Blended Learning in Practice

Autumn 2024

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Editorial

Welcome to the Autumn 2024 edition of our e-journal Blended Learning in Practice. In this edition we have 15 research articles from participants on the Post Graduate Certificate in Learning and Teaching in Higher Education Programme at the University of Hertfordshire. Additionally, we have an article from colleagues in the School of Health and Social Work

In this edition:

Chantelle Bates discusses Case-based learning as a teaching tool whereby clinical cases are presented to students to contextualise theoretical learning and demonstrate its application to realistic, practical situations. This pedagogical approach has the power to foster and enhance critical thinking, problem-solving, and decision-making skills that are essential for frontline healthcare practice. The article explores case-based learning in the undergraduate education of allied health professionals, centring on student paramedics, to scrutinise existing frameworks, investigate current perceived barriers to effective case-based learning, and synthesise these insights to identify strategies for optimising the implementation of case-based learning.

Claire Harding explores the difficulties faced by master's graduates who are seeking employment after graduating from university. These challenges are particularly confounded for international students who may not have any previous experience in the subject field or in the UK. She investigates how authentic assessment may help International Students on a Human Resources Management (HRM) Master's degree build employability skills and in doing so, reduce some of the barriers experienced by these entrants to the labour market

David Daniel discusses integrating interprofessional education (IPE) into healthcare curricula, particularly within the non-medical prescribing (NMP) programme. This article explores the significance of IPE as a pedagogic approach in crafting and executing the NMP curriculum, aiming to enhance collaboration among healthcare professionals from diverse disciplines. The article identifies potential barriers to implementing IPE within the NMP programme. The article proposes various strategies to overcome these barriers, and concludes with recommendations for stakeholders, emphasizing the need for collaborative efforts among educational institutions, academics, and students to integrate IPE effectively into the NMP curriculum.

David Chapman explains how the NHS Long Term Plan has recommended an increase of 25% in university places for Clinical Psychology training programmes. Within the programme at Hertfordshire University, the growth has been considerably greater, at 247%. As part of this training, trainees must be competent in delivering Cognitive Behavioural Therapy (CBT), including skills practice. This has led to challenges in using simulations as a learning approach for CBT. This study's aims are, to investigate how to improve and grow peer and facilitator-led CBT simulations, with trainees having a wide range of experience and

knowledge of CBT? and what makes CBT simulations a safe and compassionate learning experience in developing CBT competencies for trainees who could be experiencing 'imposter phenomenon'?

Gabriela Zemelka explores the language challenges faced by international students within the MSc Environmental Management programme at the University of Hertfordshire, United Kingdom. It specifically assesses students' proficiency in understanding and utilising technical terminology and concepts within the Water Pollution Control module. The study also examines the extent to which students utilise academic support services designed to help their academic success. The findings reveal significant linguistic problems that affect students' ability to engage effectively in classroom discussions and grasp technical terminology, highlighting an urgent need for enhanced linguistic support tailored to the needs of international students.

Gemma Bush's article aims to explore research relating to the benefits, value, and areas of belonging in Degree Apprentice (DA) Students entering the BSc cohort of Year 2 Mental Health Nursing. Degree Apprenticeships are a relatively new pathway into the vocation of Mental Health Nursing. Funded by employers, experienced practitioners navigate new spheres of social, academic and practice settings. The sense of belonging is continuously shifted. Given that it is accepted that belonging in social cohesion will influence the way people learn, this transient nature of Apprenticeship belonging requires investigation. Analysing the literature relating to Belonging in Mental Health Nursing Apprenticeships aimed to identify themes associated with this experience.

Joanna Szpunar presents an overview of strategies aimed at enhancing academic staff engagement with technology through professional development programs informed by the principles of andragogy. By drawing on adult learning theory, particularly the principles of andragogy, this research investigates effective approaches to design and implement professional development programs tailored to the unique needs and motivations of academic staff. Through an analysis of intrinsic and extrinsic factors influencing staff engagement with technology, including the distinction between learning and performance driven motivations, the study addresses the misalignment between staff expectations and professional development offerings.

Kate King considers the creative value placed on 'learning through failure' in industry and asks how failure can be embraced in higher education Drawing on existing literature, the article explores how failure is linked to creativity; why the education system kills creativity; and why there's a need for more focus on creative failure in higher education.

Laura Cole discusses why readiness is highly important when approaching the role of Newly Qualified Paramedic (NQP) and why it has not been studied at any depth in the United Kingdom (UK) as to whether paramedic science students in Higher Education are prepared, capable and ready for their future careers within this field. Her study aims to explore the

readiness of final year paramedic students in terms of their ‘soft skills’ including interview preparation and communication alongside their career aspirations.

Lesley Boyle investigates the explicit modelling of the use of chatbots to improve engagement with academic reading among Level 5 Early Childhood students. Employing a case study approach, this article explores how chatbots can mitigate challenges faced by students and foster more academic reading engagement. Grounded in the principles of Decoding the Disciplines, the study involves identifying bottlenecks in students' reading engagement, uncovering the mental tasks involved and modelling strategies to overcome these obstacles.

Mark Cornell states that applications to study nursing in the United Kingdom (UK) are on the decline therefore more needs to be done to improve accessibility to university programmes. Blended learning is an approach which integrates face-to-face learning with online teaching. This approach could improve accessibility and therefore encourage more nursing applications. The objective of this study was to ascertain what student nurse’s perceptions are of a blended learning approach in undergraduate nursing education.

Paul Xavier discusses how confidence in dealing with paediatric patients as a final year radiography student appears to be a burning issue. Students often begin a radiography training programme with preconceived thoughts of the challenges of imaging children and the issues that come with this. The aim of this article is to explore the causes of this perceived lack of confidence with the use of a literature review whilst also looking at what is currently provided at University of Hertfordshire

Tom Elvin considers there are numerous, rapidly developing pedagogical approaches, aiming to support, develop and enhance student learning and experience. Virtual reality can provide an opportunity to enhance previous pedagogical approaches and develop its own individual approach. This research critically appraises previous research, to establish the role of virtual reality within Paramedic Undergraduate Anatomy & physiology education.

Richard Matovu and Anthony Herbland present a comprehensive framework for implementing multimedia assessments in Health and Social Care in Higher Education, aiming to equip the university lecturer with practical tools and strategies to enable student success.

Sara Baco describes how gamification is increasingly utilised in higher education as a creative tool to enhance student engagement and motivation. She considers its use in pharmacy education, and specifically within the Master of Pharmacy undergraduate programme. Innovative examples of gamification have been identified, including simulation games and escape rooms, which can be utilised as a springboard for creating a variety of educational games in multiple content areas of the pharmacy curriculum.

Sean Cox presents a comprehensive literature review, exploring the potential value of incorporating quantity-based assessment to assignments in the Creative Arts at degree

level. Drawing on sources in pedagogic literature as well as from disciplines unrelated to the creative arts, the review explores the basis for quantity-based assessment in existing curriculums and theories. Key themes identified include the importance of practice by repetition and the value of reflection on practice to improve learning.

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Contributor Profiles

Chantelle Bates c.bates3@herts.ac.uk

Chantelle Bates is a Senior Lecturer in the Paramedic Science Department. Since graduating from the University of Northampton and registering as a paramedic in 2016, she spent most of her clinical career focussed on the mentoring, education, and support of fellow ambulance clinicians. Following her passion for education, Chantelle joined UH in 2022 and is a module leader on the BSc (Hons) Paramedic Science programme. Her current interests are in health and medical education, particularly in the use of case-dissection and problem-solving, alongside the biopsychosocial approach to patient-centred care.

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Claire Harding joined the Hertfordshire Business School as a visiting lecturer in 2022, after 8 years as Global Vice President Human Resources (HR) in a pharmaceutical company. Claire is now a senior lecturer with the HR Department and has recently achieved Fellow of the Higher Education Academy. Claire holds an MA in Human Resourcing and recently completed an MSc in Organisational Psychology at Birbeck College, University of London with her dissertation focussed on the attitudes of business travellers towards the work-home interface in a post-Covid environment. Claire believes passionately in supporting students to achieve the skills they need for their future careers.

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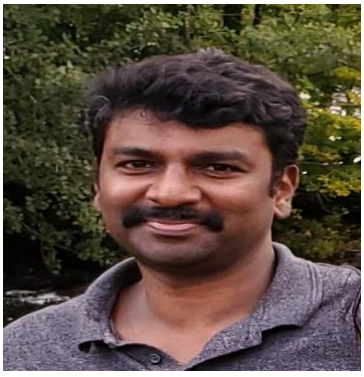

David Daniel is a senior lecturer at the School of Health and Social Care at the University of Hertfordshire. He teaches across the non-medical prescribing program, specialist community nursing programs, and advanced clinical practice program. He is also an advanced clinical practitioner (ACP) in an NHS Walk-in centre. His clinical responsibilities include assessing and treating patients with minor injuries and illnesses.

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David is a senior lecturer on the doctorate programme in Clinical Psychology. He was awarded his doctorate in Clinical Psychology (DClin) in 2011 at the University of Hull and has since been employed in a range of NHS adult mental health services, specialising in working with those who hear voices, experience unusual belief and perceptual experiences and receive the label of 'Psychosis'. Since joining the university in 2021, David has been co-ordinating and supporting students on their clinical placements, is the co-lead of the Cognitive Behaviour Therapy (CBT) module and is the principal supervisor of research projects focusing on those who are at risk of developing 'Psychosis'.

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Gabriela Zemelka is a Lecturer in Water Quality and Water Resources Management at the University of Hertfordshire, where she has taught since 2023. Among her many roles, she is also the Deputy Programme Lead for the MSc Environmental Management programme. She obtained her PhD from Cracow University of Technology and previously worked as a Postdoctoral Research Assistant at Queen Mary University of London. Her recent research has focused on the impacts of plastic pollution in aquatic environments and the assessment of heavy metal contamination in residential garden soils and compost.

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Gemma Bush is a Lecturer in Mental Health Nursing and Registered Mental Health Nurse since 2011. Gemma has worked within Child and Adolescent Mental Health Nursing, and specifically eating disorders in various clinical settings, joining the University of Hertfordshire in 2023. Her current research interests, in this issue of Blended Learning in Practice, include the inclusion and belonging within the Nursing curriculum or Degree Apprentice Students.

Joanna Szpunar j.szpunar@herts.ac.uk

Joanna Szpunar is a Learning and Teaching Technologist at Hertfordshire Business School. As a Learning and Teaching Technologist, Joanna continues to drive innovation and improvement in education through the integration of technology. Additionally, she is a committee member and Communication Officer for the UCISA Digital Capability Group, promoting the dissemination of experience and good practice in IT training and skills development for both staff and students in UK higher education institutions.

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Kate King is a Senior Lecturer working across the Product & Industrial Design and Creative Media Art programmes, and on the Postgraduate Design course at the University of Hertfordshire. Her teaching focuses on the practice of Design Thinking – a human-centred, creative approach to problem solving, that emphasises the needs of people. With over 25 years of experience working in industry, Kate's Design Thinking expertise has seen her work for the world-renowned innovation consultancy IDEO. She counts the BBC, NHS, Oxfam, Deliveroo and Tesco among her clients and brings a wealth of industry examples to her teaching work.

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Laura is a Senior Lecturer in Paramedic Science at the University of Hertfordshire working with a range of paramedic science students on various modules for both BSc (Hons) Paramedic Science and MSc Advanced Paramedic Practice programmes. She is the Admissions Lead for both BSc (Hons) and Pre-Registration MSc programmes. She is the module leader for Minor Illness and Injury for paramedics and Complex Patient Groups in paramedicine. Laura has 12-years' experience within the NHS as a frontline paramedic and an Emergency Care Practitioner (ECP) within the Urgent Care environment. She holds a BSc (Hons) in Paramedic Practice, a PGCert in Higher Education and is about to embark on a master's degree in Skin Integrity and Wound Care.

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Lesley Boyle is a Senior Lecturer in the School of Law and Education. She works across both the Initial Teacher Education and Early Childhood programmes and is the Early Years Lead. Lesley is a qualified teacher and has over 25 years of teaching primarily in Early Years contexts. She has held various leadership positions before joining University of Hertfordshire in 2021. Lesley is currently in the final stages of completing her EdD.

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Mark Cornell is a Lecturer who as a Registered Learning Disability Nurse works within the Learning Disability Nursing Programme at UH. Mark's clinical experience spans acute and, for the majority of his career, community settings where he has supported people with learning disabilities to ensure they live health, happy, fun, person centred and safe lives. As a Positive Behaviour Support Practitioner, he specialises in providing clinical intervention to those whose behaviours challenge and his interests include Dementia & Neurodiversity

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Paul recently took up the role of Senior Lecturer on the Diagnostic Radiography Team at the University of Hertfordshire. Before this, he spent 18 years with the National Health Service (NHS), where he had the opportunity to work in several renowned hospitals, including Guy's and St Thomas' and Great Ormond Street Hospital. After qualifying as a radiographer, he had a chance to work in various hospital departments. Paul's current focus within radiography is on paediatric care, simulation, and enhancing the educational experience for his students, aiming to contribute positively to their academic journey.

Tom Elvin t.elvin@herts.ac.uk

Tom Elvin is a Senior Lecturer in Paramedic Science at the University of Hertfordshire. After completing his DipHE Paramedic Practice, and later his MSC Advanced Professional Practice at Sheffield Hallam University, he has worked in various clinical roles across the Paramedic profession. He has been a member of the Paramedic Faculty at the University of Hertfordshire since 2021, teaching on both the Undergraduate & Postgraduate courses. His research interests focus on the Utilisation of Virtual Reality Technology in Paramedic education.

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Richard Matovu is Educational Technologist in the School of Health and Social Work, a position he has held since February 2018. Before this, he worked as a Computing/ICT teacher in a secondary school for 15 successful years. Richard is passionate about e-learning, instructional design, blended learning, and the application of creative multimedia technologies in education. His research focuses on how e-learning technologies, such as interactive multimedia assessment guides, video tutorials, and podcasts, can enhance teaching and learning.

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Anthony Herbland is the Programme Leader for the MRes in Health and Social Work and has been an academic since 2001. He earned his PhD in Electronic Engineering from the University of Hertfordshire in 2007, followed by an MA in Learning and Teaching in 2012, which further fuelled his interest in education research. His current research focuses on the use of educational technology to enhance student learning. Additionally, Anthony serves as the Technology Enhanced Learning Champion within the School of Health and Social Work.

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Sara Baco is a Lecturer in Clinical Pharmacy Practice and Year 3 lead on the Master of Pharmacy degree course at the University of Hertfordshire. After completing a Master of Pharmacy degree at the University of Reading, Sara qualified as a pharmacist in 2012. She practiced as a pharmacist for several years, then joined the University of East Anglia as a Teacher practitioner in 2020 where she taught on the Master of Pharmacy programme. Sara joined the University of Hertfordshire in 2021 where she gained Fellowship of the HEA. One of her main areas of interest is gamification.

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Sean Cox is a Senior Lecturer in 2D Animation at the University of Hertfordshire. After completing his bachelor's degree at the University of South Wales, he spent eight years in Industry working as a 2D generalist for long and short-form content. Sean joined the University of Hertfordshire in 2021 on the BA Animation pathways and became course leader for MA Animation in 2023.

Case-Based Learning Pedagogy as a Tool for Developing Critical and Creative Paramedics

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Abstract

Case-based learning is a teaching tool whereby clinical cases are presented to students to contextualise theoretical learning and demonstrate its application to realistic, practical situations. The concept works to simulate real-life scenarios, and thus is vital to the education and development of allied health profession students. This pedagogical approach has the power to foster and enhance critical thinking, problem-solving, and decision-making skills that are essential for frontline healthcare practice. This journal article explores case-based learning in the undergraduate education of allied health professionals, centring on student paramedics, to scrutinise existing frameworks, investigate current perceived barriers to effective case-based learning, and synthesise these insights to identify strategies for optimising the implementation of case-based learning.

Introduction and Background

Twenty-first century education places a great emphasis on acquiring and fostering the necessary skills to sustain lifelong learning, with the Partnership for 21st Century Skills (2008) outlining four key learning and innovation skills to prepare students for complex life and work environments: creativity, critical thinking, communication, and collaboration. Aligning with this is the International Society for the Scholarship of Teaching and Learning (ISSOTL) Grand Challenge of developing critical and creative thinkers in postsecondary education (Scharff et al., 2023).

Paramedicine has only emerged into higher education in the last three decades (College of Paramedics., 2017). As such, there is still significant room for further development and research into effective, immersive teaching techniques to cultivate critical and creative graduate paramedics who are prepared for high intensity working environments. Bourdieu (2000) explores the term ‘scholastic epistemocentrism’ to describe the separation of theoretical knowledge from practical expertise, broadly suggesting a privilege of the former, a challenge that must be overcome in the education of undergraduate paramedics (Clarke, 2018). Thus, we customarily observe paramedic educators employing a variety of pedagogical techniques and theories, often drawn from personal encounters in frontline experience, to deconstruct and dissect contemporary paramedic practice for student paramedics, seeking to narrow the ‘theory-practice gap’ (Margolis et al., 2009; Michau et al., 2009).

Despite higher education institutions, paramedic educators and regulatory bodies seeking to enrich critical and creative thinking in graduates, there still exists the challenge of strategy. Lack of shared understanding goes some way to explaining this disparity, with the definition of “critical thinking” being often convoluted or overly complex (Blakey, Golding and Wilkinson, 2022; Heft and Scharff., 2017). When we consider defining critical thinking in the context of contemporary paramedic practice, we can look to clinical decision making for influence. A frequently used metaphor of clinical decision making is the three circles Venn diagram illustrated in Figure 1, which explores the over-lapping challenges involved in complex decision making; requiring the engagement of creative, critical, and analytical thinking (Flaherty., 2020). This tangible representation of the complex and interlinking factors allows us to visualize the level of criticality we are seeking to foster in student paramedics, and guide paramedic educators to recognise the importance of cultivating this skill from the outset.

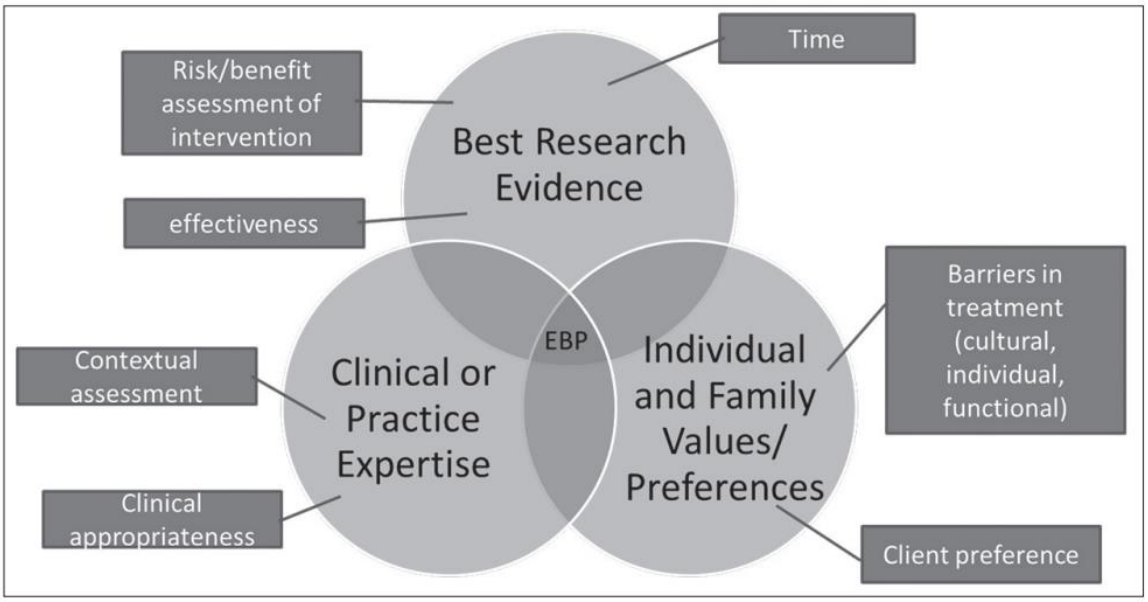

Figure 1: The Three Circles of Evidence-Based Practice (Flaherty., 2020)

Case-Based Learning (CBL) is a teaching and learning tool that works to pose contextualised questions that are based upon “real-life” clinical problems to promote authentic learning (Williams., 2005) and is frequently utilised in the education of undergraduate student paramedics. Thought to have been introduced in 1912 by Professor of Pathology James Lorrain Smith, case-method of teaching has been a long-established method whereby students correlate scientific understanding with clinical findings (Sturdy, 2007). Often, CBL is compared against Problem-Based Learning (PBL) and although some similarities exist, CBL demands active involvement from the facilitating educator to guide inquiry, promoting deep and meaningful learning through the active application of knowledge and critical thinking (Perez et al., 2023).

Whilst many claim or suggest CBL as an effective learning and teaching method in medical education, little evidence exists to decode the efficacy of these techniques, particularly in

direct relation to undergraduate student paramedics (Thistlethwaite et al., 2012). This article aspires to: explore the comparative attitudes towards case-based learning; contribute valuable perspectives for educators to refine their approach to case-based learning and implement a standardised best-practice; and enhance the overall educational experience for future paramedic professionals, harnessing them with the critical and creative skills essential for their future roles as emergency, urgent and primary care clinicians.

Methods

Through reflection of personal experiences and engaging with students and colleagues alike, three key explorative research questions were formulated: “how is case-based learning addressed in the pedagogical literature concerning the undergraduate education of health professionals?”; “what are the perceived barriers for effective case-based learning?”; and “in what ways can the insights from a literature review enhance the implementation of a best practice approach to case-based learning, to foster the development of critical and creative skills in graduate paramedics?”.

An in-depth literature review of academic and health professional journals was carried out, focusing primarily on case-based learning and problem-based learning. The initial search sought to locate journals discussing case-based learning as a pedagogical tool in the higher education of undergraduate student paramedics, but it became evident that there was a distinct lack of literature on this specific topic, thus the search was widened to encapsulate health professionals as a whole.

Literature Review

Case-Based Learning defined.

As aforementioned, CBL is a long-established teaching and learning method that is frequently employed in the education of health professionals (Li et al., 2014). In a recent review of CBL, Thistlethwaite et al (2012) highlighted that there is “no international consensus as to the definition of case-based learning (CBL) though it is contrasted to problem-based learning (PBL) in terms of structure”. They further explored the theme of CBL, concluding the theory that its key theme is that of inquiry-based learning that exists on a continuum between structured and guided learning. Liu et al (2014) seconded this, providing a definition of the CBL method as that which “focuses on case-study teaching and inquiry-based learning on the continuum between structured and guided learning”.

Another theme in the defining of CBL is that of evaluation and exploration. Sam et al (2015) defined CBL as a pedagogical method that is “structured so that trainees explore clinically relevant topics using open-ended questions with well-defined goals”. Similarly, when exploring CBL as an approach to developing soft skills in medical students, Gade and Chari (2013) concluded that “by discussing a clinical case related to the topic taught, students

evaluated their own understanding of the concept using a higher order of cognition", thus encouraging the processes of active learning and production of a higher-yielding outcome.

The use of a *higher order of cognition*, and emphasis on deep thought processes is also explored in an article for dental education in which Perez et al (2023) describes CBL as a "guided inquiry method that promotes deep and meaningful learning through knowledge application". They go on to discuss these factors, exploring the necessity for student healthcare professionals to actively apply their knowledge to clinical cases; thus, deepening and improving their understanding of the content area through knowledge application, collaborative learning, and guided facilitation. Alongside this concept of a *higher order of cognition*, Margolis et al (2009) also speak of a higher level of teaching. In their qualitative study of student paramedics' perceptions of specific strategies that lead to a successful paramedic educational program, CBL was explored as a strategy that fosters both realism and a higher level of teaching in the classroom environment. CBL was described by one of the participants as an active learning strategy that helps "make book-smart paramedics understand how to apply their knowledge [in practice]."

To dissect this notion of a *higher level of teaching* in the education of undergraduate paramedics, exploration of curriculum structure and learning goals can be undertaken. The College of Paramedics (2024) promotes the implementation of a spiral curriculum, incorporating knowledge, skills, and behaviour development throughout their undergraduate programme and onward into their continued professional development (Figure 2). Bruner (1960) introduced the concept of a spiral curriculum, describing a process in which ideas are presented in homologue form, returned to later with more precision and power, and further developed and expanded until, in the end, the student has a sense of mastery. Considering a *higher level of teaching* and the theory of a spiral curriculum, a summation can be formed that Level 4, 5 and 6 students require consistently advancing knowledge delivery, with educators demonstrating detailed insight of the student needs, wants and limitations as they progress through a 3-year BSc Paramedic Science programme.

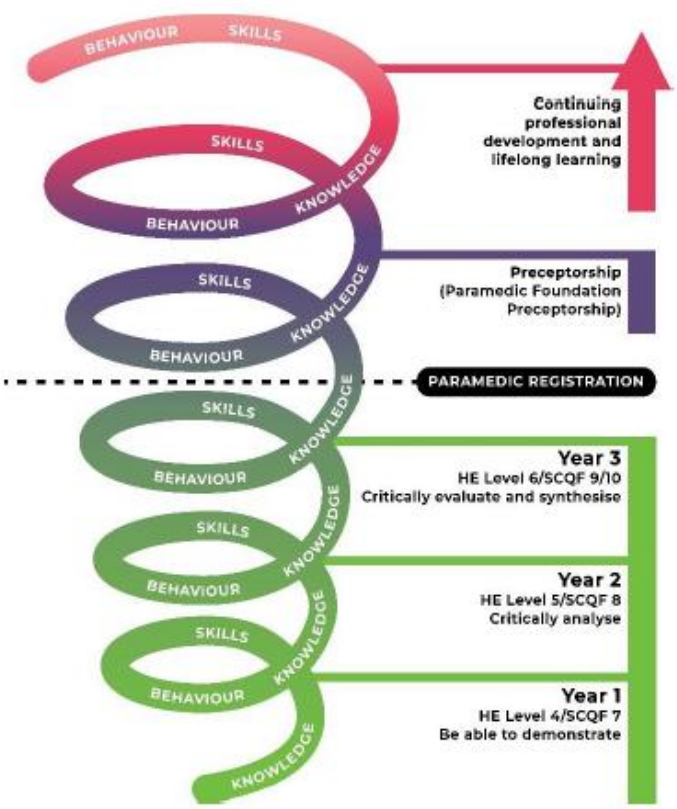

Figure 2: Recommended Spiral Curriculum Approach (College of Paramedics, 2024)

Drawing on the literature, Mclean (2016) surmised that a definition of CBL required four key components: (1) a clinical case study, (2) a learner-led inquiry process whereby all of the information is to be learned, (3) enough information presented prior to the activity to ensure a well-grounded baseline for all students, and (4) a facilitator guiding the learning, ensuring that all intended objectives are met.

In most studies, CBL is defined as a pedagogical method of teaching and learning, which includes a clinical case, a problem-solving or question-answering component, and an expected set of learning objectives with a clearly defined measured outcome (McLean, 2016). A modern definition should include the themes of deep cognition and facilitator-guided, intended-outcome acquisition, alongside the provided interpretation by Thistlethwaite et al: “the goal of CBL is to prepare students for clinical practice through the use of authentic clinical cases. It links theory to practice, through the application of knowledge to the cases, using inquiry-based learning methods.”

Case-based learning versus problem-based learning.

When we consider CBL, we must also consider alternative methods of inquiry-based education. PBL is similar in its concepts, but also displays distinct differences. Despite Thistlethwaite et al (2012) remarking that the nuances between CBL and PBL are often

unclear, McLean (2016) analyses the contrasts and comparisons that we see in the literature between CBL and PBL, highlighting these key differences as seen in Figure 3. Albanese and Mitchell (1993) explored the basis of these theoretical pedagogical frameworks, focussing attention on how learners use these learning methods to discover education that is meaningful to them, whilst simultaneously scaffolding their knowledge and skills based on the new learning structures and resources provided by the educator. The participative learning environment that comes alongside these methods promotes an autonomous learning stance for students and encourages them to take ownership and responsibility of their own learning. It also provides an alternative dynamic and learning opportunity for the teacher, who now takes an active role in listening, facilitating and guiding, as opposed to directing.

	PBL	CBL
Item		
Goals	Designed so that students may learn problem-solving, information gathering, clinical reasoning, collaboration. Focus is usually how to go about solving the problem presented, not as much what the content of the problem. This is process learning activity.	Designed so that students can learn about clinical cases: diagnosis, management. Problem solving is often required but may be aided.
Focus	Problem solving.	Clinical based knowledge. How to solve specific problems in the profession, or manage/identify problems or diseases.
Advanced study	Little advanced study. Information is often researched during the case.	Advanced study required. Students have been shown to benefit from having baseline knowledge imparted prior to case based learning.
Role of learner	Active participation. Expected to ask questions, explore the topic during the session.	Expected to participate, have done advanced preparation, ask some questions directly related to cases.
Role of teacher	Provide case, information as requested. Expected to not interfere with student interest, even if not directly applied to case. Expected to observe, not too much guidance. Expected to impart the method of problem solving or information gathering.	Provide case or cases. Expected to guide discussion or if written or online, guide content so that specific learning objectives are met. Keeps discussion on tract without allowing much tangential discussion. Ensures that correct answers are known.
Amount of content	Usually one case per session, since the focus is on the process.	Can be one to many. Usually more than one case.
Learning objectives	Loosely followed if at all.	Discrete learning objectives.
Outcomes	The process is the outcome.	Measured outcomes to see if objectives are met.

Figure 3: Differences in CBL and PBL (McLean, 2016)

Williams (2005) considers that PBL is the founding paradigm that models such as CBL have been built and developed upon. Alongside CBL exists several other inquiry-based learning methods with a range of defining features (Figure 4). All have similar pedagogical characteristics to PBL and are considered proportionate variations; however, a clear distinction can be made between PBL and CBL (Williams, 2004). PBL requires no previous knowledge or experience, and the key learning outcome is the process of problem-solving itself. Comparatively, CBL requires students to have an agreed baseline knowledge of the presenting case, and its relevant components, to assist in problem-solving and engage in a meaningful theory-to-practice learning process. The main traits of CBL derived from PBL are that a presented case or problem is used to stimulate deep and critical-thinking, and procure knowledge, skills, and attitudes (Williams, 2005).

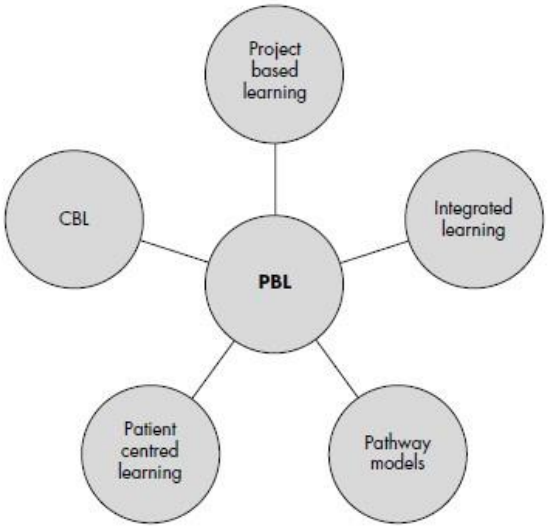

Figure 4: Educational fusions of problem-based learning (Williams, 2004)

In their paper included in this review, Srinivasan et al (2007) remark that CBL utilises a facilitator-led, guided-inquiry approach, with clearly defined learning outcomes and is thus, distinctly different from and more structured than PBL. As part of their comparison, Srinivasan et al (2007) found that fewer than 5% of students and academic staff felt that there were no advantages to the CBL format of delivery. Findings demonstrated that students preferred CBL to PBL. Justification for this fell in several themes; CBL made better use of time; it led to fewer tangents and digressions; it remained grossly focussed throughout; and there was minimal work without benefit. Additionally, over half of the students felt CBL provided greater opportunity for clinical problem-solving skills, embedding their theoretical knowledge into realistic cases. Similarly, Garvey et al (2000) collated qualitative data which revealed that the majority of students involved in the study felt CBL was a worthwhile progression from PBL. Another study, completed by Dupius and Persky (2008), concluded with the findings that "[CBL] helps focus the learners on the key points of a clinical case and encourages a structured approach to clinical problem-solving while allowing facilitators to correct any incorrect assumptions of the learner, which does not always happen in PBL."

Despite their clearly defined differences, the literature does still appear to struggle to distinguish between the two inquiry-led learning methods. Williams (2009) poses the theorem that these problem-solving pedagogical mechanisms that are modelled upon a student-centred and patient-centred philosophy, such as CBL, fall into a hypernym of PBL fusions.

Barriers to effective case-based learning.

McLean (2016) explored CBL in the context of worldwide medical and healthcare fields, discovering significant criticism of the CBL approach to contextualising theoretical

knowledge exists among students. A review of a variety of qualitative findings led McLean (2016) to categorise these challenges into key areas. The areas outlined included: a perceived lack of structure, poor preparation, insubstantial facilitator guidance, as well as challenges with engaging students in autonomous learning practices.

To build an appropriate, engaging, and pertinent case, educators will need to dig into personal and professional experiences, taking into consideration the intended learning outcomes and educational goals of the CBL session, as well as the greater goals of the programme and accrediting professional body, all of which is time-consuming (Radi et al., 2018). In the absence of sound preparation of the facilitator, there is likely to be insufficient preparation for the student, thus leading to a poor baseline and disconnectedness from the outset. Preparation of both students and teachers when utilising the CBL format is key for success. In a qualitative study completed by Nordquist et al (2012) in Sweden, the introduction of a new CBL format was poorly introduced due to the lack of engagement and preparation from the students, as well as the staff. The study clearly demonstrates how inadequate preparation can impact the success of a CBL experience for both academic staff and students, leading to an overall negative experience. That being said, the article does conclude that despite the challenges, the impression was that CBL could increase meaningful, interactive learning. Further to this, Vansteenkiste et al (2009) concluded that students engage more effectively and have a superior learning experience when foundational knowledge is imparted as part of the preparation process.

Alongside preparation, another key barrier that frequently re-occurs in the literature is communication and working relationships. Williams (2009) found that some of the main tenet of CBL, such as student-staff communication and interaction, produced conflicting results. The literature discussed the struggle experienced by both staff and students in association with dysfunctional learner groups, and that the success of CBL programmes is directly related to the learning environment dynamics. Additionally, Radi et al (2018) expressed that students are required to have high-concentration levels, adequate speaking and listening skills, and critical thinking throughout the process of CBL. With this in mind, students are likely to fatigue quickly, further exacerbated by an inadequate learning environment.

The employment of group work in higher education is increasingly common, but as alluded to earlier, it is in group work that individualistic competitiveness is often observed, damaging student's social and learning experiences (Turner, 2009). A study by Xerri, Radford and Shacklock (2018) investigated the influence of student connectedness (with peers and teachers) upon student engagement in academic activities. Their results suggested peer relationships, teacher-student relationships, and students' individual sense of purpose and belonging, were central to student engagement in academic activities and efficiency in a learning environment. These findings highlight the importance of nurturing the key relationships between students and teachers, facilitating a compassionate and purposeful

environment. Gilbert (2017) gives the example of utilising seminar or tutorial settings to embed compassionate learning skills in groups of students, cultivating the necessary qualities required to provide the optimum environment for CBL to be a successful teaching and learning tool. Furthermore, considering the student paramedic's onward career, the experience of a compassionate learning environment enables translation of compassionate behaviour into their future professional practice (Martin et al, 2023).

Use of case-based learning to embed critical thinking and creativity.

Thistlethwaite et al (2012) stated that, overall, "the importance of active and interactive learning was stressed as contributing to efficacy, while CBL was considered a vehicle for the transfer of learning from theory into clinical application and problem-solving". Alongside this implementation of problem solving, Garvey (2000) highlights the requirement for creativity in the use of communication, reasoning, and decision-making skills.

Srinivasan et al (2007) summarised that CBL facilitates the learning group to focus on "creative problem solving with some advance preparation, discovery is encouraged in a format in which both students and facilitators share responsibility for coming to closure on cardinal learning points (i.e., on the continuum between structured and guided)." Whilst Williams (2005) describes the benefits of CBL as including: "the development of intrinsic and extrinsic motivation; allows for individualised learning; encourages self-evaluation and critical reflection; allows scientific inquiry and the development of support provision for their conclusions; integration of knowledge and practice, and development of learning skills".

This pedagogical tool, when embedded in undergraduate paramedic curriculum, offers an opportunity to allow thematic elements to be assimilated in a multifaceted manner (Williams, 2005). Pearson et al (2003) discussed the introduction of their patient-oriented model 'The Double Helix Curriculum' which is underpinned by a similar theory. Basic sciences and clinical practice are overlapped and evolved throughout their 4-year medical degree with themes integrated across all facets of the curriculum in a case-based approach, endeavouring to illustrate the dynamic relationships that contribute to health and disease. Incorporating CBL with the current spiral curriculum model that exists in many undergraduate paramedic programmes, supports educators and students to seamlessly bind the biopsychosocial components of competent paramedic practice through the duration of their studies, whilst embedding the critical-thinking, analytical and creative skills required to dissect and examine the cases presented. By guiding students in this process, educators work to progress them from novice to expert as required by the professional and regulatory bodies, fostering skills for successful careers and lifelong learning.

In consideration of the ISSOTL Grand Challenge of developing critical and creative thinkers in postsecondary education, effectively delivered CBL, with its multifaceted and analytical

requirements, should be considered an effective tool for developing clinical critical-thinking skills (Scharff et al., 2023).

Limitations of this review

In reviewing journal articles and literature sources, the term *case-based learning* was used as the primary search term. It is possible that articles were missed, whereby they described the factors of CBL but were termed differently. Furthermore, foreign language articles were not accessed where there was not an English translation.

In defence of the search strategy, the objective of the journal article was to explore what is currently considered *case-based learning*, and thus this was the term used in the literature search. To greater develop and define CBL, examining the discrete factors of the implementation of CBL was necessary, and in the absence of this, a lack of meaningful exploration would have occurred.

Conclusion and Recommendations

CBL is an inquiry-led, guided pedagogical learning tool that involves using critical thinking skills to analyse a presented case, applying theoretical knowledge to acquire a set of intended learning outcomes. CBL has been seen to improve clinical performance, communication, and patient-centred care. Alongside this, the student-centred philosophy of CBL provides meaningful, relevant education to the undergraduate healthcare professional, facilitated by educators with personal experience and expertise, inducing a deeper level of learning and higher process of cognition. Undergraduate healthcare professionals, with particular focus on student paramedics, will graduate from their programme and be required to interact, assess, and appropriately manage the presenting conditions of patients, and so education that has direct relevance is key. Despite this article focusing primarily on student paramedics and healthcare professionals, it is clear that CBL is harnessed across a variety of disciplines, worldwide.

In reviewing the efficacy of CBL as a pedagogical tool, several key considerations became apparent. Firstly, defining CBL. Despite being a long-established and well-known teaching and learning method, CBL still appears to lack a clear definition, likely contributing to its lack of standardisation. CBL consistently appears to have four key components: a clinical case study; a facilitated, learner-led inquiry process; effective preparation whereby enough information is presented prior to the activity; and a well-informed facilitator guiding the learners towards the intended learning outcomes. Thus, the following recommendation is made as a definition of CBL: a well-established pedagogical method of learning and teaching whereby a clinical case is analysed and dissected using inquiry-based learning methods, building upon underpinning knowledge to link theory to practice through a facilitator-guided, deeply cognitive experience, on the continuum between structured and guided learning.

Secondly, CBL versus PBL. PBL is resoundingly considered to be the founding paradigm of CBL, as well as several other inquiry-based learning methods. Their differences are clearly defined in the literature, though some confusion still exists, and this could be a contributing factor to the perceived barriers of CBL. Therefore, it is imperative when employing CBL as a teaching and learning method, that the key aspects of guided inquiry and adherence to learning objectives are closely attended to.

Thirdly, the barriers to effective case-based learning. Two dominant barriers presented themselves in the literature: preparation and environment. Lack of preparation, for both students and facilitators, was very prevalent as a challenge in the implementation of CBL, causing a breakdown in student engagement and poor knowledge-uptake. Alongside this, a dysfunctional learner group impeded a safe learning environment, therefore stunting learner involvement and participation. Thus, the following recommendation is made as a standardised approach to CBL (Figure 5). By introducing foundational knowledge and learning environment ground rules as part of the standardised approach, educators can work to mitigate the current barriers that exist in the literature concerning the inefficacy of CBL.

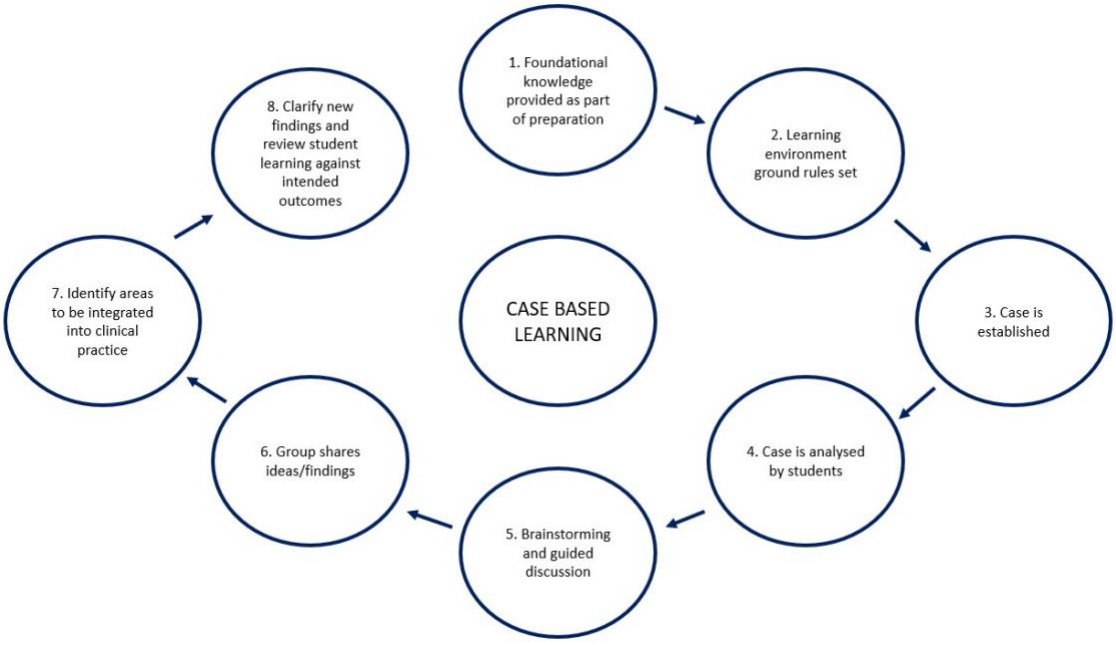

Figure 5: Recommended case-based learning implementation process

CBL appears to provide a fantastic platform for contributing to the graduate attributes of critical thinking and creativity, particularly for undergraduate health professionals, namely student paramedics from both a university and professional-body perspective. The literature highlights findings that creative problem-solving, reasoning, communication and critical analysis are all skills nurtured by the process of CBL when implemented effectively with adequate preparation. The ISSOTL Grand Challenge of developing critical and creative

thinkers in postsecondary education can be targeted, in part, by the application of visionary, meaningful and captivating CBL.

In summary, CBL imparts relevance to undergraduate healthcare professionals, tying theory to practice and enabling the evolution of critical, creative thinkers with inquiry-led, student-centred pedagogical methods. Though much evidence is currently available, and recommendations have been made from the findings, further research is necessary to explore these themes in direct relation to the use of CBL in the education of undergraduate student paramedics, encouraging educators to continue to be innovative in education of paramedic students.

References

Albanese, M. and Mitchell, S., (1993). "Problem-based learning: A review of literature on its outcomes and implementation issues," Academic Medicine.

Bourdieu, P. (2000) Pascalian Meditations. Stanford, CA.: Stanford University Press

Bruner, J. (1960) "On learning mathematics1," The Mathematics Teacher, 53(8), 610–619. Available at: https://doi.org/10.5951/MT.53.8.0610.

Clarke, V. (2018) "The Theory-Practice Relationship in Paramedic Undergraduate Education." Available at: https://doi.org/10.18745/TH.21089.

College of Paramedics [Internet]. The Journey of the College; 2017. Available from: https://www.collegeofparamedics.co.uk/about_us/the-journey-of-the-college. Accessed on 26th April 2024.

College of Paramedics (2024) Paramedic Curriculum. 6th Ed.

Dupuis, R., Persky, A. (2008) "Use of case-based learning in a clinical pharmacokinetics course," American journal of pharmaceutical education.

Flaherty, H. (2020) "Bridging the gap between research and practice: A discussion about how to integrate evidence-based interventions in clinical practice through education.," The Journal of Practice Teaching and Learning. Available at:https://doi.org/10.1921/jpts.v17i2.1302.

Gade, S. and Chari, S. (2013) "Case-based learning in endocrine physiology: An approach toward self-directed learning and the development of soft skills in medical students," American Journal of Physiology - Advances in Physiology Education, 37(4), pp. 356–360. Available at: https://doi.org/10.1152/ADVAN.00076.2012.

Gamble, A., Golding, C., Wilkinson, T., (2022) "The scholarship of teaching and learning critical thinking: finding a way forward with evidence from a medical teaching context," International Journal for the Scholarship of Teaching and Learning, 16(3), p. 7. Available at: https://doi.org/10.20429/ijsotl.2022.160307.

Garvey, M., (2000) “Multidisciplinary case-based learning for undergraduate students,” European Journal of Dental Education, 4(4), pp. 165–168. Available at: https://doi.org/10.1034/j.1600-0579.2000.040404.x.

Gilbert, T. (2017) ‘When Looking Is Allowed: What Compassionate Group Work Looks Like in a UK University’ in P. Gibbs (1) The Pedagogy of Compassion at the Heart of Higher Education. Springer International Publishing AG. pp. 189-202

Heft, I., Scharff, L. (2017) “Aligning Best Practices to Develop Targeted Critical Thinking Skills and Habits.,” Journal of the Scholarship of Teaching and Learning, 17(3), pp. 48–67. Available at: https://doi.org/10.14434/josotl.v17i3.22600.

Li, S., Yu, B. and Yue, J. (2014) “Case-oriented Self-learning and Review in Pharmacology Teaching,” The American Journal of the Medical Sciences, 348(1), pp. 52–56. Available at: https://doi.org/10.1097/MAJ.0000000000000197

Margolis, G. et al. (2009) “Strategies of high-performing paramedic educational programs,” Prehospital Emergency Care, 13(4), pp. 505–511. Available at: https://doi.org/10.1080/10903120902993396

Martin, A. et al. (2023) “The role of compassion in higher education practices,” Journal of University Teaching & Learning Practice, 20(3). Available at: https://doi.org/10.53761/1.20.3.01.

McLean, S. (2016) “Case-Based Learning and its Application in Medical and Health-Care Fields: A Review of Worldwide Literature,” Journal of Medical Education and Curricular Development, 3.

Michau, R. et al. (2009) “An investigation of theory-practice gap in undergraduate paramedic education,” Springer, 9(1). Available at: https://doi.org/10.1186/1472-6920-9-23.

Nordquist, J. et al. (2012) “Case-Based Learning in Surgery: Lessons Learned,” World journal of surgery, 36(5), pp. 945–955. Available at: https://doi.org/10.1007/s00268-011-1396-9.

Partnership for 21st Century Skills. (2008). 21st Century Skills. Education & Competitiveness: A Resources and Policy Guide. [Online]. Retrieved from: http://www.p21.org/storage/documents/21st_century_skills_education_and_competitiveness_guide.pdf. Accessed on 26th April 2024.

Pearson, T. et al. (2003) “Integration of the case-based series in population-oriented prevention into a problem-based medical curriculum,” American Journal of Preventive Medicine, 24(4), pp. 102–107. Available at: https://doi.org/10.1016/S0749-3797(03)00030-8.

Perez, A. et al. (2023) “Multiple cases in case-based learning: A qualitative description study,” European Journal of Dental Education, 27(4), pp. 1067–1076. Available at: https://doi.org/10.1111/eje.12900.

Radi Afsouran, N. et al. (2018) “Case-method teaching: advantages and disadvantages in organizational training,” Journal of Management Development, 37(9–10), pp. 711–720. Available at: https://doi.org/10.1108/JMD-10-2017-0324/FULL/HTML.

Sam, C. et al. (2015) “Building capacity in laboratory medicine in Africa by increasing physician involvement: a laboratory medicine course for clinicians,” American journal of clinical pathology, 143, pp. 405–411. Available at: https://doi.org/10.1309/AJCPNYT1WPSRCLC6.

Scharff, L. et al. (2023) Grand Challenges for SoTL #1., International Society for the Scholarship of Teaching and Learning. Available at: https://issotl.com/grand-challenges-for-sotl/gc-sotl-1/. Accessed on 26th April 2024.

Srinivasan, M., Wilkes, M., Stevenson, F. (2007) “Comparing problem-based learning with case-based learning: effects of a major curricular shift at two institutions,” Academic Medicine.

Sturdy, S.-B. of the H. of and 2007, undefined (2007) “Scientific method for medical practitioners: the case method of teaching pathology in early twentieth-century Edinburgh,” JSTOR. Available at: https://doi.org/10.1353/bhm.2007.0093.

Thistlethwaite, J. et al. (2012) “The effectiveness of case-based learning in health professional education. A BEME systematic review: BEME Guide No. 23,” Medical teacher, 34(6). Available at: https://doi.org/10.3109/0142159X.2012.680939.

Turner, Y. (2009). ‘Knowing me, knowing you, is there nothing we can do?’ Pedagogic challenges in using group work to create an intercultural learning space. Journal of Studies in International Education, 13 (2), 240– 255.

Vansteenkiste, M. et al. (2009) “Motivational profiles from a self-determination perspective: the quality of motivation matters.,” Journal of educational psychology. Available at: https://doi.org/10.1037/a0015083.

Williams, B. (2004) “The Implementation of Case-Based Learning - Shaping the Pedagogy in Ambulance Education,” Australasian Journal of Paramedicine, 2, pp. 1–7. Available at: https://doi.org/10.33151/AJP.2.3.286.

Williams, B. (2009) “Do undergraduate paramedic students embrace case based learning using a blended teaching approach? A 3-year review. Australasian Journal of Educational Technology, 25(3), pp. 421–439. Available at: https://ajet.org.au/index.php/AJET/article/view/1143

Williams, B. (2005) “Case based learning—a review of the literature: is there scope for this educational paradigm in prehospital education?” Emergency Medicine Journal, 22, pp. 577–581. Available at: https://doi.org/10.1136/emj.2004.022707.

Xerri, M.J., Radford, K. and Shacklock, K. (2018) “Student engagement in academic activities: a social support perspective,” Higher Education, 75(4), pp. 589–605. Available at: https://doi.org/10.1007/S10734-017-0162-9/METRICS.

The impact of Authentic Assessment on Employability of International Students studying a UK Human Resource Management Master's degree.

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Abstract

This discussion paper explores the difficulties faced by master's graduates who are seeking employment after graduating from university. These challenges are particularly confounded for international students who may not have any previous experience in the subject field or in the UK. This paper investigates how authentic assessment may help International Students on a Human Resources Management (HRM) Master's degree build employability skills and in doing so, reduce some of the barriers experienced by these entrants to the labour market. Research on these students' expectations on finding a job in HRM after graduation are high and therefore lecturers should consider how they can provide opportunities for practical, workplace learning in their curriculums.

The findings recommend that whilst there are challenges, such as time and effort in embedding authentic assessment in modules, the outcomes can be significant and should not be ignored. It is therefore recommended that educators consider a range of opportunities for authentic assessment alongside more traditional methods using innovative technologies and explore opportunities for real-world experience, whether in a work or simulated setting.

Introduction

In today's markets where demonstrable skills and abilities in graduates is essential (Sotiriadou *et al*., 2019), it is important that we equip our graduates not only with an understanding of the key topics but the necessary soft skills that they will need to succeed in their future careers. This is even more necessary for non-domestic students seeking employment in the UK, who face the additional hurdles associated with visa requirements, language barriers and lack of UK work experience.

In this discussion paper we review the literature pertaining to the development of graduate skills and the use of authentic assessment to bridge the knowledge–practitioner gap, as well as the role of authentic assessment in engaging students in their learning. The research will incorporate feedback from students on this module to ensure that a student-centric approach is maintained.

Whilst the paper is applied to students studying Resourcing on an MA HRM programme, this is an important topic for any academic professional teaching higher education and the results are intended to be generalisable across all fields of Higher-Level Education practice.

Background

Today's workplace is associated with change (Ashford-Rowe *et al*., 2014) and the HRM field, like many others, can be unpredictable, requiring quick responses, a high level of interpersonal skills and emotional intelligence. Yet there is debate if graduates are prepared for the world of work (Gold *et al*., 2013).

Employability skills have been a high-profile priority for universities in recent years, with pressure applied from both employers and government to deliver highly skilled, able graduates into the workplace. In a paper by Sotiriadou *et al.* (2019), they discuss the difficulties graduates face when entering the labour market and the importance of equipping students with the right skills and attributes to not only gain but remain in employment. In particular, they emphasise the importance of communication skills.

It is commonplace for universities to publish graduate attributes and to align their teaching to help students develop the necessary life-long skills for employment. However, employability barriers facing non-domestic graduates may be even greater, with communication impacted by language barriers and a lack of work experience in the UK. This means that supporting these students to develop demonstrable qualities valuable to employers is paramount, particularly when considering the high levels of debt, they may have incurred to gain a UK education. This debt has further knock-on effects as students seek lower cost accommodation often resulting in long distances travelled into university, reliance on public transport which may be unreliable and a need to work to support themselves and their families. This in turn can impact their engagement and participation in their degree programme and in a worst-case scenario, may lead to academic offences. The significance is clear when we consider at least one fifth of university students are from overseas (HESA, 2020).

We need to move away from assessments that encourage students to explore AI, essay mills and contract cheating and instead, establish assessments that engage the student in a way they can see the outcome has a tangible benefit to them. That they can recognise that they have gained some form of knowledge, skill, or ability that they will take forward in the future, encompassing principles of fun and the building of community.

In order to address this dilemma, the questions considered in the remainder of this paper are:

- Can authentic assessments help non-domestic students with little or no experience in their chosen field increase their employability?
- Can authentic assessment help students engage with their learning and gain valuable skills?

For the purposes of this discussion paper, the focus is on a cohort of students studying resourcing as part of an HRM degree. The resourcing subject is fundamental to the practice of HRM and graduates will be expected to demonstrate practical skills, such as interviewing, when entering the workplace as professionals. Furthermore, this cohort comprises solely of non-domestic students and the incidence of suspected academic misconduct is on the increase.

What is Authentic Assessment?

The concept of authentic assessment originates from the US secondary school system and was used in the 1990's as a means to drive standardisation and encourage students to reflect on the key learnings from performing tasks (McArthur, 2022). The concept can be applied to any field of study, not just those associated with specific job types and can be carried out at any educational level.

It is difficult to find a precise definition of authentic assessment as authors differ on their epistemological or philosophical viewpoints, however there is consistency in putting the learner's interests first (McArthur, 2022). For the purposes of this discussion, we use the definition from Gulikers *et al*., (2004 p.69), who express authentic assessment as 'an assessment requiring students to use the same competencies, or combinations of knowledge, skills, and attitudes, that they need to apply in the criterion situation in professional life'. Here the emphasis is on the development of career enhancing skills that can be applied in the 'real world' (Ashford-Rowe *et al*., 2014).

McArthur (2022) would argue such a definition is too narrow and there is an over-emphasis on ability linked to practice that ignores the wider context of society and the students' need for wider satisfaction than simply salary. She further argues by putting authentic assessment into a wider context, this would also impact our ability to increase inclusivity and decolonise the curriculum. However, whilst a compelling argument, McArthur's paper lacks empirical evidence, and it could be argued a student's motivation for learning will be contextual.

Authentic assessment can take a variety of forms and different types of assessment may be more relevant for different fields of study. Examples might include presentations, live interactions, portfolios, case studies, reflective work, Vivas and team activities (Sokhanvar *et al*., 2021). It is highly prevalent already in some fields such as nursing (Gulikers *et al.*, 2006), but in other areas such as business schools, there is scope to expand its use further (Manville, Donald and Eves, 2022).

Vilarroel *et al.* (2018) in a literature review spanning 1988 to 2015 identified 13 characteristics of authentic assessment grouped into three broad categories. They found authentic assessment needs to have an element of realism, must be cognitively challenging and students are able to recognise good performance through 'evaluative judgement'.

McArthur (2022) suggests in order for the assessment to be effective the intended learning outcomes need to be clearly evident to the students.

Ashford-Rowe *et al.* (2014) identify eight critical elements they believe are necessary for authentic assessment to achieve desired outcomes. These are:

- The assessment should produce some form of product or performance outcome and the student should be able to recognise the skills and knowledge they are developing.
- The assessment needs to be challenging for the student and requires them to use a range of skills and knowledge.
- The assessment needs to be aligned to real-life scenarios to ensure knowledge is transferred during the assessment process.
- Students need to reflect and self-evaluate on their performance (metacognition)
- The skills and abilities demonstrated need to be relevant to the workplace.
- The environment and tools used need to be appropriate for the workplace.
- Feedback on performance needs to be provided.
- There needs to be an element of teamworking or social collaboration.

Whilst these studies use authentic assessment as a pedagogic model in its own right, other authors have tried to align authentic assessment with more traditional pedagogic foundations. Pitt and Quinian (2022) in their review of assessment and feedback for AdvanceHE suggest researchers have been using Anderson and Krathowhl's (2001) revised Bloom's taxonomy to help explain the cognitive processes involved with authentic assessment. These revised categories are remembering, understanding, applying, analyzing, evaluating and creating and seem to capture more of the real-world applicability skills required by students. For example, the adoption of create rather than synthesis becomes more relevant when we consider a real-world assessment. Furthermore, they adopt an action-orientated approach using verbs instead of nouns.

Wiewiora and Kowalkiewicz (2019) use Kolb's (1984) model to help explain the processes involved in authentic assessment. They point to the alignment between experiential learning and assessment based on real life scenarios, with the opportunity for concrete experience, reflective observation, abstract conceptualisation and active experimentation.

Authentic Assessment and Student Employability

Employability is defined as 'the potential a graduate has for obtaining and succeeding in a graduate-level position' (Knight and Yorke, 2004 p.4) and is a primary goal of the Teaching Excellence and Student Outcomes Framework (TEF), which requires that students 'are able

to progress into employment … and their qualifications hold their value over time' (OFS, 2022).

With students at the centre of our teaching, it is important to understand how authentic assessment can help our learners to achieve the attributes necessary for employability. Sokhanvar *et al.* (2021) identify a number of skills development benefits associated with authentic assessment:

- Enhanced communication skills
- Teamworking
- Development of critical thinking and problem-solving skills
- Ability to apply what they have learned to real life situations
- Reflection helps to increase self-awareness
- The student gains greater confidence in their abilities

Pitt and Quinian (2022), however, point out that this review lacks 'evidence standards for selection or reporting'.

A study by Wiewiora and Kowalkiewicz (2018) on management degree students undertaking authentic assessment suggested students gained increased self-concept' for example through greater self-awareness and self-efficacy. They also identified an increased comprehension of key concepts in management theory, and they developed leadership skills, including business writing.

However, students do not always feel they are gaining the employability skills from their degrees. For example, The Engineer (2012) found just 43% of graduates in the engineering sector felt they had the necessary skills for the workplace. Amongst issues cited was the lack of practical application in their studies.

The wider impact of authentic assessment

In answer to the question of whether authentic assessment can help enhance the student experience and drive increased participation, Sokhanvar *et al.* (2021) identified increases in engagement, satisfaction and effort to achieve learning goals as a direct result of applying authentic assessments. Similarly, Shahnia and Yengejeh (2019) found students reported greater learning and satisfaction through authentic assessments.

Meanwhile, a study from Simpson (2016) demonstrated an increase in student attainment, with pass grades higher than with traditional assessment. However, for each of these studies it is difficult to correlate the outcomes directly with authentic assessment and not the biproduct of, for example, increased collaboration (Pitt and Quinian, 2022).

Other research has pointed to greater academic integrity as a result of authentic assessment as students are required to create their own interpretations and responses to information and it becomes more difficult to contract cheat by hiring somebody else to do the work (Sotiriadou *et al*., 2019). Providing clear instructions on the assessment, for example by video, and making the assessment engaging also helped reduce academic integrity offences.

Understanding the needs of the student

McArthur's (2022) assertions on the need for a societal element in assessment to drive engagement may be realistic for today's learner, however, to better understand the needs of the students a survey was conducted to understand some of the key drivers for the current Resourcing HRM intake at the University of Hertfordshire.

Methodology:

Students were sent a mid-module questionnaire, which was created in Mentimeter. Additional questions were added at the end relating to this study. The link for the questionnaire was shared in an announcement to all students and was also shown during tutorials. The purpose of the questionnaire and the additional questions was explained to the students.

The choice of Mentimeter enabled anonymisation of responses, use of multiple devices to complete the questionnaire and provided the opportunity to complete the questions asynchronously.

Two questions were open question format and sought to understand:

- Why did the student sign up for this degree?
- What would the student like to gain at the end of their degree?

The third question used an ordinal scale to measure how much experience the student had in HRM.

Limitations of the research:

It was decided not to ask the students whether they felt the current assessments provided them with the skills necessary for a future role. On hindsight this information could have been valuable to help understand if the current assessment methodology was meeting students' needs and creating engagement.

The survey went out to 171 students; however, the participation rate was low with n=9 (5%). This may be due to the number of surveys the students were receiving at the same time. Given the nature of the questions, conducting a focus group or interviews may have resulted in richer data.

Whilst there was a participation of 5%, not all participants responded to the open field boxes that the student had to write in. Participation in all questions may have been increased if students were asked to select the reason from a list of options. This would also have enabled quantitative, rather than qualitative, analysis of the responses.

Results:

Due to the low participation rate, interpretation of the results is limited.

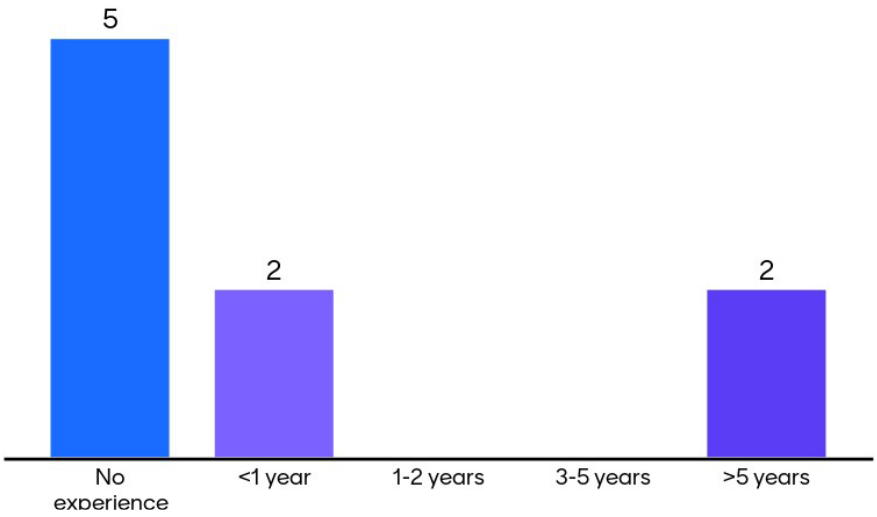
- *Why did the student sign up for this degree?*

For this question, only 6 of the 9 students responded. Of those students, five indicated they want to become HRM practitioners. One responded they were already in HRM but wanted to increase their knowledge.

- *What would the student like to gain at the end of their degree?*

For this question, 5 of the 9 students responded. All respondents agreed they were looking for a job as quickly as possible in HRM.

- *How much work experience in HRM do you have?*



This data suggests our students have minimal experience in their chosen field of study. 55% indicated they had no experience in HRM, whilst only 25% indicated they had >5 years of experience. No students indicated they had experience of more than 1 year but less than 5 years.

Discussion

Whilst limited in validity and reliability, the results of the research into student needs provides us with three fundamental pieces of information in relation to the potential need for authentic assessment.

If we assume those that have responded are representative of the larger cohort of students, we can deduce students are doing their degree because they want a future career in HRM, and it is important this happens as soon as they graduate. However, three quarters of these students come from a non-HRM background or have relatively little experience in HRM, which will make it more challenging to find their first role.

The recruitment agency Indeed, (2023), highlight that if you are seeking to find a job in HRM with no previous experience, you will need to be prepared to undertake an entry level role and work your way up. This is likely to be unpalatable to a student that has spent 12-24 months gaining a Level-7 qualification. However, even with experience in their home country, Sofat (2021) found employers would prioritise host country experience and would not consider experience overseas as relevant in the host country.

Given these students have come to the university with a dream of their ideal job (Sofat, 2021), it is important as educators that we aim to support these students not only gain their degree but have a competitive edge over other students seeking roles after graduation. This also enhances the university's reputation as an institution that cares about the future of its students.

A mitigant to the lack of experience may be where the student can demonstrate they have gained practical skills alongside their studies (Blackmore *et al.* (2017). This means gaining real world application either through practice or through internships / placements (The Engineer, 2012).

Unfortunately, with larger cohorts, the feasibility of more than 170 students all gaining some form of internship / work placement is challenging, if not unrealistic. We therefore need to consider alternative ways to help them gain real world application and this is where the use of authentic assessment could play a pivotal role. In the case of HRM Resourcing students,

The other important aspect in supporting students to increase their prospects of a role after graduation is the avoidance of academic misconduct. When a student uses an alternative method to generative a submission and pass this off as their own work, it is unlikely they have undergone any learning during the process, much less developed any employability skills. The practice of doing and reflection on that process is an essential element of pedagogic theory (Kolb, 1984) When faced with an employer, it will be difficult for them to demonstrate knowledge and practical application as they simply will not have the understanding, much less the experience. However, if as Shahnia and Yengejeh (2019) have stated, authentic assessment can generate engagement and learning by including elements of skills that the student will need in the future, we have an opportunity to help the student's employability and possibly help them to realise their expectations from their qualification.

If we acknowledge we want to support students increase their employability and this can be done through authentic assessment, we need to consider what will authentic assessment look like? For this, it is important we embed authentic assessment from the early stage of the degree, not add it as an afterthought at the end of the course (Jackson and Tomlinson, 2020).

The starting point, whatever the discipline being studied, is to consider precisely what skills and abilities the student needs to replicate for the workplace and how can these be assessed. Will their future employer expect them to write essays in the workplace or will their work output take a different form? In the case of resourcing students, this can result in a portfolio of work that can be assessed, ranging from carrying out job analysis, creating job descriptions, CV sifting, interviewing, and marking candidates, designing onboarding interventions, using talent grids, and creating succession plans. Here the students demonstrate ability to communicate effectively through written and spoken exercises that are specific to role requirements, and they gain concrete experience of how the theory is applied to practice. This can then be used as evidence on CVs and during interviews when they seek employment after their studies.

However, authentic is not a simple panacea and comes with challenges. If not appropriately designed, learning outcomes may not be as intended or worse, will detrimentally impact the learning of the student resulting in decreased esteem (Gulikers et al., 2006; Gulikers et al., 2008). There is also a risk that implementing different types and styles of assessment across a programme could result in confusion for students.

International cohorts at PG level in UK universities can be high in numbers and developing and assessing an activity that can be used on a widespread scale can be difficult. It takes time, creative energy, and resources to design and facilitate on a cohort of more than 170, and this is something lecturers are often in short supply of (Manville, Donald and Eves, 2022).

However, as IT and the use of AI continues to develop, there may be opportunities for more creative and realistic scenarios. For example, a module at the university of Hertfordshire that is aligned to a professional body has been working with the careers service and IT division to create a bespoke interviewing tool that will allow students to be recorded answering questions related to the body's standards. The assessors can watch the videos and rate the students' responses.

Furthermore, the module leader does not need to work alone. Sharing assessment ideas with the teaching team, internal and external moderators or discussing as Programme team could help to generate new ideas, pulling on experience from practice, as well as pedagogy, and ensuring a balanced approach.

A final consideration is that the university has strong relationships with industry and has Employer Advisory Boards and it may be possible to leverage these relationships to create authentic assessment, understanding what type of assessment would 'reflect real-world practices and develop appropriate workplace skills' (Bowater, Rayment and Loughlin, 2024). Inviting representatives from a company to talk about their work can help bring concepts to life for the students. Alternatively organising a site visit so students experience the work environment and can see how work is performed. Does a company have a specific issue that the students could work on in project groups? Can their work be showcased to future employers? There is a myriad of opportunities that collaboration with industry might bring to authentic assessment.

Recommendations

In considering the points above, it would seem there is an important role for authentic assessment no matter the discipline being taught whether it is sciences, humanities, arts, or business, however, it needs to be approached carefully.

To ensure students are able to experience the best mix of skills development opportunities, the use of authentic assessment should be approached at a programme level. This would ensure a range of different opportunities targeting different aspects of employability are implemented and will help ensure consistency in application of assessment types.

Given the challenges on time and energy for creating authentic assessments, it is recommended that as a starting point, educators consider a mixture of traditional and authentic assessment in their modules (Villarroel *et al*., 2018). It is also suggested that module leaders work with other teaching practitioners to develop ideas.

We should consider engaging with our industry partners to understand exactly what they want from our graduates and involve them in the design of our assessments. Providing some form of work experience for students, on which they then reflect could be invaluable in helping the students gain experience and build their CVs. Zhao and Cox (2022) suggest day experiences in the workplace, which could be more feasible to organise where larger cohorts are concerned. Alternatively organising a site visit or a speaker to address the students.

Finally, module planners and lecturers should look outside of their subject area to understand what other schools or departments are doing. For example, sharing best practice, or involving the IT team to ensure they are leveraging the latest IT developments, driving the best student outcomes whilst ensuring more efficient practices.

Future Research

To take this paper further, it would be beneficial to study the link between authentic assessment and actual employment post-graduation for this HRM resourcing cohort, measuring employability before the assessment is implemented and after.

Conclusion

It is argued here that authentic assessment is important to support students develop employability skills. Of course, we cannot control factors when the graduate goes for a job interview, such as the student's preparation, ability to interview on the day or how they complete tests, and we cannot control employer attitudes and discrimination. However, if we as academics can make the path just a little bit easier then I believe we are fulfilling our roles. We need to be prepared to commit energy and think outside the box to ensure we are creating incredible learning opportunities that could change the lives of our students when they leave the university and begin their new careers.

References:

Anderson, L W and Krathwohl, D R (2001) A taxonomy for learning, teaching and assessing: A revision of Bloom's Taxonomy of Educational Objectives. Complete Edition. New York: Longman

Ashford-Roe, K., Herrington, J., and Brown, C. (2014). Establishing the critical elements that determine authentic assessment. Assessment and Evaluation in Higher Education, 39 (2), 205-222

Blackmore, J., Gribble, C., & Rahimi, M. (2017). International education, the formation of capital and graduate employment: Chinese accounting graduates' experiences of the Australian labour market. Critical Studies in Education, 58(1), 69-88.

Bowater, R., Rayment, S. and Loughloin, M. (2024). Partnering with industry for authentic experiences and assessment. Times Higher Education. Available at: Partnering with industry for authentic experiences and assessment | THE Campus Learn, Share, Connect (timeshighereducation.com) [Accessed 05 August 2024]

Gold, J., Holden, R., Stewart, J., Iles, P and Beardwell, J. (2013). Human Resource Development. Palgrave Macmillan, Basingstoke. 2nd Ed.

Gulikers, J.T.M., Bastiaens, T.J., and Kirschner, P.A. (2004). A five-dimensional framework for authentic assessment. Education Technology Research and Development, 52(3), 67-86

Gulikers, J., Bastiaens, T., & Kirschner, P. (2006). Authentic assessment, student and teacher perceptions: the practical value of the five-dimensional framework. Journal of Vocational Education & Training, 58(3), 337-357.

Kester, L. (2008). Authenticity is in the eye of the beholder: student and teacher perceptions of assessment authenticity. Journal of Vocational Education & Training, 60(4), 401-412. https://doi.org/10.1080/13636820802591830

Higher Education Statistics Agency [HESA]. (2020). Higher education student statistics: UK, 2018/19. Retrieved January 19, 2021, from https://www.hesa.ac.uk/news/16-01-2020/sb255-higher-education-student-statistics

Indeed. (2023). How to get HR jobs with no experience. Available at: How to get HR jobs with no experience (Plus job list) | Indeed.com UK [Accessed 02 April 2024]

Jackson, D., & Tomlinson, M. (2020). Investigating the relationship between career planning, proactivity and employability perceptions among higher education students in uncertain labour market conditions. Higher Education, 80, 435-455

Knight, P., & Yorke, M. (2004). Learning, curriculum and employability in higher education. Routledge Falmer

Kolb, D. A. 1984. Experiential learning: Experience as the source of learning and development. Prentice-Hall: New Jersey

Manville, G., Donald, W. E., and Eves, A. (2022). Can Embedding Authentic Assessment Into the Curriculum Enhance the Employability of Business School students? GiLE Journal of Skills Development. Vol.2, No.2.

McArthur, J. (2022). Rethinking authentic assessment: work, well-being and society. Higher Education 85: 85-101

OFS (2022). The regulatory framework for higher education in England. Office for Students. Available at: The regulatory framework for higher education in England - Office for Students [Accessed 07 April 2024]

Pitt, D. and Quinian, K.M. (2022). Impacts of higher education assessment and feedback policy and practice on students: a review of the literature 2016-2021. Available at: https://www.advance-he.ac.uk/knowledge-hub/impacts-higher-education-assessment-and-feedback-policy-and-practice-students-review [Accessed 21 February 2024]

Shahnia, F and Yengejeh, H H (2019) 'Various interactive and self-learning focused tutorial activities in the power electronic course', Transactions on Education, 62 (4): 246-255.

Sofat, S. (2021). Barriers of International Graduates seeking Employment after graduation: A Systematic Review. Auckland University of Technology

Sokhanvar, Z., Salehi, K., and Sohanvar, F. (2021). Advantages of authentic assessment for improving the learning experience and employability skills for higher education students: A systematic literature review. Studies in Educational Evaluation, 70, 101030

Sotiriadou, P., Logan, D., Daly, A., and Guest, R. (2019. The role of authentic assessment to preserve academic integrity and promote skill development and employability. Studies in Higher Education, 1-17

Villarroel, V., Bloxham, S., Bruna, D., Bruna, C., and Herrera-Seda, C. (2018). Authentic assessment: Creating a blueprint for course design. Assessment and Evaluation in Higher Education, 43(5), 840-854

Wiewiora, A., and Kowalkiewicz, A. (2019). The role of authentic assessment in developing authentic leadership identify and competencies. Assessment and Evaluation in Higher Education, 44(3), 415-430

Zhao, X and Cox, A. (2022). Chinese students' study in the UK and employability: the views of Chinese employers, students and alumni, and UK teachers. Journal of Education and Work. Vol 35, issue 4

Potential barriers to Interprofessional Learning in Non-Medical Prescribing programs and strategies to overcome them.

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Abstract

Integrating interprofessional education (IPE) into healthcare curricula, particularly within the non-medical prescribing (NMP) program, is crucial for addressing global healthcare challenges and achieving the United Nations' sustainable development goals. This article explores the significance of IPE as a pedagogic approach in crafting and executing the NMP curriculum, aiming to enhance collaboration among healthcare professionals from diverse disciplines. Drawing from current literature, including studies examining the effectiveness of IPE in medical and healthcare education, this article identifies potential barriers to implementing IPE within the NMP program. These barriers include diverse disciplinary differences, hierarchical dynamics, control of professional boundaries, and power struggles among healthcare professionals.

This article proposes various strategies to overcome these barriers. Educational institutions are urged to create conducive learning environments that facilitate pedagogical approaches such as flipped learning and intentional physical infrastructure design to promote this. Academics are called upon to design interconnected curriculum frameworks that encourage meaningful interactions among students from different professional backgrounds. Additionally, students play a crucial role in peer learning and simulative practice, contributing unique perspectives and experiences to interprofessional learning activities.

The article concludes with recommendations for stakeholders, emphasizing the need for collaborative efforts among educational institutions, academics, and students to integrate IPE effectively into the NMP curriculum. These efforts aim to equip healthcare professionals with the attitudes, values, and skills necessary for effective teamwork in addressing the complex healthcare needs of the future. While the primary focus of this article is to enhance IPE within the NMP program, the insights gained here can be applied to other educational programs involving professionals from two or more disciplines sharing their learning environment.

Introduction

In 2015, the United Nations General Assembly established 17 sustainable development goals, aiming to enhance the well-being of the global population. Among these goals is ensuring universal access to good health and well-being across all age groups (WHO, 2016). Meeting this target by 2030 necessitates an additional 18 million healthcare workers globally (WHO, 2016). Various strategies have been proposed to address this shortfall, including promoting Interprofessional Education (IPE) within healthcare. IPE involves

professionals from diverse disciplines sharing their expertise and collaborating for improved health outcomes (Sullivan et al., 2015).

In the United Kingdom, the government has tasked the National Health Service (NHS) with developing a long-term plan to bolster staff training, retain the current workforce, and reform NHS services (NHS England, 2023). Non-medical prescribing program is pivotal in realizing NHS England's objectives. The NMP curriculum provides a unique platform for healthcare professionals from different clinical backgrounds, such as Nurses, Midwives, Pharmacists, Paramedics, Physiotherapists, Podiatrists, and Radiographers, to engage in collaborative learning within an educational framework. Moreover, regulatory bodies mandate educational institutions employ an interprofessional education model to design and deliver NMP programs. Consequently, this study will delve into the significance of IPE as a pedagogic approach in crafting and executing the NMP curriculum. It will explore existing research on this subject, identify challenges or barriers to implementing IPE, and evaluate pedagogic theories that could effectively surmount these obstacles and integrate IPE into NMP programs.

Current Literature

Traditionally, Nurses and other healthcare professionals have cooperated in clinical settings such as hospitals and communities. While numerous studies have assessed the efficacy of interprofessional learning among these professionals in clinical environments (Celio et al., 2018; Bell et al., 2017; Khan et al., 2014), the effectiveness of such learning in educational settings remains underexplored. Each discipline brings unique expertise, and mutual learning among these professionals can enrich the educational experience.

A literature review was conducted to examine the existing evidence regarding IPE outcomes within the NMP program. While evidence specific to the NMP program was limited, numerous studies have investigated the effectiveness of IPE among medical and other healthcare professionals. Two Lecturers from the University of Scotland, who were involved in teaching within the NMP program, assessed IPE's impact on various professionals within the NMP program (McTaggart and Moore, 2022). They employed case-based interprofessional discussions and encouraged student participation in online meetings to share practical experiences. While initial engagement hesitancy was observed among some participants, the group ultimately found value in these interactive sessions and appreciated their learning opportunities. Additionally, the Lecturers observed that IPE facilitated a deeper understanding of challenging pharmacological concepts and fostered the development of robust professional networks within the group. However, the study's limitation lies in its failure to measure participants' pre-intervention knowledge status, leaving uncertainty about whether the observed outcomes directly resulted from the intervention.

Moreover, Cohen et al. (2006) conducted a study assessing Parkinson's Disease knowledge among healthcare trainees from various professional backgrounds, including medicine, nursing, and allied healthcare. These trainees engaged in collaborative learning with peers from different disciplines, and outcome data were compared with a control group to ensure internal validity. Qualitative data collected before and after the intervention demonstrated a significant improvement in disease knowledge among the trainees. While this finding underscores the efficacy of IPE in enhancing subject knowledge, the study failed to investigate whether participants overcame pre-existing stereotypes about other professionals before engaging in IPE activities.

Addressing this gap, Eccott et al. (2012) studied students from diverse healthcare backgrounds, including doctors, nurses, pharmacists, occupational therapists, and physiotherapists, for an IPE-based module. They assessed participants' attitudes and perceptions towards other professionals and compared these data with post-module assessments. Results revealed a significant improvement in participants' perceptions and a reduction in stereotypes towards other professionals following the module. This study highlights the transformative potential of IPE in fostering mutual understanding and collaboration among healthcare professionals from different disciplines.

Given the promising outcomes described above, it is imperative to delve deeper into the barriers hindering the implementation of IPE among the NMP students and devise strategies to address them. Consequently, the following section will examine the potential obstacles that may thwart the effective integration of IPE among NMP students.

Potential barriers to interprofessional education.

In a study conducted by Kensington-Miller et al. (2021), the experiences of seven scholars from diverse professional backgrounds and nationalities were examined. This research explored how practitioners from varying professional domains within the Scholarship of Teaching and Learning (SoTL) landscape effectively collaborate to achieve meaningful outcomes. This study's findings are relevant to our work, as the SoTL field necessitates collaboration among professionals and scholars from different disciplines to enhance global student learning (Potter and Kustra, 2011). Employing the theoretical framework developed by Wenger-Trayner and Wenger-Trayner (2015), this study investigated how the convergence of individuals from diverse professional backgrounds creates a practice landscape characterized by predefined boundaries. The framework elucidates the barriers individuals and communities encounter in integrating into this broader landscape. These barriers may include distinct disciplinary communities with their **differences and boundaries**, **control over professional territories**, **perceived workplace hierarchies**, and **power dynamics** among these communities. The following section of this work will analyse these barriers with the NMP student community in focus.

Diverse- Disciplines with differences

To ensure positive outcomes for students in interdisciplinary programs like the NMP program, it is crucial to acknowledge and address the diversity among individuals from various disciplines involved in this endeavour. McKinney (2013) emphasizes the importance of professionals, including nurses, pharmacists, and other Allied Health Professionals (AHPs) with differing experience levels, coming together to surmount their differences and collaborate towards shared objectives. Furthermore, Syahrizal et al.'s (2020) study examined the perceptions of healthcare professionals from diverse disciplines regarding IPE. Their research encompassed students from various fields, such as medicine, dentistry, psychology, pharmacy, and nursing. Findings revealed a favourable reception of IPE among pharmacy students, with 75% expressing positive views. Similarly, most nursing students (56.4%) perceived IPE positively. However, medical students displayed the lowest enthusiasm, with only 37% expressing a preference for IPE, indicating that not all students across different professions view IPE in a positive light.

This discovery is pertinent to the NMP program, particularly due to the engagement of students from diverse healthcare backgrounds in IPE endeavours. Within the NMP program, participants originate from diverse clinical backgrounds, each contributing varying experience levels to the learning environment. It is often not just the difference between professionals that can be a barrier; professionals with varied levels of experience within a single profession can also hinder IPE. For instance, a survey conducted by Mørk et al. (2010) introduced an innovative procedure to a group of doctors, revealing that more experienced doctors within the cohort showed resistance to this change compared to their junior counterparts. This highlights that challenges in achieving optimal learning outcomes in IPE initiatives may stem from differences between various professionals and variations in experience levels within a single community.

Control of Professional Boundaries

The healthcare professional landscape undergoes continual transformation, exemplified by the evolving nature of the NMP program, which has seen numerous changes since its inception. Consequently, professionals with specialized knowledge and unique skills converge in this dynamic landscape. However, the presence of these distinctive traits may result in certain individuals and communities exerting control over specific boundaries within this domain. Resistance to relinquishing control over long-held boundaries can engender conflicts among these entities (Griffin and Keeffe, 2020), leading to interprofessional tension and discord. Such conflicts pose challenges for both educators and learners within this environment. For instance, pharmacists contribute their expertise in theoretical pharmacology, while nurses excel in patient-facing skills such as history collection and physical assessment. Physiotherapists possess deep knowledge of the anatomy of the Musculoskeletal (MSK) system and demonstrate proficiency in assessing

MSK-related conditions. While the diverse expertise brought by each profession enriches the program, maintaining traditional boundaries can hinder effective IPE.

Hierarchy

According to Gergerich, Boland and Scott (2019), the presence of a hierarchy among healthcare professionals can lead to conflict that adversely affects IPE. Moreover, as Paradis and Whitehead (2018) emphasised, successful interprofessional learning necessitates the absence of hierarchy and rank within the group and they recommend that all participants must be considered equal partners with a shared aim and purpose. However, research by Hean et al. (2006) acknowledges the persistence of stereotypes and hierarchy among healthcare professionals. For instance, there is a perception that nurses and physiotherapists possess superior practical skills compared to pharmacists. Similarly, despite having substantial experience, therapists may perceive their academic knowledge to be inferior to that of doctors, yet believe their practical skills surpass those of doctors (Kämmer and Ewers, 2021). In the NMP program, hierarchical dynamics among students can significantly impact the learning environment and collaborative efforts. While the program aims to foster IPE, hierarchical structures may emerge, influenced by prior educational backgrounds, professional experiences, or perceived levels of expertise. This needs to be addressed to foster IPE.

Power Dynamics

The landscape of non-medical prescribing originated in the year 1992 when nurses were granted the authority to prescribe a limited range of medications from the formulary (Cope, Abuzour and Tully, 2016). Over time, this landscape has evolved to encompass professionals from diverse disciplines, including pharmacists, radiographers, physiotherapists, podiatrists, dieticians, and optometrists. However, as Hong and O (2009) noted, integrating relatively new communities into an established landscape can precipitate power struggles. This sentiment is echoed by Wenger-Trayner and Wenger-Trayner (2015), who elucidate that power dynamics often come into play when communities converge within a shared landscape. Therefore, stakeholders must acknowledge these dynamics when fostering an environment conducive to Interprofessional Education (IPE) in the NMP program. Thus, successfully implementing IPE within the NMP program necessitates addressing these challenges arising from power dynamics at multiple levels.

Using pedagogic strategies to overcome these barriers.

Given the outlined challenges, it is imperative to devise strategies to surmount these barriers among professionals undertaking the Non-Medical Prescribing (NMP) program in educational institutions worldwide. Consequently, the forthcoming section will scrutinize effective strategies for mitigating these obstacles and promoting IPE within the NMP curriculum. It will also delve into the pivotal role of institutions in overcoming these

challenges, exploring how educators can foster an environment conducive to IPE. Additionally, this section will assess students' contributions in overcoming these barriers and ensuring the successful integration of IPE within educational institutions offering the NMP program.

Role of Educational Institutions

While IPE can occur within clinical settings, its integration into educational institutions holds significant potential for cultivating a collaborative workforce. Educational institutions are pivotal in addressing these challenges and bridging divides among individuals and communities within a landscape. Buring et al. (2009) advocate the creation of spaces within educational infrastructure and building design that facilitate the convergence of diverse student communities, fostering environments conducive to collaborative interprofessional learning. They propose the intentional design of physical infrastructure to promote interprofessional learning opportunities, enabling professionals to engage in shared learning experiences by implementing paedagogic strategies such as flipped learning.

Flipped learning entails exposing students to educational materials before classroom sessions, enhancing their comprehension of the subject matter (Flipped Learning Network, 2014). Burgess et al. (2017) explored implementing flipped learning as a pedagogical approach to facilitate IPE in educational institutions. This study involved 115 students from diverse healthcare backgrounds, including pharmacy, medicine, and other health sciences. The findings of this study underscored the importance of providing students with conducive learning environments, such as smaller classrooms and group settings, to optimize the effectiveness of flipped learning in promoting IPE. By fostering a sense of community and facilitating increased interaction among students, these smaller learning environments encouraged peer learning and collaboration, thereby enhancing the overall efficacy of IPE. Consequently, institutions are responsible for offering such opportunities to students by creating smaller classrooms where students can come together and form a sense of community. This will allow students to overcome barriers and effectively cross pre-existing boundaries, flatten hierarchy and tackle power dynamics between various professionals.

Role of academics

Academics play a pivotal role in designing curriculum, serving as architects who shape students' educational experiences. Moreover, academics have the tools and means to leverage pedagogical principles and instructional strategies to create learning experiences relevant to the student groups. Therefore, academics within the institution need to use appropriate pedagogical principles while designing the curriculum. This should be done in a way that encourages IPE within the institution. As Fung (2017) articulated, the connected curriculum framework represents a paradigm shift in educational design, emphasizing integrating knowledge, skills, and experiences across disciplinary boundaries (Figure 1). This framework advocates for coherence, continuity, and collaboration in curriculum

development, aiming to foster deeper learning and real-world applicability. The connected curriculum framework encourages students to connect meaningfully with students from different disciplines by organising learning around overarching themes or issues. It promotes interdisciplinary dialogue which enables problem-solving skills, preparing students for the challenges of the contemporary world. Through its emphasis on connectedness and relevance, Fung's framework empowers students to develop a holistic understanding of complex concepts while cultivating a sense of purpose and engagement in their educational journey.

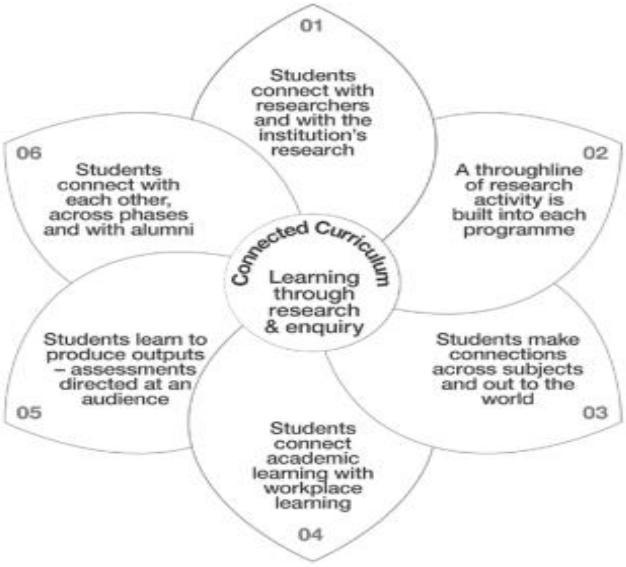

Figure 1 The connected curriculum framework (Fung, 2017)

While facilitating IPE among students can be rewarding, it can also present some challenging scenarios. According to Kensington-Miller et al. (2021), for IPE to happen, communities must cross professional boundaries across a landscape, and brokering is often required to achieve this successfully. Furthermore, Etienne Wenger-Trayner et al. (2014) argue that for brokering to be efficient, the person who assumes this role should be able to coordinate and align the participants' perspectives meaningfully. The key to being an effective broker is to remove the discipline-specific hat and treat students from all disciplines as equal partners, which can be challenging for academics. Thus, by adopting a connected curriculum as a pedagogical approach and adeptly facilitating interactions among students, academics can elevate the effectiveness of IPE. These approaches enable students to relinquish control over their professional boundaries and surmount differences with peers from diverse backgrounds. By fostering collaborative learning experiences that transcend disciplinary confines, a connected curriculum can empower students to embrace interdisciplinary perspectives and cultivate the skills essential for effective teamwork in healthcare settings.

Role of a student

The NMP program allows students to engage with peers from diverse healthcare professions, fostering mutual understanding, respect, and communication skills essential for effective teamwork. By embracing a learner-centred approach, students can contribute to the co-construction of knowledge and developing shared competencies across professions. Moreover, students from different clinical backgrounds can bring unique perspectives, experiences, and expertise to interprofessional learning activities, enriching the educational experience for themselves and their peers. Through their engagement in IPE, students cultivate the attitudes, values, and skills necessary for collaborative practice, ultimately enhancing the quality and safety of patient care.

This sentiment is echoed in a study by Lehrer et al. (2015), where 97 students, comprising 62 from the medical field and 35 from pharmacy, were enlisted to evaluate the effectiveness of peer learning in IPE. Over 16 weeks, these students engaged in peer learning activities before completing a survey to assess the impact of IPE. The findings indicated that using problem-based peer learning as a pedagogic strategy significantly enhanced the overall learning experience and positively influenced perceptions of IPE. However, despite the study's insights into the benefits of peer learning, only 29 students (19 medical and ten pharmacy) participated in the survey, highlighting potential limitations. While the study identifies time constraints and lack of awareness as barriers, it does not directly address these challenges within its methodology.

While this study explored and addressed barriers through peer learning within classroom settings, it falls short of addressing challenges that may arise when healthcare professionals encounter real-life scenarios. Hence, it is crucial to investigate the efficacy of IPE in facilitating collaboration among professionals during authentic, real-world situations. Such exploration is essential for understanding how effectively IPE principles translate into practice and identifying additional barriers or facilitators that may influence interprofessional teamwork outside of the classroom environment. It is crucial to explore this aspect, as classroom education should equip healthcare professionals with the skills to address real-time scenarios through collaborative teamwork in their workplace effectively.

Student engagement in simulation as a pedagogical strategy holds promise in exploring this aspect of IPE among students. Simulation involves students from diverse professional backgrounds coming together to enact real-time scenarios, acquire new skills, and deepen their professional subject knowledge (Fifolt et al., 2023). Simulation transcends simple classroom interactions in educational settings, immersing students in complex real-life scenarios where professionals can interact and learn collaboratively (Alexander et al., 2015). Yu et al. (2020) conducted a study to assess the effectiveness of IPE when real-life scenarios are simulated in a classroom setting. This study involved 43 medical and 44 nursing students participating in a 2-day program comprising three separate sessions and simulating three real-life scenarios. Although the participants' overall perception of interprofessional

education improved at the end of the program, their perception of the roles of professional groups remained unchanged. The study suggested that sustained interprofessional exposure over an extended period is necessary to observe meaningful changes in role perception.

Additionally, a study by Conte, Wihlborg, and Lindström (2022) explored the potential benefits of IPE among nursing, paramedic, and medical students in the ambulance service. This study found that collaborative learning strategies enhanced students' learning experiences when confronted with unfamiliar situations. One assignment involved students collaborating in simulations to manage clinical situations without access to medical records or individuals with medical knowledge. Nurses in the study expressed that this scenario provided exposure to new skills and learning opportunities through collaborative engagement with their paramedic counterparts. Hence, it is crucial for students in the NMP program to be afforded opportunities to participate in pedagogical strategies like peer learning and simulation, aiming to bolster IPE. Offering scenarios that simulate real-life situations in classroom or lab environments enables collaborative learning experiences and knowledge sharing among students. Embracing these strategies empowers students to transcend professional disparities and effectively tackle challenges stemming from hierarchical dynamics within the community.

Conclusion/ Recommendation

In conclusion, the integration of IPE into the Non-Medical Prescribing (NMP) curriculum holds immense promise for addressing global healthcare challenges and achieving the Sustainable Development Goals outlined by the United Nations. By fostering collaboration among healthcare professionals from diverse backgrounds, IPE enhances student learning experiences and cultivates the attitudes, values, and skills essential for effective teamwork in healthcare settings. While challenges such as diverse disciplinary differences, hierarchical dynamics, and power struggles may impede the effective implementation of IPE, various strategies can be employed to surmount these barriers.

Educational institutions play a pivotal role in fostering an environment conducive to IPE by creating spaces that facilitate the implementation of pedagogical approaches such as flipped learning and encourage collaborative learning. Currently, consultations are underway among the stakeholders of the School of Health and Social Work (HSK) and the School of Life and Medical Sciences (LMS) at the University of Hertfordshire, who are building a new facility to accommodate these schools. We recommend that flexibility to create smaller spaces must be incorporated into the building design to host smaller student groups, which has proven to improve the effectiveness of IPE by overcoming the above-mentioned barriers.

Additionally, academics from different schools should serve as key facilitators in designing interconnected curricula and orchestrating meaningful interactions among students, thereby elevating the effectiveness of IPE initiatives. This can be achieved by academics

from different schools collaborating and deliberatively designing curricula to encourage and facilitate collaboration among students from different professional backgrounds.

Moreover, students play a crucial role in peer learning and simulative practice, contributing unique perspectives and experiences to interprofessional learning activities. By embracing IPE within the NMP program and addressing these challenges at multiple levels, stakeholders can pave the way for a collaborative workforce equipped to address the complex healthcare needs of the future. As van der Gulden et al. (2020) point out IPE promotes interprofessional collaboration (IPC), which is widely acknowledged for fostering a collaborative team approach. This can lead to enhanced quality of patient care, shorter hospital stays, lower care costs, and a reduction in medical errors. By embracing IPE and IPC, non-medical prescribers can bring about this change within the struggling healthcare systems within the United Kingdom.

References

Alexander, M., Durham, C.F., Hooper, J.I., Jeffries, P.R., Goldman, N., Kardong-Edgren, S. "Suzie", Kesten, K.S., Spector, N., Tagliareni, E., Radtke, B. and Tillman, C. (2015). NCSBN Simulation Guidelines for Prelicensure Nursing Programs. Journal of Nursing Regulation, 6(3), pp.39–42. doi: https://doi.org/10.1016/s2155-8256(15)30783-3.

Bell, H.T., Granas, A.G., Enmarker, I., Omli, R. and Steinsbekk, A. (2017). Nurses' and pharmacists' learning experiences from participating in interprofessional medication reviews for elderly in primary health care - a qualitative study. BMC Family Practice, 18(1). doi: https://doi.org/10.1186/s12875-017-0598-0.

Burgess, A., Roberts, C., van Diggele, C. and Mellis, C. (2017). Peer teacher training (PTT) program for health professional students: interprofessional and flipped learning. BMC Medical Education, 17(1). doi: https://doi.org/10.1186/s12909-017-1037-6.

Buring, S.M., Bhushan, A., Brazeau, G., Conway, S., Hansen, L. and Westberg, S. (2009). Keys to Successful Implementation of Interprofessional Education: Learning Location, Faculty Development, and Curricular Themes. American Journal of Pharmaceutical Education, [online] 73(4), p.60. doi: https://doi.org/10.5688/aj730460.

Celio, J., Ninane, F., Bugnon, O. and Schneider, M.P. (2018). Pharmacist-nurse collaborations in medication adherence-enhancing interventions: A review. Patient Education and Counseling, 101(7), pp.1175–1192. doi: https://doi.org/10.1016/j.pec.2018.01.022.

Cohen, E.V., Hagestuen, R., González-Ramos, G., Cohen, H.W., Bassich, C., Book, E., Bradley, K.P., Carter, J.H., Di Minno, M., Gardner, J., Giroux, M., González, M.J., Holten, S., Joseph, R., Kornegay, D.D., Simpson, P.A., Tomaino, C.M., Vandendolder, R.P., Walde-Douglas, M., Wichmann, R. and Morgan, J.C. (2016) 'Interprofessional education increases knowledge,

promotes team building, and changes practice in the care of Parkinson's disease', Parkinsonism & related disorders, 22, pp. 21–27.

Conte, H., Wihlborg, J. and Lindström, V. (2022). Developing new possibilities for interprofessional learning- students' experience of learning together in the ambulance service. BMC Medical Education, [online] 22(1). doi: https://doi.org/10.1186/s12909-022-03251-8.

Cope, L.C., Abuzour, A.S. and Tully, M.P. (2016). Nonmedical prescribing: Where Are We now? Therapeutic Advances in Drug Safety, [online] 7(4), pp.165–172. doi: https://doi.org/10.1177/2042098616646726

Eccott, L., Greig, A., Hall, W., Lee, M., Newton, C., & Wood, V. (2012). Evaluating Students' Perceptions of an Interprofessional Problem-based Pilot Learning Project. Journal of Allied Health, 41(4), 185–189. https://www.ingentaconnect.com/content/asahp/jah/2012/00000041/00000004/art00008

Etienne Wenger-Trayner, Fenton-O'Creevy, M., Hutchinson, S., Kubiak, C. and Wenger-Trayner, B. (2014). Learning in Landscapes of Practice. Routledge.

Fifolt, M., Brown, M., Kidd, E., Nabavi, M., Lee, H. and McCormick, L.C. (2021). Using Interprofessional Simulation to Enhance Student Knowledge and Promote Collaborative Practice in Disaster Management. Pedagogy in Health Promotion, 9(1), p.237337992098757. doi: https://doi.org/10.1177/2373379920987576.

Flipped Learning Network (2014). FLIP handout FNL Web. [online] Available at: https://flippedlearning.org/wp-content/uploads/2016/07/FLIP_handout_FNL_Web.pdf.

Fung, D. (2017). A Connected Curriculum for Higher Education. [online] Available at: https://discovery.ucl.ac.uk/id/eprint/1558776/1/A-Connected-Curriculum-for-Higher-Education.pdf.

Gergerich, E., Boland, D. and Scott, M.A. (2019). Hierarchies in interprofessional training. Journal of Interprofessional Care, 33(5), pp.528–535. doi: https://doi.org/10.1080/13561820.2018.1538110.

Griffin, A. and O'Keeffe, C. (2019). Learning to collaborate: boundary work and contemporary approaches in interprofessional education. [online] discovery.ucl.ac.uk. Available at: https://discovery.ucl.ac.uk/id/eprint/10080319/ [Accessed 18 Mar. 2024].

Hean, S., Clark, J.M., Adams, K. and Humphris, D. (2006). Will opposites attract? Similarities and differences in students' perceptions of the stereotype profiles of other health and social care professional groups. Journal of Interprofessional Care, 20(2), pp.162–181. doi: https://doi.org/10.1080/13561820600646546.

Hong, J.F.L. and O, F.K.H. (2009). Conflicting Identities and Power Between Communities of Practice: The Case of IT Outsourcing. Management Learning, 40(3), pp.311–326. doi: https://doi.org/10.1177/1350507609104342.

Kämmer J. E., Ewers M. (2022). Stereotypes of experienced health professionals in an interprofessional context: results from a cross-sectional survey in Germany. J. Interprof. Care 36, 350–361. doi: 10.1080/13561820.2021.1903405, PMID:

Kensington-Miller, B., Webb, A., Gansemer-Topf, A., Lewis, H., Luu, J., Maheux-Pelletier, G. and Hofmann, A. (2021). Brokering Boundary Crossings through the SoTL Landscape of Practice. Teaching & Learning Inquiry, 9(1), pp.365–379. doi: https://doi.org/10.20343/teachlearninqu.9.1.24.

Khan, A.N., Khan, M.U., Shoaib, M.H., Yousuf, R.I. and Mir, S.A. (2014). Practice Nurses and Pharmacists: A Perspective on the Expectation and Experience of Nurses for Future Collaboration. Oman Medical Journal, [online] 29(4), pp.271–275. doi: https://doi.org/10.5001/omj.2014.71.

Lehrer, M. D., Murray, S., Benzar, R., Stormont, R., Lightfoot, M., Hafertepe, M., Welch, G., Peters, N., & Maio, A. (2015). Peer-led problem-based learning in interprofessional education of health professions students. Medical education online, 20, 28851. https://doi.org/10.3402/meo.v20.28851

Mørk, B.E., Hoholm, T., Ellingsen, G., Edwin, B. and Aanestad, M. (2010). Challenging expertise: On power relations within and across communities of practice in medical innovation. Management Learning, 41(5), pp.575–592. doi: https://doi.org/10.1177/1350507610374552

NHS England (2023). NHS England» NHS Long Term Workforce Plan. [online] www.england.nhs.uk. Available at: https://www.england.nhs.uk/long-read/nhs-long-term-workforce-plan-2/

Paradis, E. and Whitehead, C.R. (2018). Beyond the Lamppost. Academic Medicine, 93(10), pp.1457–1463. doi: https://doi.org/10.1097/acm.0000000000002233.

Potter, M.K. and Kustra, E. (2011). The Relationship between Scholarly Teaching and SoTL: Models, Distinctions, and Clarifications. International Journal for the Scholarship of Teaching and Learning, 5(1). doi: https://doi.org/10.20429/ijsotl.2011.050123.

Sullivan M, Kiovsky R, Mason D, Hill C, Dukes C. Interprofessional collaboration and education. Am J Nurs. (2015);115(3):47–54. doi: 10.1097/01.NAJ.0000461822.40440.58.

Syahrizal, D., Renaldi, T., Dianti, S.W., Jannah, N., Rachmah, R., Firdausa, S. and Vonna, A. (2020). The Differences in Perceptions of Interprofessional Education Among Health

Profession Students: The Indonesian Experience. Journal of Multidisciplinary Healthcare, Volume 13, pp.403–410. doi: https://doi.org/10.2147/jmdh.s240195.

Van der Gulden, R., Haan, N.D.S., Greijn, C.M., Looman, N., Tromp, F. and Dielissen, P.W. (2020). Interprofessional education and collaboration between general practitioner trainees and practice nurses in providing chronic care; a qualitative study. BMC Medical Education, 20(1). doi: https://doi.org/10.1186/s12909-020-02206-1.

Wenger-Trayner, E. and Wenger-Trayner, B. (2015). Introduction to Communities of Practice. [online] Wenger-Trayner. Available at: https://www.wenger-trayner.com/introduction-to-communities-of-practice/.

www.who.int. (2010). World Health Organization (WHO). [online] Available at: http://apps.who.int/iris/handle/10665/70185..

www.who.int. (2016). World Health Organization (WHO). [online] Available at: https://iris.who.int/bitstream/handle/10665/250368/9789241511131-eng.pdf?sequence=1.

Yu, J., Lee, Woosuck, Kim, M., Choi, S., Lee, S., Kim, S., Jung, Y., Kwak, D., Jung, H., Lee, S., Lee, Y.-J., Hyun, S.-J., KANG, Y., Kim, S.M. and Lee, J. (2020). Effectiveness of simulation-based interprofessional education for medical and nursing students in South Korea: a pre-post survey. BMC Medical Education, 20(1). Doi: https://doi.org/10.1186/s12909-020-02395-9.

Effective Cognitive Behaviour Therapy (CBT) Simulations in Clinical Psychology Teaching and Training

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Abstract

The NHS Long Term Plan has recommended an increase of 25% in university places for Clinical Psychology training programmes. Within the programme at Hertfordshire University, the growth has been considerably greater, at 247%. As part of this training, trainees must be competent in delivering Cognitive Behavioural Therapy (CBT), including skills practice. This has led to challenges in using simulations as a learning approach for CBT. Including the impact of increased cohort size, imposter phenomenon, and teaching CBT with positivist and linear underpinnings in a course that is social constructionist in its outlook. Subsequently, this study's aims are, how can we improve and grow peer and facilitator-led CBT simulations, with trainees having a wide range of experience and knowledge of CBT? And what makes CBT simulations a safe and compassionate learning experience in developing CBT competencies for trainees who could be experiencing 'imposter phenomenon'? Qualitative and quantitative feedback via questionnaire measures, including the Critical Incident Questionnaire (CIQ) (Brookfield, 1995) was analysed from trainees from all three cohorts who participated in CBT simulations. Primary themes of timing & structure, peer practice, facilitator guidance and group safety were identified with recommendations to help inform further teaching in this area.

Introduction

As part of the NHS long-term plan (NHS England, 2019), in 2021, Health Education England increased university places for Clinical Psychology training by 25% (Health Education England, 2020). The Clinical Psychology doctorate programme at Hertfordshire University had the highest increase of any programme in England, at 247%. This increase in training places led to several challenges on the programme, including teaching Cognitive Behaviour Therapy (CBT) to this substantially larger cohort of trainees.

CBT is a model of psychological therapy that can support those to understand the distress and difficulties they are experiencing and work towards recovery. It is structured, collaborative, and goal-focused, with homework tasks between sessions. The sessions focus on the links between thoughts, emotions, body, and behaviours and on change and acceptance (Beck, 2011). It can be delivered individually, with couples, in a group, online, by telephone and with self-help books.

Regulatory and professional bodies require CBT as part of the clinical psychology training curriculum (BPS, 2019) (HCPC, 2017). It is also the most frequently cited and recommended psychological therapy in national evidence-based guidelines (NICE, 2024). Thus, with its

prominence in regulatory and professional bodies and in national guidelines, CBT could be considered a threshold concept in Clinical Psychology training. However, there is an argument for less focus on CBT within the curriculum and more emphasis on different approaches, as, despite record numbers of professionals trained in CBT (NHS Benchmarking Network, 2022), the prevalence rate of mental health difficulties has continued to increase (McManus *et al.*, 2016), suggesting complex issues are at play.

Different approaches could focus on the underlying systemic factors contributing to someone's difficulties, relieve distress through community-based efforts, and reduce inequalities through social justice work. Those approaches have gained traction with the recent draft of British Psychological Society (BPS) training standards for Clinical Psychology focusing further on social justice (BPS, 2023). This chimes with an overall call to decolonise the curriculum (Muldoon, 2019) as CBT has privileged a Western European individualised understanding of mental health.

An additional prerequisite of CBT teaching is a ratio of at least 50:50 between theory and skills training (BABCP, 2022). Skills training is not well operationalised, but in general terms, pedagogical concepts under this include enactive learning strategies, deliberate practice, role-plays, simulations, and simulation-based learning (SBL). Further research has supported the 50:50 requirement, with students finding that assessment skills were most successfully trained using enactive learning strategies, whereas lectures were more valuable for CBT theory (Bennett-Levy et al., 2009). However, students have voiced concerns that although simulations were beneficial for skills training, they could lack the authenticity of a 'real life' scenario (Oxlad *et al.*, 2022).

The increase in HEE-commissioned training places and the requirement to teach CBT with skills training have led to three dilemmas in teaching CBT at the University of Hertfordshire. Those are the trainees' wide-ranging experiences and knowledge, the imposter phenomenon, and the blend of positivism and social constructionism.

The first dilemma is accommodating the wide-ranging experiences of trainees. At one end of the spectrum, some trainees are accredited CBT therapists, whereas others have very little (if any) knowledge or skills in CBT. With this variation, trainees could learn from each other by appreciating all their various levels of knowledge in CBT, potentially leading to a positive community of inquiry (Garrison, 2017). Developing this community will need careful consideration and an appropriate staff-student ratio. This has been a challenge on the programme, as the workforce levels have struggled to keep pace with the expansion in trainee numbers. It is also important to note that some research indicated that interactions with trainers and personal reflection were given stronger endorsements than peer-related learning (Rakovshik and McManus, 2013). This somewhat contradictory result could be owing to the type of learning task that was taking place and how it was structured, as that could inadvertently discourage compassionate peer interaction and a positive community of inquiry.

In addition to the dilemma of how you approach CBT simulation-based teaching and learning to a diverse cohort, there is the possible negative impact of the imposter phenomenon (IP) (Tigranyan et al., 2021), also known as “imposter syndrome” / “fraud syndrome” / ”the imposter experience” and a similar concept, the doctoral liminal period of uncertainty (Keefer, 2015). IP has been defined as “to designate an internal experience of intellectual phoniness.” (Clance and Imes, 1978).

The prevalence of imposter syndrome within ‘employed’ populations varies extensively from 9% to 82%, with studies using different screening tools, cut-off scores and the possibility of publication bias needing to be considered (Bravata, 2020). Nevertheless, IP could be common within doctoral training at Hertfordshire University, with studies suggesting that 88% of doctoral students report at least moderate experience of IP that also correlates with depression, anxiety, and perfectionistic cognitions (Tigranyan et al., 2021). The likely impact is a detrimental effect on their training experience. There are also parrels with liminal periods(Keefer, 2015), which are transitional phases of feeling overwhelmed, confused, and lacking self-belief, and CBT simulations could well be part of this phase. This all needs to be considered in their design and implementation; otherwise, there is a risk it could perpetuate this phenomenon and period. This underlines the need for a compassionate learning experience to promote psychological safety so that students can work within their proximal level of development (Vygotsky, 1978).

The third and final dilemma is more broadly conceptual: how do you teach CBT, which has a solid positivist tradition with linear underpinnings, on a social constructionist course? There are different understandings of what is meant by ‘positivism’ (McGrath and Johnson, 2003), but within CBT, it broadly means that there are scientific observable facts, that methods used for physical and medical sciences should only be applied and that it is objective (Barker, Pistrang and Elliott, 2015). Whereas social constructionism is that there is no ‘true’ and objective reality; instead, there are multiple individual realities based on language (Madill, Jordan and Shirley, 2000).

This dilemma of two philosophical standpoints could continue perpetuating feelings of confusion and uncertainty for trainees. This does not necessarily lead to wholly negative consequences, as synthesising alternative viewpoints is at the very heart of academia. The constructionist orientation of Bruner (Bruner, 1985) and Piaget (Piaget and Cook, 1954) interrelates with the cognitivist information processing model (Proctor and Vu, 2006), but it is rather the moral and ethical uncertainties that this can lead to. The moral standpoint of focusing on systemic social justice issues could be a contradictory position to the individualised nature of CBT. Therefore, trainees could experience an intellectual sense of confusion and a moral one that could impact their sense of identity.

Previous studies into using simulations with a social constructionist ethos in the university doctoral program suggested this was a valuable approach to working with service users compassionately (Nel and Nolte, 2019). A novel study at an art exhibition also supported

this, whereby students experienced an altered reality state, gaining an understanding of what it may be like to experience hallucinations (Riches *et al.*, 2019). Both studies suggested the benefits of using simulations, but they differ from simulation-based learning, which uses 'objective' and standardised competency measures, as used in CBT (Blackburn *et al.*, 2001).

In summary, there is an apparent paucity of research on teaching CBT using simulations in the context of significant increases in Clinical Psychology training places. There are three dilemmas of the wide-ranging experiences and knowledge of trainees, the imposter phenomenon and the blend of positivism and social constructionism.

Investigating those key dilemmas could improve the trainee's knowledge, skills, and competencies in delivering CBT and subsequently enhance the recovery of those experiencing mental health difficulties. It could create a positive and effective learning environment for trainees beyond CBT to other aspects of the programme, focusing on reducing the 'imposter phenomenon' as this part of their identity can affect learning and teaching. Finally, it could also support the development of best practice guidance in using simulations on the programme.

Study aims

- How can we improve and grow peer and facilitator-led CBT simulations on a social constructionist course, with trainees having a wide range of experience and knowledge of CBT?
- What makes CBT simulations a safe and compassionate learning experience in developing CBT competencies for trainees who could be experiencing 'imposter phenomenon'?

Method

Design

The design addressed the study's aims by analysing the qualitative and quantitative feedback from trainees who attended the CBT simulation sessions. This mixed-methods design was employed because the quantitative feedback can provide a numerical benchmark for generalisability, and the qualitative feedback can help develop a richer and deeper understanding of the trainees' experiences, which is needed to attempt to meet the study's aims fully.

Participants

The participants were 37 Trainee Clinical Psychologists in the Clinical Psychology doctorate programme at the University of Hertfordshire in cohorts 21, 22, and 23 who participated in the CBT simulations and completed the online feedback form resulting in a convenience sample. This represents 23.72% of the trainees on the programme.

Measures and materials

Cohort 21 teaching feedback form

The Cohort 21 teaching feedback form was a self-report questionnaire where respondents were asked to rate eight different statements based on their experience of the teaching session using a five-point Likert scale ranging from 1 (strongly agree) to 5 (strongly disagree) with a ninth question answered with open-ended qualitative comments (see Appendix A).

Cohorts 22 and 23 teaching feedback form

The teaching feedback form for cohorts 22 and 23 was an updated and amended self-report questionnaire that consisted of four questions requiring open-ended qualitative answers and a fifth question asking for an overall rating of the teaching session (see Appendix B and C).

Critical Incident Questionnaire (CIQ) (Brookfield, 1995)

The CIQ was a self-report questionnaire that asked participants to answer five questions using open-ended answers. It provided data on the experience a teaching session is having on students, including the emotional highs and lows of their learning (see Appendix D).

Procedure

Participants were asked to complete the online feedback form after the CBT simulation sessions to support the module lead and lectures for quality assurance and to inform the annual module review and training course committee. This was in keeping with how feedback was sought in other sessions on the module, and the same feedback form was used throughout. Additionally, cohort 23 was asked to complete the CIQ as part of the CBT simulation. All feedback forms were accessed via a QR code on the university's digital learning platform, CANVAS.

Data analysis strategy

The feedback form data from cohort 21 was analysed using descriptive statistics (questions 1-8). The responses to question 9 on the cohort 21 feedback form, the cohorts 22 and 23 feedback form, and the CIQ generated a series of primary themes.

Ethical issues considered

As this was part of a routine evaluation of teaching quality, ethical approval from the University was not sought or required per the university's protocol for ethical approval (University of Hertfordshire, 2018). All trainees gave informed consent during student registration for the doctorate programme for their feedback to be used for module evaluation. All data collected was stored securely on the university's OneDrive cloud storage system.

Findings

Across all questionnaire measures, the overall response rate was 23.72% (n=37), as completion was not compulsory. The mean and standard deviations for the Cohort 21 teaching feedback form are shown in Table 1, and the data analysis was performed using Microsoft Excel version 2401 (Microsoft, 2024).

Table 1 Descriptive statistics

Item	Mean 1 (strongly agree) to 5 (strongly disagree)	S.D
GOALS AND LEARNING OBJECTIVES: Clearly stated at the start of the session	1.2	0.40
CONTENT: Subjects or topics covered recognise and build upon my existing knowledge and skills	1.4	0.49
TEACHING MATERIALS & HANDOUTS: The teaching materials and handouts illuminated the content	1.6	0.80
ENGAGEMENT: The presenter(s) was engaging, encouraged discussion and participation and was willing to answer questions	1.2	0.40
ORGANISATION AND TIME MANAGEMENT: A coherent schedule was maintained within the allotted time	2.2	1.6
RELEVANCE FOR CLINICAL PRACTICE: The knowledge and/or skills gained in the	1.4	0.49

session are applicable to clinical practice		
COURSE PHILOSOPHY: The content of the session and its delivery fit with the overall course philosophy for example ability to consider alternative perspectives flexibly and ethically	2.2	1.16
IMPACT OF DIVERSITY (Course Philosophy cont'd): Within the subject/topic(s) covered by the session, sameness and difference were acknowledged and/or addressed	2.2	1.16

The results suggest that in cohort 21, the trainees found the goals and learning objectives and the engagement aspects of the simulation overall positive, with the organisation and time management, the delivery of the session in keeping with the course philosophy, and the impact of diversity acknowledged and discussed less so.

The themes that emerged from analysing the feedback forms and the CIQ responses are presented below.

Table 2: Primary Themes

Primary themes
Timing and structure
Peer practice
Facilitator guidance
Group safety

The four primary themes apply across the dataset, and each theme will be described with quotes to illustrate.

Theme one-Timing and structure

This theme describes the structure of the day, whether the information was provided in advance, the use of information booklets, the number of scenarios practised and how it related to other teaching sessions. It was clear that trainees preferred information being given in advance, "*Would have liked to of had the information a couple of days earlier"* and for it to be more closely linked to the CBT teaching they had received, "*We would benefit from having such sessions more closely aligned with teaching e.g., having this after the CBT teaching and having a systemic one around this time"* and for the simulations to be structured, "*It was really well organised and scaffolded, have the resource packs and facilitators etc it was excellent."* Finally, trainees commented on reducing the number of scenarios used in the simulation, "*Instead of many scenarios, perhaps one scenario that can be used trans diagnostically so we can apply different modalities*."

Theme two-Peer practice

This theme illustrates the trainee's comments in working with their peers. Overall, the trainees enjoyed working with their peers and gained confidence from this, *"It was really helpful to hear how others use questioning and approach things …"* and *"Improved confidence in undertaking a variety of CBT modalities."* And "*Just really enjoying this format of learning - such a rich experience, I really appreciated learning from my peers".*

Theme three-Facilitator guidance

Another theme that emerged was the level of guidance given by facilitators. Trainees reported that they would have benefitted from all the small groups having a facilitator present, which unfortunately was impossible because of our staff-student ratio at the time, "*Also, to have enough staff to supervise throughout, particularly those with expertise in the relevant modalities. I feel my group lacked direction at times."* And for there to be a clear demonstration of the skills that trainees were expected to practice, "*Would be great to see lecturers model the assessment/formulation/intervention sections as there was potentially a lot of pressure placed on those who had CBT experience to demonstrate to everyone else in the group.*"

Theme four-Group safety

The trainees also frequently stated that being in small groups that they selected was beneficial in the sense of psychological safety it provided, "*Leaning into being uncomfortable and trying out new things which was massively facilitated by small groups which we were able to choose. Being open about not knowing with clients and figuring*

things out together". And "*Helpful to test out the modalities in a safe environment with self-selected groups".*

Discussion

Regarding the first research aim of improving and growing CBT simulations with trainees with various ranges of experience on a social constructionist course, the results appear to indicate that the sessions need a clear structure with the information provided in advance. This is consistent with the idea of scaffolding and supporting trainees in working within their zone of proximal development (Vygotsky, 1978). This information could also include a task for trainees to reflect on learning CBT on a social constructionist course, as this could support the consolidation of their sense of identity as trainees.

The findings also indicate that facilitator guidance is vital, which could support trainees with less CBT experience. This could be further enhanced by having trainees with more CBT experience as co-facilitators, which is supported by a flipped classroom approach (Melluish, Crossley and Tweed, 2007). However, with the workforce shortages across the clinical psychology profession, it could be challenging to have enough facilitators available, given the expansion of training places.

The results also guide how to make the CBT simulations a compassionate learning experience, the second research aim. They suggest that being in self-selected groups was beneficial in providing a sense of psychological safety, which could lead to mitigation against the imposter syndrome trainees could be experiencing. This could also be explained by the idea that a positive community of inquiry(Garrison, 2017) was starting to be developed. Although this could be more complex than initially realised, as the trainees' training stage needs to be considered. The first year of training could be a challenging liminal period for them to negotiate, as supported by Keefer (2015). Thus, trainees initially being in self-selected groups during their first year could help contribute to a feeling of safety, with groups becoming gradually less self-selected as the programme progresses.

It is also important to consider that the CBT simulations were rated as a positive learning experience overall. This supports the conclusions from other studies that students find peer learning enjoyable and beneficial.

The teaching and learning implications are that five recommendations can be made for improving CBT simulations.

- Small groups should be self-selected, certainly for the first year of training, with further research on whether this will be advantageous as training continues.
- Facilitators to actively demonstrate CBT skills with trainees with a high CBT experience.
- Facilitators being present for each small group

- Before the session, trainees can receive an information booklet explaining the scenarios, the rating scales, and the skills that will be practised. There could also be space for trainees to reflect on how they position themselves regarding the requirement to demonstrate CBT competencies on a social constructionist course.
- The CBT simulation sessions to take place shortly after CBT teaching sessions so that it is better aligned with the existing curriculum.

The strengths of this study are the in-depth responses of trainees, which is a hallmark of qualitative research compared to quantitative. This has enabled a clear set of recommendations to be made, which would be more challenging with studies solely using Likert rating scales, as the questions would need to be developed with a pre-conceived idea of what questions need to be asked, which would be inappropriate for an exploratory piece of research such as this. A further strength is that the data is from trainees from all three years of the programme, with themes that emerge across training cohorts, adding to the robustness of the findings. A final strength is that as the respondents were anonymous, trainees were likelier to give truthful responses. This is especially key because if the responses were not anonymous and were presented as part of a focus group, the trainees would be more likely to be negatively impacted by the social component of imposter syndrome.

Despite those strengths, there are methodological limitations to this research and the conclusions that can be drawn. One limitation is the low response rate of 23.72% and the subsequent overall sample size of 37. This raises the question of how generalisable the results and recommendations can be to the wider cohort. It also poses the question of why there are such small numbers of trainees giving feedback, allowing for the role of self-selection bias and whether the experience of the CBT simulations was as positive as the results suggest. A further limitation is that the feedback questions asked were questions that are used for all teaching sessions. Thus, richer, and more in-depth information could have been gathered from a bespoke questionnaire rather than a generic, standardised form. Furthermore, a focus group would have enabled a more representative sample to have taken place, as it is unknown how many of the responses were from those with a limited or high level of experience in CBT. A focus group with a purposive heterogeneity sample would help overcome this difficulty.

There are numerous avenues that further research could take, such as developing the tentative recommendations put forward. The recommendations could benefit from further scrutiny by asking trainees for feedback and trailing CBT simulations that follow those recommendations. Additional research could also investigate the 'imposter phenomenon' within CBT simulation sessions, hopefully leading to more specific and detailed recommendations for reducing this through compassionate group work. Moreover, supplementary studies into the benefits and drawbacks of self-selected groups developing psychological safety when engaging in CBT simulations would be helpful. They would build

on the recommendations put forward in this study. Overall, further studies could investigate whether the findings of this study are generalisable to other simulation-based learning exercises.

Conclusion

In conclusion, this is the first study that has added to the growing body of pedagogical literature that simulation-based learning is an approach favoured by trainee clinical psychologists and that trainees can successfully employ it with a wide range of experience and knowledge of CBT. Although the research is limited by the sample and depth of data that has been collected, it does offer some easy-to-implement recommendations to trial. A cautiously anticipated improvement in teaching CBT could lead to more skilled, reflective, and knowledgeable Clinical Psychologists to help with the mental health difficulties the country is experiencing. It is also hoped that this study could encourage further research into this area and the impact of the 'imposter phenomenon' on teaching.

References

BABCP (2022) Course Accreditation Process for courses providing training in Cognitive and Behavioural Psychotherapies (CBT). British Association for Behavioural & Cognitive Psychotherapies

Barker, C., Pistrang, N. and Elliott, R. (2015) 'Research Methods in Clinical Psychology: An Introduction for Students and Practitioners', in Research Methods in Clinical Psychology : An Introduction for Students and Practitioners. New York: John Wiley & Sons, pp. 91–115.

Beck, J. (2011) Cognitive Behavior Therapy: Basics and Beyond. 2nd edn. New York: Guilford Publications.

Bennett-Levy, J. et al. (2009) 'Acquiring and Refining CBT Skills and Competencies: Which Training Methods are Perceived to be Most Effective?', Behavioural and Cognitive Psychotherapy, 37(5), pp. 571–583.

Blackburn, I.M. et al. (2001) 'The revised cognitive therapy scale (CTS-R): Psychometric properties', Behavioural and Cognitive Psychotherapy, 29(4), pp. 431–446.

BPS (2019) Standards for the accreditation of Doctoral programmes in clinical psychology. The British Psychological Society.

BPS (2023) Standards for the accreditation of Doctoral programmes in clinical psychology. The British Psychological Society.

Bravata, D.M., Watts, S.A., Keefer, A.L., Madhusudhan, D.K., Taylor, K.T., Clark, D.M., Nelson, R.S., Cokley, K.O. and Hagg, H.K. (2020) 'Prevalence, predictors, and treatment of impostor syndrome: a systematic review', Journal of General Internal Medicine, 35, pp.1252-1275.

Brookfield, S.D. (1995) Becoming a critically reflective teacher. San Francisco: John Wiley & Sons.

Bruner, J. (1985) 'Models of the Learner', Educational Researcher, 14(6), pp. 5–8.

Clance, P.R. and Imes, S.A. (1978) 'The imposter phenomenon in high achieving women: Dynamics and therapeutic intervention.', Psychotherapy: Theory, Research & Practice, 15, pp. 241–247.

Garrison, D.R. (2017) E-Learning in the 21st century: A Community of Inquiry framework for research and practice. 3rd edn. Routledge/Taylor and Francis.

HCPC (2017) Standards of education and training guidance. Health & Care Professions Council.

Keefer, J.M. (2015) 'Experiencing doctoral liminality as a conceptual threshold and how supervisors can use it', Innovations in Education and Teaching International, 52(1), pp. 17–28.

Madill, A., Jordan, A. and Shirley, C. (2000) 'Objectivity and reliability in qualitative analysis: Realist, contextualist and radical constructionist epistemologies', British Journal of Psychology, 91(1), pp. 1–20.

McGrath, J.E. and Johnson, B.A. (2003) 'Methodology makes meaning: How both qualitative and quantitative paradigms shape evidence and its interpretation', in P. Camic, J.E. Rhodes, and L. Yardley (eds) Qualitative research in psychology: Expanding perspectives in methodology and design. Washington: American Psychological Association, pp. 31–48.

McManus, S. et al. (2016) Mental health and wellbeing in England: Adult Psychiatric Morbidity Survey 2014. Leeds.

Melluish, S., Crossley, J. and Tweed, A. (2007) 'An Evaluation of the Use of Simulated Patient Role-Plays in the Teaching and Assessment of Clinical Consultation Skills in Clinical Psychologists' Training', Psychology Learning & Teaching, 6(2), pp. 104–113.

Microsoft (2024) 'Microsoft Excel For Windows 365'. Microsoft.

Muldoon, J. (2019) 'Academics: it's time to get behind decolonising the curriculum', The Guardian.

NICE (2024) Mental health, behavioural and neurodevelopmental conditions. National Institute of Clinical Excellence

Nel, P.W. and Nolte, L. (2019) 'On the other side: Learning about being a service user or carer during simulation training on a clinical psychology doctorate programme', Psychology Teaching Review.

NHS Benchmarking Network (2022) Health Education England Adult IAPT Workforce Census 2021. The National Health Service England

NHS England (2019) The NHS Long Term Plan. The National Health Service England

Oxlad, M. et al. (2022) 'Postgraduate students' perceptions of simulation-based learning in professional psychology training', Australian Psychologist, 57(4), pp. 226–235.

Piaget, J. and Cook, M. (1954) The Construction of Reality in the Child. Poutledge & Kegan Paul.

Proctor, R.W. and Vu, K.-P.L. (2006) 'The Cognitive Revolution at Age 50: Has the Promise of the Human Information-Processing Approach Been Fulfilled?', International Journal of Human–Computer Interaction, 21(3), pp. 253–284

Rakovshik, S.G. and McManus, F. (2013) 'An anatomy of CBT training: trainees' endorsements of elements, sources and modalities of learning during a postgraduate CBT training course', The Cognitive Behaviour Therapist, 6, p. e11.

Riches, S. et al. (2019) 'Impact of an auditory hallucinations simulation on trainee and newly qualified clinical psychologists: A mixed-methods cross-sectional study', Clinical Psychology & Psychotherapy, 26(3), pp. 277–290.

Tigranyan, S. et al. (2021) 'Factors related to the impostor phenomenon in psychology doctoral students.', Training and Education in Professional Psychology, 15(4), pp. 298–305.

University of Hertfordshire (2018) Protocol for Reflective Practitioner Work by Academic Staff. The University of Hertfordshire

Vygotsky, L.S. (1978) Mind in Society: The Development of Higher Psychological Processes. Cambridge: Harvard University Press.

Appendix A: Cohort 21 teaching feedback form

Jisc Online surveys

23.06.22 CBT Simulation C21

Showing 5 of 5 responses

Showing **all** responses

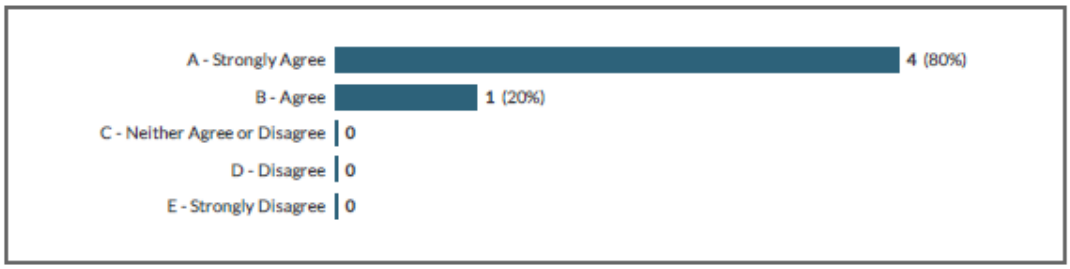
Showing **all** questions

Response rate: 5%

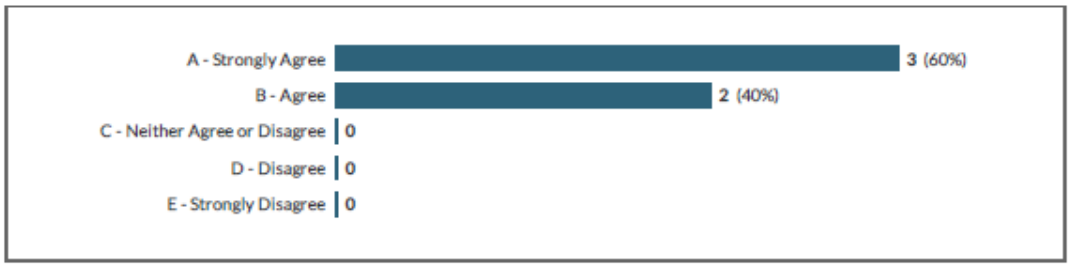
1 Lecturer:

Showing all 5 responses	
David Chapman	913373-913355-96609097
David Chapman	913373-913355-96632711
David Chapman	913373-913355-96632667
David amd daphne	913373-913355-96636765
David Chapman	913373-913355-96651111

2 GOALS AND LEARNING OBJECTIVES: Clearly stated at the start of the session

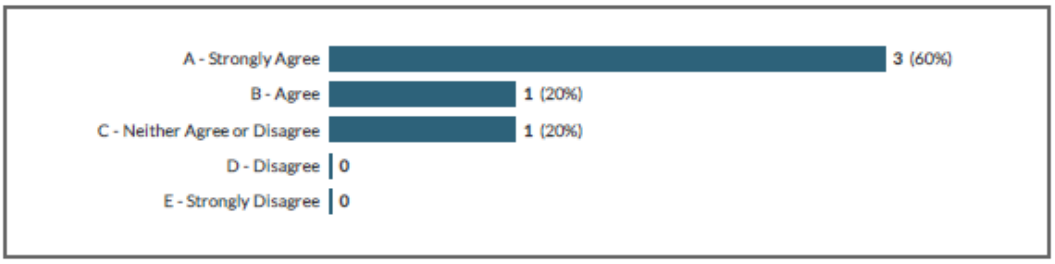


3 CONTENT: Subjects or topics covered recognise and build upon my existing knowledge and skills

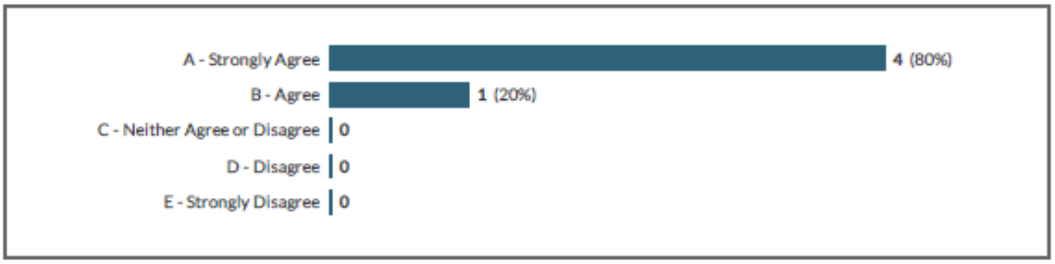


1 / 4

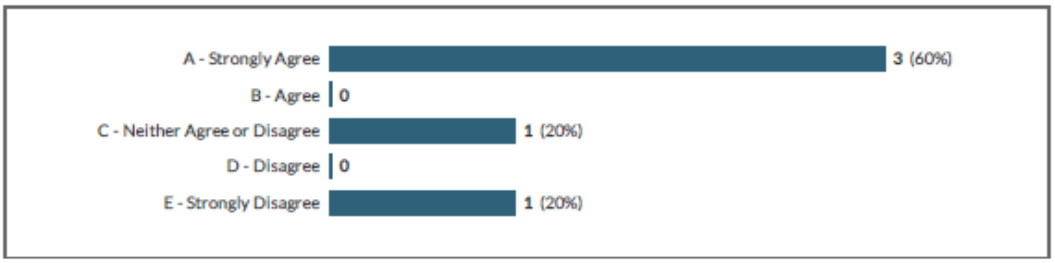
4 TEACHING MATERIALS & HANDOUTS: The teaching materials and handouts illuminated the content



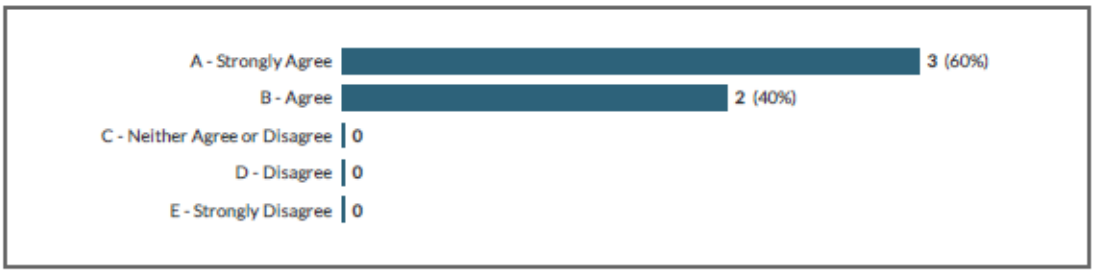
5 ENGENGEMENT: The presenter(s) was engaging, encouraged discussion and participation and was willing to answer questions



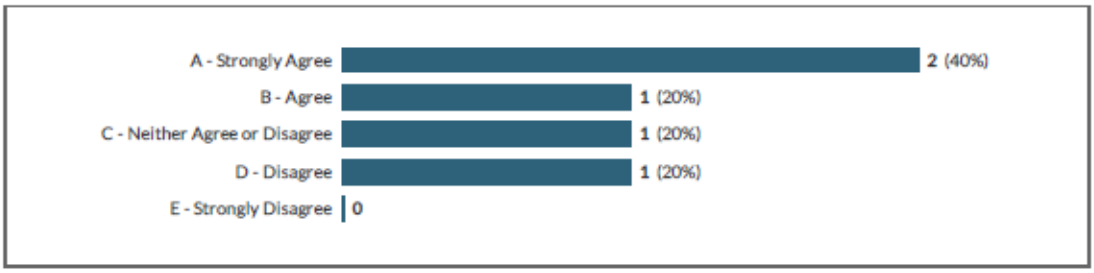
6 ORGANISATION AND TIME MANAGEMENT: A coherent schedule was maintained within the allotted time



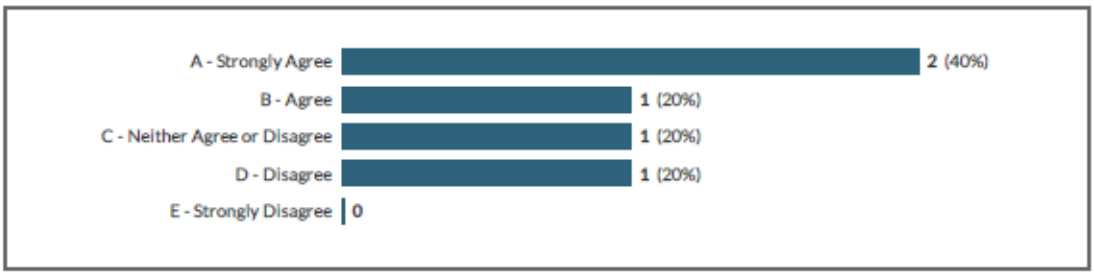
7 RELEVANCE FOR CLINICAL PRACTICE: The knowledge and/or skills gained in the session are applicable to clinical practice



8 COURSE PHILOSOPHY: The content of the session and its delivery fit with the overall course philosophy for example ability to consider alternative perspectives flexibly and ethically



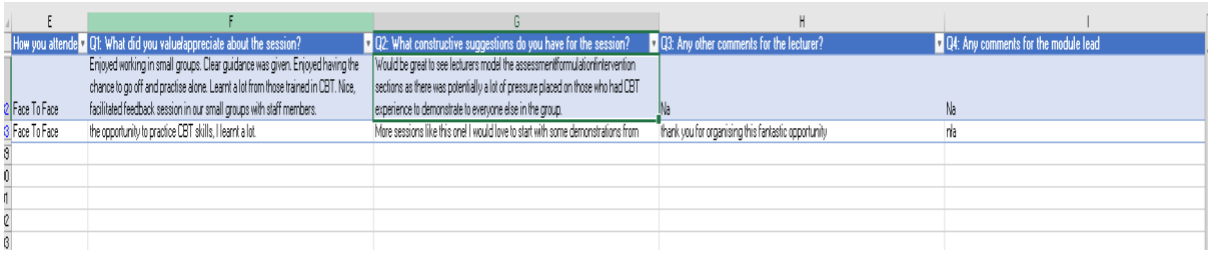
9 IMPACT OF DIVERSITY (Course Philosophy cont'd): Within the subject/topic(s) covered by the session, sameness and difference were acknowledged and/or addressed



10 COMMENTS ON TEACHER/SESSION STRENGTHS AND AREAS FOR DEVELOPMENT (Optional): Please note that this sheet and the comments you provide will be made available to the presenter(s) as feedback. It is important that you write in an appropriate and constructive style which encourages presenter(s) to take on board your comments.

Showing all 4 responses	
Except from the initial hiccup forcing people to come to uni in the context of national strikes, the session was greeat! Well hosted and great learning opportunity too	913373-913355-96609097
Really enjoyed this- I was face to face and got a lot from this. Would have liked to of had the information a couple of days earlier, but otherwise it was good thank you	913373-913355-96632711
This was a great session and I appreciate all that David did to provide a great learning experience. He also managed hybrid learning gracefully. We would benefit from having such sessions more closely algined with teaching e.g., having this after the CBT teaching and having a systemic one around this time. In general, I think we'd benefit from more of these sessions in general.	913373-913355-96632667
The simulation took place when tfl had their strikes. Although cohort expressed their difficulty in commuting to work that day due to exceptional circumstances, course staff responded harshly without sympathy. Students got mixed responses. The day was easily facilitated online and ran smoothly. This was unnecessary stress for everyone. It was unclear how long each student has and who is supposed to go first in each role-play. This could have been planned better. Each session started late. People were sent additional sheets without being informed in advance or being given time to read it. Although simulations provide good peer learning, it can be planned better.	913373-913355-96651111

Appendix B: Cohort 22 teaching feedback form



	E	F	G	H	I
	How you attende	Q1: What did you valueappreciate about the session?	Q2: What constructive suggestions do you have for the session?	Q3: Any other comments for the lecturer?	Q4: Any comments for the module lead
2	Face To Face	Enjoyed working in small groups. Clear guidance was given. Enjoyed having the chance to go off and practise alone. Learnt a lot from those trained in CBT. Nice, facilitated feedback session in our small groups with staff members.	Would be great to see lecturers model the assessmentformulationintervention sections as there was potentially a lot of pressure placed on those who had CBT experience to demonstrate to everyone else in the group.	Na	Na
3	Face To Face	the opportunity to practice CBT skills, I learnt a lot.	More sessions like this one! I would love to start with some demonstrations from	thank you for organising this fantastic opportunity	nla
8					
0					
1					
2					
3					

Appendix C: Cohort 23 teaching feedback form

6a. The session and materials were relevant to my clinical practice	6b. The session enhanced my learning and development	7. What was your main takeaway/point of learning from the session?
Agree	Agree	Practice
Strongly Agree	Strongly Agree	finding out what i am willing to try and be comfortable with what I know and don't know e.g., practicing schema therapy which I don't know- in a safe space.
Strongly Agree	Strongly Agree	The value of practicing with peers and learning from this. It was helpful in my learning both for an approach I was not familiar with in practice (DBT) and one I feel relatively familiar with (CFT). For DBT I was able to get my head around some of the concepts previously I hadn't really grasped through observing the role play. For CFT I saw a different way of approaching it and way of explaining the concepts compared to how I would have done. I did ACT and it was helpful to remind myself that the metaphors are most useful when you use one you really connect with and can explain well.
Strongly Agree	Strongly Agree	Experimenting with and applying different modalities into practice.
Strongly Agree	Strongly Agree	The day offered so many opportunities for development across modalities. It was such a valuable experience being able to push myself outside my comfort zone. This was only possible due to the structuring and smooth organisation of the day.
Strongly Agree	Agree	Great to have a booklet to accompany simulation with tips.
Strongly Agree	Strongly Agree	I found it very helpful - learnt a lot from others. Selina was a fantastic facilitator
Strongly Agree	Agree	Very good thought out session
Agree	Agree	How many skills are transferable across multiple modalities

8. What constructive suggestions do you have for developing the session?	9. Any other comments for the lecturers?	10. Any comments for the module lead
N/a	None	No
using only one scenario which you can apply different models to. I find it confusing to have too many different scenarios.	no	no
I would value more of these sessions, even half day, for example doing 1.5 days on DBT and then having 3 hours to practice. We had the same facilitator for all of the practice which I was very thankful for as it helped me to feel more comfortable due to knowing there was consistency. Maybe dependent on group consent it could be proposed to record the group sessions, and maybe have a follow up session to review and reflect?	The day felt quite relaxed overall - that may have been down to my group - but I think the clear structure and consistency of facilitator and staying in the same room also helped. I would advocate for this again.	Felt like it was well placed in year and helpful that it was after a study day, as this allowed time to prepare little and not having to manage following a day of lectures.
Instead of many scenarios, perhaps one scenario that can be used trans diagnostically so we can apply different modalities Rating scales for other modalities More focus on applying intervention techniques	Well organised, paced and the pack was incredibly helpful. Thank you	The pack provided today was very helpful. Would appreciate if something of a similar resource is provided for future teachings/simulation days
More days like this please!	Scott did such a great job in the way he structured the day and the resources he provided to scaffold the development.	Please can future simulation days be structured this way where possible.
Demonstrations of all modalities please. Also to have enough staff to supervise throughout, particularly those with expertise in the relevant modalities. I feel my group lacked direction at times.	As above. Appreciate the effort that went into the session. I personally would prefer being put into small groups though, rather than organising self..realise i might be in a minority!	As above.
No	No	No
Need more teaching of the models	None	None
Maybe a chance to switch rooms with each role play	N/a	N/a

Appendix D: Critical Incident Questionnaire (CIQ) (Brookfield, 1995)

The Classroom Critical Incident Questionnaire

Please take about five minutes to respond to the questions below about this weekend's class. Don't put your name on the form - your responses are anonymous. If nothing comes to mind for any of the questions just leave the space blank. At the next class we will share the group's responses with all of you. Thanks for taking the time to do this. What you write will help us make the class more responsive to your concerns.

At what moment in class this weekend did you feel most engaged with what was happening?

At what moment in class this weekend were you most distanced from what was happening?

What action that anyone (teacher or student) took this weekend did you find most affirming or helpful?

What action that anyone took this weekend did you find most puzzling or confusing?

What about the class this weekend surprised you the most? (This could be about your own reactions to what went on, something that someone did, or anything else that occurs).

Language challenges faced by international students within the MSc Environmental Management programme at the University of Hertfordshire, UK

Gabriela Zemelka g.zemelka@herts.ac.uk

Abstract

This case study explores the language challenges faced by international students within the MSc Environmental Management programme at the University of Hertfordshire, United Kingdom. It specifically assesses students' proficiency in understanding and utilising technical terminology and concepts within the Water Pollution Control module. The study also examines the extent to which students utilise academic support services designed to help their academic success. The findings reveal significant linguistic problems that affect students' ability to engage effectively in classroom discussions and grasp technical terminology, highlighting an urgent need for enhanced linguistic support tailored to the needs of international students. Additionally, the results indicate a potential lack of awareness or accessibility to academic support services, suggesting the need for these services to be more adaptive to the specific academic and linguistic challenges faced by international students. The research underscores ongoing issues and suggests practical, inclusive strategies to fully integrate international students into the academic community, which are vital for their success within the module and their overall educational experience.

Introduction

In the past, the pursuit of higher education in the United Kingdom (UK) by students, especially from developing countries, was driven by limited educational opportunities at home and the belief that a UK education, including the excellent standard of teaching and practical skills that UK higher education delivers, could improve job prospects and social standing (Mazzarol and Soutar, 2002; Ye and Edwards, 2018). Universities focused on how their programmes could elevate the status of these international students. Over the past two decades, universities have significantly expanded their international activities, with economic benefits and enhancing the institution's global reputation being key motivations for recruiting international students (Bolsmann and Miller, 2008; Frølich and Stensaker, 2010). In this context, the Master of Science in Environmental Management (MSc EM) programme in the School of Life and Medical Sciences (LMS) at the University of Hertfordshire (UH) provides an example of a microcosm of this international academic exchange. The student body in the UK is diverse, with the largest cohort being South Asian students and the third largest cohort being African students, as reflected in the MSc EM at the UH (HESA, 2023).

Background

Dolby and Rahman (2008) claimed that the spread of colonialism resulted in the European university system being established in Asia and Africa. Considering the influence of internationalisation, South Asian students consider the UK as the most attractive destination for higher studies (Brooks and Walters, 2009). Irungu (2013) found that African students generally perceive studying in English-speaking countries as a guarantee of employment when they return home, and students believe that employers are less interested in what university a student attends and more interested in the fact that they have a degree in developed country. However, throughout their academic journey, they come across various challenges that are unique and differ from the experiences of home students (Wolf and Phung, 2019). Universities require international students to have a minimum language proficiency, but many do not have enough practice with the verbal usage of English. For example, the policy at the UH requires students to have an IELTS score of 6.5 or an equivalent if English is not their native language (Herts language requirements, 2024). However, the actual extent of their English language proficiency is not always certain.

Language challenges

Mitton (2011) and Singh, Holmes and Gupta (2023) identified language deficiency as a significant academic barrier, resulting in heightened difficulties in their studies for African and South Asian students, respectively. Among South Asian students, this barrier extends to problems with understanding, difficulties answering questions and participating effectively in group discussions. Constantine et al. (2005) and Coward (2003) suggested that this could be because their native language significantly differs from English, which has distinct spoken and written forms. Similarly, Hyams-Ssekasi, Mushibwe and Caldwell (2014) reported that some African students faced difficulties with the native speakers understanding their accents. Language challenges include difficulties in understanding and using academic English and taking notes from academic texts, which are crucial for understanding course materials, writing assignments, and participating in classroom discussions. Rienties et al. (2013) found that international students often collaborate effectively with peers from similar cultural backgrounds.

The individual knowledge and cultural values that students bring to the learning environment can shape their engagement with course material and interactions with others. Therefore, teamwork plays a key role in international students' collaborative learning (Rienties et al., 2013). Students tend to stay towards peers with whom they have things in common, often without realising it. Therefore, designing teaching strategies that encourage teamwork can improve collaboration among students and positively impact their relationships with lecturers, as well as potentially encourage them in classroom discussions in English. Moreover, students from South Asian and African countries often come from diverse educational backgrounds, where teaching methods and learning resources may differ substantially from those in the UK, making the adaptation worse (Taylor, 2017).

Additionally, the nuances of technical terminology specific to the MSc EM can further complicate their learning experience (Kamaşak, Sahan, and Rose, 2021). An example could be the Water Pollution Control module (WPC), which is an essential part of the MSc Water and Environmental Management (WEM) pathway and is also an option for students in the general MSc EM pathway. It is a three-day course worth 15 credit points. The course includes two days of lectures in the classroom, totalling 14 hours, and one day dedicated to hands-on field and lab work in biomonitoring and chemical monitoring, lasting 8 hours. There are also 4 hours of classroom-based tutorials focusing on the assignments. This module addresses the causes and sources of ground and surface water pollution, as well as the management and treatment of wastewater and trade effluent. The hazards of wastewater disposal are considered, together with greywater use and re-use, and relevant legislation and regulation. It also explores the design and operation of wastewater treatment plants to meet environmental standards. Therefore, English technical terms and concepts form a crucial element of this module, as they are essential for discussing issues related to water pollution and water pollution control.

Academic support services

The pedagogical field has acknowledged these language challenges, suggesting a need for comprehensive support systems that include language assistance, tailored tutoring, and integration programmes to bridge this gap (Lashari et al., 2023). Also, at the MSc EM, students can find different sorts of support, such as the Life and Medical Sciences Academic Support Unit (LMS ASU), Library SkillUP, Learning Resources Centres (LRC), Herts Students' Union, or Support and Wellbeing (Herts Students' Supports Services, 2024). LMS ASU provides a variety of sessions for LMS students to develop confidence in their academic abilities. Library SkillUP is a series of online support materials to help save students time and get better grades covering referencing, effectively searching relevant information for assignments, academic English reading techniques, evaluating quality information for assignments, and academic English writing techniques to help with structuring assignments.

The LRCs offer both online and offline support to help students with their studies at the UH. Herts Students' Union provides advice and support on a range of student issues, including those of an academic nature, such as information on academic appeals and academic misconduct through study skills support. Support and wellbeing services dealing with mental health and wellbeing (Herts Students' Supports Services, 2024). Roberts and Dunworth (2012) pointed out that international students often face challenges in finding information about support services provided by universities, underscoring the need to better inform international students about the support available on campus. Nevertheless, such support is important for not only enhancing their academic performance within the WPC module but also for facilitating a smoother cultural and social adaptation to the educational environment in the UK.

Pedagogical theories

Social constructivism, a theory of social learning developed by Vygotsky, suggests that people actively engage in building their knowledge. According to Vygotsky, learning occurs mainly within social and cultural contexts rather than being an isolated process within the learner (Schreiber and Valle, 2013). This theory emphasises the importance of interactions in pairs and small groups (Johnson and Bradbury, 2015). For example, learning for students happens through their engagement with peers or teachers, while teachers play a key role in encouraging and guiding these discussions to leverage the natural dynamics of classroom conversation (Powell and Kalina, 2009). Social constructivism underlines that effective teaching and learning rely on collaborative dialogue and interaction, focusing on students' grasp of the discussions (Prawat, 1992).

On the other hand, the translanguaging approach suggests that bilingual or multilingual individuals who allow students to use their home languages in preliminary discussions, brainstorming sessions, or when making notes can facilitate a deeper understanding of complex scientific concepts. Translanguaging strategies in the classroom can validate international students' existing language skills and encourage them to use all their linguistic resources to learn and communicate, promoting a more inclusive and effective learning environment (Storheil and Iversen, 2023).

The other framework is cognitive load theory, developed by Sweller and Chandler, originated in cognitive psychology and has significantly influenced educational theory by providing insight into the cognitive mechanisms of learning. It suggests that learners have a limited capacity to process new information. Initially, new information is processed in the short-term working memory before being stored in long-term memory by forming schemas, which then influence an individual's performance in a specific area. For international students, processing content in a second language adds an extra layer of cognitive load (Chandler and Sweller,1991; Sweller et al., 2011).

With these points in mind, the study focused on the students' proficiency in understanding and utilising English technical terms and concepts within the WPC module. Additionally, it investigated the likelihood of students using academic language support services aimed to help them succeed in their studies.

Methodology

Participants were international students enrolled in the WPC module at the UH. Out of the total 136 students in the module, 129 participated. The students studied as a cohort 2023/2024 in the MSc EM programme on the WEM pathway. Following the module's last lecture, participants completed an electronic anonymous Mentimeter survey in the classroom using their mobile phones or laptops. Ethical issues were discussed with students and only those participated who wanted to take the survey. They responded to five

different questions by selecting a number from 1 (not confident) to 5 (being very confident), as well as selecting Yes/No answers, or ranging from Never/Sometimes/Often to Always. Additionally, there was one multiple-choice question. Table 1 shows the pre-determined survey questions.

Table 1. Mentimeter questions

No.	Question
1	On a scale of 1 to 5, how confident do you feel participating in classroom discussions? (1 being not confident at all and 5 being very confident)?
2	Have you ever refrained from participating in a classroom discussion due to language barriers? (Yes/No)
3	How often do you find it challenging to understand the technical terminology used in lectures? (Never/Sometimes/Often/Always)
4	How frequently do you seek clarification from peers or instructors due to language misunderstandings? (Never/Sometimes/Often/Always)
5	Have you used any academic skills support services offered by the university (e.g., LMS ASU)? (Yes/No)
6	If you have answered Yes to the previous question, which support services have you used? • LMS ASU • Library SkillUP • LRC • Herts Students' Union • Support and Wellbeing • Other

The quantitative data from the survey were entered into Microsoft Excel 2023 for analysis. The responses to each question were converted into percentage values to assess various aspects: participants' confidence in engaging in classroom discussions, the frequency with which they encountered difficulties understanding technical terminology, the regularity with

which they sought clarifications from peers or instructors, and the use of language support services. These quantitative results were then analysed alongside qualitative data from a pedagogical perspective to gain a deeper understanding of the participants' experiences and the challenges they face while studying in English as a second language abroad.

Results and discussion

The results from the survey conducted among international students in the MSc EM programme at the UH revealed significant language-related challenges that affected various aspects of their academic engagement and learning experience. These challenges align with existing pedagogical literature, which frequently highlights the multifaceted impacts of language barriers on international students in higher education settings (Coward, 2003; Constantine et al. 2005; Mitton, 2011; Rienties et al., 2013; Hyams-Ssekasi, Mushibwe and Caldwell, 2014; Taylor, 2017; Kamaşak, Sahan and Rose, 2021; Singh, Holmes and Gupta, 2023).

Confidence in classroom discussions

The survey showed that a significant number of students, 47% (61 students), felt moderately confident in engaging in classroom discussions. This also indicates a plateau, where students may not be fully utilising their potential for more active engagement. The moderate average confidence level across the board suggests a significant portion of the class is at a similar threshold, which can be a foundation for targeted improvement. However, about 45% (58 students) of the students reported low confidence levels (ranging from not confident to slightly confident), stems considerable discomfort possibly due to language barriers, suggesting that these students might struggle with expressing themselves clearly or understanding nuanced discussions. Only 8% (10 students) of students felt confident or very confident.

This overall moderate confidence level in discussions indicates that while students are relatively at ease, there is a clear need for enhanced linguistic support to boost their confidence further. Moreover, this minority group may dominate discussions, which can unintentionally marginalise less confident students and skew the overall classroom dynamic. Given that confidence in language proficiency directly impacts students' willingness to engage in discussions, which are crucial for active learning, it is imperative to enhance language support. This could significantly improve confidence levels and encourage more robust participation. Angelini and García-Carbonell (2019) noted that implementing e.g., targeted speaking workshops or simulation exercises can provide a safe environment for practising language skills, helping the students to become more active and engaged participants in classroom discussions. Such initiatives would not only address the immediate language barriers but also contribute to a more inclusive and dynamic learning environment during the WPC module.

Impact of language barriers on classroom participation

Approximately 71% of the students, which reflected 92 individuals, reported that they had refrained from participating in classroom discussions at least once during the WPC module due to language barriers. This substantial proportion significantly highlights how language proficiency influences student engagement and interaction within academic settings. Andrade (2006) noted that limited language proficiency can lower participation rates in classroom discussions and reduce a sense of belonging among international students. This effect was clearly observed in the current study, where most students avoided discussions due to language difficulties.

These barriers not only prevent active engagement but also affect students' full integration into the academic community, potentially affecting their overall educational outcomes and success. Thus, the high rate of non-participation due to language barriers underscores the urgent need for targeted interventions, such as enhanced language support and more inclusive teaching strategies to accommodate non-native speakers. Campbell (2012) highlighted that strategies such as implementing a buddy system where international students are paired with native speakers, or more structured group work assignments where roles are clearly defined and distributed among students, could mitigate these effects.

Understanding technical terminology

Difficulty in understanding technical terminology was a common issue, with only 22% (28 students) reporting that they never found it challenging. Approximately 39% of students occasionally found the terminology challenging, while 31%, representing 50 and 40 students respectively, often faced challenges. Only 3% (4 students) always had difficulties with technical terms. This indicates that technical language poses a considerable barrier to full comprehension during WPC module lectures. The struggle with technical terminology, as noted by a considerable number of students, aligns with findings by Martínez, Beck, and Panza (2009), who observed that discipline-specific language introduces an additional layer of complexity for non-native speakers. The cognitive load required to process and understand specialised terminology can disrupt the overall learning process, resulting in gaps in knowledge acquisition and application.

This challenge is further compounded by the fast pace of lecture delivery, which often fails to accommodate the processing time required by those with limited language proficiency. Therefore, there is a clear need for interventions such as the provision of glossaries, visual aids that explain complex processes or pre-lecture sessions that introduce and clarify complex terms, potentially improving comprehension and helping in the learning process (Rees, Bruce and Nolan, 2013; Kinsella, Mahon and Lillis, 2017).

Seeking clarification

In terms of seeking clarification, 22% (28 students) reported that they never required further assistance, while 41% (53 students) sometimes asked for help, 29% (37 students) often sought clarification, and 5% (6 students) always needed additional explanations. This distribution suggests a proactive approach among many students in addressing language barriers, though it also highlights the frequent occurrences of misunderstandings. The overall frequency of misunderstandings calls for more structured support within classroom settings. This could involve more regular feedback sessions or dedicated additional sessions specifically for international students (Jackson, 2017; Coneyworth et al., 2020).

Usage of language support services

The survey revealed that only 40% (52 students) of the participants had used the language support services provided by the UH. Within this group, 34% (18 students) used the LMS ASU, 14% (7 students) accessed Library SkillUP, 12% (6 students) engaged with the LRC, 22% (11 students) participated in activities offered by Herts Students' Union, 8% (4 students) sought Support and Wellbeing services, and 10% (5 students) used other resources. This moderate rate of utilisation suggests some awareness and a degree of reliance on institutional support mechanisms to address language challenges. Yet, it also highlights that these needs are substantial and persistent.

However, as Martirosyan, Bustamantea, and Saxon (2019) observed, while support services are invaluable, they must be adequately tailored to meet the specific linguistic and academic needs of international students. The UH might consider integrating language development objectives directly within the curriculum, focusing not only on general language skills but also on academic and discipline-specific language competencies. This integrated approach could enhance the effectiveness of support services and ensure they more directly contribute to students' academic success and integration.

Limitations of the study

The study primarily focused on international students within the WPC module of the MSc EM programme, which may limit the findings to other modules, programmes, or faculties. Since the questions were posed by the module leader, who was in direct contact with students, the data may be susceptible to biases where students might underreport or overemphasise their challenges. A longitudinal study could also provide insights into how language competence develops over time and its long-term impact on the WPC module students' academic and social integration. Furthermore, initial language proficiency was checked using IELTS scores or equivalent tests, which might not accurately reflect students' practical linguistic capabilities in academic and technical settings. Additionally, due to the limited scope of this study, which focused only on the students' proficiency in understanding and utilising English technical terms and concepts within the WPC module, it did not deeply

explore how the diverse cultural backgrounds of the students specifically affect learning dynamics within the module.

Recommendations

Considering pedagogical enhancements during the WPC module, it would be beneficial to directly integrate language development into the curriculum, focusing particularly on technical vocabulary related to water pollution. Offering pre-lecture sessions to review complex terminology and concepts could better prepare students for the content covered in class. This could allow students to familiarise themselves with the content at their own pace, reducing cognitive load during lectures. Additionally, supplying glossaries for discipline-specific terminology can help bridge the language gap.

Workshops where students actively engage with technical vocabulary through exercises like matching terms with definitions, case studies, or practical applications might also be useful. This hands-on approach strengthens learning and helps students see the relevance of terms in real-world contexts. Inviting experts from the field to discuss practical applications of technical terms and concepts can be highly beneficial. When professionals use these terms in context, it can clarify the language and highlight its real-world relevance.

Therefore, it would be worth considering employing inclusive teaching techniques that suit a diverse student body. Techniques such as scaffolding, where information is gradually built up and supported with plenty of examples, can be particularly effective. Also, using clear, concise language and avoiding idiomatic expressions ensures that non-native speakers are not excluded.

Encouraging group work from various linguistic backgrounds could enhance language skills through peer interactions and help to reduce the formation of linguistic clusters. To further enhance the effectiveness of group work and support communication and collaboration, several strategies and preparations can be implemented. These include ensuring a balanced mix of linguistic and cultural backgrounds in group composition, establishing clear norms and guidelines for communication, such as using plain language, active listening, and respectful dialogue, or designing group tasks that require input from all members. This approach ensures that each student's perspective is valued and integral to the group's success. This not only helps improve language skills through social interaction but also enables students to learn from diverse perspectives.

Integrating the LMS ASU more effectively into curriculum delivery can further enhance student learning and success. Academic skills workshops tailored to the specific requirements of the WPC module, such as academic writing, research skills, data analysis, should be scheduled in alignment with key module milestones, e.g., before major assignments. Regularly timetabling these workshops as part of the curriculum, rather than optional extras, will help ensure broader student participation.

Implementing more frequent formative assessments would allow for ongoing monitoring of student progress and provide valuable feedback, helping students to address any knowledge and language gaps promptly. Feedback should be timely and actionable, with specific suggestions on how to improve.

Exploring the concept of the "hidden curriculum" can also provide a deeper understanding of the unspoken and implicit aspects of education that influence student learning and integration, particularly in diverse and linguistically varied classrooms. This term refers to the unwritten, unofficial, and often unintended lessons, values, and perspectives that students learn. While the formal curriculum focuses on explicit academic content, the "hidden curriculum" encompasses the social norms, behaviours, and attitudes that are conveyed through classroom interactions, university culture, and institutional policies (Koutsouris, Mountford-Zimdars and Dingwall, 2021).

Focusing on institutional policies, module staff should receive ongoing training on how to communicate with and teach a linguistically diverse student body effectively. Training could cover areas such as cultural competency, strategies for teaching non-native speakers, and the use of technology to support learning. It would be advantageous to gain a better understanding of and respond more effectively to the diverse needs of international students.

Module staff could benefit from close collaboration with support services, which enables them to address the specific academic and personal needs of their students more effectively. Additionally, regular communication between module staff and support services facilitates the early identification of students who are struggling or at risk. This proactive approach ensures that issues are addressed before they significantly affect the student's performance and overall experience.

Finally, regularly evaluating the effectiveness of teaching strategies and support services by gathering feedback from international students at the end of their studies, such as through the Postgraduate Taught Experience Survey (PTES), or at the end of the module via a Student Voice Questionnaire (SVQ), could improve the adjustments made to teaching methods and support mechanisms within the WPC module.

By implementing suggested recommendations, module leader can create a more supportive and inclusive environment that recognises the unique challenges faced by international students and actively works to enhance their academic and social integration.

Conclusions

The study on the language challenges faced by international students within the MSc EM programme at the UH has provided significant insights into how linguistic barriers affect these students' academic and social integration. The research underscored that a significant number of students avoided participating in classroom discussions due to language

difficulties, which not only hindered their learning process but also affected their sense of belonging within the academic community. This was particularly visible in discussions requiring high levels of English proficiency, where moderate to low confidence levels among students were indicative of the considerable impact of language barriers. Additionally, the study revealed that the comprehension of discipline-specific terminology represented a major challenge, especially within the context of water pollution.

This difficulty in understanding technical terminology was a substantial obstacle to students' understanding of key concepts and, consequently, their overall academic performance. While the moderate usage of academic support services showed some level of awareness and proactive engagement among students, the effectiveness of these services could be significantly enhanced. Tailoring support services more closely to meet the specific linguistic and academic needs of international students can lead to better outcomes.

In conclusion, effectively supporting international students extends beyond simply enhancing their English language skills; it involves a holistic approach to fostering their full integration into both the academic and social aspects of the university. This requires a concerted effort not only from the WPC module leader and staff members, but also faculty, and university to continuously develop and adapt supportive strategies, ensuring an inclusive and supportive learning environment for all students. This comprehensive approach could not only aid in their academic success but also enhance their overall experience at the university.

References

Andrade, M. S. (2006) International students in English-speaking universities: Adjustment factors. Journal of Research in International Education, 5(2), pp. 131-154.

Angelini, M. L. and García-Carbonell, A. (2019) Developing English speaking skills through simulation-based instruction. Teaching English with Technology, 19(2), pp. 3-20.

Bolsmann, C. and Miller, H. (2008) International student recruitment to universities in England: discourse, rationales and globalization. Globalisation, Societies and Education, 6(1), pp.75-88.

Brooks, R. and Waters, J. (2009) International higher education and the mobility of UK students. Journal of Research in International Education, 8(2), pp. 191-209.

Campbell, N. (2012) Promoting Intercultural Contact on Campus: A Project to Connect and Engage International and Host Students. Journal of Studies in International Education, 16(3), pp. 205-227.

Chandler, P. and Sweller, J. (1991) Cognitive load theory and the format of instruction. Cognition and Instruction, 8(4), pp.293-332.

Coneyworth, L., Jessop, R., Maden, P. and White, G. (2020) The overlooked cohort? – Improving the taught postgraduate student experience in higher education. Innovations in Education and Teaching International, 57(3), pp. 262-273.

Constantine, M. G., Kindaichi, M., Okazaki, S., Gainor, K. A. and Baden, A. L. (2005) A qualitative investigation of the cultural adjustment experiences of Asian international college women. Cultural Diversity and Ethnic Minority Psychology, 11(2), pp. 162- 175.

Coward, F. L. (2003) The challenge of "doing discussions" in graduate seminars: A qualitative study of international students from China, Korea, and Taiwan. PhD dissertation.

Dolby, N. and Rahman, A. (2008) Research in International Education. Review of Educational Research, 78(3), pp. 676-726.

Frølich, N. and Stensaker, B. (2010) Student recruitment strategies in higher education: promoting excellence and diversity? International Journal of Educational Management, 24(4), pp.359-370.

Herts language requirements (2024) MSc Environmental Management Why choose Herts? Available at: https://www.herts.ac.uk/courses/postgraduate-masters/msc-environmental-management (Accessed: 22 February 2024).

Herts Students' supports services (2024) Academic support. Available at: https://ask.herts.ac.uk/academic-support#:~:text=assignments%20and%20deadlines.-,English%20language%20support,module%20by%20completing%20their%20form (Accessed: 22 February 2024).

HESA (Higher Education Statistics Agency) (2015) Free online statistics - students and qualifiers. Available at: https://www.hesa.ac.uk/news/19-01-2023/sb265-higher-education-student-statistics (Accessed: 22 February 2024).

Hyams-Ssekasi, D., Mushibwe, C. P. and Caldwell, E. F. (2014) International education in the United Kingdom: The challenges of the golden opportunity for Black-African students. SAGE Open, 4(4), pp.1.

Irungu, J. (2013) African students in the US higher education system: A window of opportunities and challenges, in Alberts H. C. and Hazen H. D. (eds.) International students and scholars in the United States: Coming from Abroad.). New York Palgrave MacMillan, pp. 163-180.

Jackson, D. (2017) Exploring the challenges experienced by international students during work-integrated learning in Australia. Asia Pacific Journal of Education, 37(3), pp. 344-359.

Johnson, M.D. and Bradbury, T.N. (2015) Contributions of Social Learning Theory to the Promotion of Healthy Relationships: Asset or Liability? Journal of Family Theory & Review, 7, pp.13-27.

Kamaşak, R., Sahan, K. and Rose, H. (2021) Academic language-related challenges at an English-medium university. Journal of English for Academic Purposes, 49, 100945.

Kinsella, G. K., Mahon, C. and Lillis, S. (2017) Using pre-lecture activities to enhance learner engagement in a large group setting. Active Learning in Higher Education, 18(3), pp. 231-242.

Koutsouris, G., Mountford-Zimdars, A., and Dingwall, K. (2021) The 'ideal' higher education student: understanding the hidden curriculum to enable institutional change. Research in Post-Compulsory Education, 26(2), pp. 131-147.

Lashari, S. A., Awang-Hashim, R., Lashari, T. A. and Kaur, A. (2023) Acculturation stress and social support for international students' adjustment in Malaysia: does language proficiency matter? Journal of Applied Research in Higher Education, 15(2), pp. 496-508.

Martínez, I. A., Beck, S. C. and Panza, C. B. (2009) Academic vocabulary in agriculture research articles: A corpus-based study. English for Specific Purposes, 28(3), pp. 183-198.

Martirosyan, N.M., Bustamantea, R.M. and Saxon, D. P. (2019) Academic and Social Support Services for International Students: Current Practices. Journal of International Students, 9(1), pp. 172-191.

Mazzarol, T.W. and Soutar, G.N. (2002) 'Push-pull' factors influencing international student destination choice. The International Journal of Educational Management, 16(2), pp.82-90.

Mitton, L. (2011) The Languages of Black Africans in England. Journal of Intercultural Studies, 32(2), pp.151-172.

Powell, K.C. and Kalina, C.J. (2009) Cognitive and Social Constructivism: Developing Tools for an Effective Classroom. Education, 130(2), pp.241-250.

Prawat, R.S. (1992) Teachers' Beliefs about Teaching and Learning: A Constructivist Perspective. American Journal of Education, 100(3), pp.354-395.

Rees, S., Bruce, M. and Nolan, S. (2013) Can I have a word please: Strategies to enhance understanding of subject specific language in chemistry by international and non-traditional students. The Higher Education Academy, 9(1), pp. 8-13.

Rienties, B., Nanclares, N. H., Jindal-Snape, D. and Alcott, P. (2013) The Role of Cultural Background and Team Divisions in Developing Social Learning Relations in the Classroom. Journal of Studies in International Education, 17(4), pp. 332-353

Roberts, P. and Dunworth, K. (2012) Staff and student perceptions of support services for international students in higher education: A case study. Journal of Higher Education Policy and Management, 34(5), pp. 517-532.

Schreiber, L.M. and Valle, B.E. (2013) Social Constructivist Teaching Strategies in the Small Group Classroom. Small Group Research, 44(4), pp.395-411.

Singh, J. K. N., Holmes, H.L. and Gupta, S. (2023) South Asian postgraduate international students' employability barriers: A qualitative study from Australia and the United Kingdom. British Journal of Educational Studies, 71(4), pp. 373-391.

Storheil, I.V. and Iversen, J.Y. (2023) Translanguaging strategies in multilingual newly arrived students' writing. Scandinavian Journal of Educational Research, pp.1-14.

Sweller, J. (2011) Cognitive Load Theory. In: Mestre, J.P. and Ross, B.H., eds. Psychology of Learning and Motivation. Academic Press, 55, pp.37-76.

Taylor, S. (2017) Contested Knowledge: A Critical Review of the Concept of Differentiation in Teaching and Learning. WJETT, 1, pp. 55-68.

Wolf, D.M. and Phung, L. (2019) Studying in the United States: Language Learning Challenges, Strategies, and Support Services. Journal of International Students, 9(1), pp.211-224.

Ye, L. and Edwards, V. (2018) A narrative enquiry into the identity formation of Chinese doctoral Students in relation to study abroad. Race Ethnicity and Education, 20(6), pp. 865-876.

Social Spheres- The Value of Belonging in Social Cohesion for Degree Apprentice Students in Mental Health Nursing - A Literature Review

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Abstract

This article aims to explore research relating to the benefits, value, and areas of belonging in Degree Apprentice (DA) Students entering the BSc cohort of Year 2 Mental Health Nursing. Degree Apprenticeships are a relatively new pathway into the vocation of Mental Health Nursing. Funded by employers, experienced practitioners navigate new spheres of social, academic and practice settings. The sense of belonging is continuously shifted. Given that it is accepted that belonging in social cohesion will influence the way people learn, this transient nature of Apprenticeship belonging requires investigation. Analysing the literature relating to Belonging in Mental Health Nursing Apprenticeships aimed to identify themes associated with this experience. From the review of this area, the recommendations are:

- For Academics and Employers to support the social cohesion of these Students into the settings in which they sit and collaborate in doing so.
- For Academics to consider how best to support inclusion and belonging within the merging cohorts of Students.
- To consider further research specifically targeted at the experiences of belonging within Mental Health Nursing Apprenticeships.

Introduction

The threshold concept of belonging and social cohesion is closely aligned with the pedagogic theories around Connectivism (Renda and Kuys, 2015) and Social Learning Theory (Bandura, 1977). Bandura's (1977) Social Learning Theory would allow Students to observe and learn from those around them. Connectivism asserts that people learn when they form connections (Seimens & Canole, 2011). These connections can be within people around them, their roles, or elements of their lifestyles. Belonging in Social Cohesion promotes connections and community, owing to increased learning.

In defining 'belonging', it is important to distinguish this from 'fitting in'. Where 'fitting in' is considered as adapting oneself to the situation to be accepted or conforming (Schall, Wallace and Chuon, 2014), Belonging owes to feeling accepted for who you are (Oxford Dictionaries, 2010) and is a fundamental psychological need (Maslow 1968). Within Education, belonging can be defined as a Student's 'subjective feelings of connection and integration' in relation to their institution (Gillen-O'Neel, 2021). Belonging allows an expression of your own ideas in what you will perceive as a safe environment. These feelings of belonging are connected to their 'interpersonal relationships' (Gillen-O'Neel, 2021). In

considering social cohesion in higher education, the link between these interpersonal relationships and the sense of belonging becomes clearer. Social Cohesion is understood as 'the social relationships' (Ndiwakalunga Mulunga & Yazdanifard, 2014) and trust that come from 'connections among individuals' (Moiseyenko, 2005).

Research has demonstrated belonging can contribute towards a wide range of benefits including academic attainment (Pittman & Richmond, 2007) and increases in engagement and attendance. A sense of belonging is said to be associated with a 'deeper processing in learning' (Dupont et al. 2014) and encourages Students to be motivated, or 'persistent' in their learning journeys (Furrer and Skinner, 2003). A sense of belonging is also linked, importantly to wellbeing and enjoyment (Pedler at al, 2022). The more they enjoy learning, the more engaged a person is to continue. Those that lack a sense of belonging can also be at higher risk of leaving the course (Finn & Zimmer, 2012 in Christenson et al. 2012).

As part of the University of Hertfordshire Graduate Attributes (UH, 2022) being inclusive and collaborative is an aspiration. Students who come together and are 'working together' demonstrate this attribute. Equally, Herts Learning Principles (2024) reference 'building communities' as a desired outcome. There is an expectation Students find and cultivate a sense of community within the institution. The attributes themselves aim to 'connect Students to the University's' shared vision.

DA Students effectively keep one foot in practice by way of employment, and one foot in theory, to further their careers and gain qualification. Apprentices essentially 'carve out' (Mainiero, 1986) their positions within settings. What is important to understand for DA students, is that they may owe belonging to two (or potentially more) institutions, for example, their employment and the University. It is important to understand how this effects their learning so as to tailor the way they are supported at university.

Investigating what will bring success within the DA student experience, in all its forms, is important. In this current climate of financial restriction, it is important to make the most out of this programme. While places for the Degree Apprentice programme are limited, they do appear to be growing (NHS Employers, 2022) with data suggesting an increases in numbers of Nursing Degree Apprenticeship starters. It is important that we meet the needs of these Students based on educated understanding of their experience. Belonging to an institution, whatever that may be, will have benefits to the student in their achievements and wellbeing.

A bottleneck of cohesion was identified. The University desires Students to feel belonging, with cohesion creating learning (Garrison, 2010), creating high quality Nurses. Through a literature review and considering module feedback from Student, it is possible that supportive ways of creating belonging can be introduced and identify where further research could support this design.

Background

From September 2017, the Government decided to initiate a Degree Level Apprenticeship programme for Nursing across all branches (Department of Health and Social Care, 2016). This Apprenticeship Programme aimed to offer a different route into Nursing, a profession that needs ongoing focus and thought into recruitment and retention. Remaining employed, and paid, under their NHS service as a Healthcare Assistant or Support Worker, Students complete the first part of the course as a Nursing Associate. With this qualification they return to their NHS employer as a Band 4, practicing, in some part, within the scope of a Nurse with limitations to practice. The Nurse Associate can later decide whether to 'top this up' to become a Nurse, enabling them to continue career progression. Those Students begin the BSc in Nursing, entering mid-way through Year 2, entering a pre-existing cohort of Students, who are paying for their course themselves.

Having previously discussed why belonging in social cohesion is important, it leads to considering how we assess whether Students experience this and how it happens. Currently at the University of Hertfordshire, there is no measure of belonging used to assess the student's sense of connection and social cohesion, other than in the later 3rd Year National Student Survey. Informal ways of measuring this such as monitoring attendance and attainment in assessment may give indicators as to student experience. Module feedback or Student voice through representatives also gives some idea to the Lecturer, however with the importance of being connected understood, we cannot be sure that it is happening with Student groups.

For DA Students entering the Year 2 cohort currently begin with a cross branch induction which is reduced to a Field Specific induction (Mental Health). Lecturers make efforts to get to know the students and understand their goals for learning. These Students meet the general cohort soon after, however no practice is assumed for engineering connection by the Teaching Staff past introductions. It is also to be acknowledged that Lecturers do not communicate with their specific employer. Personal Tutors (not Module Leaders) meet with the student and a trust representative who may also not know the Student DA well via a Progress Review Meeting. Connections between institutions, where the students can experience belonging, are not notably strong.

In linking to practice, Nurses must work within teams to ensure the best outcomes for our Service Users, this involves being able to learn from and express opinions to others. The classroom, which can be a mirror to practice, allows practice of this between Students of differing backgrounds and experience. Social Learning Theory (Bandura, 1977) underpins the principles of a cohesive environment where Students can feel like they belong.

Overview of Literature Search

An in-depth search and review of literature of academic articles and nursing journals was undertaken. Preliminary searches focused on Mental Health Nursing DA Students, however, there was a lack of literature relating to both Degree Apprenticeships and specifically Mental Health Nursing. Broadening the search to include all branches of Nurses yielded more results, however this article acknowledges the potentially different experiences of the Mental Health Nurse due to the specific attributes and skill set that they are developing, or the professional identity held by these students (Santangelo et al., 2018a). Searching further still into the experiences of any Degree Apprentice Student allowed for further themes to tentatively be explored.

In reviewing those papers to include analysis of belonging, connectedness and social cohesion narrowed the focus. However, what has become apparent is the lack of research completed in Nursing Education, and specifically Mental Health Nursing Students and their sense of belonging, when their experience of belonging may be very much different to other groups of Students.

The most applicable literature was sparse, sourcing only two relevant articles. Cushen-Brewster et al (2022) conducted semi structured interviews with 7 Apprentices. There were efforts to reduce bias as Students were interviewed by Academic Staff. However, themes which include the Academic Staff support were identified, meaning bias could have been present in the responses from participants. While this was one of the most relevant papers identified, it is acknowledged that it was published within the Nursing Times. This source, is at times, discredited by Academics in terms of traditional hierarchy of evidence (Aveyard and Sharp, 2013). While this article does not declare potential bias, it was double-blind peer reviewed giving credibility to the findings.

Similarly, Derbyshire et al. (2023) used an ‘exploratory qualitative mixed methods design’, in the form of multiple semi-structured interviews. This study aimed to explore the ‘journeying’ of Apprentice Students rather than a moment in the course. Like Cushen-Brewster et al., the sample size was relatively small at 8 Apprentices, however this is representative of the number of Degree Apprentices per year at the University of Hertfordshire, and so it was be assumed these results can be generalised. Derbyshire et al. declare their ethical approval and address there is no competing interest or bias to the study. Writing by Flint (2023) was of value in the analysis of Nursing Apprentices experiences. Broadening the search to include Apprentices of all areas, a longitudinal study by Taylor Smith et al. (2023) was identified.

Literature found was within the last 5 years or sooner meaning it was relevant and applicable in terms of time. A focus on Healthcare, Nursing and specifically Mental Health was somewhat lacking. In consideration of the quality of identified papers, it is worth acknowledging and discussing the papers found.

Key themes/Findings

A review of the Literature was conducted. PRISMA guidance (Page et al. 2021) was consulted in parts. Key themes were extracted and organised. The Apprentice Student participants throughout the literature discussed how challenging they found the course, there were certain areas in which this was located or eased, as reported below. Here, those themes relating or linked to the topic of belonging will be reported.

Group Cohesion

Derbyshire et al (2023) identified the outcome of 'integration' and fitting in' as well as 'loyalty and 'commitment' to the course in general. Students within the study spoke about the help from peers being very important to their development and confidence. Xerri et al. (2018) supported this finding and identified that 'Student-Student' relationships supported engagement and academic success. Supporting these findings, Taylor Smith et al. (2023) found that 'collaboration between' the Apprentice Students increased a sense of belonging and increased support. 'Peer collaboration' based on common attributes and sharing experiences of work and the course together, formed invaluable support and helped organise and reorder identities and the course demands. Value was attributed to the experience of Belonging.

This study identified 'peer support' and 'meaningful friendships' facilitated by the place of study as created 'integration' and success, supporting the pedagogic theory of Connectivism. Although Connectivism (Richards and Rogers, 2001, in Senior, 2010) is a relatively new theory relating in part to the digital age, it can be applied to the concept of learning through relationships. The quality of student relationships needs to be acknowledged. Supportive and positively motivating relationships will benefit students' sense of belonging and success, while negative peer persuasion will not (Zhang et al. 2024).

Shifting Identities

It was noted by Cushen Brewster et al. (2022) that Apprentices are treated differently by placement areas. They are treated less as Students and more like Employees. While this perspective can negatively impact the learning approach to some Students, it increased the sense of belonging. Similarly, Nottingham and Yan (2023) found that there are 'fixed ideas' about what it considers to be a Student and how this should be demonstrated. Apprenticeships effectively require this perception to be altered, as those Students have prior experience and understanding of the job.

Derbyshire et al. (2023) also identified 'adopting Student Nurse identity' as a theme within their research. Students had to shift from their predetermined role in their employment into the uncertainty of being a student. Apprentices also reported needing to learn when to use previous experience. Too much questioning which stemmed from their previous experiences, could make them unpopular on placements, where it was felt they needed to

be aware of ‘limitations’ and ‘reflect on learning needs’. In the classroom this could also been seen as a barrier to integration with the existing cohort, where this confidence could be seen as intimidating. However, it could also be viewed as a valuable resource to drive curiosity and belonging (O’Sullivan et al. 2019).

Sense of Belonging

Fast paced shifts between placement, the workplace and University, made finding a sense of belonging a challenge, as reported by Cushen-Brewster et al. (2022). The Students felt they did not get a chance to settle in to any one setting, inhibiting their sense of belonging. It was observed that these Students did align themselves with practice in an easier fashion than the observation of Undergraduate Students, owing to their sense of established ‘responsibility’ and ‘extra expertise’.

Within the Cushen-Brewster et al. (2022) study it was acknowledged that those participants felt because they were Apprentices, and owned the attributes of that demographic, they had ‘greater integration within clinical teams’. In addition, Derbyshire et al. (2023) also found that the Apprentice Students previous experience in healthcare settings supported them to ‘fit into’ teams quickly. They were familiar with the institution’s procedures, values, routines, and expectations of Staff.

Apprentice Nurses upon qualifying felt they ‘belonged’ and were ‘believed in’ by their Assessors (Derbyshire et al. 2023) to the profession of Nursing, and any differences in pathway were not relevant as they had been when a Student. This created a sense of loyalty towards the profession and the Employers who had supported them. It was also acknowledged that their prior experience, knowledge of roles and processes gave a pre-existing sense of belonging within the workplace. They were prepared mentally for how they would assimilate into their environment meaning they were more likely to stay in the profession upon qualifying (Lusk. 2024).

Feeling Understood

Within the Cushen-Brewster et al. (2022) study, participants reported confusion around the role, identity, and their experience. Those Students wanted to be identified as visually different (uniforms) from non-apprentice students, feeling that this would help create definition and outline their learning needs. Taylor Smith et al. (2023) identified that the apprentice role is often misunderstood by various disciplines including The University and those who support in practice. They felt that being understood was important in adjusting expectations that are already held for Undergraduate Nursing Students.

Differences between the Undergraduate Nursing cohort appears to be a theme that continues. Apprentice Students felt that they also understood the mechanisms of the practice setting better than traditional Students, meaning that they were able to integrate better into the environments they were allocated (Taylor Smith et al. 2023). While there

were aspects that they found difficult about being different, it also felt important to be understood as having experience and cohesion already established within healthcare.

Support

Peer relationships offered support and academic confidence (Firth, 2023). Cushen-Brewster et al (2022) identified that the Academic Teams support was crucial in supporting their journeys through the Apprenticeship and in particular “building confidence”. These Students also felt they had additional support (compared to traditional Students) due to having another institution (Employer) by which to access guidance should they need it. Flint (2023) however describes however that in some cases Apprentices did not receive adequate support from Employers. James-Relly and Laczik (2022) add that better communication between all institutions working with Apprentices is needed to ensure holistic support.

Discussion

Module feedback gave some indications as to the potential areas of where and how DA Students feel belonging. Research appeared to support this general and surface feedback of the DA Student. The module feedback will be utilised within this discussion in relation to the literature.

Picts and Russell (2024) acknowledged a challenge in leaving a familiar setting. This acknowledged the shift out of what was comfortable, settled and known, unsettling the sense of belonging. Entering the course creating a disruption in where the Students belong. The Students had to adapt to new identities with new institutions to assimilate into and form new relationships in which they now saw themselves. Their sense of self altered between the roles they assumed and the environments in which they were physically placed and mentally belonging to. Bridges (2009, cited in Derbyshire et al. 2023) accepts that Students struggled to ‘let go of the familiar’. Apprentices, who may have a very strong sense of pre-existing belonging to their Employers. In module feedback it feels important to connect to the University, with Students feeling ‘they are supposed to be here’ and having the sense of purposeful belonging to the course.

Losing the sense of belonging would create frustration (Derbyshire et al. 2023) and loss of identity. There was a sense of being able to do certain tasks when working but now not being permitted to carry them out as a Student. This also effected confidence and unsettled a sense of where they were positioned within the course. When belonging was a challenge to form, this increased self-doubt (Wakefield et al. 2023) and reduced confidence. This however can be overcome, many Students in the Degree Apprenticeship programme had carried out recent foundation courses or top up qualifications, meaning they were recently practiced in academic aspects of the course. Arguably the Degree Apprentice Nurse becomes highly skilled at forming connections and creating a sense of inclusion for themselves, due to the transient nature of the course.

Dunbar and Carter (2017) identified that when learners 'experience social connectedness' in both clinical areas and in university theory, Students will get the most out of their learning. The pedagogical model of Connectivism discusses 'integration' and 'distributed knowledge through networks' (Renda and Kuys, 2015). Module feedback reflected this concept, Students expressing 'sharing' personal and professional experience to learn. In relation to the literature explored it can be considered that the more connected and integrated the Degree Apprentice Students feel within their Social Spheres, the better the quality of knowledge and learning they can gather. Connectivity Theory (Senior, 2010) recognises that 'socially- driven' interactions are crucial to 'learning communities' where Students can feel they are supported by their institutions and peers. Similarly, in discussing Social Learning theory, it is appreciated that learning takes place within a 'social context' and that Students will 'learn from each other' Bethards (2014). In module feedback, it was noted Students felt the 'same goal to achieve and do well together', reenforcing how collective motivation drives learning.

The literature discussed that while the sense of belonging was important to Students but that it was also somewhat transient between institutions and situations. This sense of belonging within settings, could be viewed as separate, however the literature has demonstrated this to be complex as demonstrated in Table 1.

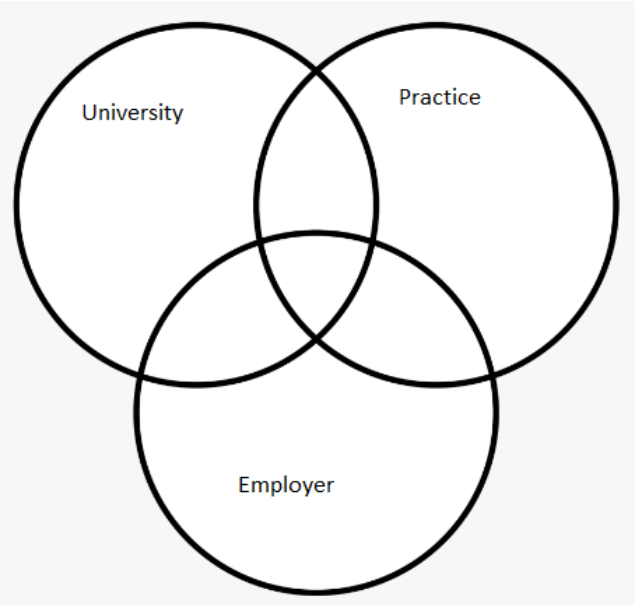

Table 1

In reviewing the literature relating to Apprenticeships sense of Belonging, the question remains, what about Mental Health Nursing Degree Apprentices? It can be argued, their experiences are different because of the skills they are developing and innately akin with. Literature so far, does not appear to address this. Arguably, Nursing within healthcare and specifically, the NHS, holds strong sense of belonging and loyalty (Robson and Robson, 2015), and Nursing in identity (Cingel and Brouwer, 2021) and vocation. These values that

appear to be core to the profession will have an impact on the value and experience of belonging of the DA Student.

Some themes identified apply to all Student Nurse. The changing of placements and into theory is an experience in common with each other, meaning further investigation into the unique experience of the Apprentice is required.

Recommendations and Conclusions

This literature review has focused and critically analysed the applicable research already academic circulation, extracting themes, and calling on module feedback. These themes will need consideration alongside the approach currently used, and how this may need to be adapted. The backward design (McTigue and Wiggins, 2013), commencing with the concept that everyone will benefit from feeling a sense of belonging through social cohesion is important to note. In understanding how these Degree Apprentice Students function and learn within the context of belonging, will inform teaching styles, strategies, and pedagogies of compassionate inclusion. This will support academic confidence and success, dynamic learning experiences and Students that meet the University Graduate Attributes. There is a responsibility of Lecturers and Employers to support, encourage and facilitate this sense of belonging with Students reporting how valuable this is when it occurs. There still appears to be some way to go in making this part of the course objectives.

There also appears to be a call for creating a sense of community that involves all parties. The research points that belonging across this course sits within different areas at different times, a joined-up approach to supporting these DA Students through effective communication, co-production and collaboration create an optimum environment for belonging.

Research into the experience of belonging in social cohesion in Nursing is limited while the focus on Mental Health appears largely un-investigated. With Mental Health skills being largely focused on connections, communication and reflective practice, research in the future on this specific group of Students would be valuable in understanding a specific experience (Santangelo et al., 2018b). In considering Mental Health Nursing Students, this could produce data which reflects the attributes of those Nurses, such as compassion, empathy, and unconditional positive regard (Rogers 1957). While this is a relatively young initiative in Nursing education and recruitment, research was limited in general, calling for a need for further and more specific investigation with the aim of making use of pre-existing and developing skills.

Within the University of Hertfordshire and Mental Health Nursing there is a periodic review next year and it is important to consider the Degree Apprentice Student experience in formulating focus. Our aim is to decrease feelings of disconnection within the University,

the whole cohort and the areas of employment and increase feelings of a cohesive, fluid, and supportive experience in gaining their Nurse qualifications.

References

Aveyard, H. and Sharp, P. (2013) *A Beginner's Guide to Evidence-Based Practice In Health And Social Care*. 2nd edn. Maidenhead: McGraw-Hill Education.

Bandura, A. (1977) *Social learning theory*. Englewood Cliffs, N.J: Prentice Hall.

Bethards, M.L. (2014) 'Applying Social Learning Theory to the Observer Role in Simulation', *Clinical simulation in nursing*, 10(2), pp. e65–e69.

Christenson, S.L., Reschly, A.L. and Wylie, C. (2012) *Handbook of Research on Student Engagement*. Dordrecht: Springer.

Cingel, M. and Brouwer, J. (2021) 'What makes a nurse today? A debate on the nursing professional identity and its need for change', *Nursing philosophy*, 22(2), pp. e12343-n/a.

Cushen-Brewster, N., Driscoll-Evans, P., Malloy, E., Last, D., Wood, J., Vickery, H. and Wilkinson, S. (2022) 'Evaluating experiences of a degree-level nursing apprenticeship', *Nursing times* (1987).

Department of Health and Social Care (2016). *Nursing degree apprenticeship: factsheet*. [online] GOV.UK. Available at: https://www.gov.uk/government/publications/nursing-degree-apprenticeships-factsheet/nursing-degree-apprenticeship-factsheet.

Derbyshire, J., Porteous, D., Corder, K., Foggo, B. and Steven, A. (2024) 'Investigating the processes and influences involved in the transformational journeys of Registered Nurse Degree Apprentices: A realist informed qualitative study', *Nurse education in practice*, 74, pp. 103834–103834.

Dunbar, H., Carter, B. (2017) 'A sense of belonging, the importance of fostering student nurses' affective bonds. *J.Child Health Care* 21, 367-369.

Dupont, S., Galand, B., Nils, F. and Hospel, V. (2014) 'Social context, self-perceptions and student engagement: a SEM investigation of the self-system model of motivational development (SSMMD)'. *Electronic Journal of Research in Educational Psychology*, 12 (1) (2014), pp. 5-32

Firth, D.H. (2023) 'The trainee nursing associates' experience of academic learning: the first 6 months', *British journal of healthcare assistants*, 17(10), pp. 362–370.

Flint, B. (2023) 'Supporting nursing degree apprentices: advice for higher education institutions and employers', *Nursing management* (Harrow, London, England), 30(6), pp. 26–31.

Furrer, C. and Skinner, E. (2003) 'Sense of Relatedness as a Factor in Children's Academic Engagement and Performance', *Journal of educational psychology*, 95(1), pp. 148–162.

Garrison, D. R., Cleveland-Innes, M., & Fung, T. S. (2010) 'Exploring causal relationships among teaching, cognitive and social presence: Student perceptions of the community of inquiry framework', *The Internet and Higher Education*, 13(1), 31–36

Gillen-O'Neel, C. (2021) 'Sense of Belonging and Student Engagement: A Daily Study of First- and Continuing-Generation College Students', *Research in higher education*, 62(1), pp. 45–71.

James Relly, S. and Laczik, A. (2022) 'Apprenticeship, employer engagement and vocational formation: a process of collaboration', *Journal of education and work*, 35(1), pp. 1–15.

Lusk, M. (2024) 'Nurse Apprenticeship: A Model From the Past, A Solution for the Future', *Journal of nursing regulation*. Vol 14, 4. p30-34.

Mainiero, L.A. (1986) 'Muddling Through: The Anguish of Apprenticeship', *Leadership & organization development journal*, 7(5), pp. 3–7.

Maslow, A. H. 1968. *Toward a Psychology of Being*. New York: Van Nostrand

McTighe, J. and Wiggins, G. (2013) *Essential Questions: Opening Doors to Student Understanding*. 1st edn. Alexandria: Association for Supervision & Curriculum Development.

Moiseyenko, O. (2005) 'Education and Social Cohesion: Higher Education', *Peabody journal of education*, 80(4), pp. 89–104.

Ndiwakalunga Mulunga, S and Yazdanifard, R. (2014) 'Review of Social Inclusion, Social Cohesion and Social Capital in Modern Organization', *Global journal of management and business research: administration and management.* 14(3).

Nottingham, P.M. and Mao, Y. (2023) 'Understanding the role of learning communities of practice within a degree apprenticeship to enhance inclusive engagement', *Higher education, skills and work-based learning*, 13(5), pp. 1009–1022.

NHS Employers (2022). *The latest NHS apprenticeship statistics | NHS Employers*. [online] www.nhsemployers.org. Available at: https://www.nhsemployers.org/articles/latest-nhs-apprenticeship-statistics.

O'Sullivan, K., Bird, N., Robson, J. and Winters, N. (2019) 'Academic identity, confidence and belonging: The role of contextualised admissions and foundation years in higher education', *British educational research journal*, 45(3), pp. 554–575.

Oxford Dictionaries. (2010). *Oxford Dictionary of English* 3rd Ed.

Page, M.J., McKenzie, J.E., Bossuyt, P.M., Boutron, I., Hoffmann, T.C., Mulrow, C.D., Shamseer, L., Tetzlaff, J.M., Akl, E.A., Brennan, S.E., Chou, R., Glanville, J., Grimshaw, J.M., Hróbjartsson, A., Lalu, M.M., Li, T., Loder, E.W., Mayo-Wilson, E., McDonald, S. and McGuinness, L.A. (2021). The PRISMA 2020 statement: An updated guideline for reporting systematic reviews. *British Medical Journal*, 372(71).

Pedler, M.L., Willis, R. and Nieuwoudt, J.E. (2022) 'A sense of belonging at university: student retention, motivation and enjoyment', *Journal of further and higher education*, 46(3), pp. 397–408.

Picts, A. and Russell, A.M. (2024) 'From healthcare professional to degree apprentice', *The clinical teacher*, 21(2), pp. e13714-n/a.

Pittman, L.D. and Richmond, A. (2007) 'Academic and Psychological Functioning in Late Adolescence: The Importance of School Belonging', *The Journal of experimental education*, 75(4), pp. 270–290.

Renda, G. and Kuys, B. (2015) 'Connectivism as a Pedagogical Model within Industrial Design Education', *Procedia technology*, 20, pp. 15–19.

Robson, A. and Robson, F. (2015) 'Do nurses wish to continue working for the UK National Health Service? A comparative study of three generations of nurses', *Journal of advanced nursing*, 71(1), pp. 65–77.

Rogers, C. R. (1957) 'The necessary and sufficient conditions of therapeutic personality change', *Journal of Consulting Psychology*, 21(2), 95–103.

Santangelo, P., Procter, N., & Fassett, D. (2018a). Seeking and defining the 'special' in specialist mental health nursing: A theoretical construct. *International journal of mental health nursing*, 27(1), 267–275.

Santangelo, P., Procter, N. and Fassett, D. (2018b) 'Mental health nursing: Daring to be different, special and leading recovery-focused care?', *International journal of mental health nursing*, 27(1), pp. 258–266.

Schall, J., Wallace, T.L. and Chhuon, V. (2016) ''Fitting in' in high school: how adolescent belonging is influenced by locus of control beliefs', *International journal of adolescence and youth*, 21(4), pp. 462–475.

Senior, R. (2010) 'Connectivity : a framework for understanding effective language teaching in face-face and online learning communities', *RELC journal*, 41(2), pp. 137–147.

Siemens, G. and Conole, G. (2011) 'Special Issue - Connectivism: Design and Delivery of Social Networked Learning', *International review of research in open and distance learning*, 12(3).

Taylor-Smith, E., Smith, S., Fabian, K. and Bratton, A. (2023) 'Apprentices" perspectives of the tripartite collaboration at the heart of degree apprenticeships: a longitudinal study', *The journal of workplace learning*, 35(8), pp. 779–795.

University of Hertfordshire Graduate Attributes (2022) https://www.herts.ac.uk/about-us/supporting-our-students/student-charter/graduate-attributes

University of Hertfordshire (2024). *Herts Learning Principles*. [online] University of Hertfordshire. Available at: www.herts.ac.uk/ltaq/learning,-teaching-and-academic-quality/home/learning-and-teaching/curriculum-design/herts-learning.

Wakefield, E., Innes, K., Dix, S. and Brand, G. (2023) 'Belonging in high acuity settings: What is needed for newly graduated registered nurses to successfully transition? A qualitative systematic review', *Nurse education today*, 121, pp. 105686–105686.

Xerri, M.J., Radford, K. and Shacklock, K. (2018) 'Student engagement in academic activities: a social support perspective', *Higher Education*, 75(4).

Zhang, M., Schwartz, D., Badaly, D., Duong, M.T., Chung, J., Ryjova, Y. and Taylor, L.M. (2024) 'Academic Achievement, Same- and Cross-Ethnic Positive Peer Regard Among Asian American and Latinx Adolescents', *Developmental psychology*, 60(2), pp. 350–362.

Enhancing Academic Staff Engagement with Technology: Redesigning Professional Development Using Andragogy as a Theoretical Lens

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Abstract

This study presents an overview of strategies aimed at enhancing academic staff engagement with technology through professional development programs informed by the principles of andragogy. The rapid digital transformation in UK universities, accelerated by the COVID-19 pandemic, has underscored the need for educators to adapt and excel in utilising digital tools for teaching. However, challenges persist in aligning staff motivations with the offerings of professional development initiatives. By drawing on adult learning theory, particularly the principles of andragogy, this research investigates effective approaches to design and implement professional development programs tailored to the unique needs and motivations of academic staff. Through an analysis of intrinsic and extrinsic factors influencing staff engagement with technology, including the distinction between learning and performance-driven motivations, this study addresses the misalignment between staff expectations and professional development offerings. Furthermore, it examines the phenomenon of "dual digitalisation" and its impact on the fragmentation of digital solutions in higher education. Finally, the study derives recommendations on integrating andragogy principles into digital professional development programs to support academic staff in overcoming resistance to adopting new technologies and fostering meaningful engagement with digital tools in their teaching practices.

Introduction

Over the years, there has been a noticeable transformation in educational culture that stimulated Higher Education (HE) institutions to adopt advanced Technology-Enhanced Learning (TEL) solutions catering to changing demands and expectations (Aston et al., 2022). It has become especially evident during the Covid-19 pandemic which set a significant milestone by irreversibly shifting the way people work and learn and was accompanied by governments' incline towards digital learning (Turnbull et al., 2021). The necessity for educational institutions to swiftly implement online learning technologies has compelled them to engage with learners remotely. Consequently, there has been a notable adoption of innovative learning and communication platforms, fundamentally altering the educational landscape for disciplines and institutions previously associated with physical settings.

The aim of empowering students to navigate this digital-centric academic landscape and enhancing their socio-economic prospects necessitated educators' commitment to fostering their own digital capabilities through engaging in targeted professional development (PD) initiatives (Wang et al., 2020). PD is essential for the career advancement of lecturers and is shaped by various contextual elements, drawing from both their personal motivations and

requirements as well as meeting externally defined objectives, posing the challenge of balancing those two perspectives (Fernandes et al., 2023). Thus, despite the growing importance of developing digital capabilities, academic staff have been observed to exhibit resistance towards engaging with technology and participating in PD programs within this context.

This study investigates the factors influencing academic staff engagement with technology in their teaching practices and how this can be increased by the provision of support and effective PD programmes. It begins with the exploration of the digitalisation trends in UK universities, accelerated by the COVID-19 pandemic highlighting increased expectations on staff's digital skills and ensuing challenges. Subsequently, the adult learning theory's recommendations for effective PD program design are investigated, allowing for further examination of successful responses to intrinsic and extrinsic factors impacting staff motivation for engagement with technology.

The analysis will include distinguishing between learning and performance-driven motivations, often leading to expectations misalignment between staff and PD program providers and the "dual digitalisation" phenomenon as a cause for fragmentation of digital solutions, challenging the creation of a unified digital learning space. Finally, the paper derives recommendations on how the implementation of strategies proposed by andragogy into digital PD programs can support overcoming the staff resistance to adopting new technologies.

Literature Review

In the contemporary academic landscape, the imperative to cultivate learner-centric approaches within education systems while simultaneously adapting to the evolving demands of globalised digital transformation has become increasingly paramount (La Fleur and Dlamini, 2022). Consequently, universities worldwide have been experiencing robust impactful changes determined by social trends towards digitalisation and technological advancements requiring the embracement of intense re-adjustments (Mohamed et al., 2022). The discourse surrounding the digital transformation of HE over the past decade has involved many considerations, with a central focus on reimagining the learning process through technology, particularly through the creation of digital learning space (Gafurov et al., 2020), which concept transcends mere technical artefacts, representing instead a dynamic environment where learning activities are situated physically, socially, and epistemically (Goodyear et al., 2021). Notwithstanding, while many industries have undergone significant digital transformation, universities have been slower to adapt (Rodríguez-Abitia and Correa, 2021).

The significant change in the transformation dynamics has been catalysed by the onset of the COVID-19 pandemic, prompting educational institutions to implement communication technologies, innovate in pedagogy, and rethink organisational structures to create digital

learning environments (Alismaiel et al., 2022). However, research has shown that many lecturers worldwide faced significant time burdens and fears associated with the rapid transition to digital teaching methods, including the need to quickly adapt to new systems and platforms, shift from traditional teaching concepts to digital ones, and investment in additional time in preparation due to the perceived demands of digital instruction (Delere et al., 2021).

The engagement of academic staff with technology within UK universities continues to present a significant challenge to the successful digital transformation of the HE sectors (Bygstad et al., 2022). To effectively tackle this challenge, it is imperative to undertake an evaluation and comprehensive understanding of the factors influencing the motivation of academic staff towards embracement of technology in teaching and how this can be addressed with the provision of support and development of effective PD programmes.

Adult Learning Theory and Professional Development

There exists extensive research on pedagogical theories and their application in various real-life case scenarios, aiming to identify effective teaching methods to support students in the learning process. In their work, Alabisi and Vucetic-Trifiro (2023) define pedagogy as a model where teachers take charge of determining what, how, and when students will learn, resulting in a teacher-centred approach where the educational emphasis lies in transmitting knowledge within a highly controlled environment focused on the subject matter content. Nevertheless, Felmer et al. (2019) argue that learning programs for adults should possess the flexibility to accommodate various personal motivations, contexts, requirements, and preferences, consequently emerging successful. This is further explored by Kaur et al. (2022) who state that adult learners are characterised by their tendency to focus on problems, self-direct their learning, possess internal motivation, and face time constraints; thus, they should make use of the wide range of resources available in ways that suit their specific learning styles, objectives, and schedules. These considerations prompt a deeper exploration of pedagogical strategies that are tailored specifically to adult learner audiences, ensuring the attainment of desired outcomes in delivering PD for academic staff in HE.

While adult learning and education have long histories, Malcolm Knowles' contributions have significantly shaped the concept and theory of andragogy and have been extensively applied in prior research, including studies on educator PD (Humble and Mozelius, 2021), the effects of COVID-19 on HE (Sharaievska et al., 2022), and redesigning PD on digital transformation for educators (Bergkvist et al., 2023). In the andragogic model, the teacher takes on the responsibility of determining learning content, while emphasising a facilitative role in the student's learning process, thereby promoting student-centred learning, distinguishing it from pedagogy (Alabisi and Vucetic-Trifiro, 2023). In the theory of andragogy, Knowles et al. (2014) outline six core principles of adult learning that are summarised in Figure 1.

Principle	Explanation
Need To Know	Adults are motivated to learn when they understand the personal benefits involved, as they are more inclined to engage with activities when they perceive a clear "what is in it for me" (WIIFM) aspect.
Self Concept	Granting adults autonomy over their learning empowers them to excel through self-direction.
Experience	Adult learners bring valuable experience, which should serve as the foundation for learning activities.
Readiness	Motivation increases in adults when there is an immediate reason to learn.
Problem Orientation	Adults prefer learning specific knowledge and skills to solve particular problems rather than generic content, and they are more motivated when they perceive the training as immediately relevant to problem-solving.
Motivation	Adults achieve optimal learning outcomes when their motivation stems from internal sources rather than external factors.

Figure 2: Six core principles of adult learning theory.

This evolution from pedagogy to andragogy reflects a continuum where learners progressively mature in their thought processes and achieve autonomy, signifying a transition from dependent learning (pedagogy) to more self-directed (andragogy) learning as they advance in their education (Kaushal et al., 2022). Nevertheless, it has been found that PD program managers often employ a top-down approach, minimising educator input, while the adult learning approach, emphasising learner involvement, particularly in digital training for academic staff, renders andragogy more suitable (Sasere and Makhasane, 2023). Thus, although it has been found that continuous lifelong learning, essential for upskilling and reskilling, must be integrated seamlessly into the busy lives of educators (Chuang, 2021), university PD content and instructional design principles often fail to cater specifically to the needs of these adult learners.

On the other hand, there has been a notable improvement in research and adoption of andragogy in the design of PD programs for academic staff. One of the trends is the shift from referring to educator growth as professional development to the prevalent term professional learning (Labone and Long, 2016). This indicates a significant change in focus and accountability, suggesting a move from a passive role for academic staff, where improvement was developer-driven, towards a more active engagement in their own learning process. Moreover, the new term presents a more internally focused or constructivist approach, where educators take an active role in their own learning process (Chuang, 2021), shaping their professional growth within their context and integrating it into their daily activities, reflecting a lifelong commitment closely intertwined with their

identities. The improvement has also been prompted by the digitalisation in HE, introducing advancements in technology and allowing for the facilitation of new modes of PD through virtual learning platforms and online collaboration tools (La Fleur and Dlamini, 2022), meeting the needs and giving working adults the autonomy to control their learning.

Discussion

Although the importance of andragogy adoption in PD programs for educators has been evidenced by research, Zhou and Milecka-Forrest (2021) argue the motivation of staff to utilise such technology becomes critical regarding their willingness to participate in PD programs oriented on digital capabilities development, prompting questions about the alignment between university investment initiatives and academic staff's adaptive orientations. It is also highlighted by Yeung et al. (2014) stating that the educators' motivation for utilising technology for pedagogical purposes ultimately emerges as the pivotal factor influencing the degree of success in this regard. Research has found that variations in learning styles, preferences, and levels of social motivation among individuals highlight the need to consider diverse factors, both personal and contextual, in designing effective PD offerings (Fernandes et al., 2023). Thus, the following sections are going to explore both external and personal factors affecting academic staff motivation to engage with technology.

External Factors

Bygstad et al. (2022) propose the term "dual digitalisation" to describe the simultaneous existence of two distinct, and partly conflicting, aspects of digitalisation that have significantly influenced the digital transformation of HE. One of the aspects of digitalisation is "digital education" which involves a process-oriented strategy encompassing digital classrooms, Learning Management Systems (LMS), distribution of digital materials, and communication related to learning outcomes, all within the framework of strategic management in HE that has been implemented gradually since the 2000s and supervised by the IT department. Conversely, the "digital subjects" dimension is focused on acquiring domain-specific knowledge in digitised formats which holds transformative potential across disciplines, enabling innovative learning approaches characterised by visualising information and fostering interactivity for information manipulation and exploration (Trivedi et al., 2024), often originating at the local level and initiated by academics. Both aspects of digitalisation are presented in Figure 2 alongside differing characteristics.

	Digital Education	Digital Subjects
Key Terms	Curriculum design, flipped classrooms, online assessment	Data visualisation, computer programming, digital humanities
Technologies	Learning Management Systems (LMS), video conferencing tools, plagiarism detection software	Simulation software, interactive e-books, virtual reality (VR) environments
Governance	Centralised decision-making by academic administration (Top-down)	Collaborative decision-making involving faculty and students (Bottom-up)
Discourse	Strategic Management: efficiency, scalability, student outcomes	Pedagogy & Autonomy: creativity, critical thinking, interdisciplinary connections

Figure 3: Two distinct aspects of dual digitalisation.

The segmentation and fragmentation of digital solutions resulted in educators viewing them as distinct digital tools rather than integral components of a unified digital learning space, consequently yielding only gradual digital improvements, yet ultimately proving insufficient in fostering disruptive changes (Bygstad et al., 2022). As a result, many HE institutions struggle with their digital transformation strategies.

The impactful change came with the Covid-19 pandemic necessitating a swift transition to online learning, prompting teachers and students to improvise and experiment with new roles, revealing a convergence of “educational” and “digital” subjects in the digital learning space, wherein certain subjects capitalised on pre-established alignment between education and subject matter (Bygstad et al., 2022). However, it is still noticeable that while one group of lecturers excel as pioneers in using cutting-edge technological resources to enhance teaching, others appear to face certain challenges that can lead to a certain level of resistance. Neglecting change can widen the digital divide, creating a rift between individuals and groups who embrace digital media and technology and those who do not, potentially resulting in social alienation (Van Laar et al., 2020). Therefore, it is important to prioritise inclusive and equitable access to digital tools and resources, ensuring that no educator is left behind in this rapidly evolving educational landscape. This requires proactive measures such as investment in infrastructure, teacher training programs, and policy initiatives aimed at bridging the digital divide and fostering digital literacy for all.

On the other hand, the implementation of new technology can induce technostress, characterised by individuals' challenges in effectively managing novel technologies,

compounded by factors such as information overload, complexity, insecurity, and uncertainty (Li and Wang, 2021). This is especially dangerous, as a contemporary lecturer is expected to adeptly blend three distinct competencies: expertise in the subject matter, proficiency in modern educational technologies, and advanced digital skills, including mastery of modern information systems (Kuznetsov, 2019). As a result, educators may experience decreased motivation to learn about new technologies due to the necessity of a forced extension of responsibilities, exacerbating their existing task overload resulting from the changed role of educators in HE.

The abovementioned challenges can be effectively tackled by promoting digital literacy, reducing the learning curve for educators in adopting new technologies, thereby incentivising exploration of innovative solutions and simplifying digital problem-solving processes, all while minimising perceived burdens. Moreover, addressing technostress requires a multifaceted approach that encompasses not only technological solutions but also organisational support, mindfulness practices, and individual coping strategies to mitigate its adverse effects on well-being and productivity within the digital learning environment. By fostering digital well-being, individuals are empowered to adopt a mindful and balanced approach to technology usage, establishing boundaries, prioritising self-care, and fostering healthy habits that mitigate the risks of technostress and enhance overall mental and emotional well-being. Consequently, alleviating technology resistance among academic staff through initiatives such as improving digital literacy, providing technical support, and promoting engagement is essential, underscoring the importance of sustained institutional policies and well-designed PD programs.

Nevertheless, this is not a straightforward solution due to the complexity of social barriers to adopting technology and making institutional support only part of the challenge. For example, older generations particularly struggle with adoption due to their historical context of less advanced technology, declining cognitive flexibility, and the perceived complexity of new systems (Wilson et al., 2023). Additionally, social and psychological factors, such as fear of failure, scepticism, mistrust, and established routines, further hinder their embrace of new technologies. Therefore, the persistent challenge lies in motivating educators to participate in these initiatives, warranting further investigation into intrinsic motivational factors.

Personal Factors

The achievement motive in literature involves a persistent need for competence, encompassing goal setting and competition with others and is categorised as definitions of success–mastery and performance goals respectively (Urdan and Kaplan, 2020). According to Dweck (2015), it is anticipated that individuals oriented towards performance goals would prioritise social comparison processes over personal development motives. Other studies have also shown that learners with performance-approach goals demonstrate active engagement in behaviours aimed at outperforming others, thereby enhancing their learning

performance through the achievement of goals, which are oriented towards showcasing competence to others and striving for higher recognition (Debicki et al., 2016; Rogat and Linnenbrink-Garcia, 2019). On the other hand, those inclined towards learning goals would demonstrate a willingness to invest effort in acquiring new knowledge and skills, potentially prioritising this overachieving high scores (Dweck, 2015).

This is further explored by the self-determination theory (SDT) offering a comprehensive framework for understanding intrinsic motivation among educators, highlighting the crucial role of psychological needs satisfaction in educational settings; yet, many current educational policies and practices follow traditional motivational models, failing to address learners' needs (Ryan and Deci, 2020). SDT posits that individuals possess an intrinsic inclination towards psychological growth and integration, as well as learning, mastery, and interpersonal connection, emphasising the necessity of supportive conditions for these proactive tendencies to manifest robustly in healthy development (Chiu, 2022). Nevertheless, research has shown that school policies and leadership styles can hinder academic staff needs satisfaction (Pelletier et al., 2002). Similarly, work overload and disruptive students diminish lecturers' autonomous motivation and perceived competence, resulting in increased emotional exhaustion and decreased sense of accomplishment (Fernet et al., 2012), leading to decreased motivation in pursuing mastery goals.

An interesting case highlighted by Zhou and Milecka-Forrest (2021) illustrates educators' emphasis on the importance of training and support for integrating digital technology into teaching, stressing the necessity of PD opportunities. It has been found that lecturers were eager to embrace new digital technologies, unanimously acknowledging their value in enriching teaching and learning practices, which primarily manifested in enhanced presentation, increased interactivity during teaching, and improved assessment and feedback. However, despite the willingness to engage, low staff participation in training sessions was observed. It has been attributed by PD managers as resistance to change.

Similar results are presented by Sharma and Srivastava (2020) who reveal that although educators recognise the significance of integrating technology into the classroom, many maintain a notable preference for traditional teaching methods and demonstrate reflexive resistance to change and innovate in curriculum development and instructional approaches. Despite recognising the potential for technology to enhance both professional and personal tasks, educators hesitate to adopt it in the classroom due to factors such as low self-efficacy, insufficient knowledge, entrenched beliefs, and workload pressures. Collectively, these barriers reflect a complex interplay of social, psychological, and workplace cultural factors contributing to technology avoidance, and their strong influence often outweighs the mere understanding of how technology can benefit various aspects of work and life.

On the other hand, it has also been found that staff resistance to change and lack of time for technology integration was exacerbated by inadequate acknowledgement of innovative initiatives, leading to frustration and adverse outcomes for lecturers (Chiu, 2022). As a

result, it has been observed that academic staff tend to express apprehension about implementing proposed digital enhancements and uncertainty about the potential impact of these changes on their module and course evaluations, which serve as significant benchmarks for their annual performance reviews (Englund et al., 2017). Consequently, many academic staff are hesitant and less inclined to embrace educational technology, as there is limited evidence demonstrating its positive effects on module and course evaluations or its beneficial influence on their personal development.

This phenomenon can be further explored through the lens of mastery and performance goals, whose effects are largely explained by SDT's concept of functional significance. Performance goals, often perceived as exerting control, stand in contrast to mastery goals, typically viewed as informational; thus, the anticipation of assessment frequently diminishes learners' autonomous motivation and elevates their propensity to adopt performance-avoidance goals (Pulfrey et al., 2011). Yang et al. (2022) stress that the performance of learners with varying goal orientations is influenced by the type of learning activities they engage in, indicating that diverse assessment methods may lead to disparate outcomes based on individual performance goals.

In a study conducted by Zhou and Milecka-Forrest (2021), it was found that educators primarily viewed the adoption of digital technologies as beneficial for enhancing their professional practice in the classroom, whereas PD providers focused more on increasing course recognition, preparing students for future careers, and creating a student-friendly environment. While these perspectives may appear aligned at first glance, they diverge significantly when scrutinised through the lens of outcome assessment. Educators' viewpoints are inherently tied to immediate classroom impacts and student achievement, reflecting a more localised and immediate evaluation framework. In contrast, PD providers adopt a broader lens, evaluating success based on overarching institutional goals, long-term career prospects for students, and the cultivation of a holistic learning environment conducive to future success. This discrepancy can be attributed to the performative environment's emphasis on efficiency and outcomes over processes, reflecting performance goals, while lecturers' perspectives are aligned more with learning goals. Ultimately, both groups expressed positivity towards the benefits, albeit driven by distinct motivations.

When PD programs prioritise primarily performance goals, valuing outcomes over the processes used, digital technology may be perceived solely as a tool to achieve goals rather than an inherent benefit, potentially fostering the adoption of performance-avoidance goals by academic staff, undermining intrinsic motivation. Therefore, acknowledging the diverse factors influencing the intrinsic motivation of academic staff, which may significantly differ from those of professional staff, highlights the complexity of technology integration in education and underscores the need for nuanced understanding and tailored evaluation strategies to accommodate diverse stakeholder perspectives.

Striking a harmonious equilibrium between mastery and performance goals can effectively support both educator and PD provider growth in digital skill enhancement initiatives. By shifting the focus of PD towards showcasing exemplary practices in teaching and learning, educators are provided with tangible examples of effective strategies that can be further enhanced through the judicious use of technology (Wanner and Palmer, 2015). This approach empowers educators by highlighting how specific digital tools can amplify their existing pedagogical practices within relevant contexts, fostering a sense of agency and enthusiasm rather than obligation. In doing so, PD programs can catalyse meaningful and sustainable professional growth while nurturing a culture of innovation and excellence in digital education.

Findings

It has been identified through the research and case study analysis that facilitating tailored PD for lecturers is essential for enhancing education quality with technology. To overcome academic staff resistance to adopting technology, professionals can improve the PD offering by applying adult learning theory principles. For successful PD, addressing educators' intrinsic motivation is vital. Thus, PD should involve setting emphasis on personal benefits and direct impact on teaching practice, aligning with the "Need To Know" principle of andragogy. This can be achieved by prioritisation of actions over tools to cultivate educators' digital proficiency.

Framing PD workshops around concrete teaching practice objectives like "improving student engagement" instead of specific digital tools, such as "Introduction to X," establishes a direct and meaningful connection to educators' professional growth. By prioritising pedagogical goals over technological proficiency, educators are encouraged to perceive technology as an enabler rather than a burdensome addition to their teaching toolkit. Moreover, this approach allows for the integration of non-digital strategies alongside digital tools, offering educators the flexibility to select approaches that align best with their teaching style and preferences, thereby adhering to the "Self-Concept" principle.

Expanding on this concept, a robust connection between technology adoption and tangible outcomes, such as enhanced student success rates, can significantly increase educators' motivation to engage with digital PD programs. By emphasising the direct correlation between technology integration and positive educational outcomes, educators are prompted to acknowledge the immediate benefits of acquiring digital skills, fostering a sense of "Readiness". Furthermore, integrating andragogy principles such as "Experience" and "Problem Orientation" throughout the program can offer additional motivation for continuous learning engagement. This can be accomplished by offering hands-on demonstrations to illustrate tool functionality and ease of use within customised case scenarios that address educators' current needs and challenges. As a result, this approach can help alleviate apprehensions, build confidence in digital adoption, and provide practical

examples of skill integration in teaching and learning contexts, thereby enhancing educators' understanding of potential impacts.

By aligning PD initiatives with educators' intrinsic motivations, with a particular focus on mastery goals, institutions can foster a culture of continuous improvement and innovation. This internal drive to excel in teaching practices, combined with the perceived advantages of technology integration, encourages educators to actively participate in digital-focused PD programs. Consequently, academic staff are more likely to dedicate time and effort to enhance their digital competencies, ultimately contributing to the achievement of optimal learning outcomes for students. Nevertheless, it is worth noting that despite the importance of overcoming educators' technology resistance, it is recommended to keep it as a gradual process rather than a disruptive revolution (Kirkup and Kirkwood, 2005).

Implementing educational technology innovations, particularly those not user-created, is a multifaceted social process, necessitating more than just emphasising digital human capital to foster active engagement in PD pathways, demanding changes in lecturers' values, motivations, and practices (Ter Beek et al., 2022). Moreover, teacher beliefs, influencing their responses to a new curriculum and filtering information during PD, underscore the necessity of actively involving teachers in implementing newly designed lessons and monitoring students' changes for reflective improvement in teacher PD (Chai, 2019).

An example of PD being offered as a gradual process allowing opportunities for reflection and feedback is an initiative proposed by the University of Hertfordshire (UH). In recent years, UH has been conducting module design reviews, providing educators with opportunities for discussion and guidance on online module design, inclusive curriculum creation, and supporting students in the online learning environment. This initiative has received overwhelmingly positive feedback and is explored in detail by Bamwo et al. (2024).

Following this example, contemporary PD initiatives should provide ongoing opportunities for feedback and reflection, such as the use of co-design, classroom visits and coaching (Darling-Hammond et al., 2017), aligning with the principles of andragogy (Thurlings et al., 2013). Sustained duration and high-quality implementation are crucial for meaningful PD, as one-off workshops often fall short in fostering lasting changes in teaching practice. Therefore, HE institutions should aim at creating Continuous PD (CPD) programmes, highlighting the continuity and iteration of the process.

Conclusions

In conclusion, this study provided a detailed investigation of the factors influencing academic staff engagement with technology in their teaching practices and how this can be increased by the provision of support and effective PD programmes. Addressing resistance to technology adoption can be achieved through the application of andragogy principles in designing PD focused on digital skills development. However, to achieve this, it is crucial to

comprehend the motivations driving educators in selecting pathways for their personal and professional development. These findings underscore the significance of grasping the intricate interplay between external and personal motivators influencing educators' willingness to engage in digital PD.

While this study focuses on PD programs supporting technology adoption, the identified strategies can be extrapolated and applied to various educational PD pathways. This can be further explored in the context of the nuanced interplay between individual dispositions, institutional contexts, and external incentives to gain a comprehensive understanding of how educators navigate and prioritise various options for their personal and professional growth.

References

Alabisi, A. and Vucetic-Trifiro, C.E. (2023) "Pedagogy, Andragogy and Heutagogy: How are they related?", *e-Journal Of Business Education And Scholarship Of Teaching*, 17(2), pp. 1–7. Available at: https://go-gale-com.ezproxy.herts.ac.uk/ps/i.do?p=AONE&u=uniherts&id=GALE|A782322413&v=2.1&it=r&sid=summon [Accessed: 21 April 2024].

Alismaiel, O.A., Cifuentes-Faura, J., and Al-Rahmi, W.M. (2022) "Online Learning, Mobile Learning, and Social Media Technologies: An Empirical Study on Constructivism Theory during the COVID-19 Pandemic", *Sustainability*, 14(18), pp. 11134-11149. Available at: https://doi.org/10.3390/su141811134 [Accessed: 21 April 2024].

Aston J., Davies, E., Guijon, M., Lauderdale, K., and Popov, D. (2022) "*The Education Technology Market in England",* Department for Education. [Online] Available at: https://assets.publishing.service.gov.uk/media/636e7717e90e07186280f7cf/Edtech_market_in_England_Nov_2022.pdf [Accessed: 21 April 2024].

Bamwo, L., Kochanowicz, M., and Szpunar, J. (2024) "Reflections on co-leading module reviews in partnership for academic staff to design an inclusive curriculum", *Journal of Educational Innovation, Partnership and Change,* 10(2).

Bergkvist, L., Ahlin, K., Humble, N., Mozelius, P., and Johansson, J. (2023) "Redesigning Professional Development on Digital Transformation Using Andragogy as a Theoretical Lens", *European Conference on e-Learning*, 22(1), pp. 25–32. Available at: http://dx.doi.org/10.34190/ecel.22.1.1821 [Accessed: 21 April 2024].

Bygstad, B., Øvrelid, E., Ludvigsen, S., and Dæhlen, M. (2022) "From dual digitalization to digital learning space: Exploring the digital transformation of higher education", *Computers and Education*, 182, pp. 104463-104474. Available at: https://doi-org.ezproxy.herts.ac.uk/10.1016/j.compedu.2022.104463 [Accessed: 21 April 2024].

Chai, C.S. (2019) “Teacher professional development for science, technology, engineering and mathematics (STEM) education: A Review from the perspectives of technological pedagogical content (TPACK)”, *The Asia-Pacific Education Researcher*, 28(1), pp. 5-13. Available at: https://doi.org/10.1007/s40299-018-0400-7 [Accessed: 21 April 2024].

Chiu, T.K.F. (2022) “School learning support for teacher technology integration from a self-determination theory perspective”, *Educational Technology Research and Development*, 70(3), pp. 931–949. Available at: https://doi.org/10.1007/s11423-022-10096-x [Accessed: 21 April 2024].

Chuang, S. (2021) “The Applications of Constructivist Learning Theory and Social Learning Theory on Adult Continuous Development”, *Performance Improvement (International Society for Performance Improvement)*, 60(3), pp. 6–14. Available at: https://doi-org.ezproxy.herts.ac.uk/10.1002/pfi.21963 [Accessed: 21 April 2024].

Darling-Hammond, L., Hyler, M. E., and Gardner, M. (2017) *Effective Teacher Professional Development*, Palo Alto, CA: Learning Policy Institute. Available at: https://files.eric.ed.gov/fulltext/ED606743.pdf [Accessed: 21 April 2024].

Debicki, B., Kellermanns, F., Barnett, T., Pearson, A., and Pearson, R. (2016) “Beyond the Big Five: The mediating role of goal orientation in the relationship between core self-evaluations and academic performance”, *The International Journal of Management Education*. 14, pp. 273-285. Available at: https://doi.org/10.1016/j.ijme.2016.05.002 [Accessed: 21 April 2024].

Delere, M., Höfer, H., Marci-Boehncke, G., and Vogel-Lefèbre, T. (2021) Analog Vs. Digital Spaces -How University Lecturers Evaluate Possibilities For Pre-Service Teachers Education Within The Corona-Pandemic. Available at: https://www.researchgate.net/publication/348415904_ANALOG_VS_DIGITAL_SPACES_-HOW_UNIVERSITY_LECTURERS_EVALUATE_POSSIBILITIES_FOR_PRE-SERVICE_TEACHERS_EDUCATION_WITHIN_THE_CORONA-PANDEMIC [Accessed: 21 April 2024].

Dweck, C.S. (2015) *Self-theories: Their Role in Motivation, Personality, and Development*, edn. 1st.,' Hoboken: Taylor and Francis. Available at: https://ebookcentral.proquest.com/lib/herts/detail.action?docID=1582002 [Accessed: 21 April 2024].

Englund, C., Olofsson, A.D., and Price, L. (2017) “Teaching with technology in higher education: understanding conceptual change and development in practice”, *Higher Education Research and Development,* 36(1), pp. 73–87. Available at: https://doi-org.ezproxy.herts.ac.uk/10.1080/07294360.2016.1171300 [Accessed: 21 April 2024].

Felmer, P., Perdomo-Díaz, J., and Reyes, C. (2019) “The ARPA Experience in Chile: Problem-Solving for Teachers’ Professional Development”, in Liljedahl, P., and Santos-Trigo, M. (eds) *Mathematical Problem Solving*. ICME-13 Monographs. Springer, Cham. Available at: https://doi.org/10.1007/978-3-030-10472-6_14 [Accessed: 21 April 2024].

Fernandes, S., Araújo, A.M., Miguel, I., and Abelha, M. (2023) “Teacher Professional Development in Higher Education: The Impact of Pedagogical Training Perceived by Teachers”, *Education Sciences*, 13(3), pp. 309-323. Available at: https://doi.org/10.3390/educsci13030309 [Accessed: 21 April 2024].

Fernet, C., Guay, F., Senécal, C., and Austin, S. (2012) “Predicting intraindividual changes in teacher burnout: The role of perceived school environment and motivational factors”, *Teaching and Teacher Education*, 28(4), pp. 514–525. Available at: https://doi-org.ezproxy.herts.ac.uk/10.1016/j.tate.2011.11.013 [Accessed: 21 April 2024].

Gafurov, I. R., Safiullin, M. R., Akhmetshin, E. M., Gapsalamov, A. R., and Vasilev, V. L. (2020) “Change of the Higher Education Paradigm in the Context of Digital Transformation: From Resource Management to Access Control”, *International Journal of Higher Education*, 9(3), pp. 71-85. Available at: https://doi.org/10.5430/ijhe.v9n3p71 [Accessed: 21 April 2024].

Goodyear, P., Carvalho, L., and Yeoman, P. (2021) “Activity-Centred Analysis and Design (ACAD): Core purposes, distinctive qualities and current developments”, Educational Technology Research And Development, 69, pp. 445–464. Available at: https://doi.org/10.1007/s11423-020-09926-7 [Accessed: 21 April 2024].

Humble, N. and Mozelius, P. (2021) “Enhancing pedagogy to andragogy in the redesign of teacher training courses on programming”, *Proceedings Of The European Conference On e-Learning (ECEL)*, pp. 210–217. Available at: http://dx.doi.org/10.34190/EEL.21.032 [Accessed: 21 April 2024].

Kaur, G., Ambinder, D., and Goyal, A. (2022) “Consume, Contribute, and Create: Succeeding as a Learner and Educator in the Digital Era”, *Methodist DeBakey Cardiovascular Journal*, 18(3), pp. 59–66. Available at: https://doi-org.ezproxy.herts.ac.uk/10.14797%2Fmdcvj.1083 [Accessed: 21 April 2024].

Kaushal, B., Singh, D., Magoon, R., and Kashav, R. (2022) “Pedagogy-andragogy-heutagogy: Towards transformative educational epistemologies”, *Journal Of Anaesthesiology, Clinical Pharmacology*, 38(3), pp. 497–498. Available at: https://doi.org/10.4103/joacp.joacp_270_20 [Accessed: 21 April 2024].

Kirkup, G. and Kirkwood, A. (2005) “Information and communications technologies (ICT) in higher education teaching-a tale of gradualism rather than revolution”, *Learning, Media and Technology*, 30(2), pp. 185–199. Available at: https://doi-org.ezproxy.herts.ac.uk/10.1080/17439880500093810 [Accessed: 21 April 2024].

Knowles, M.S., Holton III, E.F. and Swanson, R.A. (2014) *The Adult Learner: The definitive classic in adult education and human resource development*, 8th edn. Florence: Taylor and Francis. Available at: https://ebookcentral.proquest.com/lib/herts/detail.action?docID=1883897 [Accessed: 21 April 2024].

Kuznetsov, N.V. (2019) "Online education: key trends and barriers", *E-Management*, 2(1), pp. 19–25. Available at: https://doi.org/10.26425/2658-3445-2019-1-19-25 [Accessed: 21 April 2024].

La Fleur, J. and Dlamini, R. (2022) "Towards learner-centric pedagogies: Technology-enhanced teaching and learning in the 21st century classroom", *Journal Of Education*, (88), pp. 1–17. Available at: http://dx.doi.org/10.17159/2520-9868/i88a01 [Accessed: 21 April 2024].

Labone, E. and Long, J. (2016) "Features of effective professional learning: a case study of the implementation of a system-based professional learning model", *Professional Development in Education*, 42(1), pp. 54–77. Available at: https://doi-org.ezproxy.herts.ac.uk/10.1080/19415257.2014.948689 [Accessed: 21 April 2024].

Li, L. and Wang, X. (2021) "Technostress inhibitors and creators and their impacts on university teachers' work performance in higher education", *Cognition, Technology and Work*, 23, pp. 315–330. Available at: https://doi.org/10.1007/s10111-020-00625-0 [Accessed: 21 April 2024].

Mohamed, H.M.A., Tlemsani, I., and Matthews, R. (2022) "Higher education strategy in digital transformation", *Education and Information Technologies*, 27(3), pp. 3171–3195. Available at: https://doi.org/10.1007/s10639-021-10739-1 [Accessed: 21 April 2024].

Pelletier, L. G., Séguin-Lévesque, C., and Legault, L. (2002) "Pressure from above and pressure from below as determinants of teachers' motivation and teaching behaviors", *Journal of Educational Psychology*, 94(1), pp. 186–196. Available at: https://doi.org/10.1037/0022-0663.94.1.186 [Accessed: 21 April 2024].

Pulfrey, C., Buchs, C., and Butera, F. (2011) "Why Grades Engender Performance-Avoidance Goals: The Mediating Role of Autonomous Motivation", *Journal of Educational Psychology*, 103(3), pp. 683–700. Available at: https://doi-org.ezproxy.herts.ac.uk/10.1037/a0023911 [Accessed: 21 April 2024].

Rodríguez-Abitia, G. and Correa, G. (2021) "Assessing Digital Transformation in Universities", *Future Internet*, 13(2), pp. 52-68. Available at: https://doi.org/10.3390/fi13020052 [Accessed: 21 April 2024].

Rogat, T. K. and Linnenbrink-Garcia, L. (2019) "Demonstrating competence within one's group or in relation to other groups: A person-oriented approach to studying achievement

goals in small groups", *Contemporary Educational Psychology*, 59(7), pp. 101781-101799. Available at: https://doi.org/10.1016/j.cedpsych.2019.101781 [Accessed: 21 April 2024].

Ryan, R.M. and Deci, E.L. (2020) "Intrinsic and extrinsic motivation from a self-determination theory perspective: Definitions, theory, practices, and future directions", *Contemporary Educational Psychology,* 61, pp. 101860-101871. Available at: https://doi-org.ezproxy.herts.ac.uk/10.1016/j.cedpsych.2020.101860 [Accessed: 21 April 2024].

Sasere, O.B. and Makhasane, S.D. (2023) "Adult learning theory tenets: A panacea to ICT skills gaps among educators in South Africa", *Journal of Education*, (92), pp. 58–75. Available at: http://dx.doi.org/10.17159/2520-9868/i92a04 [Accessed: 21 April 2024].

Sharaievska, I., McAnirlin, O., Browning, M.H.E.M., Larson, L.R., Mullenbach, L., Rigolon, A., D'Antonio, A., Cloutier, S., Thomsen, J., Metcalf, E.C., and Reigner, N. (2022) "'Messy transitions': Students' perspectives on the impacts of the COVID-19 pandemic on higher education", *Higher Education,* pp. 1–18. Available at: https://doi.org/10.1007/s10734-022-00843-7 [Accessed: 21 April 2024].

Sharma, L. and Srivastava, M. (2020) "Teachers' motivation to adopt technology in higher education", *Journal of Applied Research in Higher Education*, 12(4), pp. 673–692. Available at: https://doi-org.ezproxy.herts.ac.uk/10.1108/JARHE-07-2018-0156 [Accessed: 21 April 2024].

Ter Beek, M., Wopereis, I., and Schildkamp, K. (2022) "Don't Wait, Innovate! Preparing Students and Lecturers in Higher Education for the Future Labor Market", *Education Sciences*, 12(9), pp. 620-633. Available at: https://doi.org/10.3390/educsci12090620 [Accessed: 21 April 2024].

Thurlings, M., Vermeulen, M., Bastiaens, T., and Stijnen, S. (2013) "Understanding feedback: A Learning theory perspective", *Educational Research Review*, 9, pp. 1-15. Available at: https://doi.org/10.1016/j.edurev.2012.11.004 [Accessed: 21 April 2024].

Trivedi, S.P., Rodman, A., Eliasz, K.L., Soffler, M.I., and Sullivan, A.M. (2024) "Finding the right combination for self-directed learning: A focus group study of residents' choice and use of digital resources to support their learning", *The Clinical Teacher*, pp. e13722–e13722. Available at: https://doi-org.ezproxy.herts.ac.uk/10.1111/tct.13722 [Accessed: 21 April 2024].

Turnbull, D., Chugh, R., and Luck, J. (2021) "Transitioning to E-Learning during the COVID-19 pandemic: How have Higher Education Institutions responded to the challenge?", Education And Information Technologies, 26, pp. 6401–6419. Available at: https://doi.org/10.1007/s10639-021-10633-w [Accessed: 21 April 2024].

Urdan, T. and Kaplan, A. (2020) "The origins, evolution, and future directions of achievement goal theory", *Contemporary Educational Psychology*, 61, pp. 101862-101872.

Available at: https://doi-org.ezproxy.herts.ac.uk/10.1016/j.cedpsych.2020.101862 [Accessed: 21 April 2024].

Van Laar, E., Van Deursen, A.J.A.M., Van Dijk, J.A.G.M., and de Haan, J. (2020) "Determinants of 21st-Century Skills and 21st-Century Digital Skills for Workers: A Systematic Literature Review", *SAGE Open*, 10(1), pp. 1-14. Available at: https://doi.org/10.1177/2158244019900176 [Accessed: 21 April 2024].

Wang, X., Tan, S.C., and Li, L. (2020) "Technostress in university students' technology-enhanced learning: An investigation from multidimensional person-environment misfit", *Computers In Human Behavior*, 105, pp. 106208-106218. Available at: https://doi.org.ezproxy.herts.ac.uk/10.1016/j.chb.2019.106208 [Accessed: 21 April 2024].

Wanner, T. and Palmer, E. (2015) "Personalising learning: Exploring student and teacher perceptions about flexible learning and assessment in a flipped university course", *Computers and Education*, 88, pp. 354–369. Available at: https://doi-org.ezproxy.herts.ac.uk/10.1016/j.compedu.2015.07.008 [Accessed: 21 April 2024].

Wilson, G., Gates, J.R., Vijaykumar, S., and Morgan, D.J. (2023) 'Understanding older adults" use of social technology and the factors influencing use', *Ageing and Society*, 43(1), pp. 222–245. Available at: https://doi.org/10.1017/S0144686X21000490 [Accessed: 2 August 2024].

Yang, J.C., Chung, C.J., and Chen, M.S. (2022) "Effects of performance goal orientations on learning performance and in-game performance in digital game-based learning", *Journal of Computer Assisted Learning*, 38(2), pp. 422–439. Available at: https://doi-org.ezproxy.herts.ac.uk/10.1111/jcal.12622 [Accessed: 21 April 2024].

Yeung, A. S., Tay, E., Hui, C., Lin, J. H., and Low, E. (2014) "Pre-service Teachers' Motivation in Using Digital Technology", *Australian Journal of Teacher Education*, 39(3), pp. 134-153. Available at: https://doi.org/10.14221/ajte.2014v39n3.1 [Accessed: 21 April 2024].

Zhou, X. and Milecka-Forrest, M. (2021) "Two groups separated by a shared goal: How academic managers and lecturers have embraced the introduction of digital technologies in UK higher education", *Research in Learning Technology*, 29, pp. 1–18. Available at: https://doi.org/10.25304/rlt.v29.2446 [Accessed: 21 April 2024].

Embracing Failure in Higher Education: The Use of Design Thinking as Pedagogy to Build Creative Confidence and Develop 21st Century Skills in Learners.

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Abstract

This study recognises the creative value placed on 'learning through failure' in industry and asks how failure can be embraced in higher education, to encourage the development of 'creative confidence' in learners (Kelley & Kelley, 2013). Drawing on existing literature, this article explores how failure is linked to creativity; why the education system kills creativity; and why there's a need for more focus on creative failure in higher education. Building on the idea of Dweck's 'growth mindset' (2006), Kapur's 'productive failure' (2008), and Sitkin's concept of 'intelligent failure' (1992), design thinking is offered as a pedagogical approach that makes space for embracing safe risk-taking. The article concludes that further research is required to understand how to practically embed design thinking as pedagogy in higher education. The notion of developing 'psychological safety' (Edmundson, 1999) in our teaching practices, is integral to fostering the mindsets of design thinking. This will help embed design thinking as pedagogy and enable students to embrace failure, helping them develop the 21st-century skills and creative confidence required to tackle the 'wicked problems' of today (Rittel and Webber, 1973).

Introduction

The Role of Failure and Creativity in Industry

It has long been acknowledged amongst innovators and entrepreneurs that there is a strong connection between failure and creativity. Search the Internet and quotes abound about the power of failure to inform successful innovation - from Thomas Edison's infamous quote about the invention of the light bulb to James Dyson's use of prototypes to inform the design of his market-leading cyclone vacuum cleaner, such quotes show that failure and creativity, are inextricably linked, or 'deeply symbiotic' to use the words of Kerrigan et al (2020).

- *'I have not failed. I've just found 10,000 ways that won't work.'* Thomas Edison, inventor of the light bulb.
- *'I made 5,127 prototypes of my vacuum cleaner before I got it right. There were 5,126 failures but I learnt from every one of them. That's how I came up with a solution. So I don't mind failure.'* – James Dyson, inventor of the cyclone vacuum cleaner.

In pursuing innovation i.e., a new or novel solution, risk is introduced as businesses cannot rely on what has gone before. As acknowledged by Creely et al (2021) 'Risk and failure are inherent to creative processes, because it is rare that good original, creative work or ideas come together in the first try.' There is more uncertainty involved in coming up with something new and therefore more risk. It stands to reason that as risk increases, so too does the possibility of failure. Successful businesses have learnt to embrace risk and failure as a necessary route to innovation, as demonstrated by McKinsey's research which identified that successful organisations are more than twice as likely to 'strongly agree that employees are rewarded for taking risks of an appropriate level.' (McKinsey 2019).

Yet whilst industry has found ways to embrace risk and failure, valuing the learning opportunities provided, there are arguments that the same is not true within the education system.

The Role of Failure and Creativity in Education

Ken Robinson's TED talk 'Do Schools Kill Creativity?' (2006) remains one of the most viewed TED talks of all time (TED, 2024). In this talk, Robinson claims that schools are wasting creativity by praising 'the right answer' and punishing mistakes, leading to a fear of failure amongst school-aged learners and a reluctance to take creative risks.

This view has been echoed by others including the Kelley brothers of innovation consultancy IDEO, who argue in their book 'Creative Confidence' (2013) that we are all born with creativity. Just like any muscle, creativity needs to be exercised and practised to improve. The Kelley brothers propose that judgements we receive due to socialisation and formal education, lead to 'creativity scars' – harsh criticisms that undermine our self-efficacy. These scars stifle our creative impulses leading to the avoidance of the risks that enable creativity to thrive. The Kelley brothers define creative confidence as 'the ability to come up with breakthrough ideas, combined with the courage to act' (2013), and argue that the ability to view failure as an essential part of learning is key to developing this creative confidence.

In higher education too, we judge the success of students on their ability to get the right answer. As reported by Eckstein (2023) higher education often rewards competition, correct answers, and achievement, leading to many students *'Seeing Failures as Shameful Events That Reflect Poorly on Character, Aptitude, and Potential.' (Eckstein, 2023).*

This permeates through the system, with academic grades as the dominant metric by which success is judged- as students, and as staff. And whilst league tables consider a broader array of metrics than just academic grades, there's no denying the fact that grades, attainment, and pass rates still matter in higher education, leaving students worrying about the idea of trying, and failing.

The Need for More Creative Failure in Education

Despite the challenges of embracing failure in education, there are arguments that a focus on creative failure is needed now, more than ever before. These arguments include the following:

The Creativity Skills Gap in the UK.

The creative industries are one of the UK's leading exports, contributing more than £97.4 billion in GVA to the UK economy (Design Council, 2021). However, creative subjects are being squeezed out of the education system, in favour of more traditional subjects. This is being seen in schools i.e., with a 71% fall in Design & Technology taken at GCSE since 2010 (Baker Dearing Education Trust, 2022), and in higher education with the dramatic reduction in funding of Creative Arts courses (Guardian, 2024).

21st Century Problems are 'Wicked Problems'.

Rittel & Webber (1973) coined the term 'wicked problems' to describe complex challenges; those that have many interdependent factors at play, that make them seemingly impossible to solve. 'Wicked problems' can be seen to characterise many of the most pressing issues we face in society today. From poverty to war, food issues to health care, global pandemics to climate change – the issues we are facing, represent just the kind of systemic, complex, ill-defined problems that Rittel & Webber would define as 'wicked'. There are no tried and tested, ready-to-roll-out solutions to these challenges. Instead, they require a highly creative, multi-disciplinary, collaborative approach to problem-solving that values risk-taking and the learnings that come through initial failure, in reaching new solutions.

The Threat of AI & Future Work Skills.

As evidenced by Figure 1, the World Economic Forum Future of Jobs Report (2020) identified the top 10 skills required in the workforce by 2025, listing 'analytical thinking and innovation' and 'creativity, originality and initiative' among the top 5 skills. Whilst AI progressions are moving at pace, there's consensus that creativity, empathy, innovation, problem-solving, critical decision-making, and collaboration are beyond the capabilities of AI, and therefore necessary skills for the 21st century workforce.

Figure 1: Top 10 Skills in 2025, (World Economic Forum, 2020)

Critical Thinking & Creativity as an ISOTL Grand Challenge

Members of the International Society for the Scholarship of Teaching and Learning (ISSOTL) have identified a set of Five Grand Challenges for improving post-secondary teaching and learning (Scharff et al 2023). The first of these five challenges acknowledges the requirement of 'dual processing' to deliver people who have skills in both creativity and critical thinking.

This challenge acknowledges that 'critical thinking is often framed as the rational or logical whereas creative thinking is seen as beneficial but simply the work of artists, writers, and composers' (Scharff et al, 2023). The challenge therefore asks for more research to understand which pedagogies are most effective for critical and creative thinking, and how 'low stakes experiences with failure' can be integrated.

So, if the need for more creativity exists, (and by extension more failure, due to their 'deeply symbiotic' relationship), how do we make space for this in an education system that prioritises getting things right? The following literature review explores typologies of failure and pedagogies of failure, to offer further insight.

Fear of Failure

Fear of failure has been defined as 'persistent and irrational anxiety about failing to measure up to the standards and goals set by oneself or others' (American Psychological Association, 2007). Talking about businesses' attitudes to failure, Rosetti (2021) of the company Fearless Culture, states that 'most of us try to avoid or ignore mistakes rather than confront them'. This is compounded further when we strive for success. After a decade of research into this topic, Gino & Staats (2015) found that an organisation's preoccupation with success 'leads to an unreasonable fear of failure' and 'a mindset that inhibits risk-taking'.

Focusing on learners in higher education, Covington (2013) suggests that fear of failure results in anxiety among overstrivers (also known as perfectionists) and avoidance by self-protectors (also known as procrastinators). Indeed, Eckstein et al (2023), write that 'fear of failure prevents students from taking risks, starting or finishing tasks, getting involved in new activities, or challenging themselves.'

Types of Failure

Rosetti and Covington's work leads to the idea that there are different types of failure and different strategies for dealing with them. As identified by Rosetti (2021) and expressed in Figure 2 by Willcocks (2024), these failure types can be plotted on a 2X2 matrix, spanning from low to high effort, and with corresponding low to high learning reward.

- In the bottom left quadrant sit 'sloppy mistakes', like forgetting to add an attachment to an email. These are low effort with low learning rewards.
- Then there are the 'a-ha moments', where errors are unavoidable as we learn something new. Low effort but a high learning opportunity.
- Next, come mistakes we choose to avoid – these are the ones we see as high effort and ignore for fear of failure, therefore offering us low learning opportunities.
- Finally, with both high effort and high learning opportunities, are the Goldmines…. the smart failures, where through trial and error we learn and gain greatest value.

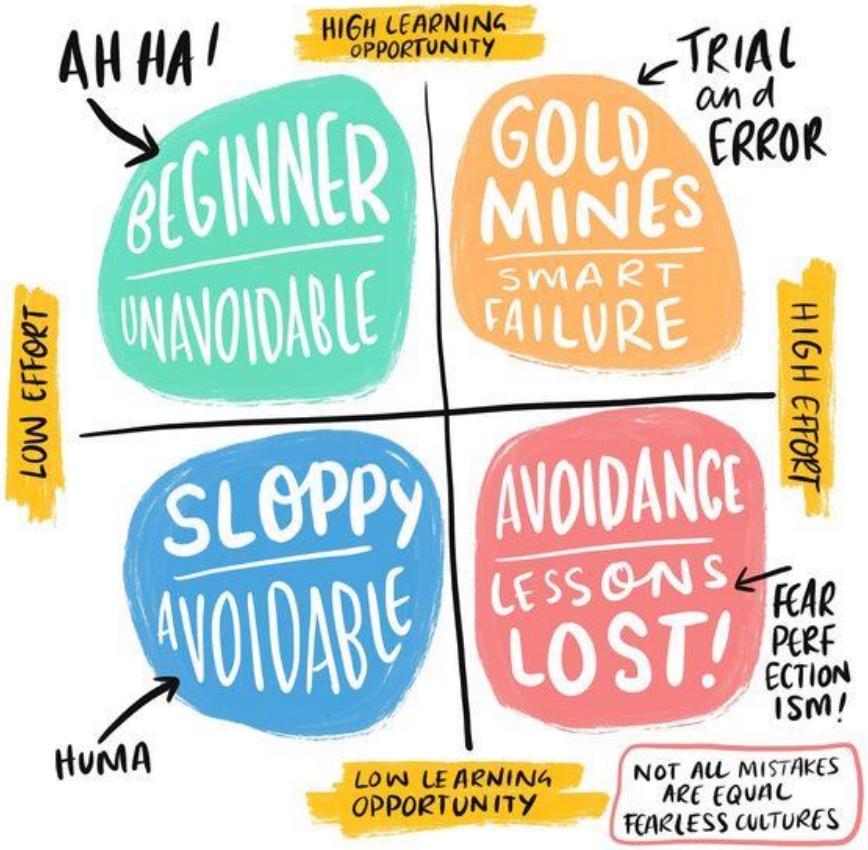

Figure 2: Types of failure, Willcocks, T. (2024). Based on Rosetti, 2021.

Reproduced with kind permission from Willcocks, T.

Harvard Professor Amy Edmundson (2023) produced a similar typology of failure based on her research in this area. She identified errors that are to be avoided including simple failures (mistakes), and complex failures (accidents). She also identified a third category of failure that she called 'intelligent failures', building on the work of Sitkin (1992). Much like Rosetti's Goldmines, 'these are described as the consequences of explorations into new areas' and are also known as 'discoveries'. Whilst mistakes and accidents are to be avoided and learnt from, discoveries, like 'goldmines', are to be embraced.

The argument that all mistakes are not equal is important, as it helps us understand where failure is inevitable and where it might hold value. But when it comes to teaching and learning, how do we encourage the right types of failure – those that provide the opportunity to take creative risks, and truly innovate? Or as Edmundson asks, how might we 'celebrate the discoveries while figuring out ways to minimise the number of mistakes and accidents' (Edmundson 2021).

Here we turn our attention to discussing three pedagogical approaches to failure that may hold value.

Growth Mindset

Carol Dweck's work focuses on the malleability of the mind, and the fact that intelligence and talents are not naturally given and static but can be learnt and grown (2006). Dweck highlights the differences between two mindsets that she describes as 'fixed' and 'growth'. With a fixed mindset, abilities are seen as something innately given, and therefore outside of a person's control. In this belief system, effort is not viewed as necessary; abilities are either possessed or they are not. People with a 'fixed mindset' are more likely to avoid challenges for fear of making mistakes, give in quickly, and get defensive or ignore feedback. People with a 'growth mindset', on the other hand, appreciate the importance of putting in effort to progress. They are more likely to embrace challenges and persevere, and when faced with mistakes, to view them as an opportunity to learn and grow.

Parallels can be drawn here between Dweck's notion of a fixed mindset (2006), Rosetti's notion of 'failure avoidance' (2021), and Covington's idea of 'self-protectors' (2013) who avoid challenges when they fear they may fail.

Impasse Driven Learning & Productive Failure

Work done by VanLehn et al (2010) identified that when learners meet apparent dead ends, they are more receptive to the teaching provided to get them past this roadblock. They concluded that it's more productive for learning, if teachers wait until an impasse is reached, and then provide guidance to help learners succeed.

'Productive failure' takes impasse-driven learning a step further by deliberately designing problems for students to fail. Kapur's work on productive failure (2014) explored how maths students' learning improved when they were first asked to tackle and struggle with a maths problem, before being taught the strategies to resolve it. The study found that maths students who 'engaged in problem-solving before being taught, demonstrated significantly greater conceptual understanding and ability to transfer to novel problems, than those who were taught first' (Kapur 2014). This suggests that there's something in the ambiguity, struggle, and subsequent failure, that paves the way for improved student learning, helping them cross liminal spaces (Mayer & Land, 2005). Manalo & Kapur's (2018) conclusions of research into productive failure went on to state that 'failure is essential to successful learning'.

Intelligent Failure

The notion of 'intelligent failure' comes from the work of behavioural psychologist Sim Sitkin (1992), who argues that there are different types of failure and that there's value in not eradicating them all. Instead, he suggests that small losses should be retained if they can be learnt from. Sitkin therefore recommends the creation of learning experiences that can foster experimentation, to enable learners to explore and challenge assumptions, and then test them through a project or experiment.

With these theories of failure and knowledge of different failure types, the question becomes how we encourage the right types of failure to help students build creative confidence and grow the 21st-century skills of creativity, critical thinking, resilience, and adaptability. How do we help them fail intelligently and safely so they do not jeopardise their degrees? This is where I suggest design thinking as pedagogy may hold the answer.

Point of View – Design Thinking as Pedagogy

What is Design Thinking?

Design thinking is an iterative approach to problem-solving that helps us understand the needs of people, reframe problems, iterate ideas, and come up with truly innovative and desirable solutions. Rooted in the practices of human-centred design, design thinking as a term and approach was popularised in the 1990s through the work of internationally renowned innovation consultancy IDEO. As a successful product design and engineering firm, IDEO evolved and made explicit some of the 'designerly ways of knowing' (Cross 2006) that had previously been implicit.

As shown in Figure 3, design thinking is often depicted as a linear process involving five steps: empathy, define, ideate, prototype and test. But most designers acknowledge that the reality of practising design thinking is messier than the typical 5-step model suggests. Rather, it's a set of steps that move forward and backwards with a series of iterative loops built in. In this way, the design process is seen as 'iterative, nonlinear,' 'an exploratory process,' involving dead ends or failures, and with 'unexpected discoveries along the way' (Brown, 2009)

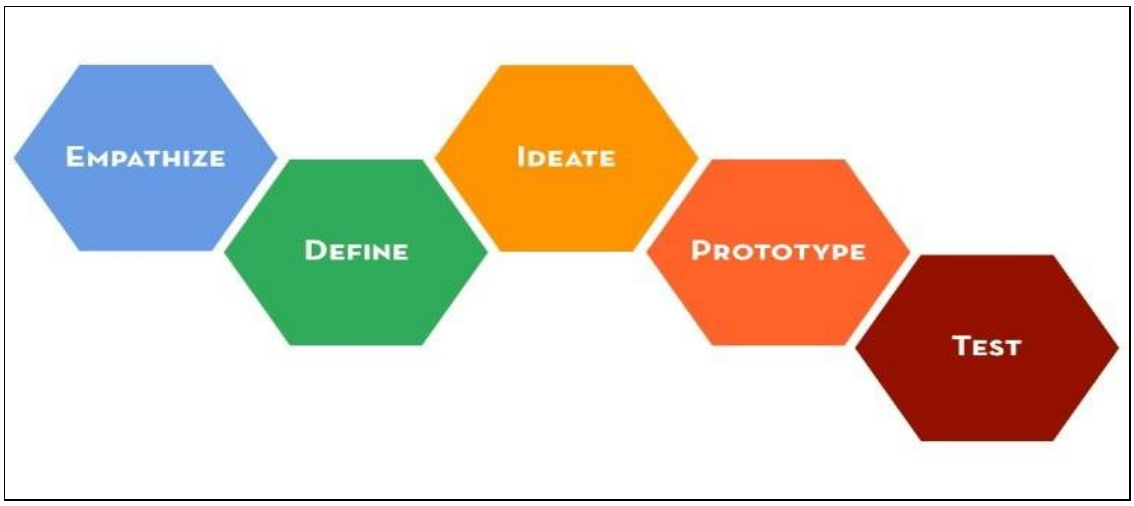

Figure 3. Stanford d.school design thinking method - evolved from IDEO's method. (d.school, 2023)

An alternative depiction of the design thinking process was created by the Design Council in 2003, by identifying the commonalities in the approaches of some of the world's most highly innovative companies. The resulting visualisation (Figure 4) has become known as the

Double Diamond Framework (2003) and helped explain not just what designers do, but also some of the 'how' and 'why' behind their ways of working.

The Double Diamond shows that designers first spend time opening up the problem, by questioning and exploring the brief to ensure they '**design the right thing '(Ball, 2023).** Then they move to the solution space, where they ideate widely, using prototyping and testing to learn, iterate and **'design the thing right' (Ball, 2023)**. The visualisation also shows that designers move through the problem and solution spaces by operating in both divergent and convergent modes… first **creating choices**, before then **making choices** – reflecting the 'dual processing' referred to in the ISSOTL grand challenge.

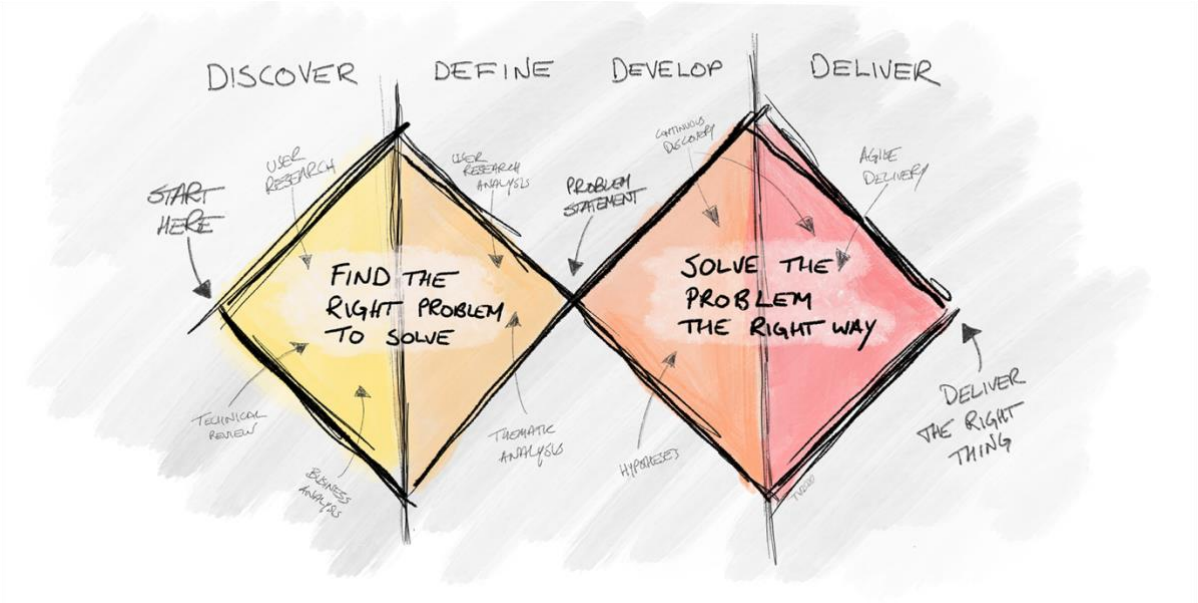

Figure 4. Depiction of the Double Diamond Framework, based on the Design Council 2003 (illustrated by: Väänänen, T. 2020)

How does Design Thinking Embrace Failure?

As Haws et al (2023) acknowledge, design thinking has 'evolved' to include a process, methods, toolkit, mindsets, or ways of working. IDEO's mindsets of design thinking (Figure 5), help to explain how design thinking positively approaches failure through 'embracing ambiguity' and 'learning from failure'.

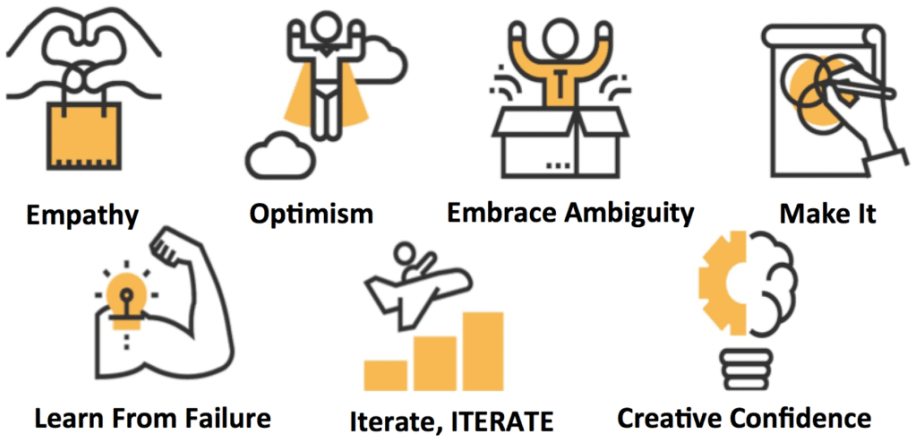

Figure 5: IDEO's Design Thinking Mindsets, (Innovation Training, 2023)

In the first diamond, designers are encouraged to 'embrace ambiguity' through empathic research, which they use to re-frame the brief into something more manageable, understandable, and relevant. Design thinking helps designers tackle their fear of failure and provides a route to help them get started, by re-defining the problem.

In the second diamond, design thinking helps designers 'learn from failure'. With a bias towards action, designers make a physical expression of the idea. The very act of making or 'building to think', as we used to call it at IDEO, helps develop the idea. By building fast, cheap, and early, designers are encouraged to share ideas with others for feedback. Here failure is embraced as a means of learning and a route to success, by use of the motto 'fail early to succeed sooner' (Kelley, 2002).

The design thinking process, therefore, is a way to mitigate the inherent risks involved in innovation and creative problem-solving. Through empathy, prototyping and testing, designers gain more certainty, increasing creative confidence in the solution by ensuring the idea is 'desirable, feasible and viable' (Brown, 2009; Kelley & Kelley 2013).

How is Design Thinking Used in Teaching and Learning in Higher Education?

On the BA Product & Industrial Design course at the University of Hertfordshire, we are concerned with teaching mastery of design. In this way we are focused on teaching design thinking techniques alongside core technical skills, to help learners gain what Tovey (2015) calls, their 'passport to practice'.

As Beligatamulla et al (2019) observe 'design thinking has become a pedagogical phenomenon in higher education' due to its 'relevance across many disciplines' and the 'twenty-first-century competencies' it builds. This has seen design thinking being used as a pedagogical approach beyond the design discipline. Stanford's d.school is perhaps the best-known and longest-established example of this. Founded by IDEO's David Kelley, the d.school enables learners to take elective classes to bolster the skills they learn in their

major subject. Each year 10% of students from all seven schools on campus, take additional classes from the d.school. (d.school, 2024).

Design thinking is also being used in course delivery at other academic institutions. Hatt et al (2023) refer to research by Brown (2008) and Liedka (2018) exploring the use of design thinking in executive education to 'foster creativity' and 'enable students to navigate uncertain times'. Hews at al (2023) explore the use of design thinking in the teaching of law students and identify its ability to help students address their fear of failure by enabling them to 'get comfortable with ambiguity' and build a 'resilience toolkit'. Madson (2021) refers to the use of design thinking in medical teaching to help address complex medical issues such as 'physician burnout, diabetes, obesity and rising costs of care'; as well as 'nurturing key competencies' in teamwork, interprofessional communication, ethical reasoning, creative problem solving and empathy.

As demonstrated by the studies presented here, design thinking has much to offer in helping students learn to embrace failure and benefit from the creative confidence and 21st Century skills that this approach can help to foster. So how should it be put into practice?

Recommendations – Design Thinking as Pedagogy

Recommendations for Adopting Design Thinking as Pedagogy?

Whilst the positives of design thinking are explored in depth in this article, it must be mentioned that design thinking is not without its criticisms. In higher education one of the most leveraged is that assessing design thinking is challenging, as it involves 'subjective and complex skills, such as creativity, collaboration, and reflection and is both process and mindset' (Hatt et al, 2023).

To address this criticism, we need to think not only about the ways we teach design thinking through project-based learning and real-world problems. We also need to consider how we assess these projects to mark the process, as well as any output. As Sawyer (2021) puts it, we must be sure with assessments that fear of failure, low grades and negative judgements don't 'wreck the potential of the experience'. Might ideas like 'contract grading' (Hiller & Hietapelto, 2001) hold the key, alongside techniques like authentic assessment, summative feedback, and reflection?

Planning the teaching and assessment though, is not enough to ensure we see the full benefits of the design thinking approach in students learning. Critically, we need to also plan and develop the 'mindsets' that enable creative confidence to thrive (Figure 6). From seeing ourselves as facilitators and coaches rather than lectures; to sharing and modelling our own failures; celebrating the failures of others through case studies; and even exploring ways for our students to recognise the value to their learning by introducing ideas like 'failure clubs' to detach failure from shame (Feigenbaum, 2021). We need to focus on our actions as

educators, and create the conditions of psychological safety (Edmundson, 2011) us to reveal our own failures, to encourage students to take risks and learn.

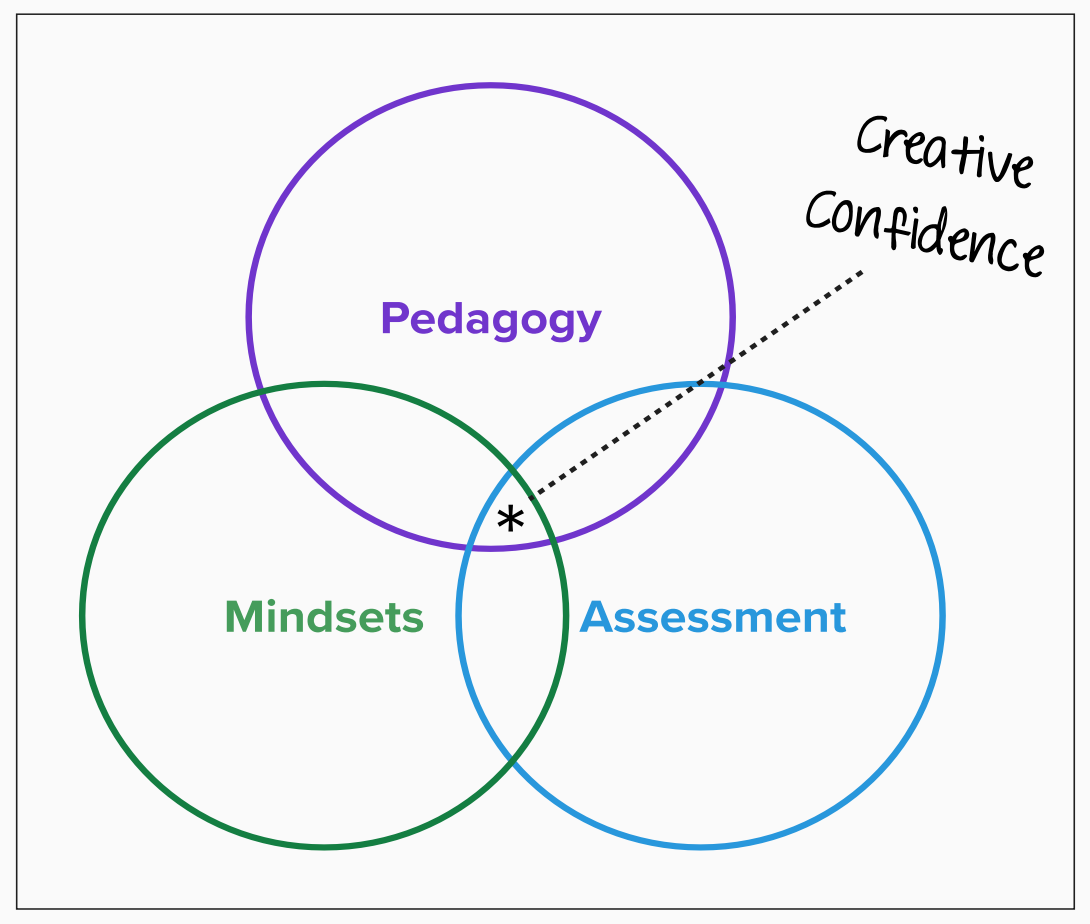

Figure 6. Model for embedding design thinking as pedagogy. (Author's own, 2024)

There is a need for more research into this model to understand at a practical level, how we embed design thinking as pedagogy, into the higher educational context, with a focus on how we develop the mindsets of design thinking at an institutional level.

Conclusion

Design thinking as pedagogy has the potential to prevent the 'lost learnings' that occur with fear of failure and provides the methods and the conditions necessary to deliver the innovative, creative problem-solving associated with 'goldmines'. Adopting design thinking as pedagogy will help graduates build their creative confidence and ready them for the 21st Century workplace by developing skills of empathy, adaptability, optimism, collaboration, critical inquiry, and creativity to solve the wicked problems we face today.

It's argued here that design thinking as pedagogy offers a safe way for students to learn from failure, providing multiple iterative feedback loops to enable learners to build creative

confidence and develop 21st Century required in today's workplace. Yet, to achieve this in practice, we first need to build the right culture for these types of projects to thrive in an academic setting. We need to ensure the focus is on helping students gain the creative benefits of failing intelligently, without jeopardising the grade outcomes of their degrees.

This means undertaking more research to understand not only how we plan our teaching and assessments but, critically, how we also build psychological safety and the mindsets of design thinking into our educational establishments and practices.

References

American Psychological Association (2007). *APA dictionary of psychology*. p. 369. Washington, DC: APA.

Ball, (2023). The Double Diamond design process – still fit for purpose? Accessed at: https://medium.com/design-council/the-double-diamond-design-process-still-fit-for-purpose-fc619bbd2ad3 (Accessed on: 19/04/24)

Baker Dearing Educational Trust (2022). Accessed at: https://bakerdearing.org/gcse-results-day-new-analysis-reveals-design-and-technology-student-numbers-have-fallen-by-up-to-71-per-cent-since-the-conservatives-came-to-power/ (Accessed on: 19/04/2024)

Beligatamulla, G. Rieger, J. Franz, J. & Strickfaden, M. (2019). Making Pedagogic Sense of Design Thinking in the Higher Education Context. *Open Education Studies, 1.*

Brown, T. (2009). *Change by Design: How Design Thinking Transforms Organizations and Inspires Innovation.* Harper Business.

Covington, M. 2013. Unmotivated or Motivated to Fail? A Cross-Cultural Study of Achievement Motivation, Fear of Failure, and Student Disengagement. *Journal of Educational Psychology, 105.*

Creely, E. Henriksen, D. Crawford, R. Henderson, M. (2021) Exploring creative risk-taking and productive failure in classroom practice. A case study of the perceived self-efficacy and agency of teachers at one school. *Thinking Skills and Creativity, Volume 42.*

Cross, N. (2006). *Designerly ways of knowing.* Springer.

Design Council, (2003). *The Double Diamond.* Accessed at: https://www.designcouncil.org.uk/our-resources/the-double-diamond/ (Accessed on: 19/04/24)

Design Council, (2022). *Design Economy – People, Places, and Economic Value 2022,* accessed at: https://www.designcouncil.org.uk/fileadmin/uploads/dc/Documents/Design_Economy_2022_Full_Report.pdf (Accessed on: 19/04/24)

d.school. (2021) *Our impact.* Accessed at: https://dschool.stanford.edu/our-impact (Accessed on: 19/04/24)

Dweck, C. (2006) *Mindset. The new psychology of success.* Random House Publishing.

Eckstein, L. Finaret, A. & Whitenack, L. (2023). Teaching the Inevitable: Embracing a Pedagogy of Failure. *Teaching & Learning Inquiry The ISSOTL Journal 11*

Edmundson, A. (1999). Psychological Safety and Learning Behavior in Work Teams. *Administrative Science Quarterly, Vol. 44, No. 2 pp. 350-383*

Edmundson, A. (2023) *Right Kind of Wrong: Why Learning to Fail Can Teach Us to Thrive.* Cornerstone Press

Edmondson, A. (2021). The Science of Intelligent Failure. Accessed at https://www.nbforum.com/newsroom/blog/amy-edmonson-the- science-of-intelligent-failure/ (Accessed on: 19/04/2024)

Feigenbaum, P. (2021) Welcome to 'failure club': supporting intrinsic motivation, sort of, in college writing. *Pedagogy. 21 (3).*

Guardian, 2024. Creative art courses at UK universities face funding cuts. Accessed at: https://www.theguardian.com/education/2024/apr/04/ministers-to-cut-funding-for-performing-and-creative-arts-courses-in-england#:~:text=Keegan's%20decision%20means%20the%20top,Gavin%20Williamson%20as%20education%20secretary (Accessed on: 19/04/2024)

Gino, F. & Staats, B. 2015. *Why Organizations Don't Learn. Accessed at: https://hbr.org/2015/11/why-organizations-dont-learn#:~:text=A%20preoccupation%20with%20success%2C%20for,luck%20in%20successes%20and%20failures. (Accessed on: 19/04/24)*

Hatt, L. Davidson, J. and Carrion-Weiss, J. (2023). Design Thinking as Pedagogy in Practice, INTERNATIONAL JOURNAL OF MANAGEMENT AND APPLIED RESEARCH, Vol. 10, No. 2,

Hews, R., Beligatamulla, G., McNamara, J. 2023.Creative confidence and thinking skills for lawyers: Making sense of design thinking pedagogy in legal education. *Thinking Skills and Creativity,Volume 49.*

Hiller, T. & Hietapelto, A. (2001). Contract Grading: Encouraging commitment to the learning process through voice in the evaluation process. *Journal of Management Education, Vol 25, (6).*

Innovation Training, (2023). *Diagram of IDEO's Design Thinking Mindsets*. Accessed at: https://www.innovationtraining.org/design-thinking-mindsets/ (Accessed on: 19/04/2024

Kapur, M. (2008). Productive failure. *Cognition and Instruction, 26*(3), 379–424.

Kapur, M. & Manalo, E. (2018). The role of failure in promoting thinking skills and creativity: New findings and insights about how failure can be beneficial for learning. *Thinking Skills and Creativity 30*

Kelley, D. & Kelley, T. (2013). *Creative confidence – unleashing the creative potential within us all.* William Collins, London.

Kelley, T. (2002). The Art of Innovation: Lessons in Creativity from IDEO. Profile Books.

Kerrigan, S., McIntyre, P., Fulton, J., & Meany, M. (2020). The systemic relationship between creative failure and creative success in the creative industries. *Creative Industries Journal*, *13*(1),

Madson, M. (2021) Making sense of design thinking: A primer for medical teachers. *Med Teach. Oct. 43(10).*

Meyer, J.., & Land, R. (2005). Threshold concepts and troublesome knowledge: Epistemological considerations and a conceptual framework for teaching and learning. *Higher education, 49.*

McKinsey, 2019. *Five moves to make during a digital transformation.* Accessed at: https://www.mckinsey.com/capabilities/mckinsey-digital/our-insights/five-moves-to-make-during-a-digital-transformation (Accessed on 19/04/2024)

Rittel, H. & Webber, M. 1973. Dilemmas in a General Theory of Planning. *Policy Sciences, Vol. 4, No. 2*,

Robinson, K. (2006), *Do Schools Kill Creativity?* TED Talk. Accessed at: https://www.ted.com/talks/sir_ken_robinson_do_schools_kill_creativity? (Accessed on: 19/04/2024)

Rosetti, G. 2021. Why companies don't learn from mistakes – they can't distinguish goldmines from sloppy ones. Accessed at: https://www.fearlessculture.design/blog-posts/why-companies-dont-learn-from-mistakes-they-cant-distinguish-goldmines-from-sloppy-ones (Accessed on: 19/04/2024)

Sawyer, K. (2021). The iterative and improvisational nature of the creative process. *Journal of creativity, Vol 31.*

Scharff, L. Capocchiano, H. Chick, N. Eady, M. Friberg, J. Gregory, D. Loy, K. & Maurer, T. 2023. Grand Challenges for SoTL #1. Accessed at: https://issotl.com/grand-challenges-for-sotl/gc-sotl-1/ (Accessed on: 19/04/24)

Sitkin, S. B. (1992). Learning through failure: the strategy of small losses. *Organizational Behavior, 14, 231–266.*

TED, 2024. *The most popular TED Talks of all time.* Available at: https://www.ted.com/playlists/171/the_most_popular_ted_talks_of_all_time, Accessed on 17/06/2024

Tovey, M. Design education as the passport to practice. In: Tovey, M. (Eds) 2015, *Design Pedagogy: Developments in art and design education.* Routledge.

VanLehn, K.Siler, S. Murray, C. Yamauchi, T. & Baggett, W. (2003). Why Do Only Some Events Cause Learning During Human Tutoring? *Cognition and Instruction*, *21*(3)

Väänänen, T. (2020) Illustration of the Double Diamond (based on Design Council's Framework, 2003). Accessed at: https://digital.nhs.uk/blog/design-matters/2020/design-is-the-strategy (Accessed on: 19/04/24)

Willcocks, T. (2024) Diagram of Types of failure. Based on Rosetti, 2021. Accessed at: https://www.linkedin.com/pulse/goldddd-tash-willcocks-vlsac/ (Accessed on: 19/04/24)

World Economic Forum, 2020. *Future of Jobs*. Accessed at: https://www.weforum.org/publications/the-future-of-jobs-report-2020/ (Accessed on: 19/04/2024)

Strategies for getting final year paramedic students 'career ready' facilitating development of 'soft skills' for their future careers

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Abstract:

Career readiness is highly important when approaching the role of Newly Qualified Paramedic (NQP) and it has not been studied at any depth in the United Kingdom (UK) as to whether paramedic science students in Higher Education are prepared, capable and ready for their future careers within this field. This study aims to explore the readiness of final year paramedic students in terms of their 'soft skills' including interview preparation and communication alongside their career aspirations.

The primary purpose of this study is to take the findings and create recommendations to adapting curricula to help students develop career readiness that will support growth and success in their future careers. This study uses a questionnaire administered before and after an event using two groups of paramedic students from the same cohort. One group participated in a mock interview, and one did not and then all participants experienced a 'real' interview. All participants completed a prepared questionnaire pre and post interviews which collected both qualitative and quantitative data. The results were analysed and critically discussed, in comparison to other research that has been undertaken in other health professions.

Introduction

In 2018, the level of qualification for paramedics' registration raised from 'Equivalent of Certificate of Higher Education' to 'Bachelor's degree with Honours (BSc Hons)' (HCPC 2018).

As part of the reforms of the National Health Service (NHS) and the organisational changes to ambulance service work in the UK, in the last two decades, paramedic education has undergone changes, transforming from in-house apprenticeship training to degree level (Givati, Markham & Street, 2018.) Internationally, pedagogical approaches to paramedic education vary, however it appears consistent that interdisciplinary placement experiences improve the overall quality of experiential learning and assists development of more rounded paramedics (Credland, 2020.)

'Career readiness' in the provision of graduates is one of the challenges that the tertiary sector faces. Within paramedic science, career readiness could be described as the ability to perform clinical skills, treat, and manage patients and demonstrate clinical decision-making skills, however, there appears to be less focus on 'soft skills' such as interview techniques, communication skills and career aspiration (Edwards, 2011.) Credland (2020) also state that 'road-ready' paramedics must also be more than just emergency responders and that the

modern paramedic needs to be a holistic, patient-centred health practitioner which includes soft skill development too.

Brown (2010) states that in human relations, effective communication is vital and specifically in the medical and nursing professions, this is poor and has long been an issue. They go on to state that many deaths have been attributed to poor clinician-patient communication and more effective communication is thought to mitigate the risk of malpractice suits. One of the most important areas of communication that requires improvement within medicine and other health care professions is listening which is defined as a soft skill. Accompanied with the fact that the author recently changed job roles to become the year lead for the third-year cohort, which incorporates getting students ready for qualification and entering the workforce, this study seemed appropriate and sparked interest into what changes could be made to enhance career readiness and improve soft skills, including listening.

This study also explored whether the current curriculum does enough to prepare them in the development of their 'soft skills,' or whether there is room for adaptations to the current modules to ensure students are getting the best chance at developing professionally and personally before going into their future careers. This is undertaken as a reflective learning task in the form of two groups from a final year cohort of a paramedic science bachelor's degree in the UK, one group undertaking a mock interview and one not. The students chose which group they were in, due to their availability on the dates the interviews were being conducted. The students then completed a questionnaire based on their thoughts, feelings, expectations and experiences and the data was then critically analysed with the provision of making recommendations for future educational practice and preparedness.

Based on a recent literature search undertaken by the author, it appears a variety of different disciplines have conducted studies on career readiness in students or junior employees. O'Meara (2012) states that the trend towards higher education and training has been linked to the evolving role of pre-hospital care and the future registration of paramedics, however, the study was based in Australia. There are several studies produced by Australian clinicians and researchers pertaining to paramedic students' career readiness and career intentions, but none found based in the UK.

There are a variety of studies that have focussed on students' transition from education to career in a variety of different disciplines such as scientist physicians, social work, law, teaching, and psychology. These disciplines have raised similar issues within students' self-awareness, students' career aspirations and their readiness to enter the working environment. Conroy (2022) focuses on the fact that despite psychology being highly popular in the USA, little is known about career support, professionalism and the preparation that is available to psychology students within higher education. Similar things can be said for the paramedic science discipline.

There are currently 56 Universities across the UK that deliver Paramedic Science (UCAS 2024) all with a generally high application rate compared to places available, therefore, like Conroy (2022) states regarding psychology, paramedic science is also highly popular within the UK, yet there have been no studies to explore students' career readiness and preparedness in soft skills. Givanti (2017) states that universities are conceptualised as places where professional knowledge is constructed to form part of clinician's academic journey and where professional characteristics are formed and professional identity and work-culture behaviours are born. This supports the high application rate for Paramedic Science degrees and provides reason as to why the application rate is high, due to the HCPC requirement of holding a BSc (Hons) degree in Paramedic Science to register as a paramedic in the UK. However, it appears there are no data or studies available regarding NQPs' career readiness within the UK. Therefore, this article aims to introduce the study of UK paramedic science students' career readiness alongside their aspirations and their development of soft skills.

Due to the recent educational change of BSc (Hons) being the entry level for registration as a paramedic, this may give answer as to why there has not yet been any in-depth research conducted into the career readiness of NQPs. Phillips (2023) conducted a study into paramedic students' resilience, mental health, and wellbeing as this is stated as poor compared to other healthcare professionals. This study will investigate whether the curricula needs to consider how to help student paramedics cope with placement experiences and provide skills to cope with paramedic role stressors once in-post.

Although this article will not be focussing upon students' well-being, it is noted that a good state of mental health and wellbeing feeds into the development and utilisation of soft skills as stated by Wang & Chen (2022) that good listening behaviour promotes the psychological security level of others. Individuals who have good listening skills are more likely to gain the trust of others, establish successful interpersonal relationships and improve work performance. Following the investigate work carried out, this article will also identify some further recommendations that can build on Phillips' (2023) proposals as to what student paramedics require in their curriculum to prepare them for the world of work.

Methodology

This study utilised a mixed methods methodology incorporating two groups of students and a survey questionnaire to collect primary data. The students were split into two groups based on students' availability. The first six were given a 'mock interview'. The mock interview group undertook a pre-planned mock interview with an ambulance service Link Tutor who obtained mock questions from their Human Resources department. The second group participated in a group with no mock interview.

All students who participated in the study were asked to complete a pre-interview questionnaire and then all participants were put through a 'real' job interview. All

participants were then asked to complete a questionnaire regarding their experience and their reflections of their career readiness. Consent was obtained by the students volunteering, and ethics were considered, however, this will be used as a learning task and evolving curriculum design, therefore, is covered by the University's protocol for Reflective Practitioner Work by Academic Staff.

The study was undertaken between 19th and 26th March 2024 and the data collection was conducted between 27th March and 9th April 2024.

Participants

Participants were final year BSc (Hons) students who were due to qualify as NQPs in June 2024. They had undertaken three years of full-time undergraduate study and had undertaken a total of 1200 hours of clinical front-line placement across the three years, with an NHS ambulance service and a paramedic mentor.

The cohort of final year students was 65 students, and all were invited to volunteer to take part in this study. A total of 12 students volunteered to be part of this study.

Across the UK, the number of paramedic science students on the programme varies from 20 – 300 with most programmes having around 60-80 students in a cohort.

To contextualise the small sample number, it is acknowledged that this is a limitation to the study. Gibbons (2012) states that studies that focus on clinical outcomes require considerably larger sample sizes than clinical research which optimises other endpoints, however, Hodge (2012) suggests the power of any study to find differences in outcome or to define important points, is determined not by the sample size, but by the number of events. Arguably, although this study does not aim to detect clinical outcomes, it does analyse the readiness of students entering a clinical role and as such is an initial, exploratory descriptive study. The sample may be small, but all students who volunteered to be involved, have all secured a job as a NQP and therefore have all been involved with ambulance service interview panels.

Results

Shown in Figure 1 are the results for the pre-interview questionnaire that all 12 participants completed prior to having mock (if relevant) and real interview, this will be referred to as 'phase one.' (Copy of the questionnaire is in Appendix A). The results from the first question in this questionnaire have been formulated into a bar chart to analyse the students' reported self-confidence in terms of being ready for both their career and interview.

Quantitative results are shown in bar and pie charts (Figures 2-4) and qualitative results are shown in tables (Tables 1 and 2) representing data from thematic analysis.

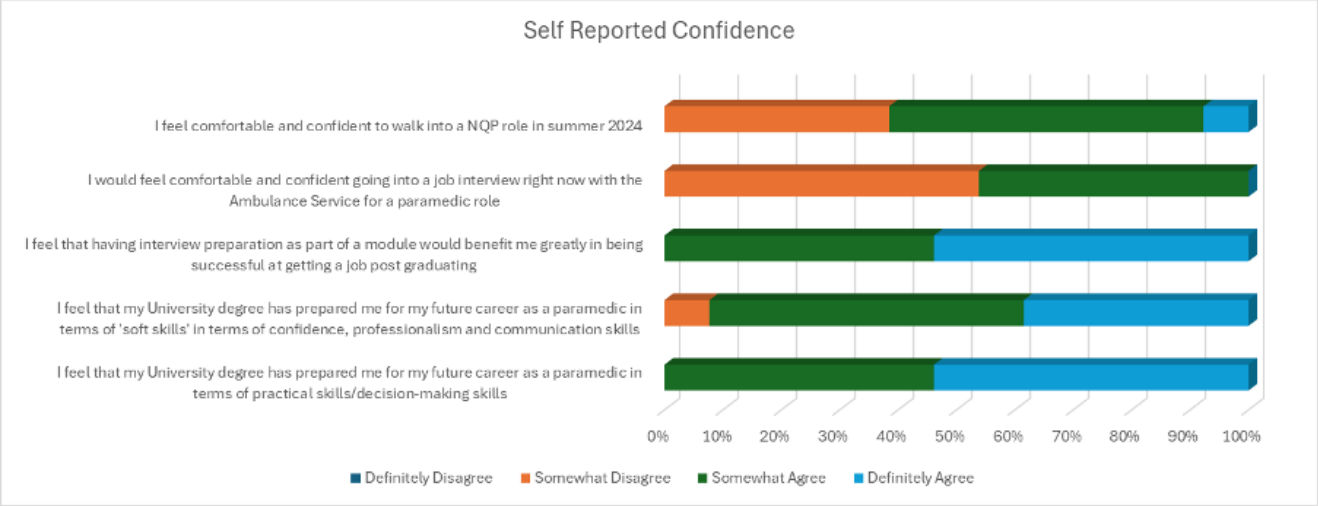

Figure 1 – Phase one, question 1 – 1.5

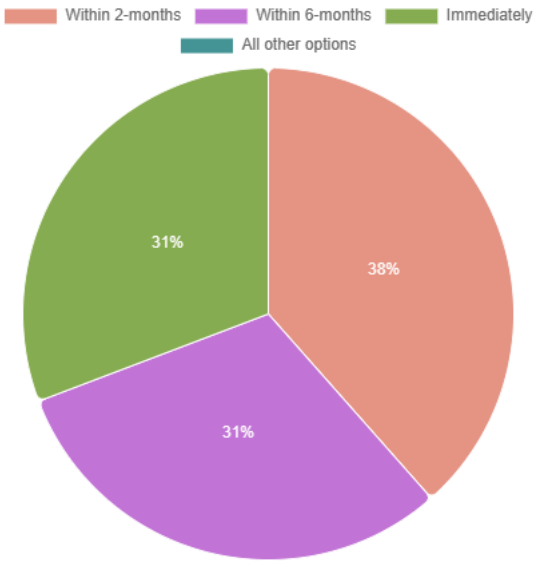

Figure 2 – Phase one, question 2- 'How long after graduating do you plan to start working as a paramedic?'

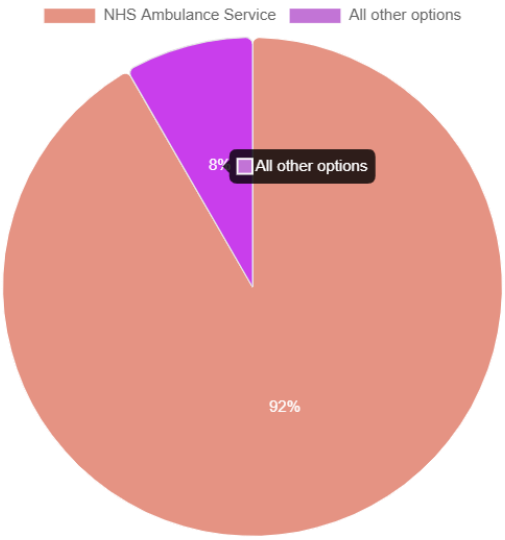

Figure 3 – Phase one, question 3- 'Where are you planning to work after you graduate?

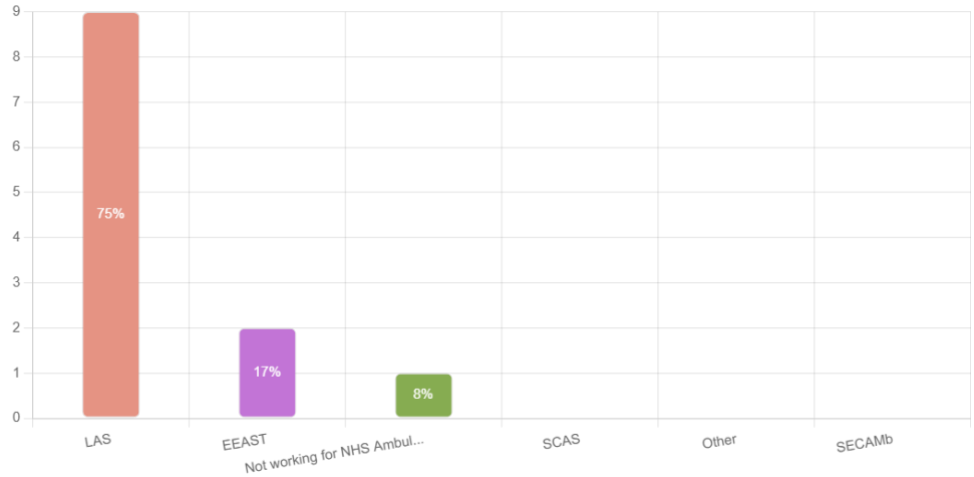

Figure 4 – Phase one, question 4- 'If you chose NHS Ambulance Service; which of the following service are you applying to?'

This result was not surprising as out of the 12 participants, 10 undertook their placements with LAS.

Alternative placements	Midwifery placements Urgent Care placement A&E placements to solidify practical skills such as cannulation
Case-based teaching	To promote more discussion in class and to get different perspectives on the case and the treatment/management.
Application process and interview preparation	To start gathering the correct documents earlier. Understanding the application process and the time it takes both to apply and to hear back. Interview preparation to get insight into what will be asked and what the expectation is.

Table 1 – Phase one - Summary of themes of question 5 'Is there anything you think you would have benefitted from either during a module or a new module that would prepare you for obtaining your future career that you have not had already throughout your degree?

Six participants stated they would have benefitted from alternative placements, *'I would have welcomed some degree of variety in roles during placements e.g., urgent care, specialised teams or even hospital, to help NQPs' explore and understand the possibilities offered by their role as well as solidify their skills.*'

Patient Assessment and Management (PAM) module	Putting theory into practice. Broad scale of assessment and management of different conditions that are seen on placement. Developing communication skills on placement.
Placements	Relationships with mentors Exposure to patients

Table 2 – Phase one - Summary of themes of question 6 'What areas of your degree (parts of modules/placements for example) have prepared you for obtaining your future career?

Seven participants stated that placements prepared them, and 6 participants stated the module PAM prepared them the most. '*PAM modules throughout all 3-years have been*

useful as they not only focus on the theory around equipment, conditions, techniques and treatment but permit for time practising in a scenario-based setting.'

Figures 5 to 10 and Tables 3 to 5 show the results from phase two. This phase is a questionnaire that all 12 participants completed post real interview (copy of the questionnaire is in Appendix B.) The first question asked which group the participant was assigned to; 'mock interview' or 'non-mock interview.' The answer to this question then triggered a branching approach into the final questionnaire.

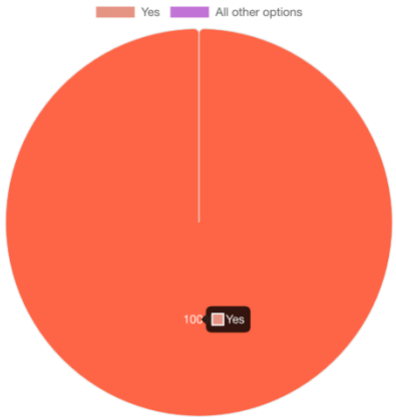

Figure 5 – Phase two, question 1 'Do you feel that having a mock interview prepared you for the real interview? (mock interview stream)

Insight to questions	Offers a chance to be prepared for giving answers in the correct format for example, scenario-based hypotheticals.
Insight to format of interview	Difference between questions i.e. protected characteristics, qualities of a paramedic compared to scenario and case-based questions.

Table 3 – Phase two - summary of how the mock interview prepared for the final interview, question 3.

6 participants commented on their anxiousness. *'It gave me an insight into potential interview questions and how I would go about answering them. It also helped to reduce some anxiousness, as I felt more prepared.'*

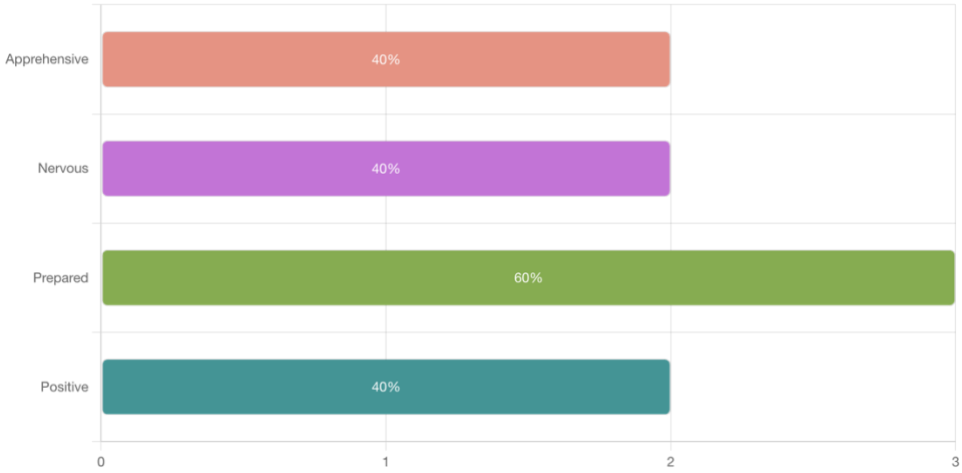

Figure 6 – Phase two, question 4 'How did you feel going into the real interview?' (mock interview stream)

Figure 7 – Phase two, question 5 'If you had to pick one aspect of the mock interview - which one benefitted you the most?' (mock interview stream)

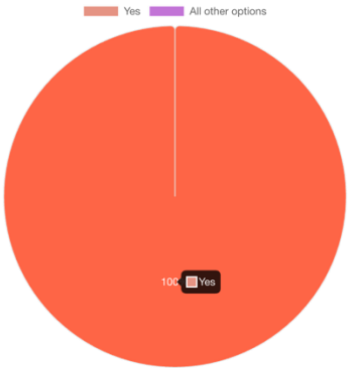

Figure 8 – Phase two, question 2 'Do you feel that having a mock interview would have prepared you for the real interview?' (non-mock interview stream)

Insight to questions	What topics/types of questions that are common within the interview
Managing emotions	Help prevent anxiety and the unprepared feeling. Would have boosted confidence.

Table 4 – Phase two – summary of why having a mock interview would have benefitted – question 3 (non-mock interview stream)

6 participants commented on feeling anxious or underprepared. '*Understanding what kind of questions there would be would help with the anxiety and feeling more prepared for the real interview. It would also improve my confidence levels to feel like I'd be more successful at interview.'*

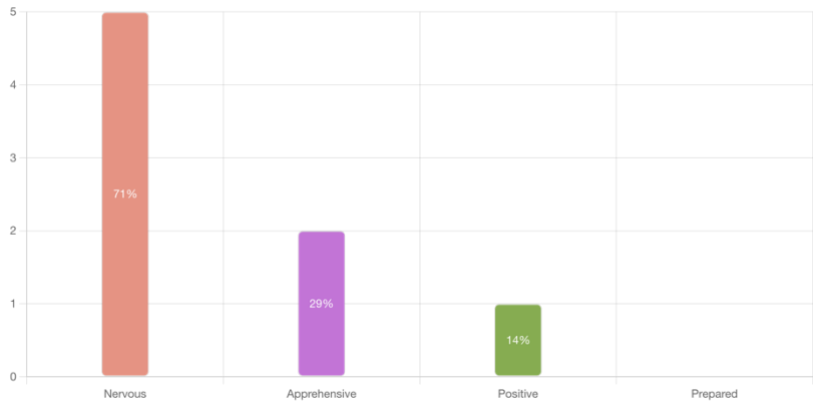

Figure 9 – Phase two, question 4 'How best describes how you felt prior to going into the interview?' (non-mock interview stream)

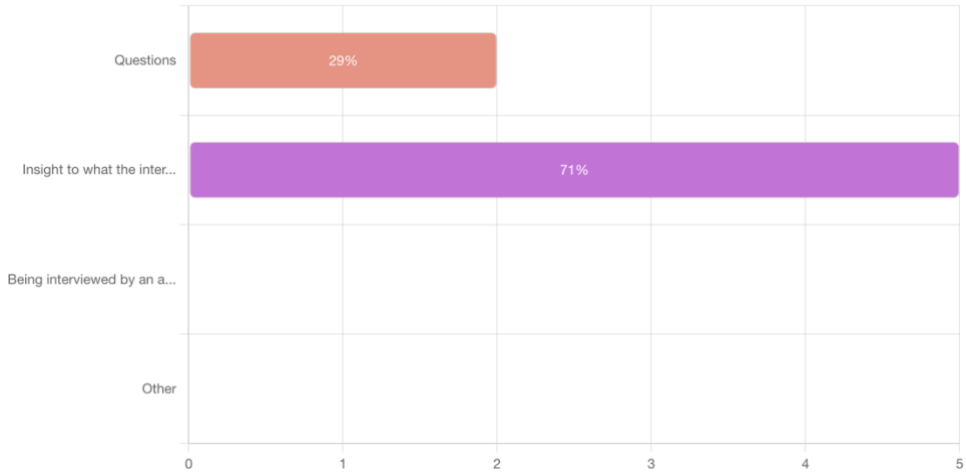

Figure 10 – Phase two, question 5 'If you had the mock interview which aspect do you think would benefit you the most? (non-mock interview stream)

Option	Count	Percentage
Included within a module	8	67%
Should be a separate module	0	0%
Should not be included at all	0	0%
Should be part of the placement module/assessed during placement.	4	33%

Table 5 – Phase two, question 6 'Do you feel interview preparation and practice should be (pick one):'

Discussion

Prior to the interview taking place, all participants were asked to complete a pre-interview questionnaire. This questionnaire set out to enquire about students' aspirations post qualification, their general feeling about how prepared they feel to enter their careers and how they feel their university course has prepared them in terms of developing soft skills ready to walk into a NQP role, either within the NHS or the wider field. Noble (2023) performed a cross-sectional survey on how well student paramedics perceive their UK pre-

registration course to have prepared them in the field. He states that the results of high confidence in paramedic students, could be due to firstly, the recent change in the paramedic education system from short model vocational courses to longer, higher education degrees. Although this study focuses on students' preparedness to deal with a specific medical condition, generally, its results show that paramedic students on degree programmes are more confident and more prepared.

Based on the pre-interview questionnaire, 54% of the participants feel they definitely agree that their degree has prepared them for their future career in terms of decision-making and practical skills, whereas 38% of the participants feel they definitely agree that their degree has prepared them in terms of confidence and soft skills such as communication and professionalism. It is recognised that Likert scales have limitations, and their validity is sometimes undermined by lack of reliability, therefore there are limitations within this article. Dolnicar (2021) states that the cost of using Likert formatted surveys is high due to generating unreliable data, cross-cultural capture response styles, limit permissible statistical methods, lengthy to complete and low test- retest reliability.

An interesting point that has come from both groups within this study, is that pre-interview anxiety is one of the biggest concerns. When asked if a mock interview helped, or would have helped, all 12 participants commented on how mock interviews would have or did help reduce anxiety and the feeling of being underprepared as often this is their first ever experience of an interview. Kosari (2021) conducted a pilot study to prepare pharmacy students for professional placement using mock interviews and states that the inclusion of mock interviews in the pharmacy curricula was found beneficial and conducive to enhance skills and confidence in career development. It is shown in the results that paramedic students believe that their skills and confidence would also benefit greatly from mock interviews being included within the paramedic curricula.

Tavares (2015) state that non-clinical attributes (soft skills) are increasingly defined as important in paramedic practice, however, the assessment of these attributes often lacks the evidence base to support it. Exploring the non-clinical attributes and clinical skills is of theoretical and practical important. Six participants stated that the practical module of PAM helped prepare them for their career the most, however, this is because of the practical elements involved. It was also noted in the results that 3 participants stated they did not feel that university helped develop soft skills such as communication and leadership and that would conclude with the above statement that non-clinical attributes are not assessed or primarily focussed on.

Participants all express that having a mock interview as part of a module or included within the curriculum would reduce anxiety, give them an insight into what would be asked of them, what the format of an interview would entail from both a clinical perspective and a non-clinical attribute perspective. Both the mock and the real interviews had questions from both perspectives. 71% of the group who did not have a mock interview felt nervous prior to

the real interview compared to 40% of the group who did. The mock interview group also had 60% who felt prepared compared to 0% from the non-mock interview group.

When asked what would have benefitted them further in obtaining their future career that they have not already had throughout their degree, half of the participants expressed alternative placement locations such as accident and emergency (A&E) or urgent care centres as opposed to just ambulance settings. Gosling (2021) states that paramedics provide care in emergencies to patients with varying ages, settings, cultures, and backgrounds and as such, a diverse skill set is needed however this is difficult to obtain at university. They also state that most placements are in hospitals or ambulance settings, but part of the diverse community are patients with special needs and disabilities and therefore students should be placed in special needs schools for exposure. However, Credland (2020) stated in her study of paramedic students undertaking alternative placements that students felt unsupported at times with professional isolation evident and barriers between interprofessional groups.

Both groups highlighted in their responses that the biggest factor that would have been or was beneficial to having a mock interview was the insight to the questions. Based on the responses in the post-interview questionnaire, it appears that having insight to the questions through a mock, decreased anxiety leading to better performance. Feiler & Powell (2016) state that considerable research has found that candidates who are anxious during job interviews, receive significantly lower scores of interview performance and therefore less likely to be hired, therefore perhaps it would be beneficial to allow interviewees an insight to the question topics prior to the interview, or include mock interviews to allow insight. Rivard (2024) backs this up by stating that pre-interview preparation should include frames of reference so that incoming information can be organised and interpreted to enhance understanding, therefore reducing anxiety, and enabling candidates to perform better and therefore being more successful.

Recommendations

The recommendations and implications from this study show that final year paramedic students feel more comfortable with interview preparation for their first post.

The implications of this brings to light the change in the curriculum that is potentially needed. Although the Paramedic Science degree is specific in its field and prepares students for the field of work both within a placement capacity whilst delivering the skills and knowledge within university teaching, there is currently nothing included within modules, or as a standalone module that prepares students specifically for the last step in their journey of transitioning from student to qualified paramedic. This could be that within a module: we as educators propose interview skills teaching, professionalism in the sense of paramedic as opposed to student professionalism.

Another alternative, to promote realism, we could add a mock interview as part of a formative assessment attached to the placement module. This would simulate a real interview that students will have with Ambulance Managers, therefore preparing them for the real thing and giving them every chance to succeed and progress into a paramedic role of their choice. With the assessment being formative as opposed to summative, this would enable students to experiment without fear of compromising a final grade.

Another alternative is to work with other stakeholders such as primary, urgent, or critical care and invite them to simulate interviews to prepare students for progression and alternative roles within pre-hospital care. This would give them the best chance to succeed and would also be a chance for these areas to promote their roles and give students an insight into what it is they need to acquire to obtain those roles.

Another recommendation from reflection and to highlight the consequences of poor career readiness and self-awareness, is to include within the placement module, examples of malpractice or serious incidents that have occurred in practice within ambulance services and ask final year students to reflect and analyse on why these took place and what sort of preparation and/or training could be done to rectify these or mitigate them in future practice.

Conclusion

This study has explored career readiness of paramedic students from higher education and whether the current curriculum does enough to prepare them in the development of soft skills such as interview techniques. It is apparent from results that paramedic students expressed a desire to have mock interviews and alternative placements included within modules to help develop soft skills such as listening and communication. However, it has also been made apparent that placements within the ambulance service plus practical modules taught at university have enabled career readiness, but it seems the gap is in the soft skills exposure. The recommendations are to include mock interviews within a placement-based module, and this is something that is available to do to help graduating paramedic students settle more easily into their future career with less anxiety and a feeling of being more prepared for both job interview and the wider world of work.

References

Brown, T. *et al* (2010) 'Listening styles of undergraduate health students', *Education for Health*, 23(3), pp.424-424.

Conroy, J. *et al*. (2022) 'Career Assistance from Psychology Programs and Career Services: Who Is Preparing Psychology Students?' *Teaching of Psychology*, 49(2), pp.144-152.

Credland, N. *et al*. (2020) 'Student Paramedic Perceptions of a Non-ambulance Practice Learning Experience', Nurse Education Today, 88. doi: 10.1016/j.nedt.2020.104374.

Dolnicar, S. (2021) '5/7-point "Likert scales" aren't always the best option: Their validity is undermined by lack of reliability, response style bias, long completion times and limitations to permissible statistical procedures', *Annals of Tourism Research,* (91). doi: 10.1016/j.annals.2021.103297.

Edwards, D. (2011) 'Paramedic preceptor: work readiness in graduate paramedics', *The Clinical Teacher*, 8, pp.79-82. doi: 10.1111/j.1743-498X.2011.00435

Feiler, A., Powell, D. (2015) 'Behavioural Expression of Job Interview Anxiety', 31, pp.155-171. doi: 10.1007/s10869-015-9403-z

Gibbons, R., Hodge, D. (2012) 'The Limitations of Small Outcome Studies', *Journal of Nuclear Cardiology,* (19)2 pp.230–232. Doi: 10.1007/s12350-012-9521-1

Givati, A., Markham, C. & Street, K. (2017) 'The Bargaining of Professionalism in Emergency Care Practice: NHS Paramedics and Higher Education', *Advances in Health Science Education,* 23, pp.353–369. doi: 10.1007/s10459-017-9802-1

Gosling, C., King, C., Williams, B. (2022) 'Becoming a better paramedic through the special needs school placement program', *Nurse Education Today*, 108. doi: 10.1016/j.nedt.2021.105181

The HCPC (2018) *New Threshold for Paramedic Registration.* Available at: https://www.hcpc-uk.org/news-and-events/blog/2018/new-threshold-for-paramedic-registration/#:~:text=New%20threshold%20applies%20from%201,'Bachelor%20degree%20with%20honours (Accessed: 28 March 2024)

Hodge, D. (2012) 'The Limitations of Small Outcome Studies', *Journal of Nuclear Cardiology,* (19)2 pp.230–232. doi: 10.1007/s12350-012-9521-1

Kosari, S. *et a*l (2021) 'RESEARCH ARTICLE: Using mock interviews to prepare pharmacy students for professional placement: Results from a pilot study', *Pharmacy Education*, 21, pp.292–297. doi: 10.46542/pe.2021.211.292297

Noble, A. *et al*. (2023) 'Raring to go? A cross-sectional survey of student paramedics on how well they perceive their UK pre-registration course to be preparing them to manage suspected seizures', *BMC Emergency Medicine,* (23), pp.119. doi: 10.1186/s12873-023-00889-5

O'Meara, P. *et al*. (2012). 'Getting in Touch with Paramedic Student Career Intentions', *Health Education Journal'*, 71(3), pp.376-385. doi: 10.1177/0017896911406962

Phillips, P. *et al* (2023) 'Who CARES? Evaluating the success of the CARES skills framework as a peer support intervention amongst paramedic students in the UK', *Emergency Medicine Journal,* 40, pp.9-10

Rivard, J. *et al* (2024) 'The effect of pre-interview knowledge and instructions on interviewer memory', *Journal of Investigative Psychology and Offender Profiling*, 1626 doi: 10.1002/jip.1626

Tavares, W., Mausz, J. (2015) 'Assessment of non-clinical attributes in paramedicine using multiple mini-interviews', *Emergency Medicine Journal, 32, pp.*70-75.

UCAS (2024) *Undergraduate Paramedic Science; Courses, Apprenticeships, Information Guides and More.* Available at: https://digital.ucas.com/coursedisplay/results/courses?searchTerm=paramedic-science&studyYear=2024&destination=Undergraduate&postcodeDistanceSystem=imperial&pageNumber=1&sort=MostRelevant&clearingPreference=None

Wang, Y., & Chen, H. (2022) 'Are human resource managers with good listening competency more likely to avoid job burnout?', *BMC public health*, 22(1), pp.246. doi: 10.1186/s12889-022-12618-x

Appendix A: Pre-Interview Questionnaire

For all research study participants

1.	Definitely Disagree	Somewhat Disagree	Somewhat Agree	Definitely Agree
I feel that my University degree has prepared me for my future career as a paramedic in terms of practical skills/decision-making skills				
I feel that my University degree has prepared me for my future career as a paramedic in terms of 'soft skills' in terms of confidence, professionalism and communication skills				
I feel that having interview preparation as part of a module would benefit me greatly in being successful at getting a job post graduating				
I would feel comfortable and confident going into a job interview right now with the Ambulance Service for a paramedic role				
I feel comfortable and confident to walk into a NQP role in summer 2024				

2.How long after graduating do you plan to start working as a paramedic? *

Immediately	Within 2-months	Within 6-months	Within 12-months	Over a year

3.Where are you planning to work after you graduate? *

	NHS Ambulance Service	Private Ambulance Service	Primary Care	Urgent Care	Other

4.If you chose NHS Ambulance Service; which of the following service are you applying to? *

LAS	EEAST	SCAS	SECAMb	Other	Not working for NHS Ambulance Service

5.Is there anything you think you would have benefitted from either during a module or a new module that would prepare you for obtaining your future career that you have not had already throughout your degree?

6.What areas of your degree (parts of modules/placements for example) have prepared you for obtaining your future career?

Appendix B: Post-Interview Questionnaire

1.Which group were you?

- Mock Interview Group
- Real Interview Group

2.Do you feel that having a mock interview prepared you for the real interview? *

- Yes
- No

3.Why yes or no?

4.How did you feel going into the real interview? *

- Apprehensive
- Nervous
- Prepared
- Positive

5.If you had to pick one aspect of the mock interview - which one benefitted, you the most? *

- Questions
- Insight to what the interview process is like

- Being interviewed by an ambulance Link Tutor in full uniform to simulate the real thing.
- None
- Other

6. If Other, please specify:

7.Do you feel that having a mock interview would have prepared you for the real interview? *

- Yes
- No

8.Why yes or no?

9.How best describes how you felt prior to going into the interview? *

- Apprehensive
- Nervous
- Prepared
- Positive

10.If you had the mock interview which aspect do you think would benefit you the most? *

- Questions
- Insight to what the interview process is like
- Being interviewed by an ambulance Link Tutor in full uniform to simulate the real thing

- Other

11.If Other, please specify: *

12.Do you feel interview preparation and practice should be (pick one):

- Included within a module.
- Should be a separate module.
- Should not be included at all.
- Should be part of the placement module/assessed during placement with a manager.

Race to Embrace: An investigation into the use of chatbots to encourage engagement with academic reading with Early Childhood students.

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Abstract:

This study investigates the explicit modelling of the use of chatbots to improve engagement with academic reading among Level 5 Early Childhood students. Employing a case study approach, this article explores how chatbots can mitigate challenges faced by students and foster more academic reading engagement. Grounded in the principles of Decoding the Disciplines, the study involves identifying bottlenecks in students' reading engagement, uncovering the mental tasks involved and modelling strategies to overcome these obstacles. Through explicit modelling, chatbots are introduced as tools for simplifying complex texts, clarifying concepts, and motivating students to engage more deeply with academic reading. Findings from student evaluations suggest that chatbots students found these helpful and that they had positively impacted on their engagement with literature.

While acknowledging limitations such as the small sample size and potential confirmation bias, the study emphasises the importance of institutional change and mindset shifts towards AI integration in higher education. Recommendations include promoting ethical and responsible AI use, and systemic leadership that embraces innovative pedagogical approaches. Overall, the integration of AI, particularly chatbots, presents promising opportunities for adaptive teaching and learning practices, which could enhance student engagement with academic reading in higher education.

Introduction

This article seeks to explore ways in which Artificial Intelligence (AI), specifically the use of chatbots, might be used to help students engage more with academic reading. Barnett and Bengtsen (2017) suggest if there were a single word that would invoke the essence of a university it would be ‘knowledge’. Barnett and Bengtsen (2017) contend that the creation of knowledge might be summarised as ‘research’ while the understanding of knowledge might be translated as ‘teaching and learning’. Scott (2002) maintains that we cannot separate teaching from researching, and Jenkins, Healey and Zetter (2007) contend that the process of engaging with research helps them to unravel the increasing complexities that exist in the modern world. This suggests that there is a symbiotic relationship between research and teaching, and that one informs the other. As an academic tutor, I believe that an integral part of my role is to encourage students to develop their knowledge and understanding through academic reading, where they can benefit from the transmission of knowledge from experts in the field which in turn enables them to make applications to both their professional and personal lives.

With this in mind, I noticed that my Early Childhood Level 5 student cohort had limited engagement with academic reading and appeared to lack confidence in expressing their views and supporting these from their wider reading. This concerned me because I fundamentally believe that through 'research', the interrogation of literature generates new knowledge as well as building on existing knowledge and understanding. The engagement with academic reading is important for these students not only for their academic writing and assignment submissions, but also to provoke more curiosity about their subject as they continue their journey towards being experts.

It seemed that most of the cohort seemed 'stuck' and were struggling to apply theoretical concepts to their practice-based activity. Moreover, this cohort face challenges in their academic journey, with a large proportion from ethnic minority groups, travelling long distances and who are the first in their family to attend university. A significant proportion have study needs agreements and are multi-language learners. In order to understand the benefits and limitations of using chatbots for academic reading, the literature review was focused primarily on the use of chatbots in Higher Education and a range of peer reviewed articles, starting with a meta systematic review (Bond et al., 2024), and since this is a fast-moving topic, included some podcasts from experts in the field such as Leon Furze and Autumn Caine.

The aims of this research project sought to provide insight into what some of the challenges the students face in engaging in academic reading and how these might be addressed using AI, specifically chatbots. I have therefore taken a case study approach where I have explored how chatbots might help students overcome some of the challenges they face when engaging with academic reading. Taking a qualitative approach, I asked the following research questions:

In what ways could the explicit modelling and encouragement of using chatbots support students to:

- Engage more with peer reviewed academic texts?
- Develop more confidence with using this in their assignment writing?

Method

My small-scale research project took a case study approach with 17 Early Childhood students who were in their second year of study. Since I am primarily interested in their perceptions, I took a qualitative approach and have compared the students' initial responses to questions about their academic reading with their perceptions after they had had some suggestions of ways to use chatbots to help them engage with reading.

My first step was to find out what was causing the difficulties with academic reading. Middendorf and Pace (2004) stress the need for academic staff to become more intentional

about unpicking ways that students learn. Coming from a teaching background, this ought to be obvious to me, and might assume some enlightened pedagogical attitudes towards teaching and learning. Yet on reflection, I have concluded that despite my professional background I found myself sadly lacking in any real interrogation of what the obstacles were for that cohort of students. I also made some classic assumptions such as 'well, if they are at university, they should be able to access more complex academic reading'. If we refer to the opening ideas about knowledge acquisition, this response is limiting because without some intervention, the students were not being enabled to develop new ideas through grappling with more complex materials, nor benefitting from research done within their field which might enhance their practice.

While considering the importance of academic reading, I was convinced by the work of Meyer and Land (2003) on threshold concepts. The term 'threshold concept' is used to describe an opening or gateway to something that was previously inaccessible. This resonated because I felt that some threshold concepts such as 'autonomy' and 'self-determination' in relation to young children were not being applied in class discussions. Furthermore, reading activities that were being set were not being completed. Although academic reading does not guarantee that they will encounter a threshold concept, it could be argued that without exposure to theory or research into Early Childhood denies them the opportunity of encountering ideas that will enable a deeper understanding of concepts relating to their field. And without encountering it, they cannot overcome it. Meyers and Land (2003) outline the benefits of threshold concepts as being 'transformative', enabling a significant shift in understanding; irreversible which facilitates the embedding of new ideas; and integrative which facilitates the links and connectedness between ideas.

I found the Decoding the Disciplines Model an extremely helpful guide (Figure 1, Middendorf and Pace, 2004: 3). Decoding the Disciplines exposes the subconscious mental processes that teachers may take for granted and therefore may not explicitly teach these in a way that is helpful for students. These seven steps enable HE academics to identify the specific barriers to learning for students by providing a systematic framework. I have used this model as a framework for my project and focused specifically on steps 1-3:

1) What is a bottle neck to learning in this class?

2) How does an expert do these things?

3) How can these tasks be explicitly modelled?

Figure 1.1 Decoding the Disciplines: Seven steps to Overcome Obstacles to Learning

Identifying the bottleneck Step 1

Having examined my students' assignments I noticed that there was limited engagement with academic reading, and in particular accessing peer reviewed journals. Instead, they would use websites or would refer only to familiar sources, such as curriculum guidance published by the Department of Education. I was interested in finding out from the student's perspective what their perceptions were of academic reading and what they saw as barriers or challenges to accessing academic reading and using this in their academic activities. Middendorf and Shopkow, (2017) acknowledge that there are sometimes unrealistic expectations by lecturers that students should just know how to tackle certain tasks in an HE context, and they recommend taking a proactive approach. They describe a situation where a student simply cannot move their learning on as a 'bottleneck'; a metaphor that refers to a stage in the learning process where progress becomes limited or restricted, like how liquid flow is constrained in a narrow-necked bottle.

Middendorf and Shopkow (2017) recommend that in Step 1 lecturers or teachers identify commonalities amongst students in mastering tasks that are considered necessary for their progress.

I asked the students to respond to an anonymous survey to describe how they approach academic reading and to identify any barriers to this. Their responses can be summarised as follows:

- Difficulty understanding the complexity of academic language
- Length of the reading in relation to time constraints and concentration spans
- Unfamiliar concepts or terminology

Step 2: Uncovering the mental task

This step involves unpicking the process to which someone who is an expert might perform this task. For example, an experienced driver will drive automatically and does not need to specifically think through each step until it comes to a point when they need to teach someone else. When applied to the engagement of academic reading I realised that most subject-related threshold concepts have become familiar to me over time and do not cause me difficulty in understanding. I have also built up a reasonable academic vocabulary and I have developed a certain amount of stamina for academic reading. I found retracing my own steps in how I have overcome some of the challenges in academic reading more complicated than I expected because this has become so automated over time.

Middendorf and Pace (2004) acknowledge that this metacognition is often the most challenging because this forensic disentangling of our own thought processes requires a methodical and disciplined approach. To overcome this, I made explicit steps for the students to follow to proceed through the bottle neck. Each week I presented the students with a peer-reviewed academic journal that was relevant to the session we are covering. Together we looked at it and exposed some of the issues that might cause difficulty. Were there particular sections, words or phrases that were unfamiliar or challenging? Did it feel overwhelmingly long? Were there unfamiliar theories or concepts within it that would require further explanation or examination?

Step 3: Model task

This step focuses on the demonstration of the mental action that will help students to overcome their bottleneck (Middendorf and Shopkow, 2017). In this case, barriers to reading engagement. At this point I decided to provide students with the tools to do this independently using readily available AI tools.

Taking a specific journal, I modelled how to make the reading more accessible through the use of chatbot tools that the students can easily access. Examples of this are:

- Simplify a paragraph of complex text within a journal.

- Writing a paragraph from their reading and asking ChatGPT to ask questions about it to clarify and refine their thinking.
- Help clarify concepts and foster a deeper understanding.
- Help them locate journals which are likely to have articles on a particular topic.
- Summarise a lengthy article that feels overwhelming.
- Engaging in 'conversations' and question and answer sessions about particular topics or concepts.

In undertaking this process, sometimes new bottlenecks emerged, such as how to take the information presented in a chatbot and make it their own, and more importantly, avoid going down the road of academic misconduct. This created some interesting discussions which meant sometimes returning to steps one and two and looking at ways of resolving the issues. Interestingly, in his later work Pace (2021) concedes that criticism has been levelled at the Decoding paradigm for its linear approach and recommends that instead it should be viewed in a more dynamic way, where steps may loop back to an earlier stage.

Chatbot tools

At this point in the discussion, it is helpful to understand how chatbots work. In simple terms, they imitate human language structures and can therefore interact with us in a conversational way. So, for example you could ask: '*please can you explain the term existentialism in one sentence as if I were a 12-year-old'?*

Whereupon it will respond with:

> '*Existentialism is like thinking about how we make choices and find meaning in our lives, believing that each person is responsible for their own actions and decisions'.*

Chatbots can scan a diverse range of different internet text, which helps them to cover a wide range of topics and respond appropriately in different situations.

In their meta systematic review of Artificial Intelligence (AI) in higher education Bond et al. (2024) identify 12 benefits for students using AI in an HE context. One that is relevant to this study is that it can improve student engagement by providing interactive and adaptive learning experiences. Chaka (2023) examines a range of existing case studies, and research papers concludes that HE institutions cannot afford to ignore the impact of AI and should no longer take a universal approach to teaching and learning. He makes the point that AI offers the opportunity for a more personalised approach. What is particularly interesting to me, working in a widening participation university, is that Alotaibi and Alsheri (2023) examined the opportunities and challenges that arise from explicit use of AI in Saudi Arabia's higher education institutes. They argue that AI can also level the playing field by providing

disadvantaged students a cheap and accessible way to engage with learning experiences that might otherwise seem daunting. In their study, they highlight that universities play an important part in making societies more sustainable and in promoting social justice. They therefore contend that universities should be integrating AI into habitual content delivery to improve educational experiences as well as preparing students for future challenges within the workplace.

Clearly there are a number of concerns that have been raised such as data security, and the risk of over-reliance on technology (Ifelebuegu, lulume and Cherukut ,2023). Crawford et al. (2023) in their commentary on the ethical use of chatbots, acknowledge the challenges AI has on academic integrity, but they stress that the benefits on student well-being outweigh the risk. They argue however, that there is a clear need for systematic leadership from within universities to cultivate supportive learning platforms for students which can embrace the use of AI. To do this effectively, they recommend cultivating a sense of moral character where the teacher models continuous self-awareness and ethics.

Findings

Having carried out the activities in sessions I gave the students an evaluation survey to complete to determine the extent they found the use of chatbots helpful and if they will continue to use it to engage more with their academic reading. The survey was sent to 17 students and 12 students responded and this summary is as follows:

- 100% of students felt that using chatbots enhanced their understanding of reading material.
- 75% thought that it helped clarify confusing concepts.
- 75% thought that they were more motivated to engage with reading material.
- 58% felt that it facilitated the generation of new ideas or insights to the reading material.
- 83% would recommend using Chatbots as a reading aid to other students.
- 83% thought it likely that they would continue to use chatbots for reading assistance in the future.

Comments from the students indicate that they found that using chatbots helped them to understand more complex materials. Two students explain:

> *"It really helped simplify articles, ensuring they were relevant to the topic and inspired further ideas".*
>
> *"It was quite good at helping me understand any confusing texts and finding key points that are related to my assignment".*

There was also the suggestion that using chatbots may help students to feel less overwhelmed by the volume or length of the reading, for example:

> *"I feel like chatbots really helped me because I used to get very overwhelmed when it came to reading but now with the chatbots they summaries[sic] it for me and it becomes a lot less overwhelming".*

And students also found that using chatbots helped them to refine their thinking, as two students describe:

> *"It helps to clarify and extend my points at times when struggling for how to articulate my ideas to paper".*

> *"It has improved my academic writing as I am now able to critically analyse and evaluate my points in my writing".*

Limitations

Clearly there are limitations with this study. It is very small, and there is the potential for confirmation bias with the students reporting more positive results because they have invested time in the process and they might want to support me, as their lecturer, knowing that I will be hoping for a positive impact. Nevertheless, it opens the door for further conversations to be had about the role of AI in an HE context.

Discussion

There is a wider discussion to be had and this is around institutional change. More specifically, mindset change around the use of AI in academic institutions. My literature review indicates that there is consensus that AI is here to stay and will only become more sophisticated and powerful Bond et al.,2024; Rudolph, J., Tan, S. and Tan, S., 2023; Bali et al., Popenici, & Kerr, 2017; Cotton, D., Cotton, P. & Shipway, R., 2024; Ifelebuegu, A., Kulumu, P. and Cherukut, 2023). However, within this, there are those who believe that AI will result in academic corruption and intellectual degeneracy. For example, concern has been raised that AI might corrupt human behaviour (Kobis, Bonnefon & Rahwan, 2021), for example by making cheating easier. Chapman and Lindner (2016) raise an interesting point that the use of AI can disrupt the personal satisfaction of overcoming difficulties through personal effort while Autumn Caines (2023) in her blog diverts our attention from the narrative of cheating to what he argues is a wider concern about legal issues and intellectual property.

Luxmi et al. (2023) highlights compliance with moral and ethical requirements as the biggest challenge to the use of AI and stresses the need for algorithms to be transparently designed. They draw attention to the recent criticism of Twitter when it was exposed that certain algorithms were generating gender and racial biases. Within the Hertfordshire university context, this is a pertinent consideration, since three priorities of the university are to actively strengthen and value diversity and inclusivity of our community, for graduates to be

professionally able, and to grow international recruitment (University of Hertfordshire, 2020). If AI algorithms are based on existing stereotypes within society, there is a risk that using AI tools such as chatbots may inadvertently disadvantage the groups of students we are aiming to encourage. Therefore, digital literacy training and support within the university for teachers must also include robust ethical guidelines that include addressing some of these more complex challenges.

Like other researchers in the field Popenici and Kerr (2017) remind us that Artificial Intelligence is developing at an accelerated pace which is having a significant impact on Higher Education and that while AI cannot replace the role of teachers, they certainly go some way to imitate them. This can be helpful, particularly for wider participation universities and those who are looking to recruit from a diverse pool of international students. While they are not suggesting that AI is a superpower and embraced without jeopardy, they acknowledge that universities need to rethink their pedagogical responses to AI and embrace the complexities inherent therein (ibid).

The wider body of literature recommends that AI can be used creatively and for the greater good of the students but that it requires leadership and explicit modelling so that the students learn to use AI ethically, responsibly and with criticality as a life-long skill (Bond et al. 2024; Rudolph, Tan and Tan 2023; Bali et al., 2023; Ifelebuegu et al.,2023; Cotton, Cotton & Shipway, 2024). Furthermore, academics are able to access some innovative resources such as Harvard University's Pedagogy Project and Leon Furze's free assessment booklet can help them to develop assessments to make use AI. At the very least module leaders need to steer assessments towards tasks that require presentation-style submissions or ones that have a clear application to practice. Mathias and John (2024) recommend this as a way of evaluating students' genuine understanding and application of knowledge rather than written essays where the misuse of AI can end up with students committing academic misconduct.

There is also the matter of change resistance. To quote a colleague, there was a time when people were suspicious of calculators, believing that it would result in the erosion of our human brain capacity. Collini (2017) suggests that in defining the role of the Higher Education sector there might be an element of nostalgic 'hand wringing' accompanied by some resistance to change. Moreover, he suggests that ignoring the fundamental drivers within the workplace is short-sighted and chatbots are used widely within most employment sectors.

Recommendations

- Higher Education institutions need to embrace AI to enhance learning; rather than adopting a fight, flight or freeze approach. This may include a mindset change whereby AI is seen more positively and not simply as a threat. The findings of this study suggest

that integrating AI tools such as chatbots can significantly enhance student's engagement with academic reading.

- There also needs to be a systemic shift within the HE culture accompanied by systematic leadership to cultivate supportive learning platforms that can guide teachers how to use AI effectively with students.
- Ethical and responsible use of AI should be actively promoted whereby students learn to use it critically as a lifelong skill while avoiding academic misconduct and intellectual property issues.
- Academic tutors adopt authentic assessments, or those that require students to engage critically with AI, as well as being transparent and offering a clear audit trail of any AI applications within their assignments.
- Decoding the disciplines as a framework is a helpful way of unpicking some barriers to learning through the identification of bottlenecks and continued pedagogical reflection is crucial. By engaging in critical reflection on teaching practices HE teachers can consider how to address barriers and challenges by using innovative methods such as the integration of AI platforms.

Conclusion

In conclusion, the integration of AI, particularly chatbots, has the potential to revolutionise teaching and learning in higher education by addressing challenges related to academic reading engagement. The finding also suggests that students need to be explicitly shown how to use chatbots effectively and this could have positive impacts on their learning and enable them to overcome challenges when encountering complex or overwhelming reading material. The University of Hertfordshire Graduate Attributes are the skills and qualities students should develop during their time at university and one of these is to be digitally capable and confident which includes having a positive attitude towards the change that technology brings (University of Hertfordshire, 2024). In the light of this, as AI continues to evolve and become more sophisticated, it is crucial that students are equipped with the skills to critically engage with AI tools such as chatbots as a life skill. This requires a concerted effort from educators, including university leadership, to embrace AI responsibly and ethically. This may mean changing mindsets and creating more relevant and inclusive practices to enable our students to be successful in an increasingly digital and AI-driven world.

References

Alotaibi, N.S. and Alshehri, A.H., (2023) 'Prospers and obstacles in using artificial intelligence in Saudi Arabia higher education institutions—The potential of AI-based learning outcomes'.

Sustainability, *15*(13), p.1-18 Available at: https://www.mdpi.com/2071-1050/15/13/10723 (Accessed 13.04.24)

Bali, M., Mills, A. and Eaton, L., (2023). 'How do we respond to generative AI in education? Open educational practices give us a framework for an ongoing process'. *Journal of Applied Learning and Teaching*, *6*(1), pp.16-30. DOI: https://doi.org/10.37074/jalt.2023.6.1.34

Barnett, R. (1993) 'Knowledge, Higher Education and Society: a postmodern problem', *Oxford Review of Education*, 19(1), pp. 33–46. [Online] Available at: https://www.tandfonline.com/doi/epdf/10.1080/0379772920170309?needAccess=true (Accessed 13.04.24)

Barnett, R. and Søren Bengtsen. 2017. "Universities and Epistemology: From a Dissolution of Knowledge to the Emergence of a New Thinking" Education Sciences 7, no. 1: 38. https://doi.org/10.3390/educsci7010038

Bond, M., Khosravi, H., De Laat, M., Bergdahl, N., Negrea, V., Oxley, E., Pham, P., Chong, S.W. and Siemens, G. (2024) 'A meta systematic review of artificial intelligence in higher education: a call for increased ethics, collaboration, and rigour', *International Journal of Educational Technology in Higher Education*, 21(1), pp. 4–41 Available at: https://link.springer.com/article/10.1186/s41239-023-00436-z (Accessed 13.4.24)

Caines, A. (July 19, 2023) 'Looking for ChatGPT Teaching Advice? Good Pedagogy is Nothing New' [online blog] Available at: https://autumm.edtech.fm/2023/07/19/looking-for-chatgpt-teaching-advice-good-pedagogy-is-nothing-new/?subscribe=pending#subscribe-blog-blog_subscription-2 (Accessed 18.04.24)

Chaka, C. (2023). Fourth industrial revolution—a review of applications, prospects, and challenges for artificial intelligence, robotics and blockchain in higher education. *Research and Practice in Technology Enhanced Learning*, *18*, 2. https://doi.org/10.58459/rptel.2023.18002

Chapman D. & Lindner S. (2016) Degrees of integrity: the threat of corruption in higher education, *Studies in Higher Education*, 41:2, 247-268, Available at: https://www.tandfonline.com/doi/full/10.1080/03075079.2014.927854 (Accessed 13.04.24)

Collini, S., (2017) *Speaking of universities*. London: Verso Books.

Cotton, D., Cotton, P. & Shipway, R. (2024) Chatting and cheating: Ensuring academic integrity in the era of ChatGPT, Innovations in Education and Teaching International, 61:2, 228-239, DOI: 10.1080/14703297.2023.2190148

Crawford, J., Cowling, M. and Allen, K.A., (2023) 'Leadership is needed for ethical ChatGPT: Character, assessment, and learning using artificial intelligence (AI)'. *Journal of University*

Teaching & Learning Practice, *20*(3), pp.1-19 Available at: https://ro.uow.edu.au/cgi/viewcontent.cgi?article=3180&context=jutlp (Accessed 13.04.24)

Harvard University (2024) AI Pedagogy Project Available at: https://aipedagogy.org/

Furze, L. (2024)Rethinking Assessment for GenAI (a free booklet) Available at: https://mailchi.mp/leonfurze/assessment (Accessed 29.7.24)

Ifelebuegu, A., Kulumu, P. and Cherukut P. (2023) 'Chatbots and AI in Education tools: The good, the bad and the ugly' Journal of Applied Learning and Teaching 6(2) pp.332-345 Available at: https://journals.sfu.ca/jalt/index.php/jalt/article/view/1057 (Accessed 9.3.24)

Jenkins, A., Healey, M. and Zetter, R., (2008). Linking teaching and research in disciplines and departments [Online] Available at: chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/https://edshare.soton.ac.uk/349/1/LinkingTeachingAndResearch_April07.pdf (Accessed 29.07.24)

Köbis, N., Bonnefon, J. & Rahwan, I. (2021). 'Bad machines corrupt good morals'. *Nature Human Behaviour*, 2021, 5 (6), pp.679-685

Luxmi, D. Mukhtiar, N., Chowdhry, B. and Newe, T. (2023) "Ethical Dilemmas and Privacy Issues in Emerging Technologies: A Review" SENSORS 23 (3)1151. Pp.1-18 https://doi.org/10.3390/s23031151

Matheis, P. and John, J.J., 2024. Reframing assessments: Designing authentic assessments in the age of generative AI. In *Academic Integrity in the Age of Artificial Intelligence* (pp. 139-161). Available at: https://www.igi-global.com/chapter/reframing-assessments/339223

Meyer, J. & Land, R. (2003) 'Threshold Concepts and Troublesome Knowledge: Linkages to Ways of Thinking and Practising within the Disciplines'. *Enhancing Teaching-Learning Environments in Undergraduate Courses* [Online]. Available at: https://citeseerx.ist.psu.edu/document?repid=rep1&type=pdf&doi=b98202852dc631ced19a98414cbd9e9461c10417(Accessed 13.04.24)

Middendorf, J. and Pace, D. (2004) Decoding the disciplines: A model for helping students learn disciplinary ways of thinking. New Directions for Teaching and Learning, 2004: 1-12. [Online] Available at: https://onlinelibrary.wiley.com/doi/epdf/10.1002/tl.142?saml_referrer (Accessed 13.04.24)

Middendorf, J., & Shopkow, L. (2017) Overcoming Student Learning Bottlenecks: Decode the Critical Thinking of Your Discipline, Taylor & Francis Group, Oxford. Available at: https://ebookcentral.proquest.com/lib/herts/detail.action?docID=5210128#

Pace, D. (2021) 'Beyond Decoding the Disciplines 1.0: New Directions for the Paradigm. Teaching and Learning Inquiry 9(2) pp 2-27[Online] Available at:

https://journalhosting.ucalgary.ca/index.php/TLI/article/view/70043/55097 (Accessed 13.4.24)

Popenici, S., and Kerr, S. (2017)'Exploring the impact of artificial intelligence on teaching and learning in higher education.' *RPTE* 12, 22 (2017). pp. 1-13 Available at: https://rdcu.be/dEEdR (Accessed 13.04.24)

Rudolph, J., Tan, S. and Tan, S., (2023) 'War of the chatbots: Bard, Bing Chat, ChatGPT, Ernie and beyond. The new AI gold rush and its impact on higher education'. *Journal of Applied Learning and Teaching*, *6*(1). DOI: https://doi.org/10.37074/jalt.2023.6.1.23

University of Hertfordshire (2020) Our Strategic Plan[Online] Available at: https://www.herts.ac.uk/about-us/our-leadership-strategy-and-plans/our-strategy-vision-and-culture/shaping-our-strategy (Accessed 18.4.24)

Scott, P. (2002) A lot to learn: we are all researchers now, Education Guardian, 8 January, 13. Available at: https://www.theguardian.com/education/2002/jan/08/highereducation.uk1 [Accessed 29.07.24]

University of Hertfordshire (2023) *Graduate Attributes* [Online] Available at: https://www.herts.ac.uk/ltaq/learning,-teaching-and-academic-quality/home/learning-and-teaching/curriculum-design/graduate-attributes (Accessed 18.4.24)

Is Blended Learning Perceived as Effective in Undergraduate Nursing Education in The United Kingdom

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Abstract

Applications to study nursing in the United Kingdom (UK) are on the decline therefore more needs to be done to improve accessibility to university programmes. Blended learning is an approach which integrates face-to-face learning with online teaching. This approach could improve accessibility and therefore encourage more nursing applications. The objective of this study was to ascertain what student nurse's perceptions are of a blended learning approach in undergraduate nursing education. A systematic literature review was conducted using both quantitative and qualitative research. Inclusion and exclusion criteria were set and adapted due to initial search results not discovering any UK based research. Questionnaires and focused discussions were used in the studies.

Four pieces of global primary research were used yielding a combined study population of 862 students. Overwhelmingly all students welcomed blended learning to nursing education. Themes identified included improved confidence and perceived competence. Engaging material and the need for tutor presence. Barriers included access to information technology (IT) equipment and internet connectivity. Blended learning is perceived as an effective approach to delivering undergraduate nurse education.

Introduction

It is primarily universities across the world such as those in China, India, and Finland that train nurses and it remains common for these settings to depend upon the traditional approaches used to ready student nurses for clinical practice (Betihavas *et al*, 2016). The global Covid-19 pandemic since 2020 has forced universities around the world to adapt their delivery methods of educational material (Watson *et al*, 2022) and the subsequent changes has seen greater focus on using technology in pedagogy to overcome the ever-increasing societal changes.

The Royal College of Nursing (RCN, 2023) reported the continued decrease in the number of applicants to nursing courses in the United Kingdom (UK) along with record levels of nurses either leaving the profession or taking time away from their roles due to ill health has led to critical shortages. The RCN urged the UK government to address the decline in student nurse's applications of which were negative perceptions of traditional teaching methods used in Higher Education. Health Education England (HEE, 2020) acknowledged that more should be done by universities to improve accessibility to nursing education as numbers of applications to train as a nurse were decreasing. They suggested that by introducing blended learning to nursing courses Health Education England hoped a greater number and

a more diverse set of applicants would be enticed to study nursing. This included potential students who must balance their study with other commitments such as being a carer or having a young family. HEE also identified the need to attract students who could only study remotely (HEE, 2022).

Blended learning is not a new pedagogical concept and was defined as a 'formal education programme in which a student learns at least in part through online delivery of content and instruction with some element of student control over time, place, path and/or pace; and at least in part at a supervised bricks and mortar location away from the home' (Staker and Horn, 2012). By integrating both technological and face-to-face interactions blended learning utilises technology enhanced learning experiences, such as online lectures, video tutorials and quizzes with the more traditional face-to-face method of delivery, including classroom-based sessions and seminars (Bliuc *et al*, 2007; Jowsey *et al*, 2020; McGarry *et al*, 2015).

Methodology

This article reviews four studies which were obtained from the following five electronic databases: CINAHL plus, EBESCO, ERIC, MEDLINE and Pub-Med Central. Initial searches focused solely on including research published within the United Kingdom (UK) in the past seven years to explore student perceptions of blended learning both pre and post the Covid–19 pandemic, thus ensuring the research was current. Search data using keywords, phrases and synonyms were used (Table 1) and the results were collated, and an edited version is listed Table 2). The abstracts, dates, locations, and titles of potential sources were reviewed, resulting in an absence of any research which complied with initial inclusion criteria. It is important to establish appropriate inclusion criteria to ensure there is a satisfactory balance between safeguarding a robust study and being confident in applying the findings to the wider population (Connelly, 2020). To support the findings of the searches, in April 2024 the University of Hertfordshire's Library Team conducted advanced searches on the authors behalf. These searches also found a lack of UK based research, as they could not locate any relevant material.

Table 1: Keywords and synonyms

Student Nurses	Perceptions	Blended learning	Nursing education
Undergraduate nurses	Beliefs	Blended teaching	Higher Education
Trainee nurse	Opinions	Mixed method teaching	University
Preregistration	Views		United Kingdom
	Understanding		Great Britain
	Attitudes		
	Thoughts		
	Experiences		
	Feelings		
	Impression		
	Judgement		
	Knowledge		
	Sense		
	Viewpoint		
	Approach		
	Effectiveness		

Table 2: Initial search results

Database	Keywords	Initial results	Limits applied	Limited results
CINAHL plus	Student nurse OR undergraduate AND blended learning AND perception	26,448	<7 years old UK based research only	0
MEDLINE	Undergraduate Nurs* AND online lesson AND opinion	5	<7 years old UK based research only	0
Pub-Med Central	Undergraduate nurse AND views AND blended learning	238	<7 years old UK based research only	0
ERIC	"Preregistration nurse" AND attitudes AND blended teaching	0		
EBESCO	Trainee nurse AND feeling AND blended	1	UK based research only	0

Due to the disappointing preliminary findings, it was concluded that further searching was required, with expanded inclusion criteria. The geographical boundaries were widened using the same five electronic databases to search for studies which had been completed within the seven-year time frame to include countries with similar lengths of degree courses for student nurses to the United Kingdom (McKenna *et al.,* 2023; National University of Singapore, n.d.; Thapa, 2024; Think Education, n.d.). Again, the abstracts and titles of potential sources were reviewed, and four studies were finally chosen, these were located in Asia and Australia and were conducted within the previous seven years.

The Problem, Intervention and Outcome (PIO) model was chosen as a research strategy, which is a variant of the Problem, Intervention, Comparison, Outcome (PICO) model, because it is widely utilised when conducting a systematic review (Frandsen *et al*, 2020). It's three-part structure: Problem/Population/Patient, Intervention/Issue and Outcome was used to formulate a focussed question and to search for exact answers.

- *P – Problem/Population/Patient.*

  A recent survey by the British Broadcasting Corporation (BBC, 2023) found that 72% of universities in the United Kingdom are not offering blended learning.

- *I - Intervention/issue.*

  Student perceived effectiveness of blended learning in undergraduate nursing programmes.

- *– Outcome.*

  What are the perceptions of student nurses regarding blended learning? Are there any identifiable themes and what recommendation(s) could be made.

Following this process formulated the research problem of 'what are student nurse's perceptions of a blended learning approach in undergraduate nursing education.'

Both qualitative and quantitative studies were used in this review. Only using secondary research meant that ethical approval was not required, however ethical approval demonstrates protection for participants and the researchers and by obtaining ethical approval the researcher can demonstrate adherence to recognised standards (University of the West of England, 2024). Therefore, only studies who have provided confirmation of appropriate ethical approval have been used. All references sourced were managed using the Zatero reference management software.

Presentation of Findings

O'Reilly *et al*'s (2020) study in Australia invited 1161 student nurses, across four campuses located in one large university in Western Sydney to complete a survey providing their perception of the effectiveness of blended learning in building self-efficiency and nursing numeracy skills. The study used three open-ended questions. The surveys were completed by first year student nurses with 525 participants providing qualitative responses. There were four main themes and two sub themes which came from the study:

Themes and sub-themes
Theme 1: Self-realisation •Investment of time and energy in the learning resources •Relevance of numeracy to clinical practice. Theme 2: Practice, practice, practice Theme 3: Boosting confidence Theme 4: Wanting More

O'Reilly *et al* (2020, p.3)

Self-realisation was defined in this study as the participants' belief of fulfilling the total potential of one's capabilities, this was evidenced in the reflections of student numeracy competence. There were two areas of self-realisation that were emphasised by participants, the first related to the realisation that investing time and energy was required to enhance numeracy skill development.

The improvement of self-efficacy that students testified as a result of engaging with the online material, quizzes and tutorials was linked to aiding exam preparations as they highlighted the areas needed focus. However, a small number of participants noted that some self-directed material was difficult to understand without explanation from tutors.

> *"please p*rovide more resources that are not so complicated to gain more confidence" (#212)
>
> "A lot of information & resources were given on vUWS [Blackboard], however how does this help if we are doing the questions ourselves? We need clarification." (#433)

O'Reilly *et al* (2020, p.4)

To further build self-efficacy in numeracy, students acknowledged that they needed to apply and consolidate through practice. The flexibility which blended learning provided, was believed to be valuable to the development and scaffolding of numeracy competence. However, some students identified the need for further time to practice their numeracy skills utilising other resources such as face-to-face practical. Using a blended learning

approach supported the student's numeracy self-efficacy and was seen as beneficial for assessment preparation by the students.

> *"[Resources] are very useful* but I need more time to practice and understand the concepts" (#237)
>
> "I think with more in class p*ractice or available practice can benefit with numeracy skill*" (#474)
>
> *"Overall it is good, more practice would be even better"* (#607)
>
> O'Reilly *et al* (2020, p.4)

Student nurses are required to achieve 100% accuracy in their numeracy assessments which for many of them caused anxiety. Some students had limited mathematical foundation knowledge. Undergraduate nursing programmes assess the numeracy competence of all student nurses prior to clinical practice as the unsafe administration of medication is a leading factor in global medical harm (Donaldson *et al*, 2017; Jarvis *et al*, 2021; World Health Organisation, 2023).

> "The pressure to receive 100% in the test, is causing stress and anxiety in my confidence" (#1146)
>
> "Having to get 100% on the numeracy assessment increases stress and anxiety "(#1380)
>
> "It is extremely overwhelming to be expected to achieve 100% in exam conditions and put students in a position of nervousness & anxiety" (#191)
>
> O'Reilly *et al* (2020, p.4)

The study found the blended learning approach within this module supported students in developing a greater understanding in medication calculations. This increased their confidence and reduced the anxiety which some students had reported. Interestingly, students reported they not only wanted more time to practice using online methods, but they firmly recognised the requirement of more face-to-face numeracy teaching.

> "*More online practice or hand on practice would be good for increasing practice & confidence*" (#756)
>
> "Has been helpful although could use more time spent on numeracy and practice tests" (#948)
>
> "More online practice, to be completed at home in spare time" (#960)
>
> O'Reilly *et al* (2020, p.5)

Students felt not enough time was spent on numeracy and that the support of tutors in facilitating medication calculation instruction was essential as it provides validation and reassurance which increased confidence. Despite the university providing significant investment in blended learning within this study a number of students felt it was not enough. Some students wanted more face-to-face sessions to support the online strategies due to a lack of confidence in their own ability to understand the online materials used.

> "It has been helpful to have delegated time in class to practice as at home it's harder to know with confidence what you're doing is right without clarification from the tutor" (#996)
>
> "I think we should get more practice in class to enhance our learning for numeracy" (#1067)
>
> O'Reilly *et al* (2020, p.5)

The study concluded that the students were satisfied with the delivery of teaching however they wanted extra practice in a classroom environment with teaching support. The importance of the tutor was highlighted by students and importantly, to develop self-efficiency in numeracy they required teaching and learning which was flexible and engaging to support understanding and build confidence.

Sukadarma *et al* (2022) conducted an evaluation study which focused on establishing the satisfaction of 105 Indonesian students who were invited to join a blended learning programme. An online survey was used which saw a response rate of 100%. The blended learning programme was introduced after five semesters of purely online learning and teaching. There were numerous indications such as communication, technical and academic challenges, which found the completely online learning process was no longer effective. Those undertaking the research also invited 10 students to a follow up interview which was conducted using a semi-structured interview via telephone call. Satisfaction of the students

was measured using a Likert-scale (1 = strongly disagree to 5 = strongly agree) which was analysed and mapped to one of five descriptions using the mean score range.

Table 1. Range and Category.

Mean Score Range	Category
4.3 -5.0	Very Satisfied
3.5 - 4.2	Satisfied
2.7 - 3.4	Neither satisfied nor dissatisfied
1.9- 2.6	Dissatisfied
1.0 - 1.8	Very Dissatisfied

Sukadarma *et al* (2022, p.887)

The survey focused on the following five factors which influenced student satisfaction (Naaj *et al*, 1999):

- Interaction
- Instruction
- Instructor/Lecturer
- Course management
- Technology

The study found that students welcomed the opportunity to interact with classmates and lectures face-to-face plus they were satisfied with the learning interactions which were facilitated by the new approach. They reported being satisfied with the instruction provided during the blended learning which also saw students not only feedback that this approach was better than the purely online learning methods previous used. Learners were also satisfied with those providing direction during the blended learning programme with the students concluding they were given the results and feedback of tests/assignments in a timely manner. Interestingly, students felt the blended learning programme was well designed which was observed from the teaching team's readiness and ability to deliver both online and face-to-face sessions.

Despite all the positive feedback some students reported connectivity issues whilst accessing online lectures which meant they missed important explanations; this issue affected those students from rural areas mostly.

The results of the analysis concluded students were satisfied with the interaction, instruction, instructors, and course management. Students were neither satisfied nor dissatisfied with the technology. Overall, the study found students were satisfied with blended learning which can be used as an alternative teaching and learning approach in nursing education.

Table 2. Descriptive Analysis of Students' Satisfaction.

Dimension	N	Mean Score	Standard Deviation	Category
Interaction	105	3.77	.783	Satisfied
Instruction	105	4.04	.794	Satisfied
Instructor	105	3.88	.685	Satisfied
Course Management	105	4.06	.657	Satisfied
Technology	105	3.41	.800	Neither satisfied nor dissatisfied
Overall		**3.85**	**.787**	**Satisfied**

Sukadarma *et al* (2022, p. 887)

Shorey *et al's* (2017) pre-pandemic study saw 74 undergraduate student nurses studying in Singapore complete reflections regarding the effective communication for healthcare professional module which historically was delivered weekly to students via a face-to-face one-hour tutorial and two-hour face-to-face lecture. The module had been recently redesigned to include blended learning which saw a combination of weekly face-to-face tutorials and online teaching introduced.

The reflections found six main themes along with a number of sub themes. Students felt the design of the module which included face-to-face tutorial sessions as positive as they did the video making element of their assessment. Facilitators introduced feedback and sharing sessions which students found "uplifting and heart-warming" which aided peer learning. This also helped students to not only get to know their classmates better but also themselves which led to them feeling a unique bond had been made. Students found the tutorial sessions were made interesting by the facilitators who were engaging, which in all motivated them to attend lessons. These sessions were deemed useful to prepare students for the face-to-face tutorials. Online activities included theoretical concepts which students reported gave them confidence to apply their learning to real life scenarios. The importance of reflective practice and retrospective learning was also established.

Table 2
Overview of themes and subthemes.

Themes	Sub-themes
1) Helpful and engaging classroom experience	1. Learning through a creative and fun-filled way 2. Uplifting and heartwarming sharing sessions 3. Engaging and helpful facilitators
2) Valuable online activities	1. Preparation for tutorials 2. Importance of reflection and retrospective learning
3) Meaningful assessment	1. Building confidence 2. Preparation for real life situations 3. Seeing different perspectives
4) Appreciation for interprofessional education	1. Importance of interprofessional education 2. Significance of teamwork
5) Personal enrichment	1. Seeing their personal growth 2. Self-actualization on their weaknesses 3. Building interpersonal relationships
6) Overall feedback and recommendations	1. Valuable experiences and enriching lessons learnt 2. Areas for improvement

Shorey *et al* (2017, p. 79)

Students felt the skills they learnt within this module not only aided self-confidence, but also helped to overcome fears regarding communicating in real-life situations. Students also learnt that different interpretations to the same scenario are possible alongside using different approaches to problem solving. Through an activity which saw undergraduate nursing students working in collaboration with undergraduate pharmacy students, the student nurses reported having a better awareness and appreciation of other healthcare professional's roles which led to a greater understanding of how to communicate. The importance of teamwork was reinforced along with how to manage team relationships.

Students identified their own strengths and weaknesses whilst working in this module which they felt contributed to making them not only a better nurse, but they were able to take this forward to improve their personal lives too. They felt the skills learnt contributed to an overall improvement in interpersonal relationships.

The findings of the study concluded that students felt blended learning boosted their confidence, enriched their learning, and attained a deeper understanding and appreciation of other professionals. Online theoretical sessions prepared and complimented face-to-face sessions plus authentic assessment helps to increase students' confidence.

Swaminathan *et al* (2021) invited the entire first- and second-year cohorts of nursing undergraduates in Chennai, India to complete an online survey, from these 158 responded. The researchers then randomly selected 10 students to participate in a focus group discussion (FGD) to understand their perceptions of blended learning.

The questionnaire included:

- Basic demographic details
- Availability of Technology specifically the internet, computers, and smartphones
- Prior experience of online learning
- Confidence and comfort levels in online learning
- Perception and readiness to adopt blended learning (online and face-to-face)
- Two open ended questions which requested participants identify hindering and facilitating factors for using online learning.

Of the 158 students who participated in the questionnaire 88.6% had access to the internet and 155 had a smartphone they used to connect to the internet.

Table 2: Gadgets available with the students

Ownness of gadgets	Total number (%)
Do you own a mobile phone	
Yes	157 (99.4)
Not a smart phone	2 (1.3)
Smart phone-Android	153 (96.8)
Smart phone-iOS	2 (1.3)
No	1 (0.6)
Do you own any of the following devices	
Lap top	35 (22.2)
Stationary PC (desktop)	16 (10.1)
Stationary PC (desktop), laptop, tablet	7 (4.4)
Tablet	8 (5.1)
No	92 (58.2)

Swaminathan *et al* (2021, p. 3)

Most of the students felt confident (73.4%) and comfortable (75.3%) in learning and accessing online materials [Figure 1]. Around half (53.8%) of those who provided a response felt blended learning will positively impact their learning but around one fourth of participants (25.9%) reported blended learning will have no impact [Figure 3].

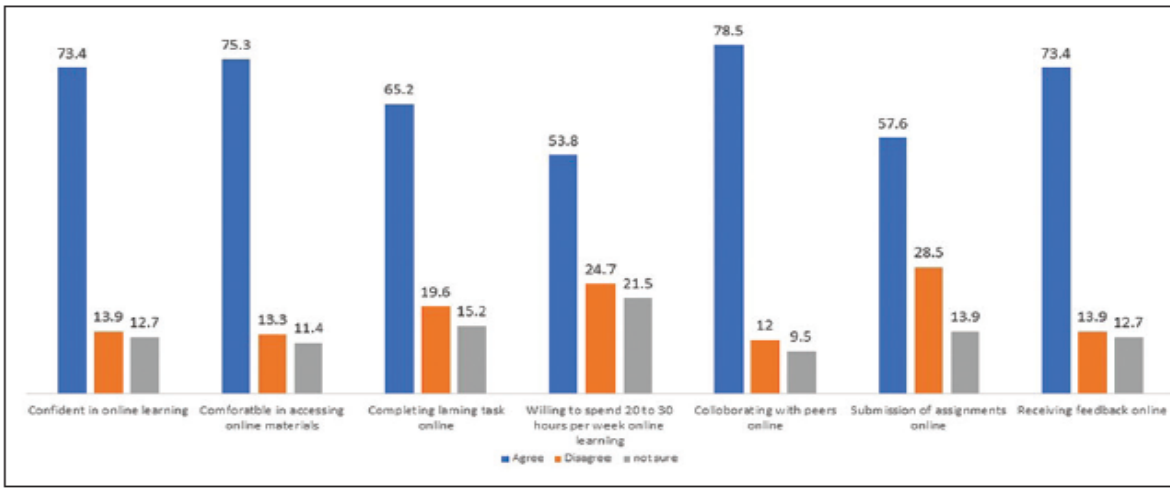

Figure 1: Confident level and readiness toward online learning

Swaminathan *et al* (2021, p. 4)

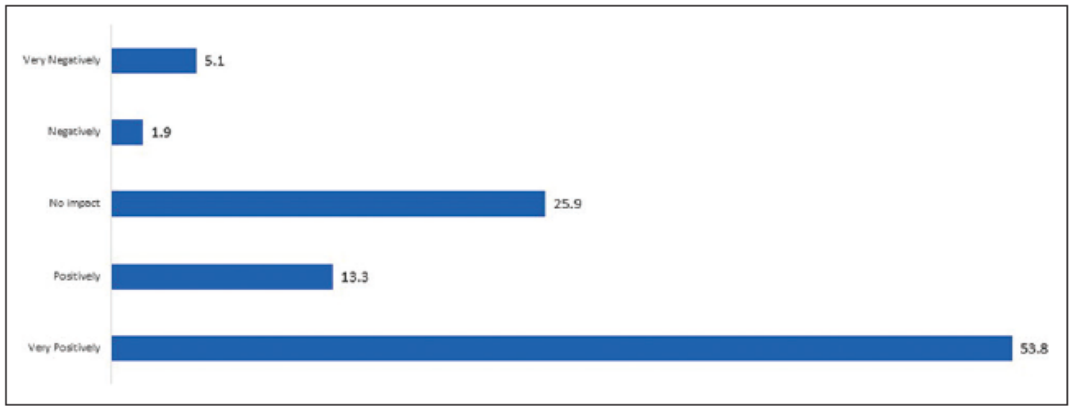

Figure 3: Perceived impact of blended learning (response in percentage)

Swaminathan *et al* (2021, p. 4)

Two themes were established from the results:

Theme 1: Readiness to adopt online learning as a component of blended learning.

Respondents were interested to use online spaces to learn and felt having access to materials as and when required will increase their learning. They also expected the content should be accessible via smartphones as they spend a lot of time using them. Most of the students had prior experience of using online learning and they felt the availability of online content will provide opportunities for those who require more time to learn, and they will be able to collaborate with their peers.

Theme 2: Perceived Barriers and challenges in adopting online contents for blended learning.

Despite most of the students having access to a smartphone and the internet, some of the respondents suggested they may require additional technology such as laptops or tablets to access online content as they did not feel their smartphones would be sufficient. One student also highlighted limited amounts of accessible mobile data.

> "I have only 2 GB data access per day; in case if I need to take part of online learning it may be difficult at home."
>
> Swaminathan *et a*l (2021, p. 5)

Students suggested lengthy videos and too much reading will dilute their learning therefore material should be easy to understand and attractive. The respondents also highlighted the absence of teachers during online learning and concentration as disadvantages.

This study concluded that student nurses are ready to use blended learning. Despite being familiar with both face-to-face and online learning methods, there are a number of challenges that were identified which include the quality of the online content and accessibility of suitable technology.

Discussion

This paper aims to understand the perception of blended learning in the United Kingdom (UK) undergraduate nurse education by student nurses. There is no recent UK-based research to directly answer this question therefore the author has analysed and synthesised the study findings from Asia and Australia to ascertain if they can be reliably applied to student nurses in the UK.

All four studies have demonstrated that using a blended learning approach in nursing education can have a positive impact on the learning experience. That it helps to build or

scaffold learning to improve both the knowledge and confidence of students. This correlates to the pedagogic theory of constructivism which is a psychological perspective suggesting that students build much of what they learn and understand, this ideology was originated by educational theorist Jean Piaget (Schuck, 2020; Matthews, 2003; Piaget, 1974). There are three important principles of constructivism; firstly, teaching must be concerned with the experiences and contexts that make learners willing and able to learn, teaching must be structured so that it can be easily understood by the learner, and teaching should be designed to facilitate extrapolation of learning (Mugambi, 2018).

O'Reilly *et al's* (2020) study particularly emphasised the use of building on existing knowledge with their online content and stated that student engagement with the material was key. They showed that by utilising a blended learning approach to the contextualised medication numeracy calculations in a simulated environment, students are enabled to have a more authentic and realistic experience (Van de Mortel *et al*, 2014). She *et al* (2021) also found that engagement was important and that interaction between lecturers and students, students and students and students with the learning materials are integral to the learning process as these interactions support students to search and locate new knowledge. This was echoed by Shorey *et al.* (2018) who said that students found the tutorial sessions were made interesting by the facilitators who were engaging, which in all motivated them to attend lessons. Similarly, Sukadarma *et al* (2021) found that students welcomed the opportunity to interact with classmates and lectures face-to-face plus, they were satisfied with the learning interactions which were facilitated by blended learning.

O'Reilly et al's (2020) study had participants spread across 4 campuses, however, each campus belongs to the same university and participants were used from one single programme of study which can put into question the ability to apply its findings to the wider population. Alongside this the study only used 3 open questions which may have limited the scope of the data they were collecting; however, the large participant numbers (n=525) provide reassurance of the validity of the themes presented. One such theme was around the difficulties students had with online learning if it was self-directed or without a live facilitator, this finding was echoed in Swaminathan et al's study (2021) in which the importance of the role of the tutor was highlighted by the participants. Their research had a combination of quantitative and qualitative data from a participant cohort of 158.

The research paper of Swaminathan et al (2021) demonstrates clarity in the research design process however they have not explored or acknowledged their study limitations. One such limitation might be that the participants were from a single university only. Their study also explored students access to IT equipment and internet connectivity. Most of their participants accessed the internet via mobile data (88.6%) and less than half (41.8%) of their participants had access to a laptop, PC or tablet which meant they used mobile phones for online sessions. This creates potential barriers to education as some students have limited

amounts of mobile data as well as the small screens that mobile phones have. Alongside this some students experienced connectivity issues which impacted their learning experience.

Connectivity difficulties, limited data and access to IT equipment was also a finding the study by Sukadarma et al. (2022). Interestingly their study yielded a 100% response rate, which is unusual for research this could lead to questions around how that was achieved. This study used a combination of questionnaires, and 10 students were interviewed for more qualitative data. This paper did not identify how or why students were chosen to participate in the follow-up interview. This may suggest a risk of bias in the selection process.

When applying the theme of IT and connectivity to the UK student population, The Office for Students (OFS, 202) state that from a poll of 1416 students 82% have access to either a computer, laptop or tablet. This contrasts with the aforementioned studies.

All four studies analysed in this research were limited by using only one site and some only studied the effect of blended learning to single modules or certain years within nurse education programmes. However, all four studies have demonstrated that using a blended learning approach in nurse education can have a positive impact on the learning experience. In combination two different module subjects have been studied and students from the first and second years of nursing programmes have participated. This provides confidence in the ability to apply these findings to the UK student nurse population. It is evident that UK focussed research on this subject is needed.

Conclusion

Given the continual decline in applications for undergraduate nursing programmes in the United Kingdom (UK) it is evident that nurse education needs to adapt to attract more aspiring nurses. Health Education England have encouraged universities in the UK to introduce blended learning approaches to the delivery of their teaching.

It is currently not known whether UK nursing students find this approach effective due to a lack of research in this area. However, there are studies from countries with comparable nursing programmes which can be used to offer an insight into how UK students may feel.

The findings of this review show that the perceptions student nurses have of a blended learning approach in undergraduate nursing education is predominantly positive. The presence of a tutor or facilitator is essential to provide students with guidance and support. Both confidence and competence can be increased from blended learning, particularly if used to build upon students existing experiences.

One potential challenge to blended learning is access to technology and assured internet connectivity, however recent data demonstrates that the vast majority of UK students have or receive the required equipment.

References

Abou Naaj, M., Nachouki, M. and Ankit, A. (2012) 'Evaluating Student Satisfaction with Blended Learning in a Gender-Segregated Environment', Journal of Information Technology Education: Research, 11, pp. 185–200. Available at: https://doi.org/10.28945/1692. [Accessed: 1 April 2024]

BBC News (2024) Nearly a third of university courses still have hybrid teaching. Available at: https://www.bbc.co.uk/news/education-64130367 [Accessed: 1 April 2024]

Betihavas, V., Bridgman, H., Kornhaber, R. and Cross, M. (2016) 'The evidence for "flipping out": A systematic review of the flipped classroom in nursing education', Nurse Education Today, 38, pp. 15–21. Available at: https://doi.org/10.1016/j.nedt.2015.12.010. [Accessed: 10 April 2024]

Bliuc, A.-M., Goodyear, P. and Ellis, R.A. (2007) 'Research focus and methodological choices in studies into students' experiences of blended learning in higher education', The Internet and Higher Education, 10(4), pp. 231–244. Available at: https://doi.org/10.1016/j.iheduc.2007.08.001. [Accessed: 1 April 2024]

Connelly, Lynne (2020) 'Inclusion and Exclusion Criteria', MEDSURG Nursing, 29(2), pp. 125–126.

Donaldson, L., Kelley, E., Dhingra-Kumar, N., Kieny, M. and Sheikh, A. (2017) 'Medication Without Harm: WHO's Third Global Patient Safety Challenge', The Lancet, 389(10080), pp. 1680–1681. Available at: https://doi.org/10.1016/S0140-6736(17)31047-4. [Accessed: 17 April 2024]

Du, L., Zhao, L., Xu, T., Wang, Y., Zu, W., Huang, Z., Nie, W. and Wang, L. (2022) 'Blended learning vs traditional teaching: The potential of a novel teaching strategy in nursing education - a systematic review and meta-analysis', Nurse Education in Practice, 63, p. 103354. Available at: https://doi.org/10.1016/j.nepr.2022.103354. [Accessed: 17 April 2024]

Health Education England. (2024) Blended Learning - Adult Nursing. Available at: https://www.hee.nhs.uk/our-work/blended-learning/blended-learning-adult-nursing [Accessed: 1 April 2024]

Health Education England. (no date) Blended learning offers flexibility to train our future healthcare workforce. Available at: https://www.hee.nhs.uk/news-blogs-events/news/blended-learning-offers-flexibility-train-our-future-healthcare-workforce. [Accessed: 1 April 2024]

Jarvis, D.H., McCullough, K.D. and McParland, T.R. (2021) 'Nurse Education and Mathematical Competency: Implementation of an Online, Self-Directed, Prerequisite

Model', International Journal of Environmental Research and Public Health, 18(24), p. 13106. Available at: https://doi.org/10.3390/ijerph182413106. [Accessed: 7 April 2024]

Jowsey, T., Foster, G., Cooper-Ioelu, P. and Jacobs, S. (2020) 'Blended learning via distance in pre-registration nursing education: A scoping review', Nurse Education in Practice, 44, p. 102775. Available at: https://doi.org/10.1016/j.nepr.2020.102775. [Accessed: 9 April 2024]

Mackie, J.E. and Bruce, C.D. (2016) 'Increasing nursing students' understanding and accuracy with medical dose calculations: A collaborative approach', Nurse Education Today, 40, pp. 146–153. Available at: https://doi.org/10.1016/j.nedt.2016.02.018. [Accessed: 1 April 2024]

Matthews, William (2003) 'Constructivism in the Classroom: Epistemology, History, and Empirical Evidence', Teacher Education Quarterly, 30(3), pp. 51–64.

McGarry, B., Theobald, K., Lewis, P. and Coyer, F. (2015) 'Flexible learning design in curriculum delivery promotes student engagement and develops metacognitive learners: An integrated review', Nurse Education Today, 35(9), pp. 966–973. Available at: https://doi.org/10.1016/j.nedt.2015.06.009. [Accessed: 18 April 2024]

McGhee, G., Marland, G.R. and Atkinson, J. (2007) 'Grounded theory research: literature reviewing and reflexivity', Journal of Advanced Nursing, 60(3), pp. 334–342. Available at: https://doi.org/10.1111/j.1365-2648.2007.04436.x. [Accessed: 1 April 2024]

McKenna, L., Sommers, C., Rachmawaty, R., Efendi, F., Malik, G., Davis, J., Duncan, R., Mambu, I., Susanti, I. and Musmulyono. (2023) 'Postgraduate nurse education in Indonesia and Australia: A comparative analysis', Nurse Education Today, 131, p. 105954. Available at: https://doi.org/10.1016/j.nedt.2023.105954. [Accessed: 1 April 2024]

Mugambi, Mercy (2018) 'Linking Constructivism Theory to Classroom Practice', International Journal of Humanities, Social Sciences and Education, 5(9), pp. 96–104. Available at: https://doi.org/10.20431/2349-0381.0509014. [Accessed: 9 April 2024]

National University of Singapore (no date) Undergraduate. Available at: https://medicine.nus.edu.sg/nursing/education-programmes/undergraduate/#:~:text=The%20Bachelor%20of%20Science%20(Nursing,training%20to%20be%20Registered%20Nurses. [Accessed: 21 April 2024]

Niu, Y., Xi, H., Liu, J., Sui, X., Li, F., Xu, H., Zhao, L., Li, Y., Zhang, S. and Guo, L. (2023) 'Effects of blended learning on undergraduate nursing students' knowledge, skills, critical thinking ability and mental health: A systematic review and meta-analysis', Nurse Education in Practice, 72, p. 103786. Available at: https://doi.org/10.1016/j.nepr.2023.103786. [Accessed: 9 April 2024]

Office For Students (2020) 'Digital poverty' risks leaving student behind., Office For Students. Available at:

https://url.uk.m.mimecastprotect.com/s/a5X0CLYKXuLD22ASBCnac?domain=officeforstudents.org.uk [Accessed: 21 April 2024]

O'Reilly, R., Ramjan, L., Fatayer, M., Stunden, A. and Gregory, L. (2020) 'First year undergraduate nursing students' perceptions of the effectiveness of blended learning approaches for nursing numeracy', Nurse Education in Practice, 45, p. 102800. Available at: https://doi.org/10.1016/j.nepr.2020.102800. [Accessed: 1 April 2024]

Piaget, J (1974) The child's construction of quantities: conservation and atomism. London: Routledge and Kegan Paul.

Royal College of Nursing. (no date) Falling nursing student applications 'deeply concerning' for future of profession. Available at: https://www.rcn.org.uk/news-and-events/news/uk-falling-nursing-student-applications-deeply-concerning-for-future-of-profession-130723. [Accessed: 18 April 2024]

Schuck, D (2019) Learning Theories: An Educational Perspective. 8th edn. New York: Pearson.

She, L., Ma, L., Jan, A., Nia, H. and Rahmatpour, P. (2021) 'Online Learning Satisfaction During COVID-19 Pandemic Among Chinese University Students: The Serial Mediation Model', Frontiers in Psychology, 12, p. 743936. Available at: https://doi.org/10.3389/fpsyg.2021.743936. [Accessed: 1 April 2024]

Shorey, S., Siew, A.L. and Ang, E. (2018) 'Experiences of nursing undergraduates on a redesigned blended communication module: A descriptive qualitative study', Nurse Education Today, 61, pp. 77–82. Available at: https://doi.org/10.1016/j.nedt.2017.11.012. [Accessed: 1 April 2024]

Staker, H. and Horn, Michael B (2012) 'Classifying K–12 Blended learning'. Available at: https://files.eric.ed.gov/fulltext/ED535180.pdf. [Accessed: 1 April 2024]

Sukadarma, G., Suastra, W. (2022) 'Nurse students' satisfaction towards blended learning program', Bali Medical Journal, 11(2), pp. 885–891. Available at: https://doi.org/10.15562/bmj.v11i2.3391. [Accessed: 1 April 2024]

Swaminathan, N., Ravichandran, L., Ramachandran, S., Milanese, S., Singarevelu, R. and Govindaraj, P. (2021) 'Entry level nursing graduate students' perception and readiness toward online component of blended learning: A mixed method study', Journal of education and health promotion, 10(1). Available at: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8249981/. [Accessed: 1 April 2024]

Thapa, Parul (2024) BSc Nursing: Course, Admission 2024, Fees, Syllabus, Entrance Exam, Top Colleges, Career Scope, shiksha. Available at: https://www.shiksha.com/nursing/b-sc-nursing-

chp#:~:text=B.Sc%20Nursing%20course%20is,the%20B%20Sc%20Nursing%20course. [Accessed: 21 April 2024]

Think Education (n.d.) How to become a nurse in Australia, Think Education. Available at: https://www.think.edu.au/blog/how-to-become-a-nurse-in-australia#:~:text=The%20Bachelor%20of%20Nursing%20is,(depending%20on%20subject%20delivery). [Accessed: 21 April 2024]

Van De Mortel, T.F., Whitehair, L.P. and Irwin, P.M. (2014) 'A whole-of-curriculum approach to improving nursing students' applied numeracy skills', Nurse Education Today, 34(3), pp. 462–467. Available at: https://doi.org/10.1016/j.nedt.2013.04.024. [Accessed: 5 April 2024]

Watson, C., Templet, T., Leigh, G., Broussard, L. and Gillis, L. (2023) 'Student and faculty perceptions of effectiveness of online teaching modalities', Nurse Education Today, 120, p. 105651. Available at: https://doi.org/10.1016/j.nedt.2022.105651. [Accessed: 1 April 2024]

World Health Organistaion (no date) Patient Safety. Available at: https://www.who.int/news-room/fact-sheets/detail/patient-safety. [Accessed: 5 April 2024]

Final year radiography student confidence in imaging paediatric patients – can this be improved?

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Abstract

Confidence in dealing with paediatric patients as a final year radiography student appears to be a burning issue. Students often begin a radiography training program with preconceived thoughts of the challenges of imaging children and the issues that come with this. The aim of this project was to explore the causes of this perceived lack of confidence with the use of a literature review whilst also looking at what is currently provided at University of Hertfordshire. Secondary data was also investigated as data was obtained from current 3rd year undergraduate students completing their dissertations. While examining the current curriculum, this study investigated the existing teaching. Pondering the issues of confidence, one theme stood out. If utilised effectively, simulation could alleviate some of the pressures of clinical placements allowing students to experience, observe, discuss, and feedback on more challenging clinical situations that are rarely seen, such as with paediatrics.

Introduction

The imaging department in a hospital receives all types of patients through their doors. Radiographers at some point will, and are expected to, competently communicate with these patients and their carers. What additional challenges do paediatrics have over those of the adult population? As an educational provider it would be prudent to look at this question, to understand what issues to consider and if there are any methods that can be employed to assist.

A child (or paediatric) patient is defined by UK law as anyone who hasn't yet reached their eighteenth birthday (Gov.uk, 2024). According to The Office for National Statistics (2020) this covers about 13 million people in the UK which is a large section of those that use the NHS (Mathers et al, 2011). This a large patient group and so its importance for medical professionals to be proficient should not be underestimated.

Starting with a baby, who has very little to no communication skills. By the age of 3 to 4, children may not have sufficient understanding to know what is happening and to comply. As they get a little older, compliance remains an issue especially when it comes to having to keep still for longer scans or if injections are needed. Parents and carers accompany them and so need to think about these factors as they will have better understanding of each child. As we reach puberty teenagers become more aware of their bodies and issues such as privacy, communication, sexual awareness can be topics that radiographers come across. Healthcare professionals must take into consideration all the physiological and mental differences this age category contains. As well as these changes, radiographers are

responsible for imaging an age group that are more sensitive to radiation compared to adults (Boggs, 2023 and Hipple and Obesian, 2022).

The general onus of the radiographer's role is to obtain diagnostic images while caring for the patient. It is fair to say that due to the complexities (compared to a standard adult) and the pressures within the NHS and healthcare system, some radiographers (especially those who are newly qualified) may not be as confident as they would like to be. This can be particularly challenging when the added complexities of this age group are considered.

Recently, the diagnostic radiography undergraduate course at the University of Hertfordshire underwent a revalidation process, and one issue that was highlighted is the students' wish for more exposure to paediatric patients (University of Hertfordshire, 2023). In addition to this, several final year students selected topics that explored confidence levels of students in imaging children, as they all felt this was an issue that warranted further investigation. With these considerations in mind and that given the authors experience and interest in this subject, this topic was chosen for investigation.

The course

Students at the University of Hertfordshire (UH) spend three years on the undergraduate diagnostic radiography program. The aim is to apply taught theory to enable the student to become a practising radiographer. Throughout their time each student completes over 1000 hours in a clinical placement (hospital) within a radiology department which Lundvall et al (2021) describes as a critical part in learning professional knowledge in practice. Throughout this time students are expected to examine all types of patients that includes paediatrics. Taken from the undergraduate course specification, one of the outcomes is to "demonstrate effective communication with patients" (University of Hertfordshire, 2022) which encapsulates paediatrics. So that a radiographer can be fit for purpose they need to be accredited and must adhere to policies, one such policy is to "understand the different communication needs, anatomy and disease processes and their manifestation in children" (Health Care Professional Council (HCPC), 2023).

Aims and Objectives

- The information gathered aims to uncover, investigate, and discuss any topics that arise.
- Give an idea of 3rd year confidence in imaging paediatric patients.
- Are there are any other issues associated with this?
- Look into the theory of why this happens /causes.
- What methods could help.
- Discuss any feasible and evidence-based options to improving this.

Methods

The aim was to examine the teaching approaches used in radiography at the University of Hertfordshire, focusing on the curriculum and the methods used to image paediatric patients. I used the data obtained from students' questionnaires to reflect on how they feel. I didn't want to redo the students work so I aimed to use the data to justify and focus my review.

A literature search using the University of Hertfordshire online library and google scholar was then conducted using keywords such as paediatric, patients, confidence, and teaching whilst using Boolean search. The idea for this was to summarise existing material and identify any gaps (Paré and Kitsiou, 2017). The search was fairly broad as there was little information on the exact topic. I filtered out journals over 5 years old in regards to radiography whilst taking out the time filter when came to education so as not to exclude any key education texts. I played with the filters to include paediatrics, education, and medicine. This provided me with a better match, but information was still too vague. Using search criteria that included medical, nursing and other allied health professionals allowed me to pick out some useful journals, albeit in different but similar fields that place their students in clinical placements.

Currently taught

At UH the undergraduate course does not provide a standalone unit into paediatrics, after the 2023 periodic review it was decided that it would be threaded throughout each of the units. The specific teaching of children and how one would image them is summarised as one two-hour lecture in the second year that is not assessed. Paediatric imaging would also be mentioned (but not covered fully) throughout other modules. Competencies for paediatric patients are not encompassed into the clinical portfolio that is filled out by each student. Exposure to paediatric patients in the clinical setting can become varied depending on the patients that given day and the levels of children that hospital caters for.

The structure of learning content and knowledge then applying it by doing it at a clinical site is employed and as Blooms model encourages students to move from the cognitive to the affective to the doing phase (Aslan Huyar and Melek, 2023). It closely follows the 'spiral curriculum' model identified by Bruner (1977) which involves revisiting taught material and ideas with the intention that students can build upon their previous education.

It can be noted from the most recent undergraduate course specification that little is mentioned about paediatrics and the only mention of confidence is as follows; "Supervised clinical experience, practiced based assessments and tutorials are utilised to develop the student's confidence" (University of Hertfordshire, 2022). To allow this to occur, the course develops skills through a combination of lectures tutorials, student-led seminars, small group work and practical work in laboratories. According to student satisfaction surveys,

this blended learning approach works well when it comes to imaging the adult population (University of Hertfordshire, 2023). It becomes slightly more complex when imaging specialised patient groups such as paediatrics, with many students feeling that more could be done (University of Hertfordshire, 2023).

To be able to practice, it is essential for qualified radiographers to be competent (HCPC, 2023). Confidence is not mentioned as an essential outcome to pass the undergraduate programme (University of Hertfordshire, 2022). Within the graduate attributes, confidence is scarcely mentioned, and when it is, it pertains to collaborative working and technology, not to professional confidence in the subject being taught (University of Hertfordshire, 2022). It can be argued that since the course outcome emphasises competence, the topic of confidence may not be fully addressed. This oversight could impact students' confidence in more challenging situations.

The clinical setting

At the hospital site each student experience allows them to learn in a setting that is closely described as constructivist learning theory (Dewy, 1938 and Vygotsky, 1978). Here the learning is constructed by building on top of knowledge the student already has. The student expands their learning from lectures and seminars whilst at placement. The 'real life' placements are an active process which is gives meaning and emotion to the learning (Dewey, 1938). The interaction between the students and the paediatric group is key to obtaining a good outcome, allowing for what Vygotsky (1978) describes as a 'socially constructed' process. Each learner has a different point of view, constructed from their experiences. However, this could be seen a criticism, as the aim to ensure all students gain a uniform understanding.

Student questionnaires

Data was obtained from five current students' dissertations that were all pertaining to confidence levels of students with paediatric patients. Only secondary data was obtained, no personal data used, responses were anonymised, and all ethical considerations were adhered to. Various questions were asked all around the subject of whether/how students were confident in imaging paediatric patients, and what issues arose. Upon summarising the relevant data, it became evident that the most significant theme to emerge was the reduced confidence in paediatric imaging among some students, compared to adult patients. Other related issues included communicating with younger children, only having limited time with paediatric patients, senior radiographers assuming control, and the increased complexity of X-raying paediatric patients who are often more vulnerable, such as those in intensive care.

Literature review themes

Patient group

Studies note that paediatrics are a very different type of patient group compared to the adult population. They were all broadly in agreement that exposure to this group was infrequent (Foster and Clark, 2019), that children are more susceptible to radiation than adults (Hipple and Obisesan, 2022), and that, due to the different developmental stages, there were distinct communication challenges (Boggs, 2023). Communication is a broad subject with there being numerous studies such as Ketema et al, (2021) and Greenburgh and Davis, (2023) that looked at the difficulties as well as the need for tridactic communication between patient, carer, and radiographer. These complexities make some students more nervous and less confident. This all points towards the challenges in imaging this group and how it could be the reason students may not feel confident communicating with children. Studies such as Hough et al (2019) (that investigated simulation in physiotherapy) and Greenburgh and Davis (2023) (that explored confidence levels of radiographers) agree that there is an issue of lack of confidence with paediatrics worth addressing.

Clinical time

Both Yang et al (2015) and Coe et al (2018) from different medical disciplines noted the importance of sufficient clinical time in terms of gaining confidence. Arranging exposure to paediatric patients in the clinical setting is challenging and can be dependent on several factors. The number of paediatric patients can vary and is often minimal and is very dependent on the patients that are presented during the students' placement. This in turn can mean that each students' experience can be very variable. The lack of opportunities for some students to get paediatric placements is widely noted (Hough et al, 2019). This seems to be causing, as Pace (2017) describes a 'bottleneck' for students to overcome to develop their confidence.

Several of the studies looked at agree that more efforts are needed to help students prepare for paediatric patients (Greenburg and Davis, 2023, Hough et al, 2019 and Makanjee et al, 1995). None of these studies investigated the best methods of teaching these students. They indicated that clinical placement helps but did not provide any clear recommendations. Studies stop short in simply recommending 'gaining preparedness from theory "with the 'greatest educational support" (Mankanjee et al, 1995) and "results suggest further training" (Greenburg and Davis, 2023).

Why lack of confidence

Deciphering the data from the 3rd year student questionnaires indicated the lack of confidence that the students have when imaging paediatric patients. This indicates students at this level still feel as though they are, as Cousin (2015) states, within the 'liminal space' and that as the questionnaires indicated, they are not quite in the comfortable place in regard to this topic. Students don't seem to have this issue (or it is certainly not significant enough for it to be reported) with adult patients. This sits neatly with Blooms Taxonomy (Aslan Huyar and Esin, 2023) that the student learns basic tasks and moves up gradually to more and more complex tasks. The way the graduate course is structured is that content and knowledge is gained in the university setting then applied and practiced in the clinical setting (not forgetting evaluating and reflecting). Dealing with paediatric patients could be described this way as it is one of the more complex and difficult tasks. This may indicate it is likely to be one of the skills to be mastered later rather than earlier.

The results from the 3rd year student studies conclude that there is a lack of confidence in imaging paediatric patients (University of Hertfordshire, 2024). Confidence can be defined as having a belief and an assurance of oneself (Oxford reference, 2024), whereas Bandura (1990) defines self-efficacy as confidence with the addition that there is a set goal, such as successfully imaging paediatric patient. This learning comes from observing the experience and then sharing and critiquing. The constructivist pedagogy aids the experience to be evaluated from different points of view, encouraging social collaboration.

Issues

- **The student** - There could be numerous reasons why students may not have gained this self-efficacy. It could be due to a lack of interest, or because many students were categorised as paediatric patients themselves in recent years. Students will all have varied experiences with children. This brings in self-deterministic theory whereby the motivation comes from within themselves and their priorities in life. It would be pertinent to ensure students wellbeing, as Frei-Landau and Levin (2023) say Maslows basic needs are met (Boggs, 2023). It can also be argued that with cognitive constructivism the learning process is dependent on the students' stage of cognitive development (Bruner, 1977) that could explain why some students have not reached the stage at which they are confident with children.

- **The Patient/Parents** – Issues with those that are present can become very difficult and complex. It can often involve multiple people, who can have a mixture of feelings. On top of this, parents and carers can have their own challenges that are often very different to that of the paediatric patient (Boggs, 2023 and Cahill and Papageorgiou, 2007).

- **The clinical placement (NHS)** – Is a major factor in allowing the doing, observing, and reflecting part of education. Unfortunately, the provision of this can vary widely with site to site, especially when it comes to experiencing difficult and challenging situations.

- **The University** – The teaching methods, content, time spent, assessments, experience, facilities, and expectations may not be up to standard. Systems may also not be in place for issues such as this one with paediatrics to be highlighted and addressed.

From the above sections listed it can be noted that some are out of our control. The university section is the part that was investigated further as it is felt that these were the factors that were more within a lecturer's control and could therefore be changed.

Confidence theory

Many students feel they lack sufficient confidence to deal with this patient age group compared to the other ages (University of Hertfordshire, 2024). From literature and from the information gathered, some student radiographers clearly have an issue with confidence when it comes to imaging children. The theory behind this is explained by Bandura (2012). He states that academic confidence theory concerns itself with whether the students have belief in themselves (to image paediatrics). Self-efficacy can be obtained through experiences that in this case would hopefully come from a clinical placement (Bandura, 2012). If this isn't the case, then alternative methods should be explored.

It is interesting to note that some students and even qualified radiographers may avoid paediatric patients and have low self-efficacy which Bandura (2012) explains is the opposite to those that have high self-efficacy. Perceptual control theory (Powers, 1973) could feed onto this, with negative feedback loops. Does the radiographer with low confidence avoid the paediatric patient (because of the low confidence and wanting to stay in control) and in turn miss the opportunity to build on confidence by successfully imaging them? Or do they face the paediatric patient hopefully giving them confidence?

Aids increasing a student's confidence

It would not solve the confidence issue, but it may be useful to manage the student's expectations. Its normal for there to be aspects of the job that need to be worked on after completing the course. The importance of being able to learn how to learn, mentioned by Bruner (1977) alongside his "spiral curriculum", indicates that the students are at different stages and that they may not gain self-efficacy until later along their career (which can be after they are qualified). This would feed in to ensuring the newly qualified radiographers adhere and understand why Continual Professional Development (CPD) is to enhance their career and build on their confidence (HCPC, 2023).

A standalone module in paediatrics would likely benefit students, but integrating it into the curriculum could be challenging, especially since most other units focus on the imaging of

this group. However, students currently have some flexibility in choosing their dissertation topics, allowing them to pursue areas of particular interest.

Clinical role-playing is used widely in the health sector (Department of Health, 2011) and can be extremely useful, but in this case to mock up a realistic situation would not be feasible without involving children, which in turn raises complex ethical issues.

Simulation

A few of the studies examined (Boggs, 2023 and Hough et al, 2019) explored simulation within their respective healthcare settings. Simulation encompasses the experiential method and allows students to use the reflective cycle (Kolb, 1984). The aim is to allow the student to align the simulation as closely as possible with the experiences obtained during placement. Although the process is not ideal, it would ensure that each student gains experience with this patient group. This is important as Dewey (1974) states that the physicality allows students to learn and grow through their experiences. It could be argued that without the involvement of children, the learning cycle would not be complete. As Lundvall et al (2021) suggest, it is crucial to learn and critique different ways of approaching a clinical situation. The observation and reflection stages would facilitate this. Students could conceptualise and learn from their actions and, ultimately, apply what they have learnt. The hope is that the earlier described issue of confidence would be addressed, albeit not completely, and help alleviate the so-called 'bottleneck'.

The literature review highlighted simulation which is widely used in the healthcare sector (Department of Health, 2011). It is described as a reproduction of a 'real' event, set of conditions or processes and may be an aid with the confidence issue. Although the source is old it remains a valid method that is still promoted by the Department of Health (2011). When trying to recreate a paediatric setting it can arguably be very difficult as the children themselves are the focus of the challenge. It would be impractical to use children, especially so with the large class sizes. The resources needed would mainly be expertise, rooms, and the time.

Self-efficacy theory, described by Bandura (2012) is concerned with the individual's belief in their capacity to reach a goal. The theory goes on to emphasise four parts.

- How the student performed in the past (i.e., do they have negative or positives experiences). It can be noted that negative experiences can affect decisions. One negative experience with a paediatric patient can sit with students and determine how they act in their next paediatric encounter.
- One of the strong points of simulation is that anyone watching can gain from 'observational learning' (Bandura, 2012).

- Receiving feedback regarding the simulation would be beneficial. Self-efficacy can be improved with debrief and feedback which allows discussion to go over and critique the interactions that occurred (Beattie et al, 2015).

- The emotional, physiological, and psychological state of those involved can improve confidence if the students are able to control and improve their emotional state when facing challenging situations, such as in a simulation (Bandura, 2012).

Role model

The simulation would be run by lecturers who have a working knowledge and a wealth of experience imaging children. Frei-Landau and Levin (2023) and Valler-Jones (2014) agree the importance of this, students would learn and feed off the expertise of the teaching staff. This expertise would also be utilised to formally teach students, with the simulation preceding the taught material, allowing students to apply what they have learned. A simulation would allow students to observe and discuss with peers any challenging situations. Wood et al (1976) and Vygotsky (1978) describe how scaffolding theory allows a student to learn more quickly and would work well alongside a simulation. If applied to imaging children, the aim would be to allow the students to achieve a better understanding interacting with this group.

Conclusion

It was promptly determined that the confidence levels of 3rd year students in the paediatric setting do not match the confidence levels when imaging the rest of the population. This is evidenced by the fact that five students chose to investigate this topic for their dissertations, indicating that it is an issue about which some feel strongly. Similar issues may also affect the imaging of other diverse groups, such as race, gender, and disability, therefore investigating these may be prove useful.

Ideally, clinical placements would provide experience, practice, and, as Bandura's social learning theory (2012) suggests, opportunities for observation. Unfortunately, due to the previously mentioned reasons, this ideal is not always met, and students' clinical experiences can vary significantly. There are instances where limited clinical exposure may prevent some students from learning effectively. For radiography students, paediatric imaging is often such an instance. It is crucial for students to observe positive outcomes in this setting. If this isn't feasible, replicating these experiences through simulations in a university setting could prove advantageous.

Other similar disciplines recommend using methods such as role-play and simulations. Theory surrounding both methods seem strong, although to keep it authentic role-play is often ruled out as children ethically would be difficult to use. The complex behavioural nature of children makes it difficult for other age groups to mimic effectively. Further study into whether adults or artificial intelligence could be warranted to gauge whether these

could be used as an option. In regard to simulation, the omission of children is not ideal, but can be worked around. The reasoning behind simulation would still be valid, and in theory should allow self-confidence to increase in this field. It should be possible for simulation to comply with Bandura's (2012) sources of influence.

References

Aslan Huyar, D. and Esin, M.N. (2023) 'Effects of bloom's mastery learning model based on CBRN preparedness program on learning skills of nursing students: A randomized controlled trial', Nurse education in practice, 67, pp. 103568–103568.

Bandura, A. (2012) 'On the Functional Properties of Perceived Self-Efficacy Revisited', Journal of management, 38(1), pp. 9–44.

Beattie, S., Woodman, T., Fakehy, M., and Dempsey, C. (2015). The Role of Performance Feedback on the Self-Efficacy–Performance Relationship. *Sport, Exercise, and Performance Psychology.* 10.1037/spy0000051.

Boggs, K.U. (2023) Interpersonal relationships: professional communication skills for nurses. 9th edn. St. Louis, Missouri: Elsevier.

Bruner, J.S. (1977) The process of education. London; Cambridge, Mass;: Harvard University Press.

Cahill, P. and Papageorgiou, A. (2007) 'Triadic communication in the primary care paediatric consultation: A review of the literature', British journal of general practice, 57(544), pp. 904–911.

Coe, J.M., Brickhouse, T.H., Bhatti, B.A. and Best, A.M. (2018) 'Impact of Community-Based Clinical Training on Dental Students" Confidence in Treating Pediatric Patients', Journal of dental education, 82(1), pp. 5–11.

Confidence. Oxford Reference. Retrieved 10 Apr. 2024, from https://www.oxfordreference.com/view/10.1093/oi/authority.20110803095631541.

Cousin, G. (2006) 'An introduction to threshold concepts', Planet (Plymouth), 17(1), pp. 4–5. DOI: 10.11120/plan.2006.00170004

Department of Health (2011). A framework for Technology Enhanced Learning. Available at: https://www.gov.uk/government/publications/a-framework-for-technology-enhanced-learning (Accessed: 25 April 2024)

Dewey, J. (1938). Experience and education. New York: Macmillan.

Dewey, J. (1974). John Dewey on Education: Selected Writings. University of Chicago Press

Foster, L.P. and Clark, K.R. (2019) ‘Pediatric Radiography Education: A Survey of Recent Graduates' Experiences’, Radiologic technology, 91(1), pp. 18–26.

Frei-Landau, R. and Levin, O. (2023) ‘Simulation-based learning in teacher education: Using Maslow”s Hierarchy of needs to conceptualize instructors” needs’, Frontiers in psychology, 14, pp. 1149576–1149576.

Gov.uk (2024). Case management guidance – Definitions. Youth Justice Board for England and Wales. Available at: https://www.gov.uk/guidance/case-management-guidance/definitions (Accessed: 11 April 2024)

Greenberg, H. and Davis, M. (2023) ‘How confident are UK radiographers at performing paediatric computed tomography trauma scans?’, Radiography (London, England. 1995), 29(2), pp. 362–368.

Health and Care Professions Council (HCPC) (UK) (2023) *Standards of Proficiency Radiographers* Available at: https://www.hcpc-uk.org/standards/standards-of-proficiency/radiographers/ (Accessed: 25 April 2024)

Hipple, C. and Obisesan, O. (2022) ‘Technologists' Experience Providing Patient Education in a Pediatric Setting’, Radiologic technology, 93(6), pp. 517–531.

Hough, J., Levan, D., Steele, M., Kelly, K. and Dalton, M. (2019) ‘Simulation-based education improves student self-efficacy in physiotherapy assessment and management of paediatric patients’, BMC medical education, 19(1), pp. 463–463.

Ketema, S.F., Kekana, R.M., Essop, H. and Msonza, H.W. (2021) ‘Diagnostic radiographers” experiences when interacting with the custodians of paediatric patients presenting for general radiographic imaging’, Radiography (London, England. 1995), 27(4), pp. 1021–1026.

Kolb, D.A. (1984) Experiential learning: experience as the source of learning and development. Prentice-Hall.

Lundvall, LL., Dahlström, N. and Dahlgren, M.A. (2021). Radiography Students’ Learning During Clinical Placements: Developing Professional Knowing in Practice. *Vocations and Learning* 14, 439–457 (2021). https://doi.org/10.1007/s12186-021-09269-1

Makanjee, C.R., Tsui, J.K., Treller, M., Francis, K., Issa, A., Hayre, C. and Lewis, S. (2023) ‘Australian student radiographers” experiences and perspectives in general paediatric medical imaging examinations’, Radiography (London, England. 1995), 29(3), pp. 604–609.

Mathers, S.A., Anderson, H., and McDonald, S. (2011). A survey of imaging services for children in England, Wales and Scotland. *Radiography*, 17(1), 20-27.

Pace, D. (2017) The Decoding the Disciplines Paradigm: Seven Steps to Increased Student Learning. Bloomington: Indiana University Press.

Paré, G, and Kitsiou, S. (2017) Methods for Literature Reviews. Handbook of eHealth Evaluation: An Evidence-based Approach. Victoria (BC): University of Victoria. Available at: https://www.ncbi.nlm.nih.gov/books/NBK481583/ (Accessed: 24 April 2024)

Powers, W.T. (1973) Behavior, the control of perception. London: Wildwood House.

The Office for National Statistics (2020). Population estimates for the UK, England and Wales, Scotland and Northern Ireland: mid-2019. Available at: https://www.ons.gov.uk/peoplepopulationandcommunity/populationandmigration/populationestimates/bulletins/annualmidyearpopulationestimates/mid2019estimates#:~:text=the%20number%20of%20children%20(those,by%2022.9%25%20to%2012.4%20million (Accessed: 30 March 2024)

University of Hertfordshire (2023) *BSc Hons Diagnostic Radiography & Imaging - Periodic Review 2023.*

University of Hertfordshire (2022) *BSc (Hons) Diagnostic Radiography and Imaging – Programme Specification.*

University of Hertfordshire (2022) *Graduate Attributes.* Available at: https://www.herts.ac.uk/about-us/supporting-our-students/student-charter/graduate-attributes

University of Hertfordshire, *BSc Hons Diagnostic Radiography & Imaging – Undergraduate dissertations raw data*, 2024, unpublished.

Valler-Jones, T. (2014) 'The impact of peer-led simulations on student nurses', British journal of nursing (Mark Allen Publishing), 23(6), pp. 321–326.

Vygotskiĭ, L.S. and Cole, M. (1978) Mind in society: the development of higher psychological processes. Cambridge: Harvard University Press.

Wood, D., Bruner, J.S. and Ross, G. (1976) 'The role of tutoring in problem solving', *Journal of child psychology and psychiatry,* 17(2), pp. 89–100.

Yang, Y.O., Kim, M., Park, K.-Y. and Yang, J.-H. (2015) 'Factors influencing the confidence in core clinical skills among hospital nurses', *International journal of nursing practice*, 21(6), pp. 831–838.

Utilisation of Virtual Reality technology within Paramedic Anatomy & Physiology Education: A Systematic review.

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Abstract

Within education, there are numerous, rapidly developing pedagogical approaches, aiming to support, develop and enhance student learning and experience. Virtual reality can provide an opportunity to enhance previous pedagogical approaches and develop its own individual approach. This research will critically appraise previous research, to establish the role of virtual reality within Paramedic Undergraduate Anatomy & Physiology education. It will critique the current pedagogical approaches, the integration and development of virtual reality, whilst identifying the gaps or opportunities within current literature surrounding virtual reality as a pedagogical approach.

This research concludes that virtual reality has the potential to address multifaceted aspects within education, as an independent pedagogical approach, which can revolutionise educational approaches. It has the potential to reduce student academic success inequality within education, through supporting the United Nations (no date) goal of technological equality access worldwide. However, it is noted, that due to the recent and rapid development of virtual reality, in a large part due to enforced lock downs during covid (Bell et al, 2021), that there are gaps within pedagogical knowledge which provides opportunities for further research.

Introduction

> *Anatomy and Physiology: "The scientific study of the body, how its parts are arranged and the study of how the bodies of living things work". (Cambridge dictionary, no date)*

This topic was selected following consideration of the content covered on the BSC Paramedic Science course and after reflection on student interaction (both reported by staff and students), attainment and continued success following completion of modules as well as well as student feedback on the importance of the topic and relevance to practice. When considering the education of healthcare professionals, every task, skills, treatment, and patient presentation requires the understanding of the underlying anatomy and physiology. However, student interaction reported interest and attainment can be limited within the undergraduate Level 4 Anatomy and Physiology (A&P) module.

This review of literature aims to develop an understanding of the pedagogies which would underpin the integration of virtual reality, which can provide a 3D, immersive, interactive learning environment (Kavanagh et al, 2017) into A&P undergraduate education.

Through studying the methods and processes used within education, pedagogy (Cambridge dictionary) aims to support students and staff to develop teaching and learning practices. This is closely aligned to the Scholarship of Teaching and Learning, research lead, professional development principles, which facilitate the continuous development and enhancement of educational pedagogies to enhance student experience. (Fanghanel et al, 2016) By facilitating differing educational approaches, it is theorised by the researcher that this can aid in reducing educational inequalities, socioeconomic barriers to learning and the attainment gap identified throughout educational settings (Bolton & Lewis, 2023)

Background

Anatomy & Physiology underpins of all healthcare practice, facilitating understanding of disease pathologies, patient presentations, treatment decisions and safe, effective care for patients, with the majority of students able to link the importance of A&P to practice during their undergraduate education. (Horiuchi-Hirose et al, 2023)

Despite the importance of Anatomy & Physiology, education is often taught through a didactic approach, where students learn by note taking, however within complex, theoretically heavy subjects such as Anatomy & Physiology there is a considerable risk of lack of student mental engagement and reduced efficacy of memory consolidation. (Brown et al, 2014).

Despite this, many lecturers continue to use didactic lectures for education, particularly where students are teacher dependent, anxious or the topic is new to the student. (Watkins, 2000) However, within Anatomy & Physiology first year education, although seemingly supporting students, this may be perpetuating the difficulties with transition into higher education and subsequently failing to support learning through differing methods; with little research having taken place into this pillar of healthcare education. (Johnson & Gallagher, 2021)

Further demonstrating the difficulties with this traditional, didactic approach and the multiprofessional challenges of Anatomy & Physiology education, nursing students indicated they regularly failed to understand the didactic lectures & books taught in first and second-year undergraduate nursing, preferring online videos and 3d interactive models. (Suliman et al, 2022)

Combining the experience of students reported in the research, alongside the pedagogical approach first described as the Learning Cone or as later termed, the Learning Pyramid, (Dale, 1969) demonstrates the value of varying pedagogical approaches within education. Although the figures have been disputed since its initial publication, the Learning Pyramid. (Masters, 2013) provided percentages of learning retention that occurs through different methodologies. Within this, only 5% occurs through lectures, yet these still form the majority of pedagogical approaches within education, with most of the learning coming

from active, participatory learning, including practice by doing, group work and teaching others. (Dale, 1969)

Although disputed, the Learning Pyramid has been built upon to form multiple pedagogical approaches since. Kolb (1984) Experiential learning builds upon the foundations of Dale's (1969) work, through four stages: feeling, watching, thinking, and doing, also known as concrete experience; reflective observation; abstract conceptualisation; and active experimentation. These four stages which clearly reflect the interactivity of learning, reinforcing the limitation of didactic teaching, suggest significant possibilities for the use of virtual reality. Virtual reality learning provides the opportunity to provide learning through multiple methods, including lecture, interactivity, active experimentation, learning through practice and teaching others through group work. It provides opportunities for students to begin to link the underlying anatomy & physiology to physical processes and illnesses.

Utilising VR could provide an opportunity to address socioeconomic, gender and race inequalities that exist within educational environments identified by Bolton & Lewis (2023). Addressing inequality in technology access is a key concept of the UN Digital Learning For All Policy (No date). Through utilising VR tools, there exists an opportunity to create worldwide, low cost~~,~~ simple access to technologies that can support, develop, and evolve education worldwide. However, potential challenges with VR are an increase in some gender inequalities, through the design, fit, weight and interaction of VR headsets themselves (Grassini & Laumann, 2020) but through awareness and design, it is challenged that this can be effectively addressed.

Within this research, evidence for utilisation of VR in Paramedic A&P education and the supporting pedagogical approaches will be investigated. However, the researcher also identifies the importance of consideration of gender inequalities, the effect VR may have on inequalities in education to make recommendations for practice, to develop recommendations that influence not only Paramedic but educational approaches.

Methodology

Aim

This literature review aims to identify evidence on the utilisation of Virtual Reality (VR) or Augmented Reality (AR) within Paramedic Anatomy & Physiology education and the pedagogies supporting its usage. A literature review has been chosen, as it provides an effective methodology for gaining an understanding of the current knowledge and theory base, whilst being able to identify areas for further research or development. (Snyder, 2019)

Method

A literature search was conducted to identify evidence upon the utilization of VR or AR within Anatomy and Physiology education; however, the search was widened to include use

within all aspects of healthcare Anatomy & Physiology teaching due to the cross overs and similarities in teaching styles between professions. Through utilizing a cross professional research group, this study aims to draw conclusions which are relevant and effective to, a wide range of professional groups.

Search Strategy

Data was collected through searching the University of Hertfordshire online Library. This was chosen as it provides full text access to a wide range of books, journals, articles, and conference presentation. Due to the rapid development of VR technology, it was felt appropriate to include conferences as these may provide the most recent evidence or experiences, although it is recognised that these are peer-reviewed and the researcher comments upon this in the following work. The time frame was limited to the past 5 years, to maintain currency of results within a rapidly changing educational pedagogy. The researcher acknowledges that this may limit results available, however, to provide results comparable to current practice/ experiences, this felt to be an acceptable risk.

Chosen texts had to provide pedagogical support to the utilisation of VR, or to develop the pedagogy of VR further, through supporting theories, as the research acknowledges the recent development of VR as a pedagogy, but with a still rapidly developing evidence support base.

The studies were identified through searching the University of Hertfordshire Online Library using the search terms 'Augmented and virtual reality and anatom* and health' all of which must be in English and accessible as a full text. The use of Boolean search term on anatomy was felt appropriate as this provide results including multiple terms, such as anatomical, anatomy, anatomy & physiology, all of which were relevant to the research being conducted within this literature review. The search term was purposefully broad, to include aspects of teaching within all levels of education, as pedagogies of learning and experiences can be beneficial across teaching locations.

Additional to the Boolean search strategy, a citation strategy was employed, where further studies of interest were identified through the initial study of interest. A citation search strategy was felt appropriate, due to the age of research available, the fast-moving development of VR technology and the multiple differing and emerging factors that may be associated with VR learning. The researcher is aware that the replicability of this study is therefore limited, however the depth of information that could be gained from this strategy and importance to conclusion and recommendations for this work, were felt to outweigh these limitations.

A total of 629 articles were found, within the University of Hertfordshire Online Library, of which 20 abstracts were read, with the remaining excluded from the titles available, either not linking into VR directly, or for being planned research or research statements. Of the 20

abstracts, two articles were chosen, with five additional articles being sourced through the citation strategy. The number of articles was purposefully limited to ensure that analysis of these was possible within the limitations of the word count, however multiple other citation sources were identified and used to support pedagogical theories within the background section of this work.

Data Collection

A narrative collection method was utilised, where key themes and pedagogies which occurred within the research were recorded, along with any trends on student engagement/ interaction, due to the close links between many pedagogies and engagement/ interaction in education.

Ethics

The researcher is not funded by nor employed by any party with a vested interest in this research. Ethical approval was not required for this research, owing to the methodologies involved.

Results

Study	**Title**	**Aim**	**Finding**
Uruthiralingam & Rea (2020)	Augmented and Virtual Reality in Anatomical Education - A Systematic Review	To determine whether an online anatomy-based exchange program has an impact on the intercultural competency preparedness and skills of healthcare professional students	Majority of studies identified were in favour of VR/AR within medical education
Su & Cheng (2019)	A Sustainability Innovation Experiential Learning Model for Virtual Reality Chemistry Laboratory: An Empirical Study with PLS-SEM and IPMA"	To design and develop a virtual reality chemistry laboratory simulation game. To investigate the effects of cognitive load on academic achievement.	Statistically significant increase in academic attainment.

		To investigate the effects of self-efficacy on learning motivation. To investigate the effects of learning motivation on academic achievement.	
Serrano et al (2020)	A Comparative Evaluation of a Virtual Reality Table and a HoloLens-Based Augmented Reality System for Anatomy Training	To design and develop a virtual reality chemistry laboratory simulation game.	97% of participants liked using VR and found it valuable addition to teaching
Bogomolova et al (2021)	Development of a Virtual Three-Dimensional Assessment Scenario for Anatomical Education	A viewpoint commentary highlights the development of a virtual 3D assessment scenario and perspectives from students and teachers on the use of this assessment tool: a 10-minute session of anatomical knowledge assessment with real-time interaction between assessor and examinee, both wearing a HoloLens and sharing the same stereoscopic 3D augmented reality model.	Positive experiences using VR and opportunity for standardisation of assessment when compared to cadaver usage.
Du et al (2020)	The impact of multi-person virtual reality competitive learning on anatomy education: a	To investigate the effects of cognitive load on academic achievement.	Positive impact on knowledge assessment on day 12, but not day 5-possibly showing

	randomized controlled study.		effect on memorization.
Suliman et al (2020)	Preliminary Analysis on Nursing Students Intention to Use Virtual Reality Application as a Learning Tool for Basic Human Anatomy Course,	To explore the factors that would influence the student's intention to use VR as a learning tool through comparative analysis of different VR gadgets using existing human anatomy VR applications that meets the identified acceptance factors.	97% in favour of use, students already use multiple technologies to support learning and this could build upon these to support learning.
Asad et al (2021)	Virtual reality as pedagogical tool to enhance experiential learning: A systematic literature review.	To explore and understand the effect of virtual reality on students' experiential learning by reviewing twenty-six selected articles.	VR creates engaging content, which then increases student interaction and design/ creativity, which strengthens students experiential learning.

Discussion

Across all studies, positive student & participant feedback was reported, with Suliman et al (2020) finding 97% of students were in favour of its use. However, this generalization, both in this work and the majority of the other studies, fail to address the underlying factors outlined be. Within Suliman et al (2020) work, the researchers self-identified that there were multiple limitations within their work, from small sample size (32 people) to gender inequalities, with most respondents being female. Positively, they did identify age ranges of recipients, which links in with Su & Cheng (2019) research within a high school environment, which found positive student experiences of VR. This could lead to expectations from students that the VR Pedagogy they used within schools will continue into HEI, however, as we see from the number of recent studies identified within this research, this is still a developing area in HEIs.

There is a risk that the learning experience of students may not meet their pre-course expectations, leading to a mismatch of expectations vs reality. This may cause an imbalance in the reality pedagogy, an educational approach incorporating students' cultural backgrounds into teaching to enhance their success. (Emdin, 2016) Confounding this, lecturers may not fully understand the student (or their expectations for VR), their 'real life experiences' of utilising VR and so are unable provide suitable context for learning or co-teaching experiences (Sirrakos & Fraser, 2017). Sirrakos & Fraser (2017) developed this further, through identifying the effect that the failure of reality pedagogy could have on differing cultures, linking into further methodological weaknesses in 6/7 of the included studies, namely age ranges. Paris & Alim (2014) identified that a culturally sustaining curriculum, part of the reality pedagogy approach, can reduced cultural attainment inequalities experienced by students. The VR pedagogy has the opportunity to support the development of the reality pedagogy within HEI's, which has been demonstrated to reduced student attainment gaps.

Positively, Suliman et al (2020) did include age ranges, however they failed to include any participants over 26 years old, conversely, Serrano et al (2020) did include ranges up to 66 years old, however is limited by a small sample size. Through synthesis of all 7 studies included here, there is a compelling argument that VR usage is supported through age ranges, from school to 66 years old, however further research or clarification of age ranges within research will be required to confirm this. Both Grassini & Laumann (2020) & Krekhov et al., (2018) reinforced these weaknesses, identifying the impact both physical headset design and personality differences may have on VR attainment or side effects, however, was limited in that the literature review included found many articles which mentioned but did not specify gender discomforts. With Munafo et al. (2017) reporting increased rates of motion sickness, similar to Krekhov et al., (2018), leading to reduced usage times for women and creating an inequality in learner experience and opportunity. Therefore, the direct findings though limited, provide a viewpoint to consider, to prevent gender, ethnicity or socioeconomic barriers affecting student attainment, a common issue within HEIs. (Bolton & Lewis, 2023)

When considering VR as a pedagogical approach, acceptance of its pedagogical limitations must be clear, with many issues being linked to the rapid and recent development of VR/AR, due to Covid. Although there are multiple, developed underlying pedagogies, a selection of which are discussed within this work, there also must be an acceptance, that as with any new pedagogy, defining VR as an independent Pedagogy will be a fluid process.

As a starting point, Hamilton et al (2021) identified the similarities in VR to Kolb's (1984) theory of experiential learning, with the additional benefit of increasing engagement and interaction (Asad et al., 2021). Through increased interaction it is suggested that the benefits of experiential learning will be magnified, and student attainment improved. (Su & Cheng, 2019) The linking of the VR pedagogy to experiential learning pedagogy is a common

trend throughout all bar one of the studies reviewed. The dynamic, interactive, fun, collaborative learning opportunities of VR were identified by Bogomolova et al (2021) as benefits within experiential healthcare education with Asad et al (2021) pointing to the opportunity to increase design, creativity, and self-efficacy, boosting experiential learning.

Su & Cheng (2019) developed this understanding further through their work within environmental chemistry, seemingly an unliked topic, however the concepts of the VR pedagogy remain similar. The neuroscience of memorization is similar across all educational topics, meaning that although the researched topics may not be similar, it would be reasonable to hypothesise that, as this was also found in Du et al (2020) study, these findings can be generalised across VR education. Both studies found identified a statistically significant increase in knowledge & memorization when using VR would also occur in other situations. (Su & Cheng, 2019 & Du et al., 2020).

Du et al (2020) developed this further by identifying the effect of VR on memorization rather than immediate recall, interestingly finding limited impact on immediate recall but significantly improved recall at 12 days post session. All other studies fail to discuss the impact on memorization, a significant point to be missing, when looking at the effectiveness of VR within education, except Su & Cheng (2019) who linked in memorization to the ARCS model of motivation (Keller & Kopp, 1987). When considering VR as an educational pedagogy, the ARCS model of motivation is an imperative part of its success, which was touched upon by multiple studies and often phrased as students' interest, but not developed or fully linked back to the underlying models. ARCS (Keller & Kopp, 1987) attention, relevance, confidence and satisfaction all link to support the use of VR in A&P education, which was previously a didactic, 2-D experience, where many students needed to use additional online resources to understand. This in turn risks increasing inequalities in accessing HEIs, attainment and completion rates, due to multiple factors, including socioeconomic and financial variations. (Bolton & Lewis, 2023) Utilising VR capabilities as part of a taught session can therefore reduce these inequalities, whilst developing experiential learning through ARCS process (Keller & Kopp, 1987)

A common trend throughout 50% of the studies is the effect of VR on cognitive load, and the resulting effectiveness of Experiential and VR pedagogies of learning. Cognitive load theory states that the mind can only hold a limited amount of information at any one time and that instructional methods need to ensure it is not overloaded for educational success. (Sweller, 1988). This theory directly links to VR, due to the risk that, through utilizing a 'new' technology, there is a risk of cognitive overload, negatively impacting achievement. Although, there seems to be a breadth of people who are identified as being 'at risk' of cognitive overload. These range from older adults (Appel et al., 2020), through to children and adolescents (Segovia & Bailenson, 2009), those with limited technological experience (Lin & Duh, 2013) as well as sensory sensitive individuals. (Wilson & Soranzo, 2015)

Although this list appears extensive, the breadth of individuals raises questions, as to whether it is the age, the experience or sensitivity which is affecting cognitive overload, and whether there are other factors, which may be present across all of these studies, such as the introduction given to students using VR, which may be partly responsible for all the cognitive overload findings. However, all studies researched within this work, which addressed cognitive load found no overload impact; instead finding that the fun, immersive impact, stimulating deep learning had the opposite effect. This identifies and area of further research, which must focus on the impact of VR on cognitive overload, but also the teaching methodologies applied when using VR and if there is an opportunity to support individuals to reduce the risk of cognitive overload. In the short term, when utilising VR it would be prudent to be aware of the risk of overload, across a breadth of students and not necessarily focus upon a certain group of students, so that support can be provided across all groups as required.

When stimulating deep learning, through immersive VR, medical students' learning improved (Reid et al., 2007), which supports the role of VR as a pedagogical approach. Furthermore, the interaction and ability to create competition, can increase stress, which for some people can improve drive and knowledge gain. (Kosestner et al., 1984) However, the risk of stress effect on learning has the potential to cause decrease in confidence and interaction which can affect learning through the ARCS and experiential approaches, so must be managed carefully to prevent harm and discrimination to differing genders and learning methods. (Reeve & Deci, 1996) Serrano et al (2020) noted the importance of consideration of age, gender but also gaming experience, in the utilization of VR and consideration of the impact of cognitive load. However, this research failed to assess any of these factors explicitly within the work. Even through synthesis of all studies within this work, it is challenging to create guidelines on who may be at risk of cognitive overload. Equally, although no studies found it to be a factor, it is consideration which must be addressed when developing VR as a pedagogy.

The final aspect addressed within 2/7 studies was the effect of gender on the neuroscience of learning. This links into the effect of ARCS model and the effect of stress and cognitive load, which would imply that the neuroscience of gender, may be more prevalent within the studies than the authors specifically relate to it. The main aspect focussed on has been the role of gender, both within drive, competition, and response to stress, with males displaying an emotional response to competition, but women, no response. (Du et al., 2020) Moderate stress, as discussed in 3/7 studies, can be beneficial and provide the drive to learn, along with active learning; this supports the neuroscience of learning. Both aspects can be positively affected through VR usage in education, and the statistical gains reported regardless of specialties, professions and courses demonstrated within all these studies can be partially explained and linked back to this pedagogy.

Conclusion & Recommendations

Education delivery comes in multiple differing forms, all of which aim to provide the addition of knowledge, understanding and skills to students through multiple differing pedagogies. VR within A&P education is no different. This research clearly identifies that VR has a role to play within education and has a growing evidence base to support VR as a stand-alone pedagogy. The utilisation of VR has been evidenced to be cross specialty, cross profession and is effective across age groups. It can be implied through this research that VR has a role to play within all educational establishments, including HEIs and failure to integrate this is failing to provide students with the best opportunity to succeed and risks discriminating against differing groups of students.

VR has an opportunity to decrease attainment gaps in HEIs caused by gender, ethnicity, socioeconomic and age, as well as initial enrolment & completion of students within HEIs, a key goal for both governmental and HEIs. (Bolton & Lewis, 2023)

However, it is noted that there a multiple limitations and gaps within research, both for A&P education with VR and for VR as an individual pedagogical approach. Furthermore, the cost implications of VR, both for initial purchase and ongoing usage, risk creating two tier education, with wealthy establishments fully utilizing it, and less wealthy not utilizing at all. This would be counterproductive to the opportunity VR has to support the UN 'Digital learning For All' initiative and must be considered and managed with any utilisation and implementation in HEI.

Furthermore, careful consideration must be given to the time implications of VR in HEI. As established throughout this research, there are differing confidence levels in utilising VR from students and staff. Therefore, implementation must provide both sufficient time for staff training and confidence, as well as student confidence; it must be acknowledged that not all students will find VR easy, but parity of opportunities is essential to prevent inequalities broadening. Within practice, utilizing VR requires careful consideration of timings of sessions, student access and time availability within teaching, which may be affected by access to VR sets, or software within these. Some of these can be mitigated, through group work and consideration of live stream casting of the VR app onto a tablet, whilst others are using it or through casting from a single person to a whole class, on a larger screen. Further access may be managed through split group working, with multiple different tasks at the same time or through timetabling sessions in large enough blocks for practical VR to be effective, instead of the shorter traditional lecture type sessions.

To address these challenges the researcher suggests that a cautious, managed approach is used when involving VR in teaching, with cyclical evaluation of its success, following an action research approach (Cohen et al, 2017) This approach is particularly valuable owing to the rapid developments within VR and the effect these may have on students and staff and the limited evidence of gender, race or age discrimination within this technology.

It is recommended that there is a focussed VR trial within the HEI sector, where age, gender and ethnicity is recorded, as well as assessing the effectiveness of the technology, either through knowledge checks or student feedback. This addresses the gaps within the current knowledge base, and combined with an action research approach, allows for any necessary changes to be rapidly implemented into practice.

References

Asad, M.M. et al. (2021) 'Virtual reality as pedagogical tool to enhance experiential learning: A systematic literature review', Education Research International, 2021, pp. 1–17. doi:10.1155/2021/7061623.

Appel, L., et al. (2020). "Older Adults and Virtual Reality: Exploring Age-Related Differences in Usability, Acceptance, and Cognitive Load." Frontiers in Psychology.

Ball, C., Huang, K.-T. and Francis, J. (2021) 'Virtual reality adoption during the COVID-19 pandemic: A uses and Gratifications Perspective', Telematics and Informatics, 65, p. 101728. doi:10.1016/j.tele.2021.101728.

Bogomolova, K. et al. (2021) 'Development of a virtual three-dimensional assessment scenario for Anatomical Education', Anatomical Sciences Education, 14(3), pp. 385–393. doi:10.1002/ase.2055.

Bolton, P. and Lewis, J. (2023). House of Commons Library. Available at: https://commonslibrary.parliament.uk/research-briefings/cbp-9195/#:~:text=Socio%2Deconomic%20status,-Pupils%20eligible%20for&text=There%20is%20a%20very%20clear,skilled%20employment%20or%20higher%20study . (Accessed: 01 April 2024).

Brown, P.C., McDaniel, M.A. and Roediger, H.L. (2014) Make it stick: The science of successful learning. Cambridge (Massachusetts): Belknap Press of Harvard University Press.

Cambridge English Dictionary (no date) https://dictionary.cambridge.org/dictionary/english/ (Accessed: 28 March 2024)

Cohen, L., Manion, L., & Morrison, K. (2017). Research methods in education (8th edition). Routledge

D. Kolb, (1984) Experiential learning: experience as the source of learning and development, Englewood Cliffs, New Jersey: Prentice Hall,

Dale, E. (1969). Audio-Visual Methods in Teaching (3rd ed., p. 108). Holt, Rinehart & Winston, New York: Dryden Press.

Emdin, C (2016), "For White Folks Who Teach in the Hood... and the Rest of Y'all Too: Reality Pedagogy and Urban Education." Beacon Press.

Fanghanel, J et al. (2016) Defining and supporting the scholarship of teaching and learning

(SOTL): A sector wide study, Defining and supporting the Scholarship of Teaching and Learning (SoTL): A sector wide study | Advance HE. Available at: https://www.advance-he.ac.uk/knowledge-hub/defining-and-supporting-scholarship-teaching-and-learning-sotl-sector-wide-study (Accessed: 1 April 2024).

Grassini, S. and Laumann, K. (2020) 'Are modern head-mounted displays sexist? A systematic review on gender differences in HMD-mediated virtual reality', Frontiers in Psychology, 11. doi:10.3389/fpsyg.2020.01604.

Hamilton, D. et al. (2020) 'Immersive virtual reality as a pedagogical tool in education: A systematic literature review of quantitative learning outcomes and experimental design', Journal of Computers in Education, 8(1), pp. 1–32. doi:10.1007/s40692-020-00169-2.

Horiuchi-Hirose, M., Fukuoka, T. and Saeki, Y. (2023) 'Integration of anatomy and physiology into nursing practice as perceived by undergraduate students and registered nurses: A scoping review', BMC Nursing, 22(1). doi:10.1186/s12912-023-01436-0.

Huk, T. (2006) 'Who benefits from learning with 3D models? the case of Spatial ability', Journal of Computer Assisted Learning, 22(6), pp. 392–404. doi:10.1111/j.1365-2729.2006.00180. x.

Johnson, S.N. and Gallagher, E.D. (2021a) 'Learning processes in anatomy and physiology: A qualitative description of how undergraduate students link actions and outcomes in a two-semester course sequence', Advances in Physiology Education, 45(3), pp. 486–500. doi:10.1152/advan.00135.2020.

Johnson, S.N. and Gallagher, E.D. (2021b) 'Learning processes in anatomy and physiology: A qualitative description of how undergraduate students link actions and outcomes in a two-semester course sequence', Advances in Physiology Education, 45(3), pp. 486–500. doi:10.1152/advan.00135.2020.

Kavanagh, S., Luxton-Reilly, A., Wuensche, B. & Plimmer, B. (2017). A systematic review of Virtual Reality in education. Themes in Science and Technology Education, 10(2), 85-119. https://www.learntechlib.org/p/182115/. (Accessed: 01 April 2024)

Keller, J. M., & Kopp, T. W. (1987). An application of the ARCS Model of Motivational Design.

In C. M. Reigeluth (Ed.), Instructional theories in action: Lessons illustrating selected theories and models (pp. 289–320). Lawrence Erlbaum Associates, Inc.

Koestner, R. et al. (1984) 'Setting limits on children's behavior: The differential effects of controlling vs. informational styles on intrinsic motivation and creativity', Journal of Personality, 52(3), pp. 233–248. doi:10.1111/j.1467-6494.1984.tb00879.x.

Krekhov, A., et al. (2018). "Exploring the Impact of Gender on VR Headset Design." ACM Symposium on Virtual Reality Software and Technology.

Lacoche, J. et al. (2017) 'Collaborators awareness for user cohabitation in co-located collaborative Virtual Environments', Proceedings of the 23rd ACM Symposium on Virtual Reality Software and Technology [Preprint]. doi:10.1145/3139131.3139142.

Lin, J. J.-W., & Duh, H. B.-L. (2013). "Effects of VR and Spatial Abilities on Cognitive Load, Task Performance, and User Experience in Immersive Virtual Environments." Presence: Teleoperators and Virtual Environments.

Masters, K. (2013) 'Edgar Dale'spyramid of learningin medical education: A literature review', Medical Teacher, 35(11). doi:10.3109/0142159x.2013.800636.

Munafo, J., et al. (2017). "The Experience of Virtual Reality Induced Symptoms and Effects (VRISE) in Men and Women." Human Factors.

Paris, D., & Alim, H. S. (2014). "What Are We Seeking to Sustain through Culturally Sustaining Pedagogy? A Loving Critique Forward." Harvard Educational Review.

Reeve, J. and Deci, E.L. (1996) 'Elements of the competitive situation that affect intrinsic motivation', Personality and Social Psychology Bulletin, 22(1), pp. 24–33. doi:10.1177/0146167296221003.

Reid, W.A., Duvall, E. and Evans, P. (2007) 'Relationship between assessment results and approaches to learning and studying in year two medical students', Medical Education, 41(8), pp. 754–762. doi:10.1111/j.1365-2923.2007.02801.x.

Segovia, K. Y., & Bailenson, J. N. (2009). "Virtual Reality as a Medium for Cognitive Behavioural Therapy: A Case Study on Children's Phobias." Journal of Child Psychology and Psychiatry.

Sirrakos, G. and Fraser, B.J. (2016) 'A cross-national mixed-method study of reality pedagogy', Learning Environments Research, 20(2), pp. 153–174. doi:10.1007/s10984-016-9220-y.

Snyder, H. (2019) 'Literature review as a research methodology: An overview and guidelines', Journal of Business Research, 104, pp. 333–339. doi:10.1016/j.jbusres.2019.07.039.

Sulaiman, H. et al. (2019) 'Evaluation of a virtual reality (VR) learning tool for Fundamental Turbine Engineering Concepts', Advances in Visual Informatics, pp. 48–59. doi:10.1007/978-3-030-34032-2_5.

Swan, K. (2001) ‘Virtual interaction: Design factors affecting student satisfaction and perceived learning in asynchronous online courses’, Distance Education, 22(2), pp. 306–331. doi:10.1080/0158791010220208.

Sweller, J. (1988) ‘Cognitive load during problem solving: Effects on learning’, Cognitive Science, 12(2), pp. 257–285. doi:10.1016/0364-0213(88)90023-7.

United Nations (no date) Digital Learning for all, United Nations. Available at: https://www.un.org/en/transforming-education-summit/digital-learning-all#:~:text=We%20commit%20to%20establishing%20and,the%20privacy%2C%20safety%20and%20data (Accessed: 01 April 2024).

Waterston, S.W. and Stewart, I.J. (2005) ‘Survey of clinicians’ attitudes to the anatomical teaching and knowledge of medical students’, Clinical Anatomy, 18(5), pp. 380–384. doi:10.1002/ca.20101.

Wilson, J. R., & Soranzo, A. (2015). "The Use of Virtual Reality in Psychology: A Case Study in Visual Perception." Computational and Mathematical Methods in Medicine.

A framework for delivering multimedia assessments in health & social care higher education: empowering university lecturers.

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Abstract:

This paper presents a comprehensive framework for implementing multimedia assessments in health and social care higher education, aiming to equip university lecturers with practical tools and strategies. Student- generated multimedia assessments offer great potential for enhancing student learning and engagement. Despite the recognised benefits and increasing usage, a pragmatic framework is notable absent from the literature.

The framework leverages educational theories such as student-centred learning and active learning, and multimodal learning and assessment principles to enhance student engagement and skill development. A thorough literature review was conducted to identify existing frameworks and models. Additionally, the framework's development was informed by an ongoing student feedback on the support received since 2021.

Drawing from existing literature review and empirical data, this framework addresses key aspects of multimedia assessments, including the rationale, detailed assessment requirements, assessment processes, student preparation, feedback provision and evaluation. The results highlight the importance of integrating educational technology and supportive practices to improve student outcomes and experiences in multimedia assessments.

This paper concludes that the proposed framework not only facilitates effective multimedia assessments but also contributes to the ongoing evolution of assessment practices in higher education.

Background

Student-generated multimedia content such as audio podcasts, digital video has been identified by some researchers to provide opportunities for student engagement, reflection on a topic of interest, active group participation encouragement and developing students into autonomous leaners, including development of digital and communication skills that are relevant to the students' profession (Schuck & Kearney, 2006; Richelle & Erik 2014; Georgiou, H & Wendy, N. 2021). Cham et al. (2021) acknowledged health students studying in higher education need to improve their digital skills and competencies.

Hawley & Allen (2018) highlight the existence of other issues involved with student multimedia projects. For example, students not having access to the right software, equipment, compatibility between different devices. Hawley & Allen (2018) also highlight a

key literature search observation regarding the lack of implementation of rigor and quality control measures by academic staff when delivering student multimedia projects. Despite these limitations or problems, Hawley & Allen still believe student-generated multimedia content creation assessments are an innovative method of assessment and a good way of enhancing learning.

Definitions

Multimedia: Multimedia refers to the integration of multiple types of media—such as images, illustrations, text, video, audio, and animations—to create a cohesive final product (Mayer, 2009). An example is a narrated presentation video, combining text, images, and voice narration.

Multimodal learning: Multimodal learning involves using various modes of learning to teach a concept and enhance the learning experience. This approach incorporates different learning styles, such as visual, auditory, kinaesthetic, and reading/writing (Tham, 2015), to tailor diverse ways people learn.

Multimodal assessment: Multimodal assessment uses a blend of different learning styles or modes. By employing multimedia assignments instead of traditional written essays or presentations, it increases student engagement by allowing them to use their preferred learning styles (Lauer, 2009; Pirhonen & Rasi, 2017).

Student-generated digital media: Student-generated digital media, such as audio podcasts and digital videos, have been identified by researchers as valuable tools for enhancing student engagement, promoting reflection on topics of interest, encouraging active group participation, and fostering the development of autonomous learners (Schuck & Kearney, 2006; Richelle & Erik, 2014; Georgiou & Wendy, 2021). These media formats provide students with the opportunity to actively create content, which can deepen their understanding and facilitate a more interactive and participatory learning experience.

Issues with multimedia assessments in higher education settings

The rise of multimedia assessments, such as narrated PowerPoint presentations and digital stories, offers new ways for students to demonstrate their knowledge, especially in non-technical disciplines (Cox et al., 2010). However, these assessments also introduce challenges for both students and staff.

Research by Arvidsson and Delfanti (2019), Earnshaw (2017), and Martin and Zahrndt (2017) highlights that multimedia assessments require specific skills that students often lack without formal training, leading to potential difficulties in creating and submitting their work. Cham et al. (2021) emphasise that health students need to improve their digital competencies to succeed in these assessments.

Overall, while multimedia assessments can enhance student engagement, they also demand increased digital literacy and support, underscoring the need for integrating digital skills training into the curriculum.

Why should we adopt multimedia assessments in higher education?

According to the recent literature, multimedia assignments can provide opportunity for students to develop visual presentation skills in conjunction with writing and promote the sharing of knowledge (Riordan et al., 2020).

They can be used to deepen students' active learning (Coulson & Frawley, 2017; Pirhonen & Rasi, 2016) also allow students to demonstrate their assessed skills using new and engaging methods of working (Cox et al., 2010, Ledonne, 2014).

Multimedia assignments can provide opportunity to develop graduate attributes such as planning skills, time management, communication skills (Frawley et al., 2015; Morel & Keahey, 2016). They also provide the opportunity to test students' ability to relate with information in a different way than they would with just written assignments. This boosts the way they deal with the given content hence providing the opportunity to extend the students' learning experience (Ledonne, 2014). Multimedia assignments can boost teamwork which produces a setting favourable to reflection and deep learning (Cox et al., Pirhonen & Rasi, 2016).

Pedagogy underpinning multimedia assessment.

The multimedia assessment method proposed is deeply rooted in student-centred learning theories, which emphasise active engagement and practical application of knowledge. Active learning, as highlighted by Coulson and Frawley (2017), encourages students to participate actively in their learning process, enhancing understanding and retention. This is achieved in multimedia assessment through critical thinking and creativity. Laverty's (2016) 'Learning by Doing' is directly applicable, as students create as can be seen a learning resource, thereby learning through direct experience. Furthermore, multimedia assignments develop visual presentation skills, a crucial competency in digital age, and promote sharing knowledge, as Riodan et al. (2020) suggest, by encouraging students to present and disseminate their work.

Collaboration learning, supported by Cox et al. (2010), is also an integral part of this approach. Students sometimes work in teams, fostering communication, and the ability to learn from peers. Reyna (2018) added that students feel empowered when showcasing what they learned to others. The assessment method is therefore aligned with the cognitivism theory because the learners have to organise, synthetise the material to present the information for producing a multimedia assessment.

The multimedia assessment method also aligns with Edgar Dale's Cone of Learning, which illustrates how different learning experiences impact retention rates (Figure 4).

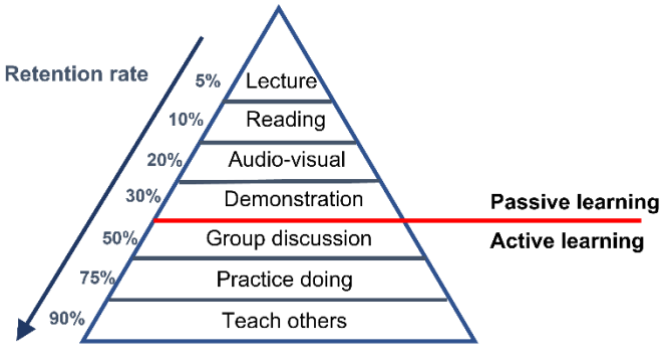

Figure 4: Cone of Learning

By engaging students in creating multimedia projects, the assessment method places them in the 'doing' and 'teach others' stages of the Dale's cone, hereby enhancing retention and deep learning. This hands-on approach ensures that students are not merely passive recipients of information but active participants.

By incorporating these theories, multimedia assessments not only evaluate student's understanding but also develop essential skills that prepare them for real-world challenges.

Aims of this article

This article aims to present a multimedia assessment framework designed for university lecturers, offering guidance on effectively implementing multimedia assessments in health and social care higher education settigs. Additionally, practical strategies for academic staff to transform their assessment approaches toward multimedia assignments will be shared.

Literature review

Eligibility criteria

Three selection criteria relating to this study were used. These provided the necessary parameters for searching and assessing the published evidence for this study. The following criteria were used to select studies: (1) articles had to describe the details about a framework or a model or a theory in order to develop a new framework for multimedia assessment. (2) the setting had to be applicable for a higher education setting.

Search strategy for a framework

A four-phase search strategy for identifying the current literature in multimedia assessment framework was adopted (Moher et al. 2009). This approach is based on the PRISMA Statement. The first phase involved the development of a search strategy that incorporated

a variety of terms. The search was restricted to peer-reviewed publications written in English and less 10 years old.

The primary research question guiding this literature search is: “What models exist for assessing media assessments in educational contexts?” To address this question, the research was broken down into three key concepts: media assessment and model. A comprehensive list of search terms was developed for each concept, including synonyms, related terms, and variations in spelling. Boolean operators were used to combine these terms effectively. For media assessment, the search terms included: media assessment and multimodal assessment. For model, the terms included: model and framework.

The Educational Resources Information Center (ERIC), Education Research Complete databases and Scopus were used. In the second phase, the titles and abstracts of publications identified by the searches were screened to identify articles that met the selection criteria. The third phase, the full text of all publications retained from phase two was reviewed to ensure that articles met all selection criteria. Lastly, after excluding irrelevant studies from phase three, the articles identified were extracted. Figure 5 illustrates the flow diagram of the literature search.

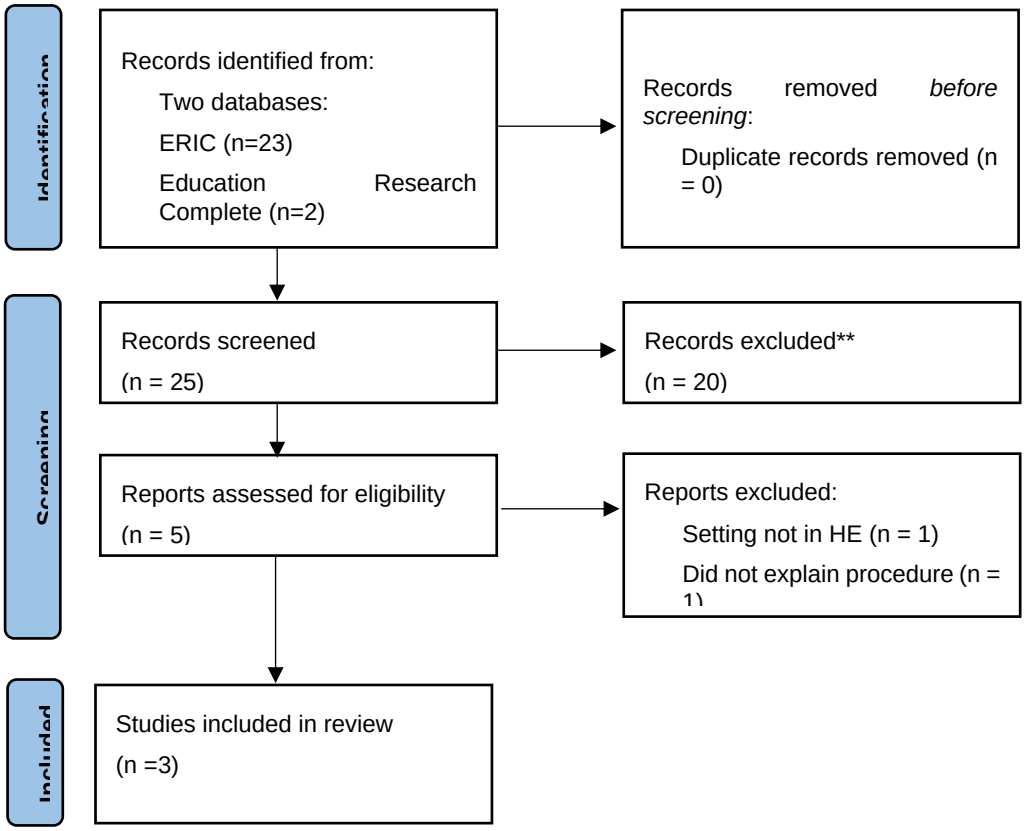

Figure 5: flow diagram of the literature search

Literature review findings

After completing the four phases outlined above, three articles were obtained (see Figure 5). Only five articles were included to the eligibility stage. The reasons for excluding the two articles were: did not explain procedures of multimedia assessment (n=1) and did not focus on higher education setting (n=1). Table 1 provides a summary of the characteristics of the included publications.

Table 1: Summary of the characteristics of the publications

	Location	**Approach used to develop a framework**	**Characteristics of frameworks focused on**
Blum & Barger, 2018	USA	Pragmatic approach emphasising on non-written assignments outside the classroom	Assessment design model which effectively facilitate the design and the implementation of multimodal assignments
Reyna & Meier, 2018	Australia and UK	Pragmatic approach	Practical framework to guide academics the implementation of digital presentations as assessment tools in tertiary science education
Ross et al., 2020	UK	Empirical approach supported with a qualitative approach	Multimodal assessment framework providing guidance for lecturers who are designing, supporting and assessing multimodal work

Reyna and Meier (2018) developed the Learner-Generated Digital Media (LGDM) framework to guide the implementation of summative digital media projects in tertiary science education. While comprehensive in covering elements like student training, video hosting, and feedback mechanisms, the framework could benefit from a stronger emphasis on assignment guidance and marking criteria, as well as addressing challenges like technological barriers and accessibility issues.

Blum and Barger (2018) introduced the CASPA model (Consume, Analyze, Scaffold, Produce, Assess) to support students in designing and implementing multimedia projects. However, it falls short as an overall implementation guide for academic staff, lacking practical applicability in a broader context.

Ross et al. (2020) offer a detailed framework for assessing multimodal student work, integrating visual, digital, and textual communication. While it emphasises critical thinking and creativity, the framework does not fully address the practical challenges of implementation, such as resource limitations and consistent application across diverse educational contexts.

Each of these models offers valuable insights for improving multimedia assessments, with Reyna and Meier's learner-centred approach and CASPA's scaffolding support being particularly strong. However, their practical limitations suggest a need for a more applicable model. Therefore, an adapted model, building on Reyna and Meier's work, was developed to serve as a practical guide for academics in health education.

Empirical development of the framework

The development of the multimedia assignment framework is grounded not only in existing educational models but also in empirical data gathered through continuous student survey conducted since 2021. This survey has provided critical insights into the students' experience and the efficacy of the support provided. With 69 responses informing the framework, the feedback has been instrumental in refining the approach. Notably, 100% of students who attended the practice sessions with an educational technologist acknowledged their usefulness in preparing for the summative assignment.

Analysing the responses to the question, "Explain how the practice session with the Educational Technologist helped you with your summative assessment", revealed six themes:

1. Skill development: students reported significant improvement in the necessary skills for creating narrated PowerPoint presentations and academic posters. Comments included: "Develop required skills" and "It helped me in developing the required skills to academic poster".

2. Understanding the assignment: the sessions clarified assignment requirements and provided step-by-step guidance. Students appreciated the "better understanding of the assignment", the "step-by-step tutorial with the opportunity to ask questions" and "It enabled me to understand what I was supposed to do".

3. Confidence: practising beforehand increased students' confidence and reduced feelings of being overwhelmed. They expressed that "I felt more confident when doing the summative".

4. Practical application: hands-on practice and useful feedback allowed students to refine their work. They highlighted that “the formative practice assignment helped me to practice” and “the feedback provided enabled me to prepare”.

5. Technical guidance: the sessions helped students develop relevant technical skills, including software usage and correct assignment upload procedures. Students noted, “Better understanding how to upload” and “It was explained how to create the narrated PowerPoint”.

6. Support and patience: the technologist’s patience and supportive instruction were highly valued. Feedback included, "He exhibited patience," and "The assistance provided was quite beneficial."

Overall, the practice sessions with the educational technologists were highly valued for their roles in skill development, enhancing understanding of the assignment requirements, boosting confidence, offering technical guidance and delivering supportive instructions.

The Multimedia Assessment Framework

The proposed framework is specifically tailored for health and social care staff in higher education, providing structured guidance on the essential steps for designing, delivering, and evaluating multimedia assessments.

Inspired by Reyna and Meier (2018), the framework comprises eight elements, developed through observations and experiences gained while supporting health and social care staff at our institution. It begins with establishing the rationale for the multimedia assessment and concludes with an evaluative phase designed to inform future improvements (Figure 6).

Figure 6: Framework for delivering multimedia assessments

The stages are designed to guide academics in delivering this type of assessment.

Stage 1 - Explain why you are using a multimedia assessment

In the initial stage of the eight-stage multimedia assignment framework, the focus is on justifying the use of multimedia assessments. Traditional assessment methods, like essays and exams, primarily assess text-based responses, which may not fully capture the diverse skills students possess. In contrast, multimedia assessments allow students to demonstrate understanding and creativity through various media, such as narrated PowerPoint presentations, digital posters, and video recordings. This approach caters to different learning styles and better reflects students' capabilities in the digital age.

The rationale for multimedia assessments is grounded in educational theories that emphasise student-centred learning, active engagement, and skill development. For example:

- Active Learning (Coulson & Frawley, 2017)
- Learning by Doing (Laverty, 2016)
- Visual Presentation Skills and Knowledge Sharing (Riordan et al., 2020)
- Collaborative Learning (Cox et al., 2010)

Multimedia assessments can effectively address higher levels of Miller's pyramid, such as a narrated PowerPoint (Shows How) or a video demonstration (Does), providing a comprehensive evaluation of student abilities.

However, before adopting multimedia assessments, the teaching team should critically assess their necessity by considering:

- Why is a multimedia assessment needed?
- How does it enhance student learning compared to traditional assessment methods?
- What added value does it provide?

If the added value is unclear, traditional assessment methods, such as essays or presentations, may be more appropriate.

Stage 2: Set the assessment requirements and marking criteria

Before the module delivery begins, the teaching team must establish the assessment requirements and marking criteria for evaluating the students' work. This stage focuses on determining how the students' multimedia assessment will be assessed. Hence, the module teaching team must develop the assessment criteria before starting to teach the students and ensure that the criteria is shared with both students and staff. This ensures that everyone involved has a consistent understanding of the assessment standards

Its therefore crucial to provide students with a clear and detailed understanding of what is expected from them in the assessment and how their wok is to be marked. This stage sets students up for success by aligning their efforts with the assessment goal. It should be clear to the students on what success and failure should look like. The module teaching team should provide detailed instructions on the length and the format of the assessment as well as the content requirements such as the inclusion of an introduction, main content segments and a conclusion, long with the references.

The marking criteria may take the form of rubrics, which must be specific for this type of assessment, different from written assessments. The rubrics may include components on the creativity and the content originality. The presentation and delivery component are important to assess the clarity and the effectiveness of the communication. A clear timeline for the assessment including a milestone for a practice submission and the submission deadline must be provided. Students need to be encouraged to manage their time effectively and aim to submit a few days before the deadline to seek technical support if needed.

Stage 3: Set the assessment submission portal

Submitting a multimedia assessment differs significantly from traditional written assessments. Unlike text-based submissions, multimedia assessments involve larger file sizes and diverse formats, which strain university learning management systems (LMS) like Canvas, especially when handling large file uploads from large student cohorts. To address this, integrating third-party tools like Panopto with the LMS can be essential. This allows examiners to easily access student submissions without the need to download files, ensuring that the LMS storage is not overwhelmed and that the work is securely stored.

The assignment portal should provide not only the assessment brief and marking rubrics but also detailed instructions or tutorial videos on how to upload multimedia files. These resources should cover key aspects of the assessment to support students effectively.

When choosing a storage medium, avoid platforms like YouTube and OneDrive, as students can alter access permissions, potentially causing examiners to lose access. Instead, use secure, long-term storage solutions such as Panopto that meet auditing and regulatory requirements.

Stage 4 - Prepare your students

This stage focuses on the skills and knowledge students need to use the various technologies required for completing the multimedia assessment. The teaching team should not assume all students possess these skills. Our observations from working with various cohorts revealed that students often struggle with multimedia assessments due to a lack of ICT skills and preparation. Therefore, it is crucial to teach these skills before starting the summative multimedia assessment.

The preparation may begin by a dedicated session led by an Educational Technologist, who will explain the technical requirements in detail. During this session, students will receive a demonstration that encapsulates the entire process from creation to submission.

Additionally, students are encouraged to practise creating and submitting multimedia files using a formative exercise and submission portal. This hands-on practice helps the students to familiarise themselves with the various required technologies and procedures, reducing anxiety and technical difficulties. Teaching team should avoid the traditional lecture style delivery method when teaching the skills. A hands-one approach is better as it gives the students to practice and acquire the relevant skills. Before the practice sessions, students should be sent preparatory exercises to ensure they come to the sessions with necessary resources such as a computer and software.

To support students' post formative sessions, they should also be informed where to find the step-by-step help written instructions alongside the screen-recorded help videos.

Creating a help page with guides and video tutorials on the module site is a good thing to put in place for the students.

Stage 5: Provide feedback on formative submission

Timely, specific, and constructive feedback is crucial for enhancing student understanding and skills. Hattie and Timperley (2007) emphasise feedback's significant impact on student achievement and learning outcomes. Black and Wiliam (1998) highlight the role of formative assessment in guiding learning, while Nicol and Macfarlane-Dick (2006) underscore its importance in fostering self-regulated learning. Yorke (2003) also stresses formative assessment's value in helping students understand evaluation standards and achieve learning outcomes.

Marshall and Drummond (2006) argue that effective assessment requires well-designed tasks that align with key module topics to enhance engagement and understanding. To maximise feedback effectiveness, markers should use rubrics to align feedback with assessment criteria, ensuring consistency and clarity (Looney, 2011). This approach reinforces learning objectives and encourages students to reflect on and apply feedback, promoting continuous learning.

Stage 6: Provide ongoing support during the Summative Assessment period

Research and experience indicate that many students fail to effectively act on formative feedback, a challenge highlighted by Nicol (2010) and Crisp (2007). These studies reveal that students often struggle to understand and apply feedback, while teachers feel their detailed feedback does not always lead to significant learning improvements. Glazzard et al. (2023) also found that students frequently do not engage with or appreciate the value of feedback, further complicating its effectiveness.

To address these issues, it is crucial to provide continuous support during the summative assessment period. As Evans (2013) suggests, teachers should actively guide students rather than waiting until submission to identify areas of need.

Specific recommendations include:

- Encourage students to use formative feedback and resources and remind them not to delay starting their assignments (Nicol, 2010; Crisp, 2007; Evans, 2013).
- Promote the use of assessment rubrics and checklists to foster self-regulation and independence (Klenowski, 2009).
- Facilitate student engagement with feedback through staff-student discussions, peer reviews, and face-to-face sessions (Nicol, 2010; Crisp, 2007; Glazzard et al., 2023).

- Organise workshops to help students understand and apply feedback, and to address any technical issues close to submission deadlines (Nicol, 2010; Crisp, 2007).
- Implement checkpoints in course design to monitor progress, identify at-risk students early, and ensure timely interventions (Henri et al., 2021).

Overall, incorporating these strategies can help bridge the gap between formative feedback and successful summative assessment completion, improving student engagement and learning outcomes.

Stage 7: Mark the Summative submission and provide feedback

In this stage, academics assess and moderate students' submitted work using the agreed-upon marking criteria. Providing relevant and effective feedback is a critical element of the multimedia assessment framework, emphasising the importance of feedback in enhancing students' understanding and skills. Feedback should be timely, specific, and constructive, enabling students to identify both their strengths and areas for improvement.

Effective feedback also enhances transparency in grading by clearly articulating the reasons behind the marks awarded. This transparency reduces ambiguity and builds trust in the evaluation process (Haughney et al., 2020).

Markers use the marking rubrics to ensure that feedback aligns with predefined criteria, including content knowledge and application, critical, analytical, and evaluative thinking, synthesis of information, as well as creativity and presentation skills. This method not only reinforces the learning objectives but also encourages students to reflect on their work and apply the feedback to future assignments, thus fostering a continuous learning process.

Stage 8: Evaluate the assessment and its delivery

In the final stage, evaluating this assessment method and its delivery approach involves lecturers adopting the role of reflective practitioners to assess the effectiveness of the multimedia assessment and identify areas for improvement. Reflective practice, as outlined by Schön (1983), encourages continuous learning and adaptation through critical reflection on one’s teaching methods. Lecturers should review both the overall success and specific challenges encountered by students. Incorporating specific questions into the module feedback questionnaire can provide valuable insights from the students’ perspectives, focusing on their experiences with the technical aspects, as well as the perceived value of the feedback received. Analysing the feedback allows lecturers to make informed adjustments to the assessment structure, marking criteria, assessment delivery, or support received. The reflective process ensures that the multimedia assessment continues to involve, enhancing its effectiveness and relevance in fostering student learning and engagement (Brookfield, 1995).

Conclusion

The framework presented in this paper offers a structured approach for implementing multimedia assessments in health and social care higher education. By aligning with educational technologies and incorporating practical strategies, the framework addresses both pedagogical and technical challenges, ensuring that multimedia assessments are not only feasible but also beneficial to students and academic staff. The proposed framework empowers lecturers by providing a clear, practical guide to seamlessly integrate multimedia assessments into the existing curriculum.

Further research should focus on the long-term impact of multimedia assessments on student learning and professional readiness. Additionally, exploring the scalability of this framework across different disciplines can provide broader applicability.

In conclusion, this framework not only facilitates the effective use of multimedia assessments but also contributes to the ongoing evaluation of assessment practices in higher education. By fostering active learning and skill development, it prepares students for digital demands of their future careers, thereby enhancing the overall quality of health and social care education.

References:

Arvidsson, A. & Delfanti, A. (2019). *Introduction to digital media*. Wiley-Blackwell, Hoboken, NJ. doi: 10.1002/9781119276296

Black, P., & Wiliam, D. (1998). Inside the black box: Raising standards through classroom assessment. Phi Delta Kappa International. https://kappanonline.org/inside-the-black-box-raising-standards-through-classroom-assessment/

Brookfield, S. (1995). *Becoming a critically reflective teacher*. Jossey-Bass.

Cham, K., Edwards, M.-L. ., Kruesi, L. ., Celeste, T. ., & Hennessey, T. (2021). Digital preferences and perceptions of students in health professional courses at a leading Australian university: A baseline for improving digital skills and competencies in health graduates. *Australasian Journal of Educational Technology*, *38*(1), 69–86. https://doi.org/10.14742/ajet.6622

Coulson, S. & Frawley, J. K. (2017). Student generated multimedia for supporting learning in an undergraduate physiotherapy course. In H. Partridge, K. Davis & J. Thomas (Eds.), *Me, Us, IT! Proceedings ASCILITE2017: 34th International Conference on Innovation, Practice and Research in the Use of Educational Technologies in Tertiary Education*. (pp. 235–244). University of Southern Queensland

Cox, A. M., Vasconcelos, A. C., & Holdridge, P. (2010). Diversifying assessment through multimedia creation in a non-technical module: Reflections on the MAIK

project. *Assessment and Evaluation in Higher Education, 35*(7), 831-846. https://doi.org/10.1080/02602930903125249

Crisp, B.R. (2007). Is it worth the effort? How feedback influences students' subsequent submission of assessable work. *Assessment & Evaluation in Higher Education*, 32(5), pp. 571-581. https://www-tandfonline-com.ezproxy.herts.ac.uk/doi/full/10.1080/02602930601116912

Earnshaw, R. (2017). *State of the art in digital media and applications.* Springer, Bradford, UK. https://doi.org/10.1007/978-3-319-61409-0

Evans, C. (2013). Making sense of assessment feedback in higher education. *Review of Educational Research*, 83(1), pp. 70-120. https://doi.org/10.3102/0034654312474350

Georgiou, H & Wendy, N. (2021). New assessment forms in higher Education. In C. McKenna & K. Wilmot. (Eds.), *Building knowledge in higher education: Enhancing teaching and learning with legitimation code theory*. (pp. 55-75). Routledge. https://doi-org.ezproxy.herts.ac.uk/10.4324/9781003028215

Glazzard, J., Stones, S., & Percy-Smith, B. (2023). Student perceptions of feedback in higher education. *International Journal of Learning, Teaching and Educational Research, 18*(11), pp. 38-52. https://doi.org/10.26803/ijlter.18.11.3

Hattie, J., & Timperley, H. (2007). The power of feedback. *Review of Educational Research, 77*(1), 81-112. https://doi.org/10.3102/003465430298487

Haughney, K., Wakeman, S., & Hart, L. (2020). Quality of Feedback in Higher Education: A Review of Literature. *Education Sciences*, *10*(3), 60. https://doi.org/10.3390/educsci10030060.

Hawley, Ruth & Allen, Cate. (2018). Student-generated video creation for assessment: can it transform assessment within Higher Education?. *International Journal for Transformative Research, 5*(1). https://doi.org/10.2478/ijtr-2018-0001

Henri, D. C., Nattrass, S., Hubbard, K. E., Morrell, L. J. and Scott, G. (2021) 'Checking for 'Checkpoints': Using course design to redefine engagement in Early-warning system learner analytics', *Open Science Framework*. Available at: https://doi.org/10.35542/osf.io/p7nuk.

Klenowski, V. (2009). Assessment for learning revisited: An Asian-Pacific perspective. *Assessment in Education: Principles, Policy & Practice, 16*(3), 263-268. https://www.tandfonline.com/doi/full/10.1080/09695940903319646

Laverty, M. J. (2016). Thinking my way back to you: John Dewey on the communication and formation of concepts. *Educational Philosophy and Theory*, *48*(10), 1029–1045. https://doi.org/10.1080/00131857.2016.1185001

Ledonne, D. (2014). Multimedia assignments: not just for film majors anymore. *Chronicle of Higher Education*, *60*(32). https://www.chronicle.com/article/Multimedia-Assignments-Not/145939

Looney, J. W. (2011). Integrating formative and summative assessment. (OECD Education Working Papers, No. 58). Paris: OECD. https://hdl.handle.net/20.500.12799/2515

Marshall, B., & Drummond, M. (2006). How teachers engage with assessment for learning: Lessons from the classroom. *Research Papers in Education, 21*(2), 133-149. https://www.tandfonline.com/doi/full/10.1080/02671520600615638

Martin, J. M. & Zahrndt, J. (2017). Media and digital literacy: a framework for instructional strategy. In M.G. Strawser (Ed.), *New media and digital pedagogy: enhancing the twenty-first-century classroom.* (pp 33–54). Lexington Books, London.

Moher D, Liberati A, Tetzlaff J, Altman D G. (2009) Preferred reporting items for systematic reviews and meta-analyses: the PRISMA statement, *BMJ; 339*(2535). doi:10.1136/bmj.b2535

Nicol, D. (2010). From monologue to dialogue: Improving written feedback processes in mass higher education. *Assessment & Evaluation in Higher Education*, 35(5), 501-517. https://doi.org/10.1080/02602931003786559

Nicol, D. J., & Macfarlane-Dick, D. (2006). Formative assessment and self-regulated learning: A model and seven principles of good feedback practice. *Studies in Higher Education, 31*(2), 199-218.

Pirhonen, J., & Rasi, P. (2017). Student-generated instructional videos facilitate learning through positive emotions. *Journal of Biological Education*, *51*(3), 215-227. https://doi.org/10.1080/00219266.2016.1200647

Riordan, M. A., Abo-Zebiba, Z., & Marsh, J. (2020). A comparison of multimedia and traditional paper assignments in an introductory psychology course. *Teaching of Psychology*. https://doi.org/10.1177/0098628320954192

Schuck, S., & Kearney, M. (2006). Capturing learning through student generated Digital Video. *Australian Educational Computing, 21*(1), 15-20

Reyna, J., & Meier, P. (2018a). Learner-Generated Digital Media (LGDM) as an Assessment Tool in Tertiary Science Education: A Review of Literature. *IAFOR Journal of Education*, *6*(3). https://doi.org/10.22492/ije.6.3.06

Reyna, J., & Meier, P. (2018b). A Practical Model for Implementing Digital Media Assessments in Tertiary Science Education. *American Journal of Educational Research*, *6*(1), 27-31.

Reyna, J. (2018). Learners as co-creators of knowledge using digital media. *Training & Development, 45*(1), 14–15. https://search.informit.org/doi/10.3316/informit.071910340901980

Richelle V. Adams & Erik Blair (2014) The learner-generated podcast: engaging postgraduate engineering students in a mathematics-intensive course, Research in PostCompulsory Education, 19:2, 132-146, DOI: 10.1080/13596748.2014.897502

Schön, D. A. (1994). The Reflective Practitioner: How Professionals Think in Action. Routledge. Abingdon, Oxon, UK.

Wood, D., Wood, H., and Middleton, D. (1978). An experimental evaluation of four face-to-face teaching strategies. *International Journal of Behavioural Development*, *1*(2), pp. 131-147. https://doi.org/10.1177/016502547800100203

Yorke, M. (2003). Formative assessment in higher education: Moves towards theory and the enhancement of pedagogic practice. *Higher Education, 45*(4), 477-501.

The Value of Gamification as a Pedagogical Tool to Support Teaching and Learning in Undergraduate Pharmacy Education.

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Abstract

Gamification is increasingly utilised in higher education as a creative tool to enhance student engagement and motivation. This paper considers its use in pharmacy education, and specifically within the Master of Pharmacy undergraduate programme. Innovative examples of gamification have been identified, including simulation games and escape rooms, which can be utilised as a springboard for creating a variety of educational games in multiple content areas of the pharmacy curriculum.

Recommendations as to how gamification can be incorporated into the Master of Pharmacy course at the University of Hertfordshire are presented, through the design of an escape room game to develop prescribing-related communication and clinical skills within a safe environment. This activity provides a collaborative social experience which can potentially enhance interpersonal, problem solving, and decision-making skills- all of which are fundamental in the transition from a student to a pharmacist.

Introduction

Gamification is increasingly utilised in higher education as a creative tool to enhance student engagement and motivation. Since 2011, there has been a surge in academic as well as general interest shown in the topic, resulting in a growing amount of research (Koivisto and Hamari, 2019). Gamification can be defined as 'the use of game design elements in non-game contexts' and involves the application of gaming elements to something that is principally not a game. "Game-based learning", "serious games" and "educational games" are some of the terms which are used in the literature to describe gamification (Deterding et al., 2011).

In education, gamification has been used as a form of active learning to increase knowledge and engage students in a learning task that is perceived to be fun, thereby breaking the monotony of conventional didactic lesson environments. The effective implementation of gamification allows learners to acquire new skills, reinforce key knowledge and simulate real life scenarios (Dell and Chudow, 2019). The ability to provide instant feedback and low-stakes formative assessments through gamified learning is thought to improve student achievement and maximise learning (Fens et al., 2021).

Whilst gamified learning is a current teaching and learning trend that spans a range of academic disciplines, the literature around its application in pharmacy education has grown

significantly in the last decade (Sera and Wheeler, 2017). Examples of gamification described in the literature include quiz-based review games such as Kahoot ® and Jeopardy®, board games and software and real-life simulations (Hope et al., 2022).

Gamification of simulations in the education of pharmacy students allows learners to practice in a safe environment, without any risk of patient harm (Fens et al., 2021). An example of this intervention is “The Pharmacy Game”, a novel educational serious game originally developed by the University of Groningen in Netherlands, where players competitively manage their own simulated pharmacy, in a fully immersive simulation (Fens et al., 2020).

Recently, one activity that has gained popularity in pharmacy education is escape rooms. This serious game requires players to collaborate to solve challenges and puzzles to ultimately “escape the room” in a specified amount of time (Hintze et al., 2023). Several authors report its adaptability as a game to deliver teaching around many areas of the pharmacy curriculum, including therapeutics, pharmacy management, physical assessment, symptom analysis and more (Kanaan et al., 2023).

Pharmacy Education

Pharmacy education within the United Kingdom (UK) is undergoing significant changes, with universities presently developing their undergraduate Master of Pharmacy (MPharm) degree to incorporate pharmacist independent prescribing learning outcomes. This will enable graduates that successfully complete their university education from 2026 to become UK pharmacist prescribers (General Pharmaceutical Council, 2021). This is a major change for the pharmacy profession since all graduating pharmacists will be able to prescribe medicines, enabling pharmacists to play a greater role in providing patient care and supporting the current healthcare system in the UK.

Despite being a welcome development for the profession, universities will need to completely review and redesign the MPharm degree. The degree will need to incorporate learning outcomes set out by the General Pharmaceutical Council (GPhC), which is the degree accreditation body in the UK, as well as the professional regulator for pharmacy professionals.

Developing the MPharm degree will require schools of pharmacy to look beyond simply mapping content to learning outcomes, as was previously done in curricula reviews. Teaching and assessment of prescribing skills necessitates a new mindset as well as radically changing how the degree course is delivered (Girvin et al., 2023). This is attributed to greater emphasis of the new learning outcomes on key skills such as diagnostic, professional judgement, leadership, and consultation skills (General Pharmaceutical Council, 2021). Course content needs to ensure that clinical skills are taught and practiced throughout the

programme, with greater emphasis on higher-order cognitive skills including collaborative clinical decision-making.

Students will need to demonstrate the ability to integrate knowledge and clinical skills, with focus on communication, physical examination, and practical skills and procedures such as measuring respiratory rate or blood pressure (Girvin and Wilson, 2018). The curriculum will need to provide learners with the opportunity to practice in a simulated environment, where students are able to perform procedural tasks on simulated patients rather than on a real patient. Additionally, educational activities will need to include exercises that mirror future practice, such as patient case scenarios with varying complexities (Girvin et al., 2023).

The advantages of using gamification in pharmacy education is to enhance preparation for real-world practice and provide opportunities for learning without the risk of harm to patients. Furthermore, it has been suggested that the use of educational games in pharmacy education may lead to improved communication and critical thinking skills, as well as the development of professional attitudes and behaviours (Kanaan et al., 2023). These skills are fundamental in the transition from a student to a pharmacy practitioner, and key to becoming a competent prescriber.

Preparing pharmacy graduates to become independent prescribers and meeting the new learning outcomes set out by the regulator requires pharmacy education to adapt and evolve. Schools of pharmacy will no doubt face challenges when reviewing and redesigning the MPharm degree (Girvin et al., 2023). Considering the potential benefits of gamification, one possible innovation is to utilise educational games within the pharmacy curriculum to prepare students for their future roles as pharmacists. This review will look at the value of utilising gamification as a pedagogical tool within the MPharm degree.

Constructivist Learning Theory

The pedagogic benefits of gamification are attributable to the constructivist learning theory, which centres on the notion that people learn through active participation in constructing knowledge. Learners develop their knowledge based on experiences, through problem-solving and personal discovery (Whitton and Hollins., 2008). Games enable learners to participate in active learning and construct knowledge, thereby promoting the principles of the constructivist learning theory. Education through gamification is learner-centred, where the learner constructs new knowledge through playing the game (Bigdeli et al., 2023). Based on Vygotsky's social constructivist theory, learning is an active and social process, where meaningful learning occurs when learners engage in social activities. The collaborative nature of educational games provides students with social interaction and the ability to learn with others (Krishnan et al., 2023). Working collaboratively enables students to work to their strengths, develop critical thinking skills and creativity, validate their ideas, and appreciate a range of individual learning styles, skills, preferences, and outlooks (Whitton and Hollins, 2008).

As a module leader on the MPharm degree at the University of Hertfordshire (UH), it is important to explore innovative teaching approaches that further enhance the learning experience for pharmacy undergraduate students.

This article will consider the pedagogic benefits of gamification in pharmacy education in relation to the constructivist theories of teaching and learning. Additionally, some of the practical issues associated with the use of gamification in the MPharm course at the University of Hertfordshire will be explored. Finally, options for the development of a gamified activity to enhance teaching and learning on the MPharm degree course at UH will be discussed.

Discussion

Hope et al. (2023) have systematically and quantitatively reviewed the literature reporting the use of gamification in pharmacy education. In particular, the review looked at the type of gamified intervention, mode of delivery and intended outcomes such as improved skills and active learning. The authors found that serious games used in pharmacy education varied greatly in features and were applied to a variety of pharmacy topics to deliver multiple and varied outcomes, from the ever-present desire to improve knowledge to engage students in novel and innovative ways of learning. Activities include board games, gamified quizzes, computer games and immersive simulations, with escape rooms being the most frequently reported.

The paper reports that escape rooms were applied in varying learning contexts, including pharmacy management, professional development, and to teach a variety of curricula topics such as diabetes, heart failure and cancer. This suggests that game-based learning is an adaptable method when designing learning activities and can be used for a variety of pharmacy content areas. However, the review also reports considerable costs to gamification, particularly with relation to faculty, funds, resources, and time.

Ostreich and Guy (2022) reviewed the literature on game-based learning (GBL) in pharmacy education. The authors found that GBL can be designed for a variety of topics within the pharmacy school curricula, while meeting accreditation standards. Such topics include immunology, diabetes treatment and opioid safety. The review reports that game-based activities can be designed to cover almost any area or discipline of pharmacy. Additionally, several gaming activities created for one topic can be changed to address other content areas without the need for creating a new idea (Osterich and Guy, 2022). One example is review style quiz games using Kahoot!® (Khalafalla and Alqaysi., 2021) or Jeopardy ® (Cusick., 2016). This demonstrates that gamification is a highly adaptable tool, where games can be modified for example by changing the questions used based on the topic being taught. Thus, gamification has the potential to be utilised in a variety of topics across the four years of the MPharm degree, and as a pedagogical tool in other health professional education programs, such as nursing and radiography.

Hintze et al. (2023) have carried out a systematic review of the current literature on escape room games in pharmacy education. They determined the impact of escape rooms on educational outcomes and discussed areas for future research. The authors reviewed 10 studies describing escape room activities implemented at colleges/schools of pharmacy. They considered the advantages of escape room gaming to be increased enjoyment for students, as well as perceived improvement of clinical knowledge and teamwork abilities. The constructivist learning theory attributes to the pedagogical benefits of escape room games, which centres on the notion that learning is enhanced by active participation, problem solving and personal discovery (Whitton and Hollins., 2008). Escape room games allow learners to explore and navigate learning in an environment that is created to promote problem-solving and critical thinking (Krishnan et al., 2023).

Three out of the Ten studies assessed student's content knowledge using assessment questions, and reported an increase in scores after the activity was completed. It could be that escape room activities have the potential to increase content knowledge, although more future research must be carried out before this can be presumed. The authors have also made suggestions for pharmacy instructors wishing to implement escape rooms into their curriculum, relating to preparation, logistics and content. The recommendations highlight the significant time commitment when designing an all-new escape room as well as the need to test the escape room prior to its rollout. Additionally, the paper emphasises the need for at least two facilitators, who must have content knowledge, to assist with the delivery of the escape room (Hintze et al., 2023). These suggestions could be viewed as limitations to implementing a pharmacy escape room game at UH, given the time and faculty constraints within the department of pharmacy.

A pilot study carried out by Krishnan et al. (2023) discusses the implementation of Hepatitiscape®, a hepatitis-themed digital escape room game, within a pharmacy undergraduate programme. Feedback from students suggests that this intervention improved problem solving and critical thinking skills. Additionally, a particularly high number of students considered that the game enhanced their teamworking ability. This can possibly be explained by Vygotsky's theory, which describes learning as an active and social process, where meaningful learning occurs when learners engage in social activity. The collaborative nature of escape room games enables students to work to their strengths and validate their ideas (Whitton and Hollins, 2008).

Hope et al. (2023) report that after escape rooms, the next most frequently utilised interventions in pharmacy education are gamified simulations. Simulation is understood as an artificial representation of a real-world scenario to achieve educational goals through experiential learning (Fens et al., 2020). Simulation-based training has demonstrated its effectiveness as a teaching method, compared to traditional methods used in pharmacy education. Combining gamification and simulation enables students to actively participate in the learning, applying their knowledge and practicing various skills by analysing situations,

interacting with patients and healthcare professionals, and making decisions in a safe environment. Hence, gamification of simulations can allow students to see the potential consequences of their actions and behaviours, allowing real-world application and risk-free healthcare decisions, without causing harm to real-life patients (Kanaan et al., 2023).

The “Pharmacy Game” is one instance where gamification and simulation are combined within the pharmacy curriculum at seven international universities. In this game, teams of students must compete to manage a simulated pharmacy, in a fully immersive, in-person simulation (Fens et al., 2021). During the game, learners are given the autonomy to practice the pharmacist’s role, to make clinical and professional decisions in an environment that replicates their future practice. Students are required to complete tasks such as checking prescriptions, dispensing medication, and counselling patients regarding safe medication use. The concept was designed to deliver capstone learning experiences, aimed at integrating prior leaning to offer a culminating experience in the latter years of the student’s pharmacy degree which aligns with the concepts of a spiral curriculum (Fens et al., 2020).

Dell and Chudow (2019) have looked at the utilisation of Kahoot! ®, a web-based review game, in pharmacy education. The author notes that previous studies have looked at the use of web-based, quiz type tools to engage students and improve exam performance within the pharmacy curriculum. However, this study is the first to look at the effects of using a competitive game environment on student performance within the course. The study reports a positive correlation between a student’s score in the game and their grade within the topic taught. Therefore, the game may potentially improve students learning and knowledge retention. However, the limitation of using a web-based multiple-choice quiz in a competitive game format is that students must respond quickly, and answers cannot be changed once submitted. This can make it hard for some students to think or can feel overwhelming to some. Additionally, Kahoot ® allows students to see the leader board, therefore participants can see which students are in the lead, as well as those who are performing poorly. This undoubtedly has the potential to cause anxiety and embarrassment, which can hinder learning (Osterich and Guy, 2022).

Cusick et al. (2016) who reviewed the use of a Jeopardy ®- style game, and Khalafalla et al (2021) who attempted a similar strategy of quizzing students, using an online platform within pharmacy education, have reported benefits to using review-style games. These include increased student engagement, as well as ease of implementation and adaptability to the topic being taught. Dell and Chudow (2019) reported similar benefits, and report that this type of gamified activity is easy to administer to large groups of students, and simple to replicate between different groups or years of students. Thus, the use of review-style online quizzes may be of benefit if utilised within the MPharm, since the course spans over four years, and usually has large student cohorts within each year. However, these games lack the social and collaborative element known to promote learning, as students answer questions individually rather than in a group.

Gamified interventions can mimic problem-based learning by presenting a problem at the onset of a game, compelling learners to gather knowledge to solve the problem. One example of this is the aforementioned “Pharmacy Game”. Sera and Wheeler (2017) suggest that blending games with problem-based learning may be useful for teaching skills such as critical thinking, problem solving, collaboration, communication and learning to learn. Additionally, the authors state that games have the potential to promote learning by encouraging active participation. They motivate learners to solve challenges, redefine failure as a learning experience and can be designed to provide regular feedback on the learner’s knowledge and skill (Sera and Wheeler, 2017).

Krishnamurthy et al (2022) note that feedback within a game can engage students in the learning process, and increases knowledge retention, empowering learners to move toward their ultimate objective of enhanced learning. However, the authors also emphasise that meaningful feedback is not always easy to achieve in gamification. Feedback should either be given often and immediately, or in shorter cycles, depending on the gamified intervention. Educators will need to consider how quickly and frequently feedback is offered in a game, which will require thought and consideration of the research available during the design process of a new educational game. As a result, creating gamification learning materials may demand substantial time and effort.

Krishnamurthy et al (2022) reviewed existing gamified learning methods in medical education. The paper touched on the constructivist pedagogy whilst discussing the educational benefits of game-based learning activities in medical education. The paper reviewed five electronic games and four mobile apps focusing on pre-clinical training. It was found that in addition to teaching new ideas, one of the educational benefits of gamification is that it can be used to consolidate knowledge and enhance memory. This can be useful in pharmacy education, since pharmacy students need to memorise a vast amount of information, including side effects, contraindication and monitoring requirements of medication. The pharmacy curriculum is heavily condensed, and educators often struggle with the time and space available to deliver the necessary teaching, rendering it difficult to accomplish subject repetition.

Given that repetition is an effective way of reinforcing learning, gamification may offer a quick way of covering a wide variety of topics, in a repetitive manner, which may support learning. Gamified interventions that allow students to return to the same theme will enable students to solidify a shaky understanding of certain subjects, such as the stepwise management of asthma as well as enabling the learner to develop a multi-faceted understanding of the subject, which is consistent with the constructivist learning theory. Oestreich and Guy (2022) also report the benefits of gamified review games, with regards to pharmacy education since they provide an engaging alternative to improve confidence with previously taught topics.

Gamification enables individual learners to immerse into collaborative environments. Within these environments, students can work together to construct new knowledge, make decisions, solve real-world problems, and experience simulations (Sera and Wheeler, 2017). Krishnamurthy et al. (2022) suggest that gamified learning activities should focus on collaboration rather than competition. They note that cooperation in the classroom reduces stress levels since responsibilities are shared across the group. Additionally, gamification can promote collaborative learning when groups of students work together on a common objective or issue. This is attributable to the social constructivist theory, where learning happens through social interaction with others (Whitton and Hollins, 2008).

As a result, game-based learning activities that require collaboration between players can lead to enhanced interpersonal skills, improved self-esteem, and the development of more supportive relationships between players (Khalafalla and Alqaysi, 2021). These social aspects are applied in many games to create a sense of community and increased engagement. Furthermore, gamification can facilitate learning outside of the classroom by fostering learning communities and encouraging learner to develop a social support system thereby enhancing interpersonal skills (Krishnamurthy et al, 2022). However, Jackson et al., (2018) emphasise that for gamification to be successful in developing the social elements, game based-learning activities need to be promoted in a pleasant and supportive learning environment.

The Pharmacy Game is an example of an educational game that facilitates collaborative work between students. Setting up the teams to run a pharmacy is a crucial part of learning to collaborate. Learners need to agree on who will be leading the team through assuming the role of the pharmacy manager and split up the roles and tasks of the pharmacy staff between themselves. To succeed in the game, students need to collaborate with other health professionals, such as GPs, nurses, and hospital staff, to consult them about medication issues of patients, prescription queries and at times more complex cases such as the treatment of patients with co-morbidities. In order to enhance social interaction within the team, a designated member of staff coaches students to help them better understand the underlying problems within their team, and to enable them to identify ways in which to optimise collaboration (Fens et al., 2020), thereby promoting a supportive learning environment.

Despite the benefits, there are several challenges associate with gamification. Sera and Wheeler (2017) emphasise that it is difficult to design an engaging educational game that also achieves instructional objectives. Developing a successful game will require that it is both educational and entertaining. This not only requires time and financial commitment, but knowledge and skills that go beyond course content, such as game design and programming knowledge. This will require various amounts of preparation and learning to match the content of the game with the learning outcomes of the course. Educators will require adequate training, and educational institutions will need to define a clear strategy

and allocate funding grants for educational research if they are to implement gamification in the pharmacy classroom.

Concluding Remarks and Recommendations

Having reviewed the literature on gamification in pharmacy education, its use as a novel and innovative way of teaching can certainly be appreciated. Gamification demonstrates potential as a tool which can enhance the learning experience for students on the undergraduate MPharm degree course. There are many innovative examples of gamification in the literature, which can be utilised as a springboard for merging new activities in multiple content areas of pharmacy education, as well as other health professional education programs. Additionally, many authors including Ostereich and Guy (2022) and Hope et al. (2023) report its adaptability and flexibility as an educational tool.

Gamification can promote the development of essential skills such as problem solving, critical thinking and collaboration (Khalafalla and Alqaysi, 2021), which render it useful for incorporating into the MPharm curriculum, where the teaching of prescribing skills has become a recent necessity.

Kanaan et al. (2023) and Hintze et al. (2023) report the barriers associated with game-based learning, which are the financial costs, number of resources and time-intensive component needed to develop and implement a successful activity. Nonetheless, creating any learning activity that requires students to truly engage with the content is a time-consuming task, and once the game is created, it can be used for future groups of students, as well as across the different years of the MPharm course, and potentially for other healthcare subjects at the University. This will significantly reduce preparation time of the gamified activity in the future.

Another limitation with using gamification is that games with sophisticated technology, such as “The Pharmacy Game” demand advanced knowledge of game development (Fens et al., 2021), and at times may require the use of a third party to build the game or application (Hope et al., 2022). This could pose a barrier to the use of certain educational games at UH, as games with complex designs may prove to be costly to create, and some instructors may find them difficult to use, especially if they are less familiar or comfortable with the use of advanced technology. It may then be more appropriate to consider designing an activity with a simpler design where the use of technology is limited. Oestreich and Guy (2022) have noted that the use of games without major technology can still be engaging and have a positive outcome on student learning.

When designing an educational activity, care must also be taken to ensure that the game does not cause embarrassment or anxiety, as often observed when using review-style quiz games. Instead, the activity should endeavour to provide a pleasant and supportive learning environment (Jackson et al, 2018), to facilitate learners to build on their existing knowledge.

Learning materials provided to students should be cautiously selected to ensure that students can apply their existing knowledge and experience so that learning takes place that may results in the construction of new knowledge.

Educational activity

Having experienced a lack of student engagement after the first year of teaching on the MPharm course at UH, it is of interest to introduce gamification as a way of promoting engagement and encouraging active participation. This can be achieved by designing an escape room educational activity. Taking into consideration the necessity to imbed prescribing within the new MPharm curriculum, the integration of the key elements of prescribing within an escape room game may potentially enhance the learning experience for students. To identify the specific learning outcomes that can be taught and assessed within the escape room activity, one can look at the prescribing related learning outcomes from the new GPHC standards, which are listed in Table 1 (Girvin et al, 2023, p. 335).

Table 1:
Examples of prescribing-related learning outcomes in the GPhC standards.
• Work in partnership with people to support and empower them in shared decision-making about their health and wellbeing • Take an all-inclusive approach to ensure the most appropriate course of action based on clinical, legal, and professional considerations • Recognise the psychological, physiological, and physical impact of prescribing decisions on people • Take responsibility for the legal, safe, and efficient supply, prescribing, and administration of medicines and devices • Demonstrate effective diagnostic skills, including physical examination, to decide the most appropriate course of action for the person • Apply relevant legislation and ethical decision-making related to prescribing, including remote prescribing • Prescribe effectively within the relevant systems and frameworks for medicines use • Understand clinical governance in relation to prescribing, while also considering that the prescriber may be in a position to supply the prescribed medicines to people • Use tools and techniques to avoid medication errors associated with prescribing, supply, and administration
(Source: Girvin et al, 2023, p. 335)

The escape room game will be designed to simulate common prescribing scenarios for pharmacy students in years two, three and four of the MPharm degree, with a view to developing prescribing-related communication, consultation, and clinical skills within a safe environment. The activity should take place towards the end of the academic year, once all teaching has taken place, therefore offering a culminating experience, which aligns with the concepts of a spiral curriculum.

The activity will include six stations also referred to as “rooms”. Teams of 5-6 students will be required to work together to “escape” from each room by solving a problem, responding to a query or completing a specified task. The activity will be timed, thus simulating a stressful environment, comparable to what is often experienced by pharmacists in a pharmacy or hospital setting. Participants will be allocated a maximum time of 90 minutes, allowing each team an average of 15 minutes to complete each station. The aim of the activity is to escape the room within the specified time frame.

Tasks or queries within each room should be mapped to the learning outcomes in Table 1. Potential scenarios will need to include tasks that mirror future practice, such as discussing the appropriateness of prescribing with doctors or other healthcare professionals, dealing with difficult patients or patients with varying complexities.

Examples of challenges within each station include prescribing tasks, where students are required to prescribe new medicines, review a prescription or identify adverse drug reactions. Stations can include procedural tasks, such as communicating information about medicines to patients from a variety of cultural backgrounds, with dementia or learning difficulties, and communicating with a healthcare practitioner regarding the treatment of patients via email, telephone or face-to face.

The learning outcomes emphasise the need for students to demonstrate effective diagnostic skills. Therefore, some of the challenges within the activity would be to perform diagnostic skills on simulated patients or interpret results of physical examinations. For example, teams can be asked to take a blood pressure reading, measure respiratory rate, peripheral oxygen saturation or heart rate. Additionally, they may be required to calculate the National Early Warning Score (NEWS2) for a given patient, or their body mass index in order to escape the room. The Royal Pharmaceutical Society has a list of core clinical assessment skills, listed in Table 2 (Girvin et al, 2023, p. 336), that pharmacist prescribers must be able to perform proficiently. It would be practicable to incorporate these skills within the escape room activity, since repeated practice in a simulated environment can enable students to become competent in performing them.

Table 2

Royal Pharmaceutical Society list of core clinical assessment skills for prescribing pharmacists.

Blood pressure	Blood glucose (capillary)
Peripheral oxygen saturation	Peak expiratory flow rate
Heart rate and rhythm	Calculation of the National Early Warning
Urinalysis	Score (NEWS2)
Temperature	Chest (respiratory) examination
Height, weight, and	Mental and cognitive state examination
body mass index	Ear nose and throat examination
Respiratory rate	Depression and anxiety screening

(Source: Girvin et al, 2023, p. 336)

The escape room activity will promote learning, as based on the constructivist theory, students can explore and navigate learning by personal discovery and problem-solving, thereby constructing knowledge as they move from one station to the other within the game (Whitton and Hollins, 2008). Furthermore, the escape room game will provide a collaborative social experience, which based on Vygotsky's social constructivist theory, will promote learning through social interactions and learning conversations (Bigdeli et al., 2023) as the students work together to answer questions and progress in the activity.

When looking at designing an educational activity to be used in the MPHarm , whether it is in the form of an escape room, or gamified simulation, it is important to create a game that can promote meaningful learning. How game elements function to enable the learning process to occur during game playing can be explained through sound learning theories. The gamification element that underpins constructivism is explanatory feedback, which explains to the player why their response is either correct, or incorrect (Tärning, 2018). Effective educational games must provide learners with feedback to allow them the opportunity to make sense of their mistakes by relating the inputs from their experience in obtaining the answer for the question. Meaningful learning can then occur when learners can correctly connect their mistakes with the feedback provided, which will enable the player to construct new understanding of the content (Ahmad et al., 2019)

When designing an escape room activity to be used as an educational tool, it is essential that explanatory feedback is incorporated within the game, possibly at the end of the game,

or following the completion of each station. Explanatory feedback is an approach of scaffolding knowledge (Ahmad et al., 2019) which may help students learn better, since they have gained the experience of escaping the room, which leads them to constructing new, meaningful understanding of the topic.

References

Ahmad, T.S., Hussin, A., Yusri, G., Sembilan, U.T.M.N. and Campus, K.P. (2019) 'A review of learning theories for gamification elements in instructional games', *Malaysian International Conference on Academic Strategies in English Language Teaching*: Malaysia, 21-22 August.

Bigdeli, S., Hosseinzadeh, Z., Dehnad, A., Sohrabi, Z., Aalaa, M., Haghani, F. and Atlasi, R. (2023) 'Underpinning learning theories of medical educational games: a scoping review', *Medical journal of the Islamic Republic of Iran*, 37(26). Available at: https://doi.org/10.47176/mjiri.37.26

Cusick, J.(2016) 'A Jeopardy-style review game using team clickers', *MedEdPORTAL*,*12*, p.p.10485. Available at: https://doi.org/10.15766/mep_2374-8265.10485

Dell, K. A., and Chudow, M. B. (2019). 'A web-based review game as a measure of overall course knowledge in pharmacotherapeutics', *Currents in Pharmacy Teaching and Learning*, 11(8), pp. 838–842. Available at: https://doi.org/10.1016/j.cptl.2019.04.012

Deterding, S., Dixon, D., Khaled, R. and Nacke, L. (2011) *'From game design elements to gamefulness: defining" gamification"* '. *Proceedings of the 15th international academic MindTrek conference: Envisioning future media environments* pp. 9-15. Available at: https://doi.org/10.1145/2181037.2181040

Fens, T., Dantuma-Wering, C.M., and Taxis, K. (2020) 'The Pharmacy Game-GIMMICS® a Simulation Game for Competency-Based Education' *Pharmacy* 8(4), pp. 198. Available at: https://doi.org/10.3390/pharmacy8040198

Fens, T., Hope, D. L., Crawshaw, S., Tommelein, E., Dantuma-Wering, C., Verdel, B. M., Trečiokienė, I., Solanki, V., van Puijenbroek, E. P., and Taxis, K. (2021) 'The International Pharmacy Game: A Comparison of Implementation in Seven Universities World-Wide', *Pharmacy (Basel, Switzerland)*, 9(3), pp. 125. Available at: https://doi.org/10.3390/pharmacy9030125

General Pharmaceutical Council (2021) *Standards for the initial education and training of pharmacists*. Available at: https://www.pharmacyregulation.org/sites/default/files/document/standards-for-the-initial-education-and-training-of-pharmacists-january-2021_0.pdf

Girvin, B. and Wilson, D. (2018) 'Clinical skills training for pharmacists in general practice' *Prescriber*, *29*(12), pp.19-25. Available at: https://doi.org/10.1002/psb.1724

Girvin, B., Sims, L. and Haughey, S. (2023) 'Empowering future pharmacists - Embedding prescribing in the United Kingdom pharmacy undergraduate degree ', *Currents in Pharmacy Teaching and Learning*, 15(4), pp. 334–339. https://doi.org/10.1016/j.cptl.2023.04.010

Hintze, T. D., Samuel, N., and Braaten, B. (2023) 'A Systematic Review of Escape Room Gaming in Pharmacy Education' *American Journal of Pharmaceutical Education*, 87(5), pp.100048. Available at: https://doi.org/10.1016/j.ajpe.2022.09.007

Hope, D. L., Grant, G. D., Rogers, G. D., and King, M. A. (2022). 'Gamification in pharmacy education: A systematic quantitative literature review', *International Journal of Pharmacy Practice*, 31(1), pp. 15–31. Available at: https://doi.org/10.1093/ijpp/riac099

Jackson, S. C., Bilich, L. A., and Skuza, N. (2018) 'The benefits and challenges of collaborative learning: Educating dental and dental hygiene students together' *Journal of Dental Education*, 82(12), pp. 1279–1286. Available at: https://doi.org/10.21815/jde.018.134

Kanaan, S., Dabbous, M., Akel, M., Lteif, R., Rahal, M. and Sakr, F. (2023) 'Game-based learning in pharmacy education: A systematic review and narrative synthesis ', *Pharmacy Education*, 23(1), pp. 629–639. Available at: https://doi.org/10.46542/pe.2023.231.629639.

Khalafalla, F.G. and Alqaysi, R. (2021) 'Blending team-based learning and game-based learning in pharmacy education', *Currents in Pharmacy Teaching and Learning*, 13(8), pp.992-997. Available at: https://doi.org/10.1016/j.cptl.2021.06.013

Koivisto, J., and Hamari, J. (2019) 'The rise of motivational information systems: A review of gamification research' *International Journal of Information Management*, 45, pp. 191-210. Available at: 10.1016/j.ijinfomgt.2018.10.013

Krishnamurthy, K., Selvaraj, N., Gupta, P., Cyriac, B., Dhurairaj, P., Abdullah, A., Krishnapillai, A., Lugova, H., Haque, M., Xie, S. and Ang, E.T. (2022) 'Benefits of gamification in medical education', *Clinical Anatomy*, *35*(6), pp.795-807. Available at: https://doi.org/10.1002/ca.23916

Krishnan, S., Blebil, A. Q., Dujaili, J. A., Chuang, S., and Lim, A. (2023) 'Implementation of a hepatitis-themed virtual escape room in pharmacy education: A pilot study', *Education and information technologies*, 28, pp. 14347-14359. Available at: https://doi.org/10.1007/s10639-023-11745-1

Oestreich, J. H., and Guy, J. W. (2022) 'Game-based learning in pharmacy education', *Pharmacy (Basel)*, 10(1), pp. 11. Available at: https://doi.org/10.3390/pharmacy10010011

Sera, L., Wheeler, E. (2019) 'Game on: The gamification of the pharmacy classroom', *Currents in Pharmacy Teaching and Learning*, 9(1), pp. 155-159. Available at: https://doi.org/10.1016/j.cptl.2016.08.046

Tärning, B. (2018) 'Review of feedback in digital applications–does the feedback they provide support learning?' *Journal of Information Technology Education Research*, *17*, pp.247. Available at: https://jite.informingscience.org/documents/Vol17/JITEv17ResearchP247-283Tarning4644.pdf

Whitton, N. and Hollins, P. (2008) 'Collaborative virtual gaming worlds in higher education', *Research in Learning Technology*, 16(3). Available at: https://doi.org/10.3402/rlt.v16i3.10900

10,000 Hours – Why is quantity of practice not a primary criterion for assessment in the Creative Arts?

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Abstract

This article presents a comprehensive literature review, exploring the potential value of incorporating quantity-based assessment to assignments in the Creative Arts at degree level. Drawing on sources in pedagogic literature as well as from disciplines unrelated to the creative arts, the review explores the basis for quantity-based assessment in existing curriculums and theories. Key themes identified include the importance of practice by repetition and the value of reflection on practice in order to improve learning. The findings make clear the potential value for introducing quantity-based assessments to the creative arts and ground the concept in theory from existing literature.

Introduction

There is a great focus within the creative arts at degree level on employability. The common assumption that it is tough to get a job in the Creative Arts is sadly proven true statistically, with one recent large-scale study showing that fewer than five percent of creative arts graduates attain employment in the Arts, Design and Media sector (Luminate, 2023). To combat this, great scrutiny is given to the industry relevance of assignments in the creative arts at degree level, and outcomes from these assignments are designed to show employers that a graduate is industry ready. Any graduate hoping to achieve gainful employment in a relevant industry requires a portfolio packed with high-quality work, and it is the responsibility of teachers to do everything they can to ensure this. This is reflected in the assessment criteria at degree level, where portfolio-quality work is rewarded. When considering the development of creative skills, however, the production of high-quality work is not the only factor.

The necessity for a high *quantity* of repetitive practice when acquiring a creative skill is well understood, both by practitioners of the creative arts and those who have never lifted a pencil. No one sees a beautiful performance on the public piano at St. Pancras station and assumes that it' is the player's first time sitting down at the keys. We would naturally assume that said player had put in many hours of practice. The value of volume of practice is firmly embedded in popular culture also, with the commonly held idea (popularised by Malcolm Gladwell in his book "Outliers") being that the volume of practice required to become an expert in any given field is 10,000 hours (Gladwell, 2008).

While the value of quantity of practice is well understood by practitioners, this is not reflected in the design of assessment. Instead, assignments typically focus on the creation of

portfolio-ready work. Even at Levels 4 and 5, it is assumed that assignment outcomes will form the building blocks of a portfolio to show potential future employers.

This article reviews the current literature on pedagogy and assessment design, seeking to explore the potential benefits of incorporating quantity of practice into assessments in the creative arts at degree level and exploring ways it could be integrated into curriculum design.

Methodology

In this literature review, a systematic search strategy was employed to identify relevant publications on the topics of assignment and assessment design. Initially, searches were conducted to find literature specifically regarding quantity of practice within the creative arts, but immediately a dearth of relevant publications was clear. As such, literature from a variety of sources and disciplines has been examined, straying into science and technology as well as primary and secondary education. Searches were conducted in the electronic databases Google Scholar and the University of Hertfordshire Online Library, initially using keywords related to the topic, and then further researching the concepts encountered.

Only peer-reviewed articles were considered. Studies were screened based on their relevance to the central topics of the article. The discussions of the included publications were analysed to identify relevant theories. As this was a secondary study, ethical considerations were not necessary, aside from considering ethical implications such as plagiarism and proper citation. This methodology enabled a thorough exploration of the topics of the article and largely bridged the gaps in the existing literature in order to consider the topic of assessment based on quantity within the creative arts.

Discussion

To consider the value of quantity of practice as an assessment criterion within the creative arts, it is important first to formally examine the value of high-volume practice. As stated above, the value of practice is broadly understood, but specific literature on the subject is difficult to find. As such, in order to appropriately examine existing literature, it is necessary to decode some of the language at the heart of the topic. Practice, within the context of this article, is considered not only as “performing an activity habitually or regularly” (Cambridge, 2023), but as a proposed method of *learning*. Learning through practice is essentially synonymous with experience, which is defined as “the state of having been affected by or gained knowledge through direct observation or participation” (Cambridge, 2023).

Experiential learning is a theory around which a great deal of pedagogic literature exists. Although the theory has existed for far longer, David A Kolb’s seminal Experiential Learning Theory put emphasis on the importance of learning through direct-sense participation, rather than the memorisation and analysis of academic information (Kolb, 2009). At its heart is the “learning spiral”, a cyclical model for learning through experience, which involves

experience, reflection, thinking and acting (Kolb, 2014). Its initial focus, within the context of higher education, was to provide a refreshing alternative to the typical academic learning techniques of the time, which focussed on the memorisation of information. It has since become a majorly influential theory and is present throughout the structures and curriculums of higher education today.

In the teaching of the creative arts, by virtue of requiring relatively less information retention and relatively more vocational skill, a vast majority of learning is facilitated through experience. While the nature of this learning, based largely on experimentation, makes essential the theory of experiential learning, it also somewhat reduces its novelty, and arguably amplifies the classic arguments of its detractors. Organizational theorist James March, for example, diagnoses an issue with the experiential learning model, and attributes this issue with the incomprehensible nature of experience: “eExperience is rooted in a complicated causal system that can be described adequately by a description that is too complex for the human mind” (March, 2010). Perhaps the complex and intangible nature of experience as explained by March goes some way to explain why quantity of practice, which is essentially learning *entirely* by experience, does not play a greater role in the design of assessment within the creative arts. Put simply, it is not easy to understand and explain.

Another potential criticism of experiential learning comes from John Dewey, an early major proponent of the theory. He placed a major emphasis on experience and named it one of his four core learning principles (Dewey, 1916). In a later revision, however, he rethought his position on experience. Dewey supposed that most experiential learning was culturally mediated by previous experience, and the previous experience of educators, and was undetachable from these biases, saying that “Experience is already overlaid and saturated with the products of the reflection of past generations and by-gone ages. It is filled with interpretations, classifications, due to sophisticated thought, which have become incorporated into what seems to be fresh naïve empirical material. It would take more wisdom than is possessed by the wisest historical scholar to track all of these absorbed borrowings to their original sources (Dewey, 1925). What Dewey sees as a potential pitfall of experience as a learning technique may be an asset within the context of skill learning in the creative arts.

The value of quantity of practice is understood by practitioners through their own experience, and this bias may be a valuable tool, rather than a problem, aiding students to arrive at similar conclusions. The goal of practice as a method of learning is not only to improve student skills, but to imbue them with an understanding of how to continue to learn, which they will need to continue to do throughout their careers. It is a question of cognition versus metacognition, theories of psychology for which a great deal of literature can be found. Cognition can be simply defined as “all mental processes related to memory, learning, problem-solving, evaluation, reasoning, and decision making” (Favell, 1979).

Metacognition, often described as “thinking about thinking”, is more challenging to define. Metacognition relates to the mental processes required to understand and *control* cognitive processes. In the context of learning, it is examining one’s own learning process, and considering how everything is working. John Flavell (1979) defines two categories of metacognitive process – “metacognitive knowledge” and “metacognitive experience”. The former relates to knowledge of cognition, and the latter relates to the application of this understanding to accomplish a task successfully (Favell, 1979).

At the time of writing, the bulk of the literature on metacognition has concentrated on the understanding of metacognitive processes (Antonietti, Ignazi, & Perego, 2000; Metallidou, 2009; Schraw & Dennison, 1994; Topcu & Ubuz, 2008), delineating sets of metacognitive skills (Nelson & Narens, 1994; Veenman, Van Hout-Wolters, & Afflerbach, 2006), and methodologies for basically measuring metacognition (Pieschl, 2009; Schraw, Kuch, Gutierrez, & Richmond, 2014). This research is focussed on the psychology of metacognition, and at a conceptual level this information is present in pedagogy, but as David Neat (2003) suggests, there is little practical assistance for teachers to make these concepts a reality in the classroom.

A metacognitive understanding in students is greatly desirable for any teacher. Many teachers hope that their students will display a higher understanding of their own learning processes. Cognition, however, is arguably more pressingly necessary and more easily understood, taught, and assessed. As a result, metacognition is typically made a secondary learning outcome. Some students display metacognitive abilities, and are considered good students for having done so, but the standard for a successful class is still, in many cases, that the majority of the cohort understand any given lesson at a cognitive level.

While the memorization and understanding of some content is fundamental to any discipline, the constantly developing world of technology increasingly makes obsolete the requirement for memorization of content. We all have the answer to any question in our pockets, and the systems for finding solutions, as well as our own abilities to search for these solutions, are developing constantly. Thus, as David Pace (2017) says in his seminal book “Decoding the Disciplines”, “increasingly, it is the how to, not the what, that must be transmitted in college classes”. That is to say – the metacognition, rather than the cognition.

In any artistic discipline, the how to almost always requires a skill, and skills require practice. This presents some issues when applying the lessons of even the most valuable and modern pedagogical frameworks. Take the threshold concepts framework for example. In their highly important 2003 paper, Meyer and Land introduced the theory of threshold concepts – “conceptual gateways” within certain disciplines that lead to previously inaccessible ways of thinking about something. The theory found immediate appeal as being ‘pedagogically fertile’ and an energising topic to consider (Meyer and Land, 2005). Threshold Concepts are defined as being transformative (they involve a fundamental shift in a student’s understanding of the subject), integrative (they reveal hidden connections), and irreversible

(Meyer and Land 2003, 2005, 2006). The theory, while incredibly useful for disciplines which are heavily focused on theory, is difficult to apply to practical situations, or by extension vocational skills.

David Pace (2017) builds on this idea with his framework of "Decoding the Disciplines". In place of threshold concepts, Pace speaks of "bottlenecks", defined within teaching and learning as "places in the stream of learning which are apt to be obstructed". Put simply, they are pinch points in the learning process, where students will commonly find difficulty. As Pace suggests, and with a great strategic framework for exactly how, addressing these bottlenecks leads to greater general student understanding. Pace is careful to distinguish the differences between "Threshold Concepts" and "Bottlenecks". Concentrating on bottlenecks, he says, keeps attention on what the student must do, whereas threshold concepts concern what the student must know (Pace, 2017).

My focus on quantity of practice while reviewing the literature has led to a gap in these frameworks. According to Pace (2017), once a bottleneck has been defined, the next step is to define the mental operations required to overcome this bottleneck. This step involves "modelling operations", which might be as simple as examining how someone with more experience might take on the same challenge. In the case of artistic skills, however, this does not fully solve the issue, as the answer might be that the more experienced person knows how to tackle a problem because she has spent years developing her skill. While there certainly is immense value in learning how an expert tackles any given problem, the nature of learning artistic skills is that there are infinite combinations of mental and dextrous tasks, and natural ease or difficulty with which any individual might approach them. The decoding framework is a great way to consider how to tackle a single problem but does not necessarily help a budding creative to understand how to tackle new problems on their own. Only *experience*, it seems, can do this.

As Pace (2017) states, threshold concepts concern what the student must *know*. As we have seen from the literature on cognition and metacognition, however, there is not just one way to know something. Meyer and Land's (2003) threshold concepts focus on cognitive understanding, but perhaps there are also threshold concepts within *metacognitive* understanding. Perhaps one such metacognitive threshold is for a student to truly understand the value of volume of practice, and to broadly understand that voluminous practice is comprised of a great many tiny cognitive lessons. While practice, of course, can vary in quality, a broad rule can be applied – the more you practice, the better you get. Perhaps elements can be borrowed from these various frameworks in order to make define a metacognitive threshold to truly understand the value of practice byb repetition. I feel there is a great deal of research to be done connecting these theories, and it is certainly beyond the scope of this article.

Outside of the creative arts, many examples can be found that illustrate the importance of quantity of practice. The World Federation of Occupational Therapy (WFOT), for example,

requires that each pre-registration occupational therapist completes 1,000 hours of clinical practice to meet the requirements for professional registration (WFOT, 2016). The British Medical Assocation (BMA) still follows an initially EU-led initiative that states that basic medical training requires at least 5,500 hours of medical practice (BMA, 2020). The Nursing and Midwifery Council (NMC) requires 2,300 hours of practice (NMC, 2023). As the NMC states in their 2023 review, "This environment allows a student to repeat, gain feedback, evaluate and reflect on their practice, preparing them to deliver the safe, effective and kind nursing".

It seems that in areas with great safety implications, the necessity of voluminous practice is commonplace. It is well understood in these disciplines that practice by repetition is fundamental in acquiring essential skills and cementing the effectiveness of their practice. In the creative arts, where we also recognise that voluminous practice is important to acquiring essential skills in our disciplines, no such recognition is present in assessment. It is important to note that in all examples given, an essential companion to the specified hours of experience is reflection upon the experience itself. This closely mirrors the learning spiral at the heart of David Kolb's Experiential Learning Theory.

One interesting discipline in which to examine literature is Chemistry. In the field of chemistry, where the results of an experiment cannot be guaranteed, the focus in assessment is shifted to how students design experiments, and how they handle the results of these experiments. In essence, students in Chemistry are assessed on their ability to reflect and learn from experience. If they were assessed based on the outcomes of their experiments alone, students would likely all design extremely predictable experiments. Perhaps a parallel can be drawn here with the creative arts. A student who is being assessed solely on the quality of the outcome may well choose not to take creative risks, for fear that these might not pay off (Strieth-Kalthoff et al, 2022). Similar findings can be found in literature on criminal justice education, where methodology design and results analysis are often deemed the most important parts of a publication (Fox, Jennings, 2014).

A problem arises when making the claim that quantity of work does not play a role in the design of assignments and assessments in the creative arts. Designers of these programs would certainly claim the value of repetitive practice is understood, and that assignments over time are designed to mimic the cyclical learning that repetitive practice can facilitate. When examining the possibility of amending this area of program and assessment design, it is important to address and research these potential detractions. As stated above, cognition is typically easier to measure and assess, and so metacognition is often made a secondary aim.

There may be value however in incorporating assignments in which this metacognitive understanding is the *primary* criteria for assessment. One bottleneck that Pace (2017) identifies in students of Economics is the inability to relate a specific model to a concrete situation (Pace, 2017). Once the concept is considered in combination with myriad others, it

is more difficult to relate and understand. Perhaps an issue with expecting students to gain a metacognitive understanding of the value of volume of practice while also focussing on quality, creativity, and various other criteria within an assignment or module is that the value of one lesson is muddied or sidelined by the others.

Conclusion

In this article, I aimed to review the current literature on pedagogy and assessment design, seeking to explore the potential benefits of incorporating quantity of practice into assessments in the creative arts at degree level and exploring ways it could be integrated into curriculum design. Through extensive analysis of relevant literature, some key findings have emerged.

Firstly, it is clear there is a significant basis for the value of assessing based on quality in pedagogical literature. The importance of learning by experience is very well established, and the potential benefits of designing assessments where quantity of outcome is a significant or primary criterion can be explained with literature surrounding cognition versus metacognition.

When examining literature from other fields, the research also highlighted that assessing based on quantity is already commonplace and understood in many disciplines and is recognised as an appropriate way to prepare students and to cement key skills. In both the analysis of pedagogic literature and examining literature related to disciplines outside of the creative arts, one finding was ubiquitously present – that a vital part of the experiential learning process is self-reflection. It is clear from the analysis of the literature that if quantity of outcome were to be made the central goal of an assignment, this must be combined with student self-reflection about the exercise.

While the review of the literature creates a valuable and exciting basis for making quantity a primary criterion for assessment in the creative arts, some gaps in the research have been identified that warrant further research. While the basis is well established, a study examining the value of assessment based on quantity on student learning in the creative arts would be an excellent way to further explore the idea. Such a study might involve designing an assignment where students are assessed based on the volume of work produced, and then analysing the effect on their learning, and their understanding of the value of practice for creative skill development.

Another area of the review that has potential for further study is the idea of metacognitive threshold concepts, a melding of a few different theories of pedagogy. When examining the existing theories of threshold concepts, cognition versus metacognition and bottlenecks, a gap in the literature became clear. If the bottleneck or threshold concept that is creating an obstruction in the learning path of students is only passable by gaining some fundamental experiential knowledge over a sustained period of time, it is not satisfactorily accounted for

by these existing theories, which require either ensuring particular cognitive understanding (threshold concepts) or modelling operations (decoding the disciplines). My idea is that there exist some threshold concepts which are metacognitive, and can *only* be understood by practice and reflection, rather than by examining the practice of others. It was far beyond the scope of this article to establish whether or not such threshold concepts exist, but if so I believe that a great gap in existing pedagogy is exposed.

Further research is also required into the potential effects on student satisfaction, stress, and creativity that assessing based on quantity could have.

The lack of specific literature relating to the creative arts was something of a limitation in the article. Links were made between various disparate fields, but very little of the literature available related to creative arts specifically. My conclusion from examining the literature is that there is certainly a place for quantity-focussed assessment within the creative arts, and one that is likely under-utilised in the current landscape of assignment and assessment design. However, the literature also exposed some important caveats which must be adhered to when implementing such a model.

1. Quantity of outcome cannot *completely* replace quality of outcome as the primary criteria for assessment, although there is some space for it to be utilised.

2. Quantity based assessment is best utilised to establish foundational knowledge, or to cement important knowledge or skills.

3. It is fundamental that assessment based on quantity of outcome be accompanied by student self-reflection on the practice.

Suggestions

Based on the analysis above, my suggestion is that quantity of outcome would be best utilised at Level 4 in creative arts degrees, as a way of developing fundamental art and creative skills, as well as establishing understanding about the value of practice which will compound with time and pay dividends in L5 and L6 as students apply these lessons when creating high-quality portfolio work.

Example assignment

Level Four students are given an assignment where they must fill up a sketchbook of 100 pages with observational drawings. They are told the aim of the assignment is to practice and improve their drawing skills. At the beginning of the assignment, students are asked to rate their drawing skills relating to specific disciplines (e.g., figure drawing, animal drawing, landscapes etc). At the end students are graded primarily on the quantity of work they produce (how much of the book they filled but are also required to reflect on the process. They are also required to rate their skills once again, and to reflect on any differences in the ratings before and after. To some, such an assignment may not seem academic enough.

However, as this article shows, the learning such an assignment could yield has a strong basis in literature.

References

Luminate. (2023). What do creative arts graduates do? [online] Available at: https://luminate.prospects.ac.uk/what-do-creative-arts-graduates-do#:~:text=Creative%20arts%20graduate%20unemployment%20remained.

Gladwell, M. (2008). Outliers: The Story of Success. New York: Back Bay Books.

Cambridge Dictionary (2023). [online] @CambridgeWords. Available at: https://dictionary.cambridge.org/dictionary/english.

Kolb, A.Y. and Kolb, D.A. (2009) 'The Learning Way: Meta-cognitive Aspects of Experiential Learning', Simulation & gaming, 40(3), pp. 297–327.

Kolb, D.A. (2014) Experiential learning: experience as the source of learning and development. Second. Upper Saddle River, New Jersey: Pearson Education Inc.

Flavell, J.H. (1979) 'Metacognition and cognitive monitoring: A new area of cognitive-developmental inquiry', The American psychologist, 34(10), pp. 906–911.

LEAT, D.A.V.I.D. and LIN, M.E.I. (2003) 'Developing a Pedagogy of Metacognition and Transfer: Some signposts for the generation and use of knowledge and the creation of research partnerships', British educational research journal, 29(3), pp. 383–415.

Strieth-Kalthoff, F., Sandfort, F., Kühnemund, M., Schäfer, F.R., Kuchen, H. and Glorius, F. (2022) 'Machine Learning for Chemical Reactivity: The Importance of Failed Experiments', Angewandte Chemie (International ed.), 61(29), pp. e202204647-n/a.

Hahn Fox, B. and Jennings, W.G. (2014) 'How to Write a Methodology and Results Section for Empirical Research', Journal of criminal justice education, 25(2), pp. 137–156.

Dewey, J. and Archambault, R.D. (1974). John Dewey on education: selected writings. Chicago: University Of Chicago Press.

Pace, D. (2017). The decoding the disciplines paradigm: seven steps to increased student learning. Bloomington: Indiana University Press.

Meyer, J.H.F. and Land, R. (2005). Threshold concepts and troublesome knowledge (2): Epistemological considerations and a conceptual framework for teaching and learning. Higher Education, [online] 49(3), pp.373–388. doi: https://doi.org/10.1007/s10734-004-6779-5.