weeks in the studio, followed by two weeks delivering online classes using the Microsoft Teams platform. Repeating the same cycle of classes three times over the first semester afforded a unique circumstance for a qualitative research project addressing the teacher and student experience of a fine art education during the time of COVID-19.

Previously, the 'Now' part of the module invited students to consider their practice as a present activity, rather than rooted in art historical and traditional ways of thinking and making. I regarded the pandemic, however, as an opportunity to engage with a unique 'Now'. I rethought the concept of 'Now' by situating ourselves in an unprecedented situation as artist/co-researchers, collaboratively producing new knowledge regarding art making in the socially distanced time of COVID-19.

The project I innovated was titled '*Masking, Masquerading, and Identity'.* It took the circumstances of mandated social distancing and mask wearing and invited students to creatively engage in a shared inquiry that:

- researched practices of social distancing
- considered the socio-cultural use of masks across world cultures and history
- examined mask making and wearing as an artistic subject matter and artist process
- devised rapid creative responses

In other words, students were encouraged to think of themselves as context specific artist-researchers, gaining experience of social and visual research. It allowed the students to produce haptic experiments with materials to investigate their immediate habitat and to make new work. Moreover, the students sought to understand and place themselves in the epicentre of uncertainty and precarity, addressing what were often real personal insecurities and fears, transposing them into 'artistic material' to be worked *with*, to work *on* and to be worked *by*. One student said:

> "I certainly don't think I would have made the stuff I make at all, it's more conceptual…exploring ideas of art taking over, because obviously we don't have a studio space, so things are just kind of accumulating…'cause we don't have anywhere to store it. So, this is like becoming a big part (the idea) of living with art".

Other students responded to the lack of space:

> "…the kind of lack of space has pushed me to incorporate things I will be able to share digitally. I've made a massive shift to digital ways of working which for me, like, I would never have expected".

As a PGR teacher, the pandemic, and its effects on the teaching of fine art, provided a unique and time-limited opportunity to re-consider the teacher/student relationship. With each three-week project cycle, I introduced the idea of student and tutor as co-researchers engaging with new technological platforms as a *shared* learning experience. I flipped the role of the tutor as an expert to that of a student, as I freely admitted that in many cases the students knew more about online sharing platforms like Zoom and Microsoft Teams than I did.

I also emphasised that collaborative researching had the very real effect of dissipating the fear of not knowing and 'getting this all wrong' and being 'frightened' of both the pandemic situation *and* the technology, as experienced by students and teachers alike. How to creatively manage our fears was, I proposed, not an individual problem but one that could be shared. I also invited the students to reflexively enquire what was going on in this moment of moving from studio-based teaching/learning/making to online teaching with the online dissemination of their art making. Some students, however, did not want to engage with the pandemic overtly as subject matter:

> "I see making my art as an opportunity to forget what's happening".

And some were eager to get on and make the art they desired in any event:

> "I know I want to paint abstracts, and this is what I am going to do".

Pedagogical adaptation

For our first meeting face-to-face, students read from sociologist Richard Sennett's *The Fall of Public Man* (1977) for a group discussion. During this session, we recognised the relevance of Sennett's 1970s writing on changing patterns of public social behaviour within a pandemic context. We followed our discussion with a rapid design brief. Students had twenty-five minutes to fashion a 'paper bag mask' in response to my question: '*What do you want to say, that you can only say by wearing a mask?'.* This resulted in extraordinary creative works: intricate animal heads, clown faces, complex patterns, and macabre disguises. We ended our session with a consideration of the socio-cultural and artistic history of mask wearing and masks as an artistic subject matter and object – a gallop through Ancient Greek theatre, 18th-century Venetian life and art, to feminist and queer art practices.

Figure 1. *What do you want to say, that you can only say by wearing a mask?* This exercise launched our workshop cycle in which students had 25 minutes to make a mask using a new paper bag. *Photo: Anna Douglas, 2020*

Figure 2. *What do you want to say, that you can only say by wearing a mask?* The project encouraged deep connection with how each student was feeling in the moment, and provided the space in which to share this with others. *Photo: Anna Douglas, 2020*

Week two was delivered online via Microsoft Teams. Students presented their responses to another rapid brief, this time to devise an 'emergency mask' from domestic objects and materials to hand in their flat. Remarkably ingenious designs resulted: masks cut out of individual bra cups, dried tea bags sewn together, and masks made out of kitchen rubber gloves. These were photographed in makeshift photographic studios in student bedrooms, bathrooms, and corridors. These were shared online via basic screen sharing in Teams.

Figure 3. Students were asked to make an emergency mask, transforming objects and or materials immediately to hand in their student accommodation, demonstrating innovation, resourcefulness and determination. *Photo: Molly Newham, 2020*

Figure 4. Emergency masks made from household objects were illustrated through 'staged photography', so that students developed an awareness of this contemporary photographic genre. *Photo: Molly Huxley, 2020*

Building on the first week's lecture, students additionally undertook personal research which they presented as an online illustrated talk. Remarkable research was done, with one student presenting on the invention of pandemic masks during the early 20th century Mantunian plague – a topic previously unfamiliar to me. Using PowerPoint online had unexpected consequences. Students reported that preparing a sequenced narrative of ideas and images, and the methodological process of designing and building presentations, allowed them to "give more thought to organising their ideas". I continue to adopt PowerPoint as a pedagogical tool in the post-COVID classroom whenever feasible.

In addition to undertaking cultural research and making artwork, students were invited to keep an autoethnographic reflective journal over the three weeks, noting how they were responding to and feeling about making art in lockdown. This was mirrored by my own field notes taken in each of my classes, as well as day-to-day journaling in which I noted my own use, adaptation, learning and fears around IT to deliver teaching: everything from hardware failures to software learnings. Having received ethics clearance from the University, at the end of the term, I conducted one-to-one tutorials and a group feedback workshop with my students. This allowed me to research further how they had responded to their life and work environments, their personal and shared strategies for coping and adjusting, their encounters with information technology, and also to inquire about their overall well-being. I later subjected the transcripts of this meeting to Constructivist Grounded

Theory method coding to further support my understanding of the students' experiences. CGT method of analysis asks what is going on in the speech of others, and seeks to arrive at, through iterative coding, a series of "sensitizing concepts" (Charmaz, 2012: 16-17). Re-occurring patterns of ideas highlighted students' sense of precarity and not knowing, contrasted with their resilience, determination and imagination. A felt sense of loss of togetherness was only partially salved by group chats on social media.

Tutoring experience

Like my students, I underwent a steep IT learning curve that was at times stressful, and I simultaneously worked hard to contain my own pandemic fears. As a result of our shared experience of navigating the uncertain and unknown, a bond emerged between myself and my students, and my classes became a mutual twice weekly 'life-line'. There was, however, a significant difference between us. Students had legitimate expectations that their tutors, and the University, would help them navigate this precarious journey. With the pandemic, "a new phenomena of teacher-student accessibility" via 24/7 online platforms emerged, compounding the stress I felt (Sabol, 2020: 131). How much time was I able to provide, given my constant need for adaptation and IT skilling-up, or be willing to give (taking into consideration out of work demands and stresses) to support my students, who in many cases told me they felt "abandoned", "cheated" and "financially exploited"? I often felt internally conflicted as the lines between pastoral care, personal tutoring, and teaching was blurred.

Opportunities for learning together were not equal. Students were hampered by a number of factors, including ineffective IT equipment suitable for spending hours online in group crits or for undertaking the generation of distributable digital files (PowerPoint), or producing digital artworks, or even effectively documenting non-digital artworks and artefacts to share online. Whilst the online strategy of the University assumed student access to high-end laptops, many valiantly struggled with iPhones and iPads, often pushing these devices to their limits. I had myself to invest in a new laptop to be able to operate a range of software suitable for conference sharing and viewing students' work.

There was also an assumption that students and tutors had access to the internet. Even those living in halls found Wi-Fi signals buckling under the volume of access. Cold spots resulted in groups of students of different disciplines having to work from shared kitchens. Those who returned to family homes established themselves in shared dining rooms and kitchens. This experience was not unique. Across the country, workers were experiencing the impact of sharing spaces with others. Once I became aware that students might be 'broadcasting' from spaces shared with others, I had to check-in whether they felt secure to share their work and thoughts in spaces potentially overlooked by parents, siblings and flatmates.

Being online, however, outside of the physical space of 'the studio' brought into focus skill gaps in digital technologies that students took upon themselves to fill, substituting YouTube videos for university technician support. Whilst some students voiced their dissatisfaction in paying fees only to further "fork out on online tutoring", this situation also permitted opportunities for students to take charge of their learning, making it distinctly more bespoke. Today, students are not attending workshops as we might expect. Is this the consequence of the success of YouTube DIY videos?

My own IT limitations, coupled with my scepticism of the disembodying tendencies of social media and the extensive use of digital devices, meant I kept my classes relatively low-tech, preferring to be attentive to the telepresence of our interaction with each other. Rather than getting wrapped up in

a host of Microsoft-led online platforms - many of which the University promotes (including Top Hat, Pebble Pad, etc.) - I hoped to nurture an online space as a "performance of empathy" (Turkle, 2017: 18) that cultivated students' "inquiry-orientated mind-sets'" and "instinctive approaches to practice" (Coleman and MacDonald, 2020).

We developed an attunement practice of checking in with each other at the start of every session, considering our camera angles, our framing, who was around us, and we similarly 'checked out' at the end of each session. We practiced attunement and gratitude, and I continue with such reflexive practices today in the physical studio.

Many students found social media exchanges lacking in emotional nuance and connection:

> "I am sick of other students sniping and moaning. What I want are people out there who are really listening not just 'sounding off".

The pandemic context provided an unanticipated moment to consider my own creative practice as a fine art tutor and to question my purpose during a crisis. Art educators have been characterised as creative, 'flexible and responsive to changing elements in the education landscape'. As 'problem solvers' we have worked through the challenges that COVID-19 created (and continues to arise) and we have embraced constructive lessons (Sabol, 2022). As a tutor, my interests in artistic practices of collaboration, site responsive art (Kwon, 2002), theories and practices of embodiment, affect, and reflexivity, audience reception, and sensory methods of ethnography (Pink, 2005) contributed to my revisioning of a studio-based programme, firstly as a hybrid strategy and then online. I approached my teaching as an experimental project in which I could learn about the teaching of art through the practices of others who, in turn, were responding to a unique context. Via this approach, I encouraged students to similarly 'lean' into this practice to "guide their transformations of embodied and participatory practices" (Coleman and Selkrig, 2020: 1). This move was certainly enabled by being a PGR tutor. With limited responsibilities to the University or my school, and little authority, I was considerably independent, and this made possible innovative transformations in my teaching. But, in equal measure, at times I also felt isolated, 'unheld' and anxious about my performance, just like my students.

Future transformations

As a PGR tutor I felt empowered to 're-think and re-imagine' how ways of being online could facilitate 'transformative learning experiences' that might exceed the precarious circumstances of the moment (Coleman and MacDonald, 2020). I have integrated some of these COVID-19 adaptations into my post-COVID teaching programmes. Today, I begin each student group or individual session with a practice of attunement. In group crits, I work on a variety of slow observation and listening exercises, and I support students to develop language to express critical evaluation of each other's art in contrast to the snippy one-liners or pithy 'likes' of social media (see the student quote above).

There are digital experiences I now feel nostalgic for: the immediate (though not fool-proof) transcripts of our TEAMS-based group crits, and the spontaneous sharing of videos, references, and illustrations of artists' work that brought a dynamism to our sessions. However, it is the less obvious realisations of attributes that were cultivated in my students that are now informing how I move forward into full-time teaching. I believe that precarity, uncertainty, ambiguity, resilience, agility, versatility, practicality, empathy and creativity are at the core of a fine art education irrespective of whether a student has the ambition to become an exhibiting artist. Where once the studio once

featured as a physical place, I now regard it as a praxis that permits creativity and reflexivity. This might require a dedicated physical art-making space, or it might be understood temporally as a demarcated moment in which creativity and inquiry can flourish (Sullivan, 2005). Overall, the pandemic convinced me that a fine art education is well situated to respond to the precarity of our present moment, in which we need more than at any other time, ethically minded, creative young people able to view the world through various lenses and contexts and to take up their responsibilities as global citizens in world (Beard, 2022).

Acknowledgements

With sincere thanks to all the 2020 first year students that took part in my classes, and specifically the research workshops, including: Abigail, Charlotte, Ellie, Jazmin, Georgia, Molly H, Molly N, Tiana and Tiegan.

References

Aspinall, K. (2014) '*The Pasmore Report'?: Reflections on the 1960 Coldstream Report' and its legacy.* Art School Educated Conference, Tate Britain.

Beard, M. (2022) *Festival of Ideas*. Howard Assembly Rooms, Leeds.

Charmaz, K. (2012) *Constructing Grounded Theory.* Thousand Oaks, California, Sage.

Coleman, K.,& MacDonald, A. (2020) *Art Education during the COVID-19 lockdown,* Teacher Magazine. Available at: https://www.teachermagazine.com.au/articles/art-education-during-the-COVID-19-lockdown [Accessed March 2023]

Coleman, K, & Selkrig, M. (2020) *Becoming co-conspiratorial, tiny coronavirus stories. Artists and Climate Change.* Available at: *https://artistsandclimatechange.com/2020/05/15/tine-coronavirs-stories-this-mistery-loves-isolation* [Accessed February 2023]

Coleman, K, & Selkrig, M. (2020) *When the going gets tough artists and educations get going*. EduResearch Matters Blog, Australian Association and Research in Education. Available at: https://www.aare.ed.au?blog/?p=5463

Durham, H. & See, L. (2015) 'Lessons learned from distance learning', in P. Kneale (Ed.), *Masters Level Teaching, Learning and Assessment: Issues in Design and Delivery*, pp. 209-217, Palgrave, London.

Green, L. (1989) *Women and Sculpture,* MPhil dissertation, University of Leeds.

Harrison, E. (2014) *The Art School Handbook. Available at:* https://www.ellieharrison.com/artschoolhandbook [Accessed May 2023]

Kill, R. (2005) *Imperialist Legacy or Academic Strategy? Resistance to writing in undergraduate Art Education.* Plymouth College of Art. Available at: https://www.jiscmail.ac.uk/cgi- bin/webadmin?A3

Kwon, M. (2002) *One Place After Another: Site-Specific Art and Locational Identity*. Cambridge, USA, MIT Press.

McDonnell, J. (2014) Reimagining the Role of Art in the Relationship between Democracy and Education, Educational Philosophy & Theory 46(1), pp. 46-58. DOI: https://doi.org/10.1111/j.1469-5812.2011.00802.x

Marshall, C. (2010) *A Research Design for Studio-Based Research in Art/* Teaching Artist Journal, 8(2), pp. 77-87. DOI:10.1080/15411791003618597

Pink, S. (2005) *Doing Sensory Ethnography*. London; Sage.

Robinson, H. (2021) *Women, feminism, and art schools: The UK experience*. Women's Studies International Forum, 85(4). DOI: https://doi.org/10.1016/j.wsif.2021.102447

Sabol, F. (2022) *Art education during the COVID-19 pandemic: the journey across a changing landscape.* Art Education Policy Review, 123(3), pp. 127-134. DOI: https://doi.org/10.1080/10632913.2021.1931599

Schon, D. (1983) *The Reflective Practitioner.* London: Temple Smith.

Sennett, R. (2012) *Together: The Rituals, Pleasures and Politics of Cooperation*, Yale University Press.

Smith, S. (2015) *The Role Of Contextual Studies In Art School Education In Scotland, College Art Association of America*. Available at: https://www.collegeart.org/news/2015/10/26/the-role-of-contextual-studies-in-art-school-education-in-scotland/ [Accessed May 2023]

Sullivan, G. (2005) *Art Practice as Research: Inquiry in the Visual Arts.* Thousand Oaks, California, Sage.

Thistlewood, D. (1992) *Histories of Art and Design Education: Cole to Coldstream.* Harlow, Longman.

Turkle, S. (2017) *Empathy Machines: Forgetting the Body, A Psychoanalytic Exploration of the Body in Today's World*. London, Routledge.

Williamson, B. (2013) *Recent Developments in British Art Education: 'Nothing Changes from Generation to Generation except the Thing Seen'*. Visual Culture in Britain, 14(3), pp. 356-378, DOI: 10.1080/14714787.2013.817845