Blended Learning in Practice

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Editorial

Welcome to the autumn 2020 edition of our e-journal Blended Learning in Practice. In this edition we have seven research articles from participants on the Post Graduate Certificate in Learning and Teaching in Higher Education (PGCertHE) programme at the University of Hertfordshire.

In this edition:

Ioanna Danai Styliari investigates how Digital Game-Based Learning (DGBL) can be used to enable undergraduate Pharmacy students to build transferable digital skills. Using basic coding principles, small groups of students produced short animated videos investigating a commercially available pharmaceutical product.

Andy Timms reviews research that indicates that a teaching method called Productive Failure can result in short term enhancements to learning and understanding of Higher Education students. He questions whether we need to adjust our perceptions of 'failure' and look at the opportunities for learning that it represents in a more positive way.

Using a narrative qualitative approach, Mabel Martinelli reflects on her work as a University Lecturer and considers her students' experience within the framework of "human flourishing". Using a narrative perspective as qualitative methodology, she intertwines her experience with the literature on the themes of education, well-being and resilience, as well as literature centred around values, coaching and positive psychology.

Through an exploration of game-based learning, Sean Cloak provides an overview in the form of a case study of how, a traditional method of content delivery can be altered into a playful, game-based activity. The activity promotes the individuals own learning preference but also enhances their overall experience with the subject matter increasing their overall engagement level. The learners in this particular instance are a group of first year student paramedics.

Catherine Menon examines the use of compassion-focused pedagogy as a technique for conducting, teaching and leading these teamwork activities. She presents a review of the motivations for using compassion-focused pedagogy in safety engineering teamwork situations, the challenges which might be faced in implementing this approach and the benefits that might reasonably be expected from its use in this context. Catherine also discusses a recent trial of compassion-focused pedagogy across three modules in the University of Hertfordshire Computer Science department.

Statistics anxiety is increasingly common in social science and psychology. Emily Beadle has conducted a literature review to explore its potential causes, the variables that may hinder or help statistics anxiety and the potential strategies to reduce statistics anxiety and the effect it has on performance.

Jess McCloskey discusses the use of Acceptance and Commitment Therapy (ACT) to build up psychological flexibility and resilience of Healthcare workers in the NHS. Her article investigates the adaption of a four-part series of workshops using ACT skills into a one-day workshop, using collaborative teaching methods. This is a response to the challenging nature of healthcare worker schedules.



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Ioanna Danai Styliari is a Research Fellow at the School of Life and Medical Sciences. She is a trained Physicist with a specialization in Biomedical Engineering. After a change in carreer path and after gaining a PhD in Pharmacy she joined the University of Hertfordshire. She is working on the INFORM2020 EPSRC funded project, looking into inhaled formulations. Ioanna Danai is an Associate Fellow of the Higher Education Academy and aspires to facilitate students to become multidisciplinary.

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Mabel Martinelli is a Visiting Lecturer at the University of Hertfordshire, teaching and supervising in Cognitive and Behavioural Psychotherapy. She joined the University in 2009 and has welcomed the opportunity to teach alongside her clinical work and raising a young family. Mabel is interested in what makes others flourish and is currently re-engaging with her PhD studies in this area. Having recently completed CPAD training and a qualification in coaching she has promised her family that her PhD will be her tenth and last university qualification.

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Jess McCloskey is a Chartered Clinical Psychologist and Acceptance and Commitment Therapy Therapist who has been working in the NHS since graduating from the Doctorate in Clinical Psychology Programme at the University of Hertfordshire in 2018. After completing her doctoral research in Restorative Justice, Jess took up full-time work in Secure Forensic Services for the NHS and with the Offender Personality Disorder Pathway with the National Probation Service. Her current research interests are in the impact of using Acceptance and Commitment Therapy interventions to build up resilience in NHS and NPS staff. "Coding-in-disguise"; A Digital Game-Based Learning activity to deliver a programming course to Pharmacy students.

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Abstract

Digital Game-Based Learning (DGBL) has attracted a lot of attention as a highly engaging learning method that enhances the learning outcomes of the participants and allows them to build transferable digital skills while having fun. In this paper, we are investigating the theory and the rationale behind integrating a DGBL learning activity into the curriculum and we are presenting such a DGBL paradigm for Level 4 Pharmacy students of the University of Hertfordshire. The activity requires the students to work in small groups and present an assignment to the rest of their class by the means of an animation video, using basic coding principles at an online platform. While their digital skills as Pharmacy students might not include coding, the challenge and the freedom to present their assignment using their own script and animations of choice, enhance their learning experience. Such activities integrate a range of desirable graduate attributes and are working in the direction of producing multidisciplinary and adaptable scientists, unafraid of digital challenges.

Keywords; Digital Game-Based Learning, Pharmacy, Coding

Introduction

"It is a truth universally acknowledged that Pharmacy students must be in need of good teaching practices". To any Jane Austen aficionado reader, like the author of this paper, the above phrase would surely bring a smile on their face and would have caught their attention. This simple example shows how important it is to speak the "same language" with your audience. In the case of higher education institutions, where the majority of the audience has just reached adulthood, mastering this "language" is a constant challenge for the educator. And it is not only the "language" that has to evolve, the same applies to teaching methods; pharmacy teaching has transitioned away from a product-centered emphasis, toward a patient-centered focus, albeit there is still a debate on the science/practice balance in the undergraduate teaching (Jesson et al., 2006; Gleason et al., 2011).

Pharmacy students do not know from the start of their studies whether they will follow an academic-research based career or the "traditional" practice-in-a-pharmacy route. For this reason, it is important to ensure students are trained to enhance their scientific expertise as

well as a patient-centered attitude. This is not achieved solely by deep clinical knowledge; a well-rounded pharmacist should integrate skills, attitudes, values and behaviors with knowledge to their practice activities during their education. In 2013, the Educational Outcomes of the Center for the Advancement of Pharmacy Education (CAPE), were *"intentionally expanded beyond knowledge and skills to include the affective domain, in recognition of the importance of professional skills and personal attributes to the practice of pharmacy"* (Medina *et al.*, 2013). While there is a plethora of attributes that one could list, leadership, teamwork, adaptability and critical thinking have been highlighted as mandatory for Pharmacy education Clauson *et al.*, 2019; Baker, Crabtree and Anderson, 2020). Educating the future pharmacists should address all the aforementioned requirements, while using modern educational approaches.

The paradigm shift in education from the traditional Socratic method to a more interactive one is well documented in literature. With a 97% of youth playing computer and video games (Jenkins, 2013), the phrase "online games" is as familiar to new undergraduate students of all disciplines as is "food". With this in mind, it is no wonder that in the quest to move away from the traditional full-textbook based teaching, gamification strategies and game-based learning (GBL) have attracted a lot of attention. While gamification is the use of different motivating elements such as score cards that foster competition between users, GBL is linked to the cognitive area of the product with game content and game play enhancing the acquisition of knowledge and skills (Qian and Clark, 2016).

GBL is an interactive learning environment where the user actively develops their knowledge according to their experiences; such experiences involve problem solving and challenges that leave the learner with a sense of achievement (Gamelearn, no date; Jessica Trybus, 2015; Qian and Clark, 2016; Sera and Wheeler, 2017). It is not in the scope of this paper to provide a detailed review of GBL strategies; if the reader is interested then the highly detailed review of Qian and Clark, 2016, is a recommended read. However, it should be noted that a key element of GBL activities adding to their popularity and success is that they are fun and can also be part of a flipped classroom learning strategy (Lam *et al.*, 2019).

The role of games in pharmacy education was addressed by the American Association of Colleges of Pharmacy (AACP) Report of the 2013–2014 Academic Affairs Committee (Cain *et al.*, 2014). It was suggested that educational gaming should be encouraged among colleges and schools of pharmacy, as it has been shown that using games for learning purposes can increase examination scores, the student-learner satisfaction and motivation to learn, and increased collaborations (Cain *et al.*, 2014). To this end, a plethora of GBL studies have been explored such as escape-rooms (Clauson *et al.*, 2019; Baker, Crabtree and Anderson, 2020), role-playing (Basheti, 2014; Lucas *et al.*, 2019) alongside other active-learning approaches (Sumanasekera *et al.*, 2020).

With the facilitation of the continuous technological advancements, Digital Game-based Learning (DGBL) has emerged. Linking back to the fact that students are already familiar with most digital tools and with the concept of online/digital gaming, the main advantage of DGBL is that it associates the active involvement of the learner with a fun element; the tool is not used only for entertainment but to enhance the knowledge (Perini *et al.*, 2018). Educational gaming has become a reality even on mobile platforms (Crompton and Burke, 2018; Troussas, Krouska and Sgouropoulou, 2020). Looking into the evolution of the field, the characterization of gamification has evolved from "the use of game thinking and game mechanics in non-game contexts" into "the use of game mechanics and experience design to digitally engage and motivate people to achieve their goals." (Sera and Wheeler, 2017; Fogarty, 2019).

Game mechanics also give the learner the freedom of choice. The game environment may allow the learner to explore different areas, and quests or challenges can be presented to allow the learner the opportunity to complete tasks of choice (Sera and Wheeler, 2017). As an active learning activity, it also engages students as partners in the teaching-learning process and helps them take more responsibility for their own learning" (Gleason *et al.*, 2011). An online GBL platform with an easy and pleasant user interface enhances the enjoyment of students, which, in turn, affects the learning outcome. The positive influences of DGBL over student learning have been associated with the theory of flow experience; a psychological state characterized by complete engagement and immersion in an activity (Csikszentmihalyi, 1991; Chen and Chang, 2020).

In Pharmacy education, it was suggested that using virtual GBL and technology could enhance the learning of the students in the classrooms. One example of such a technology is *Mimycx*, sponsored by the American Association of Colleges of Pharmacy (AACP) and Professions Quest. *Mimycx* is a multiplayer online role-playing game that includes interactive quests used to teach health professional students critical thinking skills in a virtual medical environment. In every game/quest, avatars are engaged in virtual adventures that have been designed to be case-based and health-related. Thanks to the nature of such a DGBL technology, the students are familiar with the concepts of quests and what is required of them while real-time social interaction, communication, and teamwork via verbal and text chatting functionalities is encouraged (Lam *et al.*, 2019).

Another excellent example of digital game-based learning in pharmacy education is Kahoot!" a web-based game multiple-choice trivia quiz developed to allow pharmacy students at a school in the United Kingdom to review various aspects of the curriculum in preparation for their licensing examinations (Dell and Chudow, 2019). While using Kahoot!", the students worked collaboratively, created quizzes discussions and surveys, while addressing both simulated and real-life problems. During the post-intervention survey, 59.3% of students claimed they would use the game in the future for other work and 60.4% of respondents would appreciate a similar activity for other pharmacy modules (Sera and Wheeler, 2017; Dell and Chudow, 2019).

Overall, DGBL activities are relevant and familiar to the current generation of students and thanks to their approachability and enjoyability they provide an alternative educational strategy suitable to a modern classroom, making them a powerful tool that further enhances learning in higher education. As a brief summary DGBL has the following positive characteristics:

- Allows the sequencing of tasks and activities
- It is highly and actively engaging (fun)
- The learning pace is controlled and tailored to each student
- There is immediate feedback to student mistakes
- It builds up transferable skills like problem-solving and creativity
- The learner upon completing the challenge/learning activity has a sense of achievement

DGBL methods for a digital literate Pharmacy student

It has been found that students who develop digital literacies as an integral part of their learning are more effective in their study and more employable on graduation – over 90% of new graduate jobs require digital capabilities (HEA, 2017). These digital literacies mean that the student will be confident and highly adaptable in the use of new digital tools. This has been so important that it has been specified into the University of Hertfordshire's graduate attributes:

"The University promotes professional integrity and provides opportunities to develop the skills of **communication**, independent and **team working**, problem solving, **creativity**, **digital literacy**, numeracy and **self-management**. Our graduates will be confident, act with integrity, set themselves high standards and have skills that are essential to their future lives." (Hertfordshire, 2019)

One digital challenge for the future scientists is to build up their programming and coding skills, which are much needed in a laboratory/ data acquiring environment. This is reflected by the recent increase in postgraduate courses offering Data Analysis. Learning how to program can be very difficult even for first year computer science students, let alone for students in the Life and Medical Sciences. DGBL activities have been designed to show that it has improved the learning outcomes of the students (Wang and Chen, 2010).

Troussas *et al* designed and implemented Quiz Time, a mobile GBL application in order to assess and advance learners' knowledge in the programming language C# (Troussas, Krouska and Sgouropoulou, 2020). The students' feedback was that the application had a positive impact on their learning and that the application was useful. Coller and Shernoff developed

a serious game (NIU-Torcs) to be used in an undergraduate mechanical engineering course in numerical methods (Coller and Shernoff, 2009). The user/student of the application the authors developed, had to write a program in the language C++ that would provide a car with driving commands in a real-time race in a 3D environment. This was a fun activity that the students related more with and were more motivated to complete, while they were actively exploring and enhancing their own mathematical concepts such as numerical root finding, curve fitting and optimization, to apply them in the coding of the race.

One challenge of integrated DGBL activities is their nature, as in order to create a successful game such as the aforementioned ones there is a need for highly motivated and engaged makers that have the skillset, knowledge and time to invest into their creation (Sera and Wheeler, 2017). One alternative option is to use commercial off-the-shelf (COTS) games; such games might not have been developed originally for use in education but could be repurposed as tools. Such examples include the game creator tools Kodu (http://www.kodugamelab.com/), Adventure Maker (http://www.adventuremaker.com/)

and Alice (http://www.alice.org/index.php)

"Inhaler from Scratch"; a DGBL Activity for Pharmacy students.

Considering the challenge Pharmacy students might face when asked to do data analysis of the results of a research project, emphasis should be given in their curriculum to enhance their numerical and digital skills. This is expected to be beneficial in particular to Pharmacy students that want to pursue an academic career, where digital literacy is expected to be at an advanced level. A DGBL activity designed for this should also be in line with the continuous enhancement of the student-pharmacist's soft skills. With this in mind, a DGBL activity has been designed to introduce basic coding actions in disguise as part of a Level 4 (Pharmacy) students' module.

Description of the activity

Based on previous projections, approximately 80 Pharmacy students will be attending the module "Applied therapeutic interventions" in the academic year 2020/2021. The focus of the activity will be on pulmonary drug delivery, and the students will have attended a 1.5 hours lecture session on the subject. During this traditional sit-in "passive" learning activity the fundamental science behind the fate of inhaled formulations and the different inhaled formulation strategies will be discussed in depth.

At the last 15 minutes of that session, a discussion on the assessment/activity that will follow and a tutorial on "*How to make a "Scratch" cartoon from scratch"* will be given. Scratch (<u>https://scratch.mit.edu/</u>) is a free online web tool that allows the user to create animations, games, interactive stories. It has an easy to use drag and drop interface and allows the sharing of interactive projects on the web. Using this interface, the user is, in reality, *coding*, as it creates a series of dependable commands that if put together, create

the animation on the right. This is a vibrant online tool that is daily updated and allows the dissemination of knowledge in a friendly, fun and easy way. One recent example is the Corona Virus Simulator (<u>Previously available on: https://scratch.mit.edu/</u>projects/375802116/). Figure 1 shows the workspace that will be discussed during the tutorial session, while Figure 2 is a snapshot of the custom-made tutorial that will be presented to the students at the end of the teaching session.



Figure 1 A snapshot of the main workspace of Scratch that allows combining different actions to create an animation (image taken by the author). In the left panel, a series of commands is presented. The student can drag-and-drop the commands on the middle panel and connect them in a serial way so that the animation on the top right panel will act accordingly.



Figure 2 - A Snapshot of the Scratch tutorial prepared for the students (image taken by the author).

The students will be split into groups and each group assigned a commercially available inhaled product, alongside with some questions to answer (see Figure 3). At the end of the two weeks the groups have to:

- Compose a 1500-word report with relevant information on their inhaled formulation (worth 20% of the marks)
- Present their answers in the class via a 3-minute cartoon video they will have made. They will be expected to also narrate alongside the text and take as a group 5 minutes of questions on their findings. They will be given a free reign on how they want to present this and role playing will also be suggested as an option to them (10% of marking per group)

Group Number 4

Presenters: Mark Twain, Jane Austen, Charlotte Bronde

You must present information about Bricanyl Turbohaler. In your coursework and your cartoon try to identify the following characteristics;

- What type of formulation is it?
- Does it have excipients? If yes which ones? What is the role of that excipient?
- What is the API?
- How does the API act?
- What Class of drug does this API belong to?
- What is the dose?
- How stable do you think is this formulation?

Figure 3 - An example of the group allocation with the handout available to the students to prepare for the activity.

In order to maximise inclusivity and participation from the students, controls will be put into place in the form of support documents and information available to them on the online educational platform used at the University of Hertfordshire, Canvas. The students will be able to find there:

- Group Allocations in advance. Students are split into groups of 4 (mix students' skills)
- Printable Handouts with the questions that need to be addressed (See Figure 3). All materials have been made dyslexic friendly appropriate fonts/sizes/spaces to ensure inclusivity.
- Timeplan of the activity. The duration of the activity is 2 weeks, which is an adequate notice and preparation time allowing for quiet learners to contribute in their groups.
 - A reminder about the activity discussion & the Scratch tutorial taking place will be sent 2 days in advance.
- A presentation-introduction to the "sentimental framework" i.e. how to make their videos and story lines more attractive to gather more attention. They will be reminded that it is all about the video's explanation, technical presentation, content, voice and language, efficiency, and interestingness (Shoufan, 2019)

During the assessment, each group will present their work and take the questions both from the rest of the class as well as from the assessor. The assessor will ask for feedback on the use of Scratch and will explain to the students the link between their animation and coding.

Discussion

The proposed learning activity for Pharmacy students is an amalgamation of different active-learning strategies, as it combines elements of cooperative, team-based and case-based learning (Gleason *et al.*, 2011). Active learning was the key element in planning the activity as it is suggested that active learning stimulates high order thinking and increases the students' motivation to learn (Bonwell and Eison, 1991).

To the best of the author's knowledge, this is the first time an activity is proposed to enhance the digital literacy skills and in particular those of coding, in undergraduate Pharmacy students. The aim of the "Inhaler from Scratch" DBGL activity is multifold; although the students will be assessed on the content of the presentation and their report, this activity is a not just "coding-in-disguise" as it was built in order to facilitate the development of both hard skills and soft skills; basic coding understanding and core knowledge is achieved, while the very important soft skills like team building, group working, communication, creativity and self-management are also exhibited.

At the same time, from a pedagogical point of view, this activity abides by the inclusive and student-centred practices (Hurst, 2010); students are able to work on their own time, on any computer available on campus, the activity is fun and creative, it allows for the development of their creativity and building up their confidence by sharpening the students' presentation skills through role-playing. The students are placed in the role of the teacher, which can greatly enhance understanding of the topic. It is also ideal for visual and audio learners, and it achieves a sense of accomplishment upon completion. Last but not least, the narration/ text boxes used are ideal for any students with disabilities.

Such activities provide enough ground for the development and educational support of a well-rounded pharmacist, that has the ideal graduate attributes i.e. is able to communicate their ideas across an audience, can work both independently and as part of a team, are creative and digital literate, and can self-manage. At the same time, it becomes more apparent why the educational switch to the more interactive and modern DBGL activities is observed. The use of technology in active based learning activities, where the students take the initiative to learn, makes learning relevant, familiar, approachable and enjoyable (Lam *et al.*, 2019). DGBL is a powerful tool that further enhances learning in higher education. It is now in the hands of the educator to be up to date with the available tools and to be committed to invest their time in integrating DGBL into their modules.

Conclusion

An online DGBL learning activity has been developed for Level 4 Pharmacy students that requires the students to work in small groups and present an assignment to the rest of their class by the means of an animation video. This activity is taking place at an online, free to use platform and is a coding lesson in disguise as the students are required to compose a series of commands that will result in actions on the animation. This DBGL activity is highly interactive and fun, as well as inclusive, allowing the students to work both in groups and in their own time, developing both hard and soft skills. Integrating such multifunctioning DBGL activities into scientific modules, is many steps forward towards confident, adaptable and digital literate graduates.

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'Failure' A Positive Learning Experience

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Abstract

Anecdotally we often hear the phrase 'we learnt more from failure than from success'. In business it is almost axiomatic that to succeed you need to learn how to fail. Yet in higher education, whether through the pressures of time and assessment driven metrics or resistance from teaching staff, the opportunities for students to learn from mistakes and 'failure' can be difficult to build into the curriculum. This article reviews research that demonstrates that a teaching method called productive failure appears to result in short term enhancements to learning and understanding when measured through normal assessment methods and when compared to control groups given the same material but using 'traditional' active learning techniques. The method may also result in longer term benefits measured in terms of a student's resilience and motivation when faced with unfamiliar questions or tasks and the inevitable setbacks that can follow. Once students have been instructed using productive failure, they are more readily able to transfer and apply their acquired knowledge, experience and skills to new areas of inquiry. I question whether we need to adjust our perceptions of 'failure' and look at the opportunities for learning that it represents in a more positive way. The ultimate goal would be to incorporate 'productive failure' into tertiary courses, and I discuss some of the criteria for doing so successfully. We also need to appreciate that not everything that a student learns at University can be measured in traditional ways.

Introduction

In a popular TV and movie franchise, the 'Kobayashi Maru' is a no-win scenario purposely designed to be unwinnable. It was thus deemed to be a test of a candidate's emotional resilience and his or her ability to learn from 'failure'. Hopefully, the significance of the inverted commas around the word 'failure' will become more apparent as this article unfolds. In this review I want to examine whether 'failure' should be viewed in a more positive way in higher education, i.e. is there evidence that 'failure' can result in beneficial long-term learning and prolonged enhancement of both life and learning skills?

Many of the processes involved in learning from errors and the accompanying emotional responses are examined in reviews by Metcalf (2017) and Lodge et al. (2018). A further study by Lam (2019) also reveals that the reactions of students when faced with a 'no-win' situation (in the form of an unexplained problem) demonstrates that there are significant

opportunities for dialogue between educators and students to aid development of the students emotional reactions and their ability to cope productively with errors and 'failure'. As a corollary we as educators may also wish to reflect on our own response to, and ability to cope with errors and failure and how our reactions influences the students we teach.

Failure as an intermediate stage

Our aim as educators is to facilitate learning in our students, to produce adults who can assimilate information and develop critical thinking, in short; we want our students to think for themselves and succeed. Hence, I want to make a distinction here, this article is not about academic (degree, module or course) failure, this is very seldom a good outcome for either student or educator. Failure is not, and should never be, the final destination in learning. Instead, it has to be an intermediate waypoint that provides opportunity for students to learn from the insights that stem directly and indirectly from their experiences. This, after all, is a central tenet of the various forms of constructivism espoused by Piaget and Vygotsky (McLeod, 2018, Vygotsky, 1978).

One function of higher education should be to allow students the freedom to develop ideas and experiment in a safe space, even if that means some 'failure' along the way. Yet, as educators we often encounter issues with new student cohorts that limit the application of methods to encourage thoughtful experimentation. According to Chowrira et al. (2019) these issues can include "inadequate pre-class preparation", "inactive or non-responsive behaviours", "lack of motivation or perseverance" and "discomfort with failure". Hopefully, in the three or more years that students spend with us at university, we (along with the increasing emotional and intellectual maturity of the students) go some way to addressing the first three points identified above, unfortunately, I am not convinced that we adequately address the last point "discomfort with failure". In many ways university students can be poorly disposed towards failure as, simply put, they are not used to failing. Perhaps, this is also an observation that could equally be applied to many university educators, possibly accounting for the lack of engagement with or understanding of the positive aspects of learning through 'failure'.

Fear of failure

Do we stigmatise failure? There is certainly a problem with the definition and connotation of 'failure'. Almost universally it is considered a negative term in education and general society, although 'failure' has a much more nuanced definition amongst entrepreneurs and wider business. This negative association can lead to development of a 'fear of failure' in the individual or even at institutional level. I wish to take the following definition of 'fear of failure' as a basis for discussion "persistent and irrational anxiety about failing to measure up to the standards and goals set by oneself or others" (American Psychological Association, 2007, p.369). All organisations, including higher education establishments, celebrate success, however, while they may also accept that 'failure' can be beneficial in some cases,

they are often reluctant to fully embrace the concept in practise (Trapp, 2014). So external and internal pressures to succeed (whether they be financial, status driven or personal embarrassment) often occlude learning opportunities from 'failure'.

It is human nature we all fail sometimes, and it is a common refrain that 'I learnt more from failing at....'. Yet our reactions to failure are often shaped by the perceived impact of the failure or by the context within which we 'fail'. For example, gaming has become a common pastime, often including online social and collaborative elements. Learning to play these games well takes significant time and a large amount of trial and error, yet players are willing to invest their time and accept multiple failed attempts but they will persevere to 'crack' the game (Granic et al., 2014, McGonigal, 2012). Not only do these players develop emotional resilience in the face of failure (acceptance of setbacks, learning from the setbacks and applying the lessons learnt – at least in the gaming environment) but may also exhibit other improvements, for example in cognitive enhancements (Chandra et al., 2016, Gray, 2015). Yet these same game players may be paralysed by the fear of failure in real world situations that are perceived as having higher stakes such as in educational or employment contexts (Tsaousides, 2017).

So perhaps our goal should be to encourage students to learn from trial and error and show that this is both an acceptable and a useful strategy for learning. This in itself is a balancing act between developing sufficient challenges to match the range of individual student abilities, after all we wish to encourage all of our students not demoralise those that feel they can't keep up (Henry et al., 2019). We should also be encouraging a growth mind-set amongst our students as opposed to a fixed mind-set. Rather than an acceptance that their talents and abilities are innate and determine their success or failure (closed), the student is open to change, to being challenged and to self-motivated inquiry and learning, a so called 'can do' attitude. (Dweck, 2006).

Failure as a learning opportunity

By not allowing opportunities for 'failure', we also create unreasonable expectations when students move outside tertiary education into employment or post-graduate study. They lack the emotional clarity to realise that failure is a first step towards understanding of a problem and the perceived personal setback may terminally undermine the student's confidence and their desire to engage with the problem. This is essentially my interest in the concept of failure as a learning opportunity. Having spent a significant number of years in higher education I have seen first-hand the experiences of many students as they transition from undergraduate study, specifically in the life sciences, to a research focused postgraduate degree. It is clear that some students have significant problems adapting to the uncertainties of 'real' research, where 'failure' can be part and parcel of the process in the first year or beyond of a research degree.

I would use two people I knew well as examples to illustrate the different approaches students take when facing setbacks. The first was a mature female student who had worked for several years and had a young family prior to coming back into education to study for a PhD, her personal experiences had already included the vicissitudes of normal life. Her research project was beset with problems from the beginning and positive experimental results were few and far between, this was a pattern that recurred throughout the three years of her research. However, she did persevere and finished her research with a successful viva and award of her PhD. The second example was a male student who had achieved a high-class degree at undergraduate level and transitioned straight into a doctoral program. As with the first example, his research suffered from problems with methodology and design from the start. However, unlike the first example, this student eventually dropped out of his PhD program after nine months because of dissatisfaction with the progress of the research. The difference in levels of resilience and emotional intelligence displayed by these two people exemplifies the problem we have within our student populations. Some students may be very capable when things are going well and there are well defined means of measuring the outputs of their study (the second example) but these same students don't have the toolkit to cope with setbacks or when they are faced with open ended situations where there are no 'right or wrong' solutions.

We therefore arrive back at the central question of this article, how can we give students the ability to face unknown situations and realise they can learn from these, and not as in the second example above, simply walk away?

When we talk about 'failure' we need to transcend the negative attributes of the word. Therefore, any meaningful discussions about the positive aspects of 'failure' may require the adoption of a different terminology and certainly we should not use failure in student facing terminology. In attempts to rephrase and repackage 'failure' alternative phrases have been used, for example 'fail forward' a common business idea (Maddock, 2012, Maxwell, 2007) and productive failure (Kapur, 2008). It is the second concept that is of specific interest in terms of what we may be able to teach our students.

Productive Failure

Productive failure (PF) was initially conceived for use in secondary education. The first papers, describing PF as a method to teach mathematics in Singapore, were published over a decade ago (Kapur, 2008, Kapur, 2010b). PF sits firmly within a constructivist framework where students use their own experiences to construct knowledge and perhaps should be considered an extreme example of active learning (Chowrira et al., 2019, Kapur, 2010a). PF aims to encourage deep or conceptual learning, as opposed to surface learning, and to enhance motivation to persevere (Hattie and Donoghue, 2016, Kapur, 2014). However, unlike more 'traditional' forms of active learning where some instruction takes place prior to application of this knowledge to solve problems, the students are presented with unfamiliar

concepts and asked to work through them immediately and without first being taught methods or given example solutions. Students work in small groups and construct shared solutions by building on their existing knowledge to make sense of the given problem. While students often fail to succeed in the primary task (solving the problem) the activity encourages them to synthesise 'new' knowledge, developed from their own and their peer's insights and efforts (e.g. through experimentation) and combined with their pre-existing knowledge. Although the method can result in short term loss of confidence in some students, most students do eventually acknowledge their productivity in the form of developing understanding and learning processes from a failed task and perhaps more importantly, the transferability of these discovery processes to new topics (Darling-Hammond et al., 2020). The crucial learning takes place from the realisation that there may be multiple and non-exclusive approaches to solving a problem, and in turn this encourages individual metacognition and reflection on the student's initial assumptions (Langdon et al., 2019, Tanner, 2012).

Unfortunately, there is limited data on the application and efficacy of PF to students in higher education but recently there has been increased interest and production of research literature examining the subject.

Comparison of productive failure with standard undergraduate teaching

A paper by Chowrira et al. (2019) looked at the effect of PF when compared to standard undergraduate teaching using active learning (AL) instruction. Parallel groups of students following the same life-sciences course were taught using identical techniques, except for two topics within the course where one group was taught using AL and the other PF. The efficacy of each type of teaching was assessed through analysis of mid-term and final examination results which took place soon after the divergent teaching sessions and at the end of the course respectively (Figure 1).

	Teaching			Midterm 1	Teaching			Midterm 2	Teaching			Final			
PF section	AL	AL	AL	AL		PF	AL	PF	AL		AL	AL	AL	AL	
Topics	А	В	С	D		Е	F	G	Н		Ι	J	К	L	
AL section	AL	AL	AL	AL		AL	AL	AL	AL		AL	AL	AL	AL	

Figure 1.

Parallel course structure, showing variation in teaching techniques for two groups of students. Productive failure (PF) shown in green vs. active learning (AL) shown in blue, for two topics where the teaching style diverged between the groups, occurring after the midterm 1 exam and before the midterm 2 exam, both shown in gold. Taken from Chowrira et al. (2019).

The structure of the parallel PF and AL sessions are shown in Figure 2. PF is predicated on the problem-solving element coming before any discussion of methods or possible solutions, almost the inverse of the active learning sessions. A difference between this implementation of PF and previous studies involved the requirement for students to engage in pre-class reading. However, in STEM subjects, pre-reading is a common requirement at tertiary level as a certain level of knowledge and a shared lexicon are required for effective communication between instructor and students, and between students in the context of group work. Therefore, it could be reasoned that requiring pre-reading on a topic more precisely mirrors the level of engagement required on a normal university course.

Figure 2. Schema for productive failure (PF) compared to active learning (AL).



Stages of instruction and activity for productive failure (PF), shown in green and active learning (AL), shown in blue. The divergent teaching methods were implemented in the classroom for different sessions as previously shown in Figure 1. Taken from Chowrira et al. (2019).

For the mid-term examination, occurring soon after the periods of AL and PF teaching, there was a significant difference in outcome in favour of the group taught with the incorporation of PF sessions (Figure 3). The results would seem to suggest that the effect of PF instruction, at least in this study, was robust over the short term. An effect that was also observed in a separate study (Schneider and Blikstein, 2016). However, it should be noted that the difference between the two groups was smaller and not significantly different in the final

exam. Perhaps this was due to all students having extra incentive to undertake independent learning for a final exam that contributed to their degree award. An interesting finding was that PF seemed to have a greater effect on the lower ternary group of students and this did persist to the final exams with a significant increase in performance of the lower ternary PF group.





Controlled Difference in Study Item Grades on Midterm 2

Adjusted mean study grades (0–100) and standard error by condition, results were controlled for gender, year, and degree program, midterm 1 grades and midterm 2 non-study items. Error bars show standard error. *** indicates a significant difference p < .001. Taken from Chowrira et al. (2019).

Another study (Steenhof et al., 2019) also looked at PF versus direct instruction in a STEM subject area. Parallel groups of university students were given the same problem (assessment of clearance of creatinine from the body measured by concentration of

creatinine in serum). However, while the direct instruction group were given an equation to allow calculation of serum concentration and clearance, the PF group were given raw data from the research paper in which the equation was derived and asked to provide solutions for calculating creatinine clearance. Towards the end of the teaching session both groups were given the equation (for the PF group this was the first time they had seen this equation). They were then asked to answer some multiple-choice questions, which involved using the equation to perform calculations and tested recall of the session. Longer term learning acquisition was assessed by a post-session multiple-choice based test. Some of the questions in the post-session test contained new information that would influence which answers the students selected, depending on how well they had been prepared for future learning (i.e. whether their efforts had gone beyond parroting or example led solutions to include understanding and willingness to experiment with the data provided).

Results from the study comparing performance of the two groups during the session and in the post session 'preparation for future learning' test is shown in Table 1. As can be seen, in the immediate recall test the direct instruction group (0.87) outperformed the productive failure group (0.81) which was found to be significant (p = 0.031). However, in the post session test (preparation for future growth, measuring ability to apply knowledge to new situations and new information or data) the PF group (0.75) outperformed the direct instruction group (0.67) and this was shown to be significant (p = 0.04) when prior performance of the two groups in the recall test was used as a covariate.

	Direct Instructior	1	Productive Failure		
	Μ	SD	Μ	SD	
Recall- assessment	0.87	0.07	0.81	0.07	
Post-session assessment (preparation for future learning)	0.67	0.12	0.75	0.11	

Table 1. Mean proportion of correct results in an immediate recall test and in the postsession preparation for future learning phases.

Adapted from Steenhof et al. (2019).

Comparison of the two studies suggest that the direct effects of PF teaching is significant in the short term. However, other factors, for example, studying for a final exam where all students have an extrinsic motivation, may ameliorate differences in performance over

time. This may, however, be an oversimplification, those students taught using PF often displayed increased capacity to assess previously unseen problems and to experiment with different problem-solving strategies. This increased willingness to experiment and to take the inherent setbacks or 'failures' as part of the process seems to persist over time (Kapur, 2010b, Kapur, 2014, Kapur and Rummel, 2012, Trueman, 2014).

Thus, PF has the potential to address some important aspects of learning at post-secondary institutions namely, addressing the fear of failing and developing the emotional and intellectual skills to recover and learn from 'failure'. It also appears that the method of instruction shows increased benefits for those low-performing students who we want to encourage but who are often not engaged with their studies and can thus feel isolated (Chowrira et al., 2019).

Discussion

University course design has already moved away from the didactic to providing students opportunities of assimilating and understanding knowledge through active learning and through collaborative learning i.e. a focus on group work and social interaction as a means to organise a 'data rich information poor' learning environment. However, if we wish to incorporate PF into our courses, we need to provide timely feedback to allow self-assessment and learning before the student advances to the next task. If necessary, this might mean allowing time for iterative learning i.e. achieving learning by application of experience to the same task over multiple trial and error cycles. However, course design needs to be undertaken with care as not all that is labelled as PF fulfils the requirements of this type of educational activity. Poor design may erroneously lead to failure to observe any positive effects of productive failure on learning outcomes (Lam, 2019, Loibl et al., 2017, Sinha and Kapur, 2019).

Design requirements of such activities may be briefly summarised thus;

- Must involve working on complex ill-structured tasks that are challenging but do not frustrate and that have multiple alternative solutions. Problems and tasks should be built around higher cognitive levels involving, application, analysis, synthesis and evaluation exercises.
- Offer opportunities for direct explanation and elaboration (post-activity instruction).
- Allow opportunities to compare failed or suboptimal solutions and extraction of common themes and approaches from student contributions. This last stage is vital so that students consider their contributions as worthwhile and allows them to understand that developing or enhancing their learning involves self-and collective-reflection and ability to engage in metacognition.

What do we mean by a learning toolkit? Professionals from all areas often have stock questions they ask; experience has taught them (us) that these questions are often a good

place to start, but we also expand and learn different strategies when our first lines of attack fail. So, when our students 'fail', or have incomplete success, we should view this as an opportunity to impart some of these strategies. We can also incorporate the insights of students into the problem which then becomes a two-way information flow, the teacher can become the student.

Conclusion

The apparent benefit of PF in the lecture theatre requires that we, as educators, should be designing meaningful learning outcomes and activities that incorporate PF for 21st century higher education. However, the continued focus on measurable achievement and outcomes from assessment mean that there is often little time to constructively learn from 'failure' and we may be in danger of reinforcing the negative aspects of failure rather than the positive i.e. prolongating the problem rather than the solution. A conundrum that needs to be addressed.

In this article, I used the word 'failure' in a positive sense, where the process of failure and recovery helps not only to build resilience but also equips students to approach new problems with an open mind. In the words of one of the twentieth centuries greatest minds,

"Everyone sits in the prison of his own ideas; he must burst it open, and that in his youth, and so try to test his ideas on reality." (Einstein, 1931, p.53)

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Can we also help them *Flourish*? A thematic self-reflective narrative on the application of coaching, human flourishing concepts and positive psychology principles in my work with students in higher education.

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Abstract

Two years ago, as an added twist to New Year resolutions, and following my interest in positive psychology and the concept of "human flourishing", I took the step of planning my new year around "values". This process has had a transformative effect on me, and I began to explore how to apply it to my practice as an educator. Using a narrative qualitative approach, this paper centres around my work as a University Lecturer as I consider my students' experience within the framework of flourishing. Using a narrative perspective as qualitative methodology, I intertwine my experience with the literature on the themes of education, well-being and resilience, as well as literature centred around values, coaching and positive psychology.

The paper draws on my experience as a University Lecturer at the University of Hertfordshire and reflects on the opportunities and pitfalls of focusing on helping students to flourish. It is proposed that a narrative qualitative methodology will positively contribute to others by providing a relatable experience, as well as the opportunity to reflect on the themes explored, in particular the values underpinning our practice.

Key words: Flourishing, Coaching, Positive Psychology, Narrative Approach, Education, Values

Introduction

Take a moment to consider the following scenario: "Please imagine a ladder, with steps numbered from 0 at the bottom to 10 at the top. The top of the ladder represents the best possible life for you and the bottom of the ladder represents the worst possible life for you. On which step of the ladder would you say you personally feel you stand at this time?"

This question is used widely in economic research and is referred to as the "Cantril Ladder" (Glatzer & Gulyas, 2014). According to economic research, if at any moment in our lives we measure high on the scale, that would have a significant impact on many desirable areas of our lives, from an increase in our life expectancy, to measures of health and overall social integration (Diener & Tay, 2017). The benefits also translate to other domains, such as family life (decrease in divorce rates) to positive engagement in work and education (Gulyás,

2016). The Cantril Ladder as a measure has been in use for over forty years (Clark, 2018). Since 2012, it has become the main measure for comparing countries in terms of their wellbeing and is a key element in the World Happiness report (Tofallis, 2020). Reflecting on the limitations of using Gross Domestic Product (GDP) as a measure for comparing societies which have achieved a level of economic stability, the World Happiness Report is an annual publication of the United Nations, presenting a measure of world happiness, causes of happiness and misery, and policy implications highlighted by case studies (Helliwell, Layard & Sachs, 2019). The report also provides a ranking of countries (the World Happiness Index) as part of the Gallup World Poll (Zwolinski, 2019).

Personally, I equate the change in comparing countries according to GDP in favour of a measure of happiness, to reconsidering measures of attendance and academic grades in favour of evaluating the well-being of students and their experience of education.

If being happy is so good for me, how can I step further up the Cantril Ladder?

What can I do in this moment to help me jump from one step to the next?

And, considering the context in which my teaching takes place, can I bring my students up with me?

At this moment, sitting in the garden to edit this paper is the single small change propelling me that little bit higher on the ladder.

Methods

Narrative inquiry as a qualitative methodology is concerned with how we as humans transfer and share unquantifiable elements of knowledge, including experience (Clandinin, 2016). This aim makes it close to the field of education and educational research considering the particular challenges of the profession (Estefan, Caine & Clandinin, 2016). Teaching and learning are critical reflective processes involving reflecting on practice and asking critical questions about the impact of teaching strategies, which leads to new insights. The practice of education has been argued to be similar to that of other professions such as medicine, but with specific idiosyncrasies. The educator is a fundamental tool in the process of learning, which highlights further the importance of self-reflective practice (Abukari & Abubaka, 2018).

Following a narrative inquiry methodology (Clandinin, 2016), research questions evolve as the narrative develops (Agee, 2009). It has been argued that good, qualitative questions often start in broad terms, following the interests of the author, and become refined and reconstructed as the reflective and interrogative process of enquiry develops (Agee, 2009). Other authors would argue in favour of research led by questions in the quantitative methodology, which by definition are structured around pre-determined hypotheses (Charmaz, 2006). However, some authors would agree on a middle ground, emphasising the practical needs of question-led qualitative research (e.g. Richards, 2005; White, 2013), even when these are not dimensionalised in such specific terms as are often expected of qualitative methodologies (Stage, 2007).

My initial interest is aligned with my intention of embracing an existence framed by my values. How can I live a life of value, and how can I consider my need for well-being whilst engaging positively with students and helping them fulfil their own needs? The overarching questions can be articulated as "What makes us *Flourish?"* and subsequently "Can I, in my role as educator, help others to *flourish?*", and "how?"

Reflecting on my own narrative, I identified key themes which I have grouped into two main areas. These areas have guided a literature review, looking at articles published over the last ten years linking the concepts of education with the themes explored: (1) the purpose of education and how it relates to the well-being of students and (2) values, in the context of the profession of coaching, human flourishing and positive psychology as it applies to the field of education. The following "Results" section centres around these themes.

It is proposed that this methodology will contribute positively to the profession by providing a relatable experience that may contribute to the practice of other educators, as we all navigate our values of providing a quality experience for our students. The ability to share knowledge in a relatable way is considered to be a strength of the model, allowing for the transmission of a complex and multi-layered experience (Clandinin, 2016; Charmaz, 2006). The intertwining of themes and literature, which articulates both qualitative and quantitative sources, is an effort to circumnavigate some of the pitfalls identified in narrative inquiry, so as to provide a wider context and reference point (Webster & Mertova, 2007).

Results

(1) The purpose of education and how it relates to the well-being of students: Can we also help them Flourish?

Whilst the purpose and aims of education are widely debated in the literature, and arguments are presented for very contrasting points of view, there is a theme running alongside which revolves around the emphasis put on developing the student to be the best they can be, or, in essence, to help them flourish (Silva, 2017).

According to Kristjansson (2017) there is currently a trend in education portraying "flourishing" as the overarching aim of education. In Aristotelian terms, human flourishing relates to the Greek term "Eudaimonia" (εὐδαιμονία). Flourishing is feeling good about a life in which one is also able to function well (Younkins, 2003; Keyes, 2015).

The UK government in a speech on education reform proposed that the broader purpose of education, beyond our societal responsibility to educate the next generation, is to ensure

that young people "have the resilience and moral character to overcome challenges and succeed" (Gibb, 2015). There are a number of reports highlighting increasing levels of mental health problems in both students and staff in higher education (Grove, 2018; Niblock, 2018; Weale, 2018) which would further highlight an urgency for prioritising well-being in education. The need for empowering students is further supported by views on the increasingly changing / competitive and demanding educative and work environments for which newly qualified graduates will need to be prepared (Tholen, 2014).

I teach in a professional field where I train others to understand and alleviate mental health problems using talking as therapy. I have long identified in myself a core belief related to responsibility, which can be a drive as well as a burden (Riso, du Toit, Stein & Young, 2007). I hold a sense of responsibility for my practice, inasmuch as my teaching may have a direct effect on the recovery and well-being of those who are on the receiving end of my trainees' practices. My particular field of practice (Cognitive and Behavioural Therapy – CBT) aligns itself more closely to the medical model (Elkin, 2009). The therapy is centred on the understanding of mental health and the consideration and application of evidence-based treatment protocols (Butler, Chapman, Forman & Beck, 2006). It is, however, a talking therapy, and, in the same sense as education, the therapist is a key tool in the process of change. Self-reflective practice has over the last few years become more central to the practice of CBT (Laireiter & Willutzki, 2003; Bennett-Levy, Thwaites, Haarhoff & Perry, 2014). Surprisingly, a comprehensive literature search unearthed no qualitative studies focusing on the experience of the CBT practitioner as educator.

I start all my lectures with the academic aims in mind, in particular, the consideration of the knowledge that needs to be imparted according to the programme, as well as allowing time for students to consider their own knowledge gaps and their personal learning aims for the session. I have found this framework rewarding over the years and consistent with a behaviourist approach of goal setting, leading to a measurable outcome. When considering student engagement, I have observed what can be conceptualised as a normal distribution, from students who always seem eager to take part, to those who seem less interested regardless of the strategies I might implement, a pattern widely observed in the literature of education (e.g. Cinches et al, 2017).

An introspective account of my own evaluation of engagement finds me either judging engagement as a direct result of my performance or forming a judgement of the student character (e.g. in terms of their intrinsic motivation or commitment to the course). The literature on positive psychology has provided me with an alternative, and this simple change in focus has positively contributed to my experience of teaching, and the experience of students, based on the feedback I have collected.

What if we ask, "What is going right?" instead of "what is going wrong?"
To some extent, my field of psychological practice is defined by some authors as a "negative psychology" (Bannink, 2014), inasmuch as the efforts are centred on identifying, removing or reducing negative factors (e.g., identifying my beliefs regarding responsibility, and "reducing" my perfectionism). Positive psychology interventions (PPIs) are characterised as programmes, practices, treatment methods or activities aimed at cultivating positive feelings, positive behaviours, or positive cognitions (Waters, 2011). Seligman's model of positive emotions, engagement, relationships, meaning and accomplishment (PERMA) suggests that these are the five enabling factors which should be built into any practice that embraces the principles of positive psychology (Seligman et al, 2009). In this way, positive psychology interventions distinguish themselves from well-being initiatives that seek to enhance well-being through the removal or reduction of negative factors (Waters, 2011).

Collecting feedback in the form of strengths ("*what is going right?*") has been the single most positive change I can identify, which had a positive effect on the way I engage with the students and the session. This change in re-framing has allowed me to focus on the strengths of a teaching session, and further capitalise on what works. This re-framing does not ignore deficits (e.g., Bannik, 2014), but rather re-centres my efforts on what is going right, helping to capitalise on what works, having a direct impact on the mood of the session. This further contributes to the students' experience by modelling a practice which ultimately helps reduce the pervasive effects of judgement and redirect our efforts towards flourishing. I have used this strategy in two ways: as a way of concluding a teaching session, and as a way of starting a new academic term. As a starting point to the new academic term, I use a few minutes of our opening session to introduce the concept and, utilising postcards as prompts, I ask students to verbalise on what has gone "right" for them so far, how they plan to capitalise on that learning for the remainder of the course, and further, what "value" they place on the remaining leg of their educational journey.

I have found that most students kept their postcards to the end of the course. When reflecting back on their experience of learning, this postcard has helped them to re-frame their experience in a more balanced and perhaps resilient way. The theme seems to be not only balancing deficits and gains but illustrating how far they have come.

(2) Values: coaching, human flourishing and positive psychology

The term "coach" was coined in the 1850s by the University of Oxford, as a slang word referring to a tutor who "carries" a student through an exam (OED, 2019). The term has evolved over the years, but in principle it refers to a relationship aimed to help the coachee reach purpose and potential (AFC, 2019). Coaching as a distinct discipline has evolved over the last three decades, championing the call for human growth, and capitalising on a fertile historical context, which has seen a shift from an attention to basic needs to helping humans be all they can be (Brock, 2008). It is quite possible to think in a "coaching" way, by facilitating a dialogical conversation to enhance and optimise the experience of the other in

any relationship, and there is perhaps none more appropriate than the relationship between student and educator. A common theme between the concepts of coaching, human flourishing and positive psychology is the concept of "Values".

Values can be defined as cognitive concepts or beliefs which transcend specific situations and guide behaviour and its evaluation (Hanel and Wolfradt, 2016; Maio, 2010). Whilst goals are essentially achievable targets, values refer to the overarching meaning behind an action. Values are qualities intrinsic to action that can be instigated but not obtained or finished (Chase et al, 2013). Values are widely considered in coaching as a profession, as well as being a fundamental part of positive psychology as a discipline. It can be deduced that values, whether held with conscious awareness or unconsciously internalised, guide everyday actions, and are the catalyst for strong emotions and motivations, as well as being central to intrapersonal and interpersonal conflict. There are many attempts in the literature to conceptualise values, and the circumplex model of Schwartz (1992) is often cited as core. This model includes 56 personal values which can be grouped into ten value types (Fig. 1). One important feature of this model is its motivational continuum. Two adjacent value types are motivationally similar, that is positively correlated, orthogonal value types are unrelated, and opposing value types are negatively correlated (Hanel & Wolfradt, 2016). Notably, this relationship is found to correlate with personality models, such as the five-factor model of personality (Parks-Leduc, Feldman & Bardi, 2014).



Schwartz's model, and in particular its strong correlation with personality traits, suggests that values are fixed entities. It follows that exploring our values is key to understanding our motivation and guiding our day-to-day behaviour in the direction of optimal functioning or our *actualising tendency* (Rogers, 1959). However, whilst most of the literature offers a positive side to values, some emerging research identifies them as directly related to the emergence of mental health problems. Hanel and Wolfradt (2016) found a relationship between Schwartz's (1992) ten value types and four different clinical variables which are associated with mental health problems (anxiety, depression, stress and schizotypy).

In my personal and professional journey, I have found Schwartz's model helpful as a way of exploring where my core values lie. Often finding myself attracted to a particular word or other, Schwartz's framework allows for the consideration of values within a spectrum, rather than discrete entities (Schwartz, 2014). Within this model, my core values seem positioned in the quadrant of "openness". Moreover, I have introspectively often found that my intra and interpersonal conflicts lie in my interaction with the "conservation" quadrant, which is consistent with those quadrants professed as theoretically opposite (Schwartz, 1992). In regard to my professional work, I have often gravitated towards helping roles where I can actively engage in developing "openness" in others. "Openness" relates to the ethical principle of "autonomy" (Passmore, 2009), a finding also highlighted by Schwartz when exploring values and culture (1992). It is likewise linked to Rogers' (1959) definition of *optimal functioning*, which further relates to the ancient concept of "human flourishing" as developed by Aristotle. To *flourish* means to live within an optimal range of human functioning, one that connotes goodness, generativity, growth and resilience (Fredrickson & Losada, 2005).

It is of interest that authors who have explored Aristotle's concept further, reflect on *human flourishing* occurring when a person is concurrently doing "what he ought to do and doing what he wants to do" (Younkins, 2003), in which case the opposite quadrants of *conservation* ("ought to do" as social obligations and morality) and *openness* ("*self-determination"*) would both be necessary for this ultimate state to be sustained. It will follow that balancing openness and conservatism are necessary for a state of flourishing to be achieved.

The transformative power of education has not gone unnoticed in the literature (e.g., Mezirow, 1997), and it can be reflected that education when transformative can challenge our assumptions and values (Bryan, C., 2020 – personal communication). I have found different opportunities to explore values in my work as an educator, from asking direct questions, to using strategies such as questionnaires (Wilson & Groom, 2002) or prompt cards (Burke & Passmore, 2019). Encouraging students to explore the "value" behind their action, has opened a non-judgemental way of engaging positively with education. Without further prompting, I have experienced students volunteering their personal journeys into the profession and the motivation for an educative path that is ultimately about helping

others. The orientation behind thinking as a "coach" has allowed me to introduce questions such as the Cantril Ladder, and openly discuss with my students ways in which, in our small ways, we could improve our experience.

Conclusions and Discussions

Clarifying my personal values has helped me to engage positively with the profession and my work as educator. Embracing the motivation behind my actions has positively contributed to my engagement with my teaching sessions, which seems in turn to have produced a reciprocal response from the students. Being able to share these concepts with my students with simple interventions has allowed for wider engagement and collaboration. I find this experience to be a simple yet powerful vehicle in line with positive psychology to aim for flourishing within my practice.

Following on from these experiences, I have incorporated into my practice the regular question of the "Cantril Ladder", as a way of working collaboratively with my students to improve our well-being. I have found the question non-stigmatising, and as a forward-looking model, embracing the principles of coaching and positive psychology, a positive vehicle for considering our needs and how to ultimately enhance our experience in line with our well-being (*"How can we step up the ladder in this moment?"*). Thus, in addition to value clarification both for myself and my students, embracing the philosophy of flourishing has positively contributed to the enjoyment of my work, and I believe the positive engagement of students, in my modest way, contributing to their education and their future.

There are a number of proposals in the literature in regard to bringing a positive psychology curriculum to education (e.g., Seligman et al, 2009). What I have experienced instead, is not the addition of new knowledge but the possibilities behind embracing the principles of positive psychology within my practice as an educator, as a way of positively impacting on the flourishing of others.

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Enhancing '*The Silliness* from *The Seriousness'*: How can the '*power* of *play*' be used to enhance healthcare student's engagement and experiences in the higher education environment?

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Abstract

Children from the earliest stages of their development learn how to act within the world and society through the medium of play. This idea of playful learning continues throughout the stages of adolescence and then seems to end at the point of adulthood, whereby an individual is expected to conduct themselves in a certain manner fitting of their perceived age. Traditional methods of information transferral in higher education are typically conducted through lectures, workshops, seminars and tutorials, but what effect does this have on the individual, more specifically the level of their engagement within the subject. Initial feedback from participants who took part in a game-based induction exercise seems to suggest that there is a correlation between levels of enjoyment and levels of engagement, the one impacting greatly on the other.

Introduction

Through the exploration of game based learning I will aim to provide an overview in the form of a case study of how, if implemented correctly, a traditional method of content delivery can be altered into a playful, game based activity that both promotes the individuals own learning preference but also enhances their overall experience with the subject matter increasing their overall engagement level. The learners in this particular instance are a group of first year student paramedics. Focus will be made on the concept of learning through play, looking into the various benefits and challenges that come with its implementation, more specifically in relation to how it can be used to enhance the perceived engagement levels of learners in a healthcare related discipline. Secondly, I will put forward the untested idea behind the design of a game-based adaptation of a method used within induction week looking to increase the student's engagement within an anatomy and physiology-based teaching session.

Through development of a conceptual idea supported by exploration of the current literature and pedagogical theories, an attempt will be made to showcase support for the idea that adopting a playful approach to in-class teaching will ultimately enhance the student's self-confidence levels and will more likely result in greater levels of engagement and a better performance overall, especially in relation to the introverted, quiet learner. This is turn will also have a positive effect on the students own psychological resilience building upon the underlying 'scaffolding' that is required of emergency healthcare workers.

It could be argued that one of the biggest challenges currently being faced in higher education is that of the increasing issue pertaining to student engagement (Khan, 2013 Masika and Jones, 2016). One viewpoint in relation to this ongoing challenge could be a direct result of mass attendance of higher education, more specifically as a direct consequence of larger cohorts of students enrolling on degree-based courses (Hornsby and Osman, 2014). The challenges being bestowed upon educators nowadays is to shift their current method of thinking away from the constraints of the norm, emphasising on how to adapt and develop from what could be considered more traditional methods of teaching (lectures and tutorials) to more of a generational responsive model, namely flipped classrooms and a blended learning approach to teaching (Gibbs, Knapper and Piccinin, 2009). This proposed new focus is supported by Millican (2014) who suggested that educators need to start thinking more critically about the methods in which they are choosing to promote student engagement. This is further supported by Culkin and Mallick (2011) who report that the continued use of outdated teaching methods is being unilaterally rejected by an evolving cohort of students who are used to and are competent in accessing a wealth of information from a variety of media sources. New ways of teaching in the pursuit of enhanced engagement of the learner links to the suggestion of learning through play and the power that this approach can potentially have on the individual's own learning journey. The author believes that this can be achieved through the implementation of gamification and game-based learning which are both intrinsically supported by pedagogic theory (Culkin and Mallick, 2011).

Review of the literature

An evolving conundrum that is consistently requiring the higher education sector to rethink their approach is the notion surrounding the idea of 'how do student's learn best' and 'how do teachers teach effectively'. The literature supports this concept by recommending a fundamental shift from the normal teacher-centred approach to an adaptive student-centred focus that actively seeks to promote and develop lifelong learning skills within the learner themselves (Johnson, Johnson and Smith, 1991). In order to obtain a relevant level of understanding and provide context, focus needs to be momentarily aligned to the various elements of course structure which directly relate to this evolution of design methodology. Elements ranging from programme design and digital capability to methods of assessment are requiring a deeper level of scrutiny in order to meet the evolving needs and demands of a diverse and varied millennial learner. With this in mind, educators working within the higher education environment can now be afforded the ability to be opportunistic in regard to their approaches to learning and teaching for their various disciplines. Gamification encapsulates the idea of playful learning and is a rapidly evolving trend within the higher education sector (Ružic & Dumancic, 2015). It involves the use of game-based procedures

supported by specific game design and adaptation to ultimately enrich the motivation and engagement of the learners.

Gamification can be cited under a number of definitions within the literature however most notably it can be best described as the implementation of a game-based design procedure used specifically in non-game environments (Deterding *et al*, 2011). Furthermore not only does this method have a positive outcome on student motivation but also enhances the engagement and learning of those involved whilst at the same time establishing a level of involvement of the student within the educational setting which is considered to be a powerful influencing factor on achievement (Kahu, 2011). The main emphasis of this article will be placed upon presenting an overview of playful learning approach, in this case, gamebased learning and how, if implemented correctly it affects the engagement levels of the learner. A review of the literature will be undertaken to ascertain the current thinking towards this specific approach to learning with a focus of connecting the underpinning pedagogic theories that interlink and provide a driving force for this new and adaptive method of teaching. The article also looks to address some of the benefits and challenges faced by GBL when used in the higher education environment to assist in the delivery of specific module content, as seen in the presentation of an idea in relation to a game based method to promote the learners engagement with material related to human anatomy and physiology.

Game Based Learning (GBL)

In recent years there has been increasing interest in the use of games to enhance the process of learning for the individual involved. The effectiveness of its use can be evidenced in all stages of formal education and can be supported by methods used within primary schools such as the implementation of mind games to promote and enhance strategic and reasoning skills (Bottino and Ott, 2006). Not solely limited to primary and secondary education, effective game-based learning has been incorporated into higher education showcasing a diverse range of subjects in its use (Whitton and Hynes, 2006), as well as its successful use in training and work-based learning. It is also pertinent to point out that in recent years there has been a sharp uptake in the research undertaken into game-based learning in education as a threshold concept as seen within a systematic review performed by Subhash and Cudney (2018) who found there to be a growing interest in the amount of research regarding GBL noticeably from 2013 onwards.

That being said research into GLB specifically in the field of healthcare seems to be somewhat lacking; a viewpoint that is supported by Akl *et al.*, (2013) who performed a systematic review looking into the use of games as an educational strategy with the objective to assess the effect that educational games have on healthcare professionals' performance, knowledge, attitude and overall satisfaction. The study used a standardised data form to extract the data identifying two key RCTs. From this data extraction and based

on the game evaluation of two key studies used as a reinforcement technique it was found that the overall effect on knowledge was not statistically different between the two groups however the level of reported enjoyment was found to be higher in the game-based group. Based on the findings of this systematic review the authors concluded that the review neither confirmed nor refuted the utility of using games as a teaching strategy with further research being recommended in this instance (Akl *et al.*, 2013).

One of the challenges faced when considering the use of GBL to facilitate learning and participant (learner) engagement is obtaining the right balance of game mechanics and game dynamics. This balance of game mechanics, namely the process and rule sets, translate as to how the learner engages with the game itself, a process recognised by Homes and Gee (2016) that if not correctly implemented can be considered as one of the main causation factors in the failure of meeting the learners needs.

When considering the design, it is also important to recognise that the goals associated with the game need to be clear and unambiguous ensuring the possibility of both a successful and unsuccessful outcome. Kapp and Brooks (2012) highlighted the requirement of simplicity in the design process proposing a link between smaller, simpler objectives and fewer goals and student achievement. This idea of simplicity directly affecting satisfaction levels is however refuted by Moseley (2012) who indicates that there is a requirement to introduce multiple goals and challenges to ensure a progression in difficulty during the game. Moseley (2012) goes on to suggest that if the level of the goal was not raised, then ultimately this would result in a lack of perceived challenge by the learner causing a decrease in their motivation to complete it, directly opposing the previously stated perception of 'the simpler, the better'. This highlights one of the main challenges faced in the design phase, ensuring that the tasks used are appropriate to prevent the learners from losing interest, as it is the interest that enhances the engagement and satisfaction, a key consideration of which will be addressed in the design phase of my own game-based activity.

It is important at this stage to recognise that the learning process does not simply stop with the game itself. The games themselves can also be used as a trigger for educational related discussion or as a design activity whereby the learning actually takes place through the design process. Thus, not limiting this use of game theory to a linear form of teaching delivery but encouraging a level of metacognition (learning theory) from the individual taking part. Metacognition simply being defined in this instance as the ability to be able to think about one's thinking or a critical awareness of one's thinking and learning, a theory which is crucial to the process and must be demonstrated by both the teacher and the learner (Veenman, Hout-Wolters and Afflerbach, 2006).

Expanding further upon this idea of metacognition, a concept some may argue is fundamental to the development of a healthcare professional as it encourages a deeper

awareness of critical self-reflection; one could now consider the relevance constructive alignment has, putting forward the idea that both are in fact intrinsically linked. Brownlee *et al.*, (2009) stipulated that constructive alignment requires the learner to draw upon their own personal experiences in order to make meaning of the knowledge acquired from appropriate learning activities guided by the teacher. This is supported by Driscoll (2000) who believed that constructivist teachers employ the ability to create a learning environment that is student-centred with the role of the lead educator being to facilitate learning process as opposed to actively leading it.

A study by Boeker *et al.*, (2013) looked to compare the effectiveness on the learning outcome of a game-based learning instruction with a conventional script-based instruction in the teaching phase of microscopy urinalysis in a group of undergraduate medical students. A RCT was conducted with a cohort of 145 third year medical students whereby they were separated into two groups at the end of which their attitudes were collected based on the learning outcomes measured by a 34 item single choice test. The results indicated that the game-based group achieved significantly better results in the cognitive knowledge test highlighting that their attitudes towards the game learning activity and having fun whilst doing it was more positive when compared to the script-based group. The authors concluded that not only was game-based learning a more effective approach to the cognitive learning, indicating that game-based learning can be used as an effective method for self-instruction. This particular study reinforces the constructivist teaching theory of facilitation in learning as opposed to active instruction which could be achieved through the act of play.

A strength in the adoption of a constructivist teaching approach is the ability to adapt teaching methods to students' particular learning preferences, a method of which is greatly enhanced through game-based education. Matthews (2003) however stipulates that solely using constructivist teaching may have a negative impact on students who are less comfortable with this style of interactive and social-centred teaching. One of the challenges faced with the implementation of game-based learning activities is the potential negative effect it may have on the introverted, 'quiet learner'.

The Quiet Learner

One of the primary reasons for the exploration of alternative teaching methods is to provide an inclusive platform for the entire student cohort capturing those who may be categorised by a particular character trait. The most pertinent in this case being the introverted character trait who may be disadvantaged as a result of a particular style of delivery, which arguably could be considered as a causal factor in a reduction in student engagement. This is further compounded by a suggestion previously made in regard to the fallout of an exponential growth in course student numbers (Hornsby and Osman, 2014). A number of studies looking into behavioural traits amongst healthcare workers seem to suggest a correlation between certain character traits and a level of mental 'burnout' and fatigue (Godin *et al.*, 2008), suggesting that an individual's suitability to perform adequately within their chosen field of work is directly affected by their behavioural traits. That being said the data in relation to this seems fairly unreliable seeing as it would be difficult to pinpoint a singular factor such as an introverted character trait as the sole reason for this particular psychological outcome.

Expanding further on this idea a systematic review looking into the personality profiles of paramedics in relation to their suitability of employment seemed to suggest a possible link between certain character traits with a reduced risk in certain individuals experiencing disorders such as PTSD (Mirhaghi *et al.*, 2016). Again, the evidence seems inconclusive and unreliable citing more work needed to be done in the psychoanalysis of individuals reactions based on their behaviour.

Resilience

Dixon et al., (2016) makes reference to the situations that healthcare workers, namely paramedics find themselves in on a daily basis, highlighting the idea that it is in fact the 'lived experience' aspect of the job that is potentially damaging to their mental health and wellbeing. In light of this, focus needs to be on addressing themes such as resilience in the learning phase of a healthcare student's journey recognising that students with a variety of mental health needs will be undertaking the programme. By applying game-based learning to the undergraduate mode of delivery there is the potential to catalyse behavioural change and adaptation to different situational contexts (Dias, 2017). Deeper thinking in respect to this may elicit the idea of play to have little to no end or purpose, consequently it can be attributed to and directly attain to how we behave, feel and function (Whitton, 2018). Not only can the idea towards the understanding of the physiology of play be proven to enhance problem solving capabilities, cognitive flexibility and social competence within individuals but also promote adaptability, resilience and intellectual dexterity.

According to Brown and Vaughn (2009) playful learning techniques should be attributed to a fundamental part of the human experience highlighting the necessity to improve pedagogical practice. Van Vleet and Feeney (2015) define play as 'an activity or expression that is carried out with the goal of increasing joy with respect to the individual and their surroundings'. Recognition of this definition supports the notion that play can not only relate to games but can also extend to other activities that can be perceived to increase joy which one could argue encapsulates the idea of and is in fact wholly inclusive of learning. If this concept is to be accepted, and play translates into an expression that is both personal and considered an essential aspect of the human condition, then adopting methods centred around this idea will inevitably have a positive effect on an individual's engagement within any given subject.

Summary of the literature

Based on my analysis of the current literature pertaining to game-based learning with an emphasis on the impact it has specifically for healthcare students, coupled with the underpinning pedagogic literature, it is my assumption that implementation of carefully considered activity design and progressive 'risk and reward' mechanics i.e., a steady progression of challenges related to the difficulty level of the task, will ultimately consolidate the learner's hunger to progress and have an overall positive effect on their engagement level. Playful learning, as seen from the evidence, can foster a positive motivational impact on learning for the individual involved which in turn will promote a level of resilience required of any individual working within a professional field that deals with health as its core function. That being said the literature has also highlighted the importance of recognising the potential harm that can be caused to learners who do not adapt well to a socially driven activity which is a consideration that I would need to address thoroughly in the design phase.

Case Study

Drawing upon the experiences and feedback obtained of an inclusion activity performed during induction week for undergraduate paramedic students the following case study showcases an idea centring on the adaptation of the aforementioned activity into a classroom-based game with the desired goal to enhance the student's engagement and learning in regard to anatomy and physiology. The game is still in the theoretical/planning stage and has not yet been tested in real-time.



Role of the facilitator

Drawing upon the underpinning pedagogic theory of constructivism the role of the facilitator in this particular activity is to:

- Act as a mediator of creative conceptualisation and experimentation guiding the learner in the process not actively leading them
- Provide a detailed overview of the game including instructions on how to play and the rules
- Oversee the logistics and mechanics of the game, timekeeping, scoring etc.
- Provide a supportive role to the learners during the game. For example, asking questions of the learner to engage them in their own self-discovery as opposed to directly giving them the answer

Framing the challenge

The facilitator presents the relevant challenge to the students in a clear and unambiguous manner.

Implementation of the game

Based on the instructions given, and against the clock, the students then proceed to actively move around the space to find all correlating identifying features in relation to the anatomy and physiology of the various organ systems.

This part requires all individuals to actively engage in a level of social interaction with one another whilst sharing information in order to link the correct anatomical features.

Once all features have been found the team of students' progress to the individual who has been appointed the 'master organ system' in order to relay the information that they have assembled.

The results of the task are then presented to them in real-time either confirming their correct choices or returning them to the game space to continue searching for the relevant information.

The students throughout this process actively engage with their own learning either by sharing their knowledge with others or receiving information that they may not have previously been aware of.

The competitive nature of the game actively engages all who are involved.

Meaning and shared perspectives

Once the game is completed either by the students correctly identifying all the features of each of the master organ systems or by the time running out the facilitator will then engage

all students in the meaning of the task asking them to share their thoughts and what they have learned from the process. This form of 'active sharing' helps them contextualise the information.

Students will then be encouraged to provide feedback on what they thought of the activity.

For research purposes and further development of this concept I could split the cohort into two groups. With identical teaching content and learning outcomes, one group would experience a conventional method of teaching. The other would experience this gamebased approach. A specific questionnaire would then be distributed to the two groups with the intention of using the responses to ascertain:

- Their overall feelings towards the activity
- Whether or not this method promoted their own individual learning
- Their overall satisfaction and enjoyment level

The results of the questionnaire will be used to review whether or not student engagement is actually enhanced through game-based learning.

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A Pedagogical Approach to Teamwork in Safety Engineering

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Abstract

Teaching safety engineering concepts at an undergraduate level involves extensive teamwork activities, in order to replicate the experience of performing safety analysis within an industrial setting. In this paper we examine the use of compassion-focused pedagogy as a technique for conducting, teaching and leading these teamwork activities. Compassion-focused pedagogy promotes empathy and safeness during student learning activities by utilising a number of techniques which foreground the student experience and promote consideration for others. This paper presents a review of the motivations for using compassion-focused pedagogy in safety engineering teamwork situations, the challenges which might be faced in implementing this approach and the benefits that might reasonably be expected from its use in this context. This paper also discusses a recent trial of compassion-focused pedagogy across three modules in the University of Hertfordshire Computer Science department with a focus on safety engineering concepts, from 2018 - 2019. This trial provided indicative results that compassion-focused pedagogy may be associated with higher student performance in specific teamwork activities related to safety engineering.

Compassion-focused pedagogy

Compassion is the noticing of distress or disadvantaging of self or others and a commitment to reduce or prevent it (Gilbert, P., 2005; Gilbert, T., 2018). Compassion-focused pedagogy foregrounds compassion as a critical skill, requiring lecturers to view subjects, assessments and teaching practice from a student-focused perspective (Waghid, 2014), as well as to act in the students' best interest (Ahern, 2019). Compassion-focused pedagogy requires that lecturers demonstrate compassionate micro-skills, that they encourage students to engage with these skills, and that they allow students a safe environment in which to recognise and demonstrate self-compassion. More fundamentally, compassion-focused pedagogy – or critical compassionate pedagogy – can be seen as "a pedagogical commitment that allows educators to criticize institutional and classroom practices that ideologically underserve students at disadvantaged positions" (Hao, 2011).

Teamwork in computer science and safety engineering

Compassion-focused pedagogy, as described above, provides students with a grounding for compassionate, respectful interaction with others. It is therefore particularly relevant to

teamwork situations and teamwork assignments, which are becoming increasingly common in university curricula, most notably in those courses with an emphasis on industry applications (University of Hertfordshire, 2019).

The recent focus on teamwork assignments in university curricula aligns with the need to ensure that students graduate with the skills they need for the working world. In a safety engineering context, some of the most important of these skills are those which will allow them to collaborate effectively on a complex, safety-critical project with externally imposed deadlines and stringent requirements. The relevance of these skills can be demonstrated more generally by (Cross, 2016), which identifies that the time spent by workers on collaborative activities has increased by 50% since 1996. The emphasis on teamwork assignments is therefore in line with the core principles of higher education (Higher Education Academy, 2011), one of which is that instructors must recognise the wider context within which higher education operates, including future outcomes such as the fitness of students for employment.

However, despite the long-term advantages of using teamwork-based assessment in university modules focusing on Computer Science, there are some specific challenges still to overcome. It is arguable that Computer Science students face additional challenges in engaging with teamwork when compared to humanities disciplines. Traditional identities of computing are still prevalent amongst students, who consider computer science to be the preserve of those who are "clever but anti-social" (Wong, 2017). At the University of Hertfordshire, Computer Science MSc modules which involve teamwork have historically reported reduced student engagement with the material when compared to modules which focus on individual coding / designing skills. Student feedback for team-based modules also identifies lower student satisfaction with these modules (UH Programme Board, 2018).

These challenges are exacerbated when module sizes are large, as students reportedly do not feel part of a community and do not consider that they know their peers well (UH Programme Board, 2018). An illustrative example from the UH Computer Science department demonstrates the increasing prevalence of such modules: in one MSc module run within this department, the number of registered students increased by 486% in 2019 (from 95 students in 2018 to 461 students in 2019), and is predicted to increase in 2020 by a further 260% (1200 students planned in 2020)! These extremely high module sizes mean that students are unlikely to have interacted with their teammates prior to any team activity.

In addition to this, the MSc modules in question have relatively high numbers of Black And Minority Ethnic (BAME) students for whom English is a second language. Although both the BAME attainment gap and English language requirements are outside the scope of this paper, these challenges cannot be ignored if such students are not to be disadvantaged in their future roles as safety engineers. We note that the rail industry (Royal Academy of Engineering, 2015) supports this perspective, having pioneered a diversity strategy to improve safety and performance, identifying the inclusion of BAME and non-traditional engineers as a crucial factor in their objectives.

Motivations for using compassion-focused pedagogy in safety engineering

Compassion-focused pedagogy is, of course, not the only pedagogical approach to promoting effective teamwork amongst large cohorts. Riebe, 2016 identifies approaches that include simulations, role-play and peer assessment, but notes that collaborative and cooperative learning is typically not foregrounded in these.

By contrast, compassion-focused pedagogy helps students learn by building on their knowledge and experiences and by valuing their contributions (Conklin, 2008). In this respect it is similar to other approaches such as Biggs & Tang, 2011, which seek to encourage students to contribute based on their own background knowledge, as well as to value differences between themselves and their team-mates. This is particularly valuable for safety engineering activities, where team members within industry may come from a range of disciplines including academia, defence, rail, road and aviation. Compassion-focused pedagogy also foregrounds self-compassion, as discussed further in this paper. Self-compassion has been shown to increases self-improvement motivation (Breines & Chen, 2012), meaning that students are encouraged to take responsibility for their own achievements. A self-compassionate approach to teaching also promotes self-reflection, giving students the opportunity to determine how they might best engage with their studies, given their own individual background and strengths.

Compassion-focused pedagogy is particularly important for racially, culturally, linguistically economically and academically diverse students (Conklin, 2008). These students – and others from varied non-traditional backgrounds – can be easily disadvantaged if lecturers are not culturally responsive to their differences. A culturally responsive lecturer (Villegas & Lucas, 2002) is aware that students perceive situations and knowledge differently, and that race, ethnicity, social class and language can affect this. Some more information on the use of compassion-focused techniques which allow lecturers to conduct learning activities in culturally responsive ways is given later in this paper.

While our emphasis so far has been on the benefits of compassion-focused pedagogy to students, this approach also offers benefits to staff. In smaller research seminar classes at post-graduate level, the material is discussed in a generally collaborative style with the lecturer taking on the role of simply another member of the group. It is therefore reasonable to assume that in such circumstances the lecturer – as much as any of the students – will benefit from a supportive and compassionate group atmosphere. Compassionate-focused therapy has been shown to help in a group context to help promote compassionate, validating, supporting and encouraging relationships between group members (Gale et al, 2014). While therapy and education are certainly very different

domains, the trials of compassion-focused pedagogy indicate that it may provide equivalent outcomes in an educational context (see below for more detail). More generally, staff feedback (UH Programme Board, 2018) demonstrates that staff consider themselves more motivated and engaged when teaching students who are likewise motivated and engaged (Welford, 2015). Compassionate-focused pedagogy, therefore, offers benefits to both educators and learners when implemented in a way which promotes an encouraging, compassionate classroom atmosphere.

Challenges of compassion-focused pedagogy

As with all pedagogical approaches, there are some challenges which safety engineering lecturers may face when looking to integrate compassion-focused pedagogy into their material. These challenges arise because compassion-focused pedagogy does not exist solely in isolation, as a set of tools which can be mechanically or systematically applied. Rather, this pedagogical approach requires the lecturer to fully engage with its underlying motivation and principles by personally modelling caring, interpersonal relationships and by approaching each interaction with students as a caring encounter (Conklin, 2008). A lecturer who does this provides students with the opportunity to learn how to interact with each other in a similar way. Thus, a successful implementation of compassion-focused pedagogy enables a dual-learning approach: the students engage both with the course content material and with (potentially new and challenging!) methods of interacting with each other.

This focus on genuine, compassionate teaching does present certain challenges for lecturers where students are resistant to the underlying principles of compassion-focused pedagogy and teamwork. (Conklin, 2008) discusses the situation where a student might express resistance to principles of inclusion, in this case a student expressing resistance to anti-racist principles). This author's own experience has also included a (white, male, culturally British) student stating that being in a team with BAME and international students was causing him discomfort and compromising his ability to perform well in collaborative safety engineering activities.

These situations can be difficult for a lecturer to address in a compassionate manner, while still adhering to the commitments to equality and diversity which typically guide universities (University of Hertfordshire UPR, 2019). A compassion-focused pedagogical approach encourages lecturers to identify these type of student reactions as reactions of "suffering" (Conklin, 2008), and to seek to respond in a compassionate way such that these students are not left to "founder in a sea of white guilt" (Carson & Johnston, 2000).

Furthermore, a compassion-focused pedagogical approach also places additional requirements on students. It requires students to engage at the "next level", by participating in an iterative process of self-reflection. That is, students are encouraged not just to participate in discussions but to reflect on their own participation (Conklin, 2008).

Introducing this concept to students can present some challenges to lecturers, particularly at the beginning of a module where students do not yet consider the classroom a "safe space". One potential method of addressing this challenge is to make use of a constructivist approach to teamwork, encouraging students to build on past experiences (Biggs & Tang, 2011).

Compassion-focused pedagogy and teamwork

Compassion-focused pedagogy in teamwork situations seeks to provide the students with some of the "micro skills of compassion" (Gilbert, 2018). These micro-skills include:

- Breaking eye contact
- Inviting others to speak
- Engaging in self-reflection
- Deliberately choosing language which is inclusive
- Identifying group management strategies which do not presume a shared or homogeneous cultural background

Another technique of compassion-focused pedagogy which is useful in teamwork situations is to decolonise the curriculum to allow students form all backgrounds to participate fully. Decolonisation refers to the act of re-siting the curriculum (Patel, 2001) in a more diverse cultural context. This is particularly important for mathematical subjects such as safety engineering, because colonisation-focused curriculums in these disciplines tend to present in more subtle ways than in humanities disciplines. One example, in the author's experience, is the seminal use of certain names in cryptography and cyber-security: Alice and Bob pass messages between each other, and Eve (eavesdropper) intercepts these. The use of these names presumes a shared cultural heritage with which students are assumed to be familiar (especially Eve as the instigator of unwanted events!). Another example, again from the author's experience, is the unstated presumption that all legal processes will follow the Western norm. These presumptions mean that many existing discussions of forensic cyber-security are inaccessible to students from cultures which use Sharia law, which does not allow certain cyber-security artefacts as admissible in court (Alanazi, Jones & Menon, 2018). When students are working in teams, a colonisation-focused curriculum disempowers certain students and creates barriers to their engagement.

A third technique of compassion-focused pedagogy is to focus on promoting selfcompassion. Self-compassion differs from self-esteem in that self-esteem is founded in competition: attempting to measure oneself against the success of others, (Neff, 2003). Selfcompassion, by contrast, is founded in noticing one's own distress and identifying safe, compassionate and rational ways to address this. Helping students to develop selfcompassion means that collaborative, instead of competitive, approaches to learning can be foregrounded. A fourth technique of compassion-focused pedagogy is to promote the recognition that with a diverse range of students they will have different learning styles (Amir & Jelas, 2010). Compassion-focused pedagogy encourages accommodation of different learning styles (Honey & Mumford, 1992) in teamwork situations. For example, where a group is creating a new design for an IT system, a compassion-focused pedagogical approach might be to encourage students to take it in turns to drive their design forward, beginning with Activists (initiating the design), Reflectors (reviewing the design, particularly where this is complex or involves new/ dynamic requirements), Theorists (who may lead the group in terms of selfreflection and identifying general principles relating to collaborative work) and Pragmatists (who may relate their conclusions to wider research in the area).

Previous UH trials of compassion-focused pedagogy

Compassion-focused pedagogy has been trialled in the Computer Science department of UH and has been explicitly tied to marks. (Gilbert, T., 2016) describes a study in which a percentage of marks were awarded based on how well each student encouraged others to participate. Marks were awarded specifically for eye contact, language and group management strategies (Havergal, 2016). This study concluded that it is possible to observe the deliberate actions of compassion performed by students, and to assess these effectively.

Applications and results from compassion-focused pedagogy trial

We have applied some aspects and techniques of compassion-focused pedagogy within three modules run as part of the Computer Science department at UH, over the course of 2018 - 2019. These modules introduce safety analysis techniques such as HAZOP, and emphasise the importance of using applicable standards to demonstrate that target failure rates are met for safety-critical systems. These concepts are typically unfamiliar to students, and teamwork activities are a crucial aspect of these modules. As identified in the abstract, the results from this trial demonstrate that there may be a correlation between the use of compassion-focused pedagogical techniques and improved student marks in teamwork situations focused on safety engineering. However, there are some important caveats to note about how the trial was conducted, which are discussed below.

Methodology of trial

The modules on which compassion-focused pedagogy was trialled were all focused on safety engineering and complex system design, and consisted of:

- A Level 7 (MSc) module with 461 students (95% BAME representation) [Module A]
- A level 4 module with 238 students (40% BAME representation) [Module B]
- A level 4 Degree Apprenticeship module with 12 students (16% BAME representations) [Module C]

The primary assessment for each of these modules (course weighting from 35% - 50%) was a team presentation task which required students to work within previously assigned teams to research a (specified) question or issue around human factors, safety-critical systems, or system analysis.

The techniques that were trialled included:

- Teaching students compassionate micro-skills including:
 - the use of gestures to "break" eye contact between students who were excluding others from the group discussion
 - issuing explicit invitations to team members to speak
 - deliberate and self-reflective identification of areas of expertise for each team member prior to the team sessions, following the four learning styles of (Honey & Mumford, 1992)
- Conducting a dedicated session on self-reflection prior to conducting the team-work activities
- Decolonising the curriculum by re-designing the research questions to ensure these were not specific to the UK or Western culture (e.g., by utilising computer systems used in India, Pakistan and China as an optional focus for research)
- Asking students to identify the strengths and background knowledge that their teammates brought to the teamwork exercise, as part of two dedicated session conducted both midway through the assessment and immediately after it
- Asking students to explicitly identify other methods which they could personally use to encourage others to participate, including eye contact, group management and choice of language

Dedicated sessions on these techniques were integrated into lesson plans.

Caveats on compassion-focused pedagogy trial

When assessing results from this experiment, it is important to note that these techniques were not deliberately introduced as a trial of compassion-focused pedagogy. Rather, they were introduced as part of the normal assessment and reflection on teaching practice undertaken during and at the end of each semester, and after discussion with colleagues who identified that they had also found these techniques helpful. There are two consequences of this: firstly, that the trial may be categorised as "reflective practitioner work" which – given the anonymisation of the data – means that ethics approval is not required (University of Hertfordshire UPR, 2018). The second consequence of this is that the elements of rigour which would usually be expected in a formal trial (e.g. consistency across student population samples, consistency of all other teaching techniques except those being trialled, formal methodological processes to be followed) were absent. The author therefore emphasises that, although the results show an indicative trend that compassion-focused

pedagogy improves student marks in teamwork situations for modules focused on safety engineering, no claim of statistical significance can be made.

Results from trial

A comparison of mark distributions between the previous year (2017 - 2018) and the year of the trial (2018 - 2019) is shown in Tables 1 - 3. It was not possible to compare across a longer historical period as Module A was newly introduced in 2017 while Module B and C were completely revised in 2017 and the module content significantly changed from previous years.

Module A results

The percentage of failures in each module dropped noticeably in all modules with the introduction of compassion-focused pedagogy. The effect was most pronounced in Module A (Level 7), where the 2017 – 2018 failure rate had been, at 23%, significantly over the university's target Level 7 threshold of 10%. The 2018 – 2019 failure rate in Module A with compassion-focused pedagogical techniques is predicted to be within this target threshold once referral coursework is completed. This is particularly notable given the high proportion of BAME students on this module, and the particular challenges identified for BAME students in teamwork activities and safety engineering more generally (see Section 2).

It is also interesting to note what the Module A mark distribution tells us about student engagement with the course. From personal experience across different modules, we have observed that there are often a small number of students who do not engage with the coursework at all, and hence score 0. The introduction of compassion-focused pedagogy appears to have eliminated this effect entirely, despite the extremely large student numbers. As can be seen in Table 1, the entire cohort of 461 students engaged sufficiently to either pass the module or to be offered a referral. Although no formal investigation was performed to examine why this cohort engaged unusually well, an indication may be found in the informal student feedback. Students were asked – informally – for their opinions on the teamwork activity, and their responses included: "I liked my group [team] members", "I don't want to let my team down", and "My group [team] worked well together". It could therefore be theorised that compassion-focused pedagogy helped promote a cohesive identity for each team, encouraging students to perform better individually – and to engage more with the coursework – because they felt personally invested in their team mates' success.

	80-100	70-79	60-69	50-59	40-49	20-39	0-19	Total # students	% Fail
2017- 2018	3	15	34	20	17	5	1	95	23% (post- referral)
2018- 2019	44	62	86	207	45	17	0	461	13% (pre- referral)

Table 1: Module A mark distribution

Modulse B and C results

Modules B and C (Level 4) also showed a decrease in failure rates when compassion-focused pedagogy was introduced. (The author notes that the original 2017-2018 failure rate was within the university Level 4 target threshold of 20% for both these modules). The mark distribution for Module B shows that the shift to higher marks was distributed uniformly. This means that the percentage of students obtaining a "good degree" (>60%) for Module B in 2018 – 2019 is 53%, which is within the university target threshold of 50% - 70%. Prior to the introduction of compassion-focused pedagogy, the percentage of students achieving a "good degree" classification for Module B was 50%, which is only just within the university's threshold.

Failure rates were also reduced for Module C, and again an increase in student engagement was noted. All students passed this module once compassion-focused pedagogy was introduced, and – as was the case with Module A – there was increased student engagement, as shown by a drop in the number of students achieving 0 – 19%. However, given the relatively low student numbers for Module C, it is not possible to conclude that this has significance. Again, however, anecdotal evidence shows that the students were engaged by the teamwork activities, with feedback including "My team helped me out", "I think my team worked well together" and "My group [team] helped me understand the lectures".

	80-100	70-79	60-69	50-59	40-49	20-39	0-19	Total #	%F
2017- 2018	0	15	56	60	42	19	17	209	17% (post- referral)
2018- 2019	5	36	85	67	19	12	14	238	12% (pre- referral)

Table 2: Module B mark distribution

Table 3: Module C mark distribution

	80-100	70-79	60-69	50-59	40-49	20-39	0-19	Total #	%F
2017- 2018	0	3	2	1	0	0	1	7	15% (post- referral)
2018- 2019	0	5	5	2	0	0	0	12	0% (pre- referral)

Conclusions

In this paper we have provided an overview of compassion-focused pedagogy, with a particular focus on its use in teamwork activities focused on safety engineering. We have identified a number of motivations for using this pedagogical approach, including increased student engagement and consideration for others. We have also discussed the challenges of using compassion-focused pedagogy, and suggested some methods for overcoming these. We have also described a recent trial of compassion-focused pedagogy across three modules in the University of Hertfordshire computer science department. Although the results from the trial cannot be assumed to have statistical significance, they have provided an initial indication that use of compassion-focused pedagogical techniques results in higher performance during safety engineering teamwork activities.

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Strategies for overcoming statistics anxiety in undergraduate psychology courses

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Abstract

Statistics anxiety is increasingly common in social science and psychology. Many students pick these subjects without realising the role of statistics in the subject or the importance of statistics in accredited degree programmes. The aim of this research article is to conduct a systematic literature review to explore the potential causes of statistics anxiety, the variables that may hinder or help statistics anxiety and the potential strategies to reduce statistics anxiety or the effect it has on performance. Results indicate that there is a decrease over time of mathematical skill in psychology undergraduate entrants, indicating a potential cause. It is also shown to be associated with reduced performance in tests and module scores, procrastination behaviour and self-efficacy. Effects of age and gender are also shown. Potential strategies such as collaborative or cooperative learning, mindfulness and mediation, the role of technology and introducing humour to statistical teaching are all discussed. It is recommended that further research on the potential of individual or (preferably) combined approaches of these pedagogic strategies are investigated in undergraduate statistics courses to further see the effects. It seems likely that a combined intervention would prove most effective given the diverse and varied abilities, backgrounds and ages of psychology cohorts.

Introduction

Students, particularly those in subjects such as psychology, education or sociology, find the necessary statistics courses in their undergraduate degree programmes to be "dull, difficult and distressing" (Haslam and McGarty, 2014, p. 1) and anxiety inducing (Zeidner, 1991; Onwuegbuzie and Wilson, 2003; Onwuegbuzie, 2004; Ruggeri et al., 2008; Carpenter and McDonald, 2017). They also frequently view statistics courses as the worst and most anxiety inducing courses that they take (Hogg, 1991; Zeidner, 1991).

Statistics anxiety can be defined as apprehension when being exposed to statistics in any form; for example, in statistics content, problems, courses, evaluation or assessment (Onwuegbuzie and Wilson, 2003; Macher *et al.*, 2011, 2015). It has been suggested to be experienced by as many as 80% of students (Onwuegbuzie and Wilson, 2003). It has been studied particularly in psychology (Lalonde and Gardner, 1993), education, sociology or

social science students, with Betz (1978) finding that a quarter of psychology students experienced mathematical anxiety associated with their course. Statistics anxiety is also widely cited as the reasoning for students' lack of engagement and enjoyment of statistics modules in social science courses (Paxton, 2006; Bridges et al., 1998; Schacht and Stewart, 1990; Ralston et al., 2016). Individuals on these courses can have less interest in statistics and mathematics and a more self-critical view of their mathematics skills. Often this is due to the entrance requirements and expectations of a maths element being lower than for traditional science subject such as physics or chemistry. They also often underestimate the level of mathematics involved in the subject they have chosen (Ruggeri et al., 2008). Psychology students have also shown decreases in enjoyability of statistics across their first year of undergraduate study (Ruggeri, Dempster and Hanna, 2011). Statistics anxiety has been shown to be negatively associated with mathematical ability, self-efficacy and attitudes towards statistics (Chiesi, Primi and Carmona, 2011), learning time and less efficient learning strategies (Macher et al., 2011), and positively associated with procrastination (Onwuegbuzie, 2004), worry and rumination (Papousek et al., 2012; Macher et al., 2013).

In my work at the University of Hertfordshire as a tutor, proctor and lecturer in research methods courses, I have found that student enjoyment, and engagement reduce, while frustration and negativity associated with research increase as the statistical complexity and focus increases throughout their studies. This is particularly noticeable through the latter part of the first year of study (level 4) and the jump from first to second year (level 5) study. However, there are also a number of practical solutions that I have experienced and tried that have seen some success in helping students with the anxiety, which will be discussed further throughout this article.

In the UK and internationally, statistics is an important and heavily weighted element of accredited psychology undergraduate programmes. In the UK the British Psychological Society (BPS) details what accredited psychology programmes should contain in terms of statistics and research methods courses (BPS, 2017). They detail that students should have an awareness of statistical inference, power analysis and sampling, detect differences in means and the relationship between variables. They should also be able to appreciate the philosophy, assumptions and alternatives to statistical procedures and understand issues relating to scale construction such as reliability, validity and factor analysis (questionnaire development) (BPS, 2017). Similarly, the American Psychological Association (APA) details 19 learning objectives for research methods and statistics courses with emphasis on interpretation (5, 9, 12, 13 and 14) and the distinctions between statistical significance and practical significance (6) (Tomcho *et al.*, 2009). Both the BPS and APA detail the importance of being able to use and interpret results from statistical software packages (Tomcho *et al.*, 2009; BPS, 2017) such as SPSS or R.

Given the importance of statistics to these courses and the increasing anxiety experienced by these students it is of importance to understand the role of statistics anxiety and how to combat this in undergraduate psychology students. BPS accreditation of a course means that it counts towards professional body registration or qualification. A BPS accredited degree allows for the student to apply for graduate basis for chartered (GBC) membership of the BPS. Completion of an accredited psychology degree is also necessary for progression onto professional development as a psychologist and onto chartered membership. The BPS also then ensures the quality and standard across institutions that deliver accredited programmes considering elements such as ethics, selection and admission, programme delivery and quality management (BPS, 2019).

Aims and Objectives

This report details a systematic literature review of statistics anxiety and strategies to overcome it. It will aim to answer the following research questions:

- What variables are associated with statistics anxiety?
- What are the potential causes of statistics anxiety?
- What are potential strategies to reduce statistics anxiety?

Throughout the report these will be considered alongside with reflection on practices in undergraduate psychology at the University of Hertfordshire and of the graduate attributes from the University of Hertfordshire. In the UK and internationally, the APA style of reporting statistics is widely accepted and is expected in the majority of UK university BPS accredited courses, for this reason the requirements of the BPS and APA will also be considered.

A literature review has previously been conducted in 2014 (Chew and Dillon, 2014) and as such this review will primarily focus on studies from 2015-2020, with reference to this review to cover prior research. Kiss, Harari and Vukovic (2019) also summarised some practical interventions to help reduce statistics anxiety, so these will also be referred to throughout.

Method

Search Strategy

The search-terms (Table 1) were systematically searched in the database Scopus, with each concept being searched individually with the Boolean terms 'OR' (with exception of in concept 3 where some included 'NOT') before being combined with 'AND'. This gave a total of 361 papers which were examined on the basis of the inclusion and exclusion criteria (Table 2) listed below. Once this was completed the final list of papers was 89.

Concept 1: statistics and mathematics anxiety	Concept 2: pedagogy	Concept 3: Level of study
Statistic* anxiet*	Pedago*	"university students"
Math* anxiet*	Teach*	Undergraduate*
	Learn*	"College students"
		"higher education"
		NOT school, "high school", postgraduate*, "sixth form", "A level", GCSE

Table 1 Search concepts and search terms used in the systematic search

Table 2 Inclusion and exclusion criteria for the searches

Inclusion Criteria	Exclusion Criteria
Must describe statistics or mathematical anxiety as a primary concept/topic.	Does not describe statistics or mathematical anxiety.
Must relate to Undergraduate study and to learning, teaching or pedagogy of statistics.	Relates to postgraduate or pre-Higher Education study Unrelated to the teaching or learning of statistics.

A search of the references of the selected papers was then used. Additional searches were performed (using the search terms above where relevant) on journal websites such as: Teaching in Higher Education, Assessment and Evaluation in Higher Education, Journal of Statistics Education, Teaching of Psychology, British Journal of Educational Technology, Active Learning in Higher Education. All of these searches will be limited from 2015-2020.

Data were extracted based on the research questions detailed above. This data will be reviewed narratively with a theoretical discussion of how statistics anxiety relates to other variables and categorisation, reflection and critical evaluation of the practical implications of potential strategies to reduce anxiety.
Results

What other variables are associated with statistics anxiety and what causes statistics anxiety?

The factors affecting and affected by statistics anxiety are thoroughly discussed by Chew and Dillon (2014), however a brief summary will be included here plus additional variables and research from the past 5 years. Chew and Dillon (2014) suggested that statistics anxiety is related to mathematics anxiety but is a distinct concept. Nevertheless, mathematics anxiety appears to act quite similarly to statistics anxiety, with similar associates (Foley *et al.*, 2017) and is related to it (Paechter et al., 2017). Mathematics anxiety has been shown to be predicted by gender, trait anxiety and mathematics grades, while statistics anxiety has been shown to be predicted by mathematics grades. Mathematics anxiety has been shown to predict performance while statistics anxiety predicts procrastination (Paechter *et al.*, 2017). Attitude to statistics is also highlighted, whereby negative attitudes predict statistics anxiety. Chew and Dillon (2014) recommend that future research examines statistics anxiety, mathematics anxiety and attitudes concurrently.

Statistics anxiety has been shown to affect performance and learning outcomes in statistics courses (Afdal *et al.*, 2019), although some research shows no association with performance (Lester, 2016) as well as increasing procrastination, perceived learning difficulty and reduced understanding (Lin, Durbin and Rancer, 2016).

Antecedents of statistics anxiety are also covered by Chew and Dillon (2014). They highlight situational antecedents such as mathematics anxiety, number anxiety and exam anxiety, as well as characteristics of statistics courses such as pacing (accelerated more anxiety inducing), location (online more anxiety inducing than on campus) and ambiguity of the subject. The pacing is particularly relevant when comparing undergraduate statistics in psychology, which is typically over 2-3 full years, compared to master's conversion courses which is more likely to be a semester long course or single year long. The location is also interesting given the increase in online and distance courses and the increase of online resources and teaching in more traditional courses. Further situational antecedents include the class and the instructor/teacher (Cui *et al.*, 2019), with fear of instructors highlighted as a component of statistics anxiety (Maat and Rosli, 2016; Zimmerman and Johnson, 2017; Nielsen and Kreiner, 2018; Afdal *et al.*, 2019; Paltoglou, Morys-Carter and Davies, 2019). Dispositional antecedents include procrastination, reading ability and learning strategies (Chew and Dillon, 2014) as well as individual attitudes, motivations, experiences (background), behaviour and characteristics (Chi *et al.*, 2019) and personality (Smail, 2017).

Environmental antecedents include demographics such as age and gender (Chew and Dillon, 2014) and cultural and race factors (Gautreau, Brye and Lunceford, 2016). The role of gender in statistics anxiety has been mixed with several studies showing greater anxiety in females than males (Smail, 2017; Wahid, Yusof and Nor, 2018; Ng and Teoh, 2019; Ordóñez

Camacho, Romero Martínez and Ruiz De Miguel, 2019), however some studies have shown no gender differences (Alves et al., 2016; Alizamar et al., 2019). Others have shown the effect of anxiety on performance to be greater in females (Wahid et al, 2018), or differences in types of anxiety, for example that females are higher in trait mathematics anxiety, but no differences between males and females for state mathematics anxiety (Bieg et al., 2015). Stereotypes that men are better at mathematics than women have been shown to affect performance, but only when mathematics anxiety is high (Pérez-Garín, Bustillos and Molero, 2017). Meanwhile the evidence of race and country on statistics anxiety is rather mixed. Previous research has shown lower perception of the worth of statistics for Caucasian participants compared to African American students (Onwuegbuzie, 1999) and lower statistics anxiety for Chinese students compared to samples in the UK and USA (Liu, Onwuegbuzie and Meng, 2011). More recent research has also shown differences in mathematical anxiety in pre-service teachers where Latina teachers were significantly lower for positive statements and significantly higher for negative statements than non-Latinas (Gautreau et al., 2016). Cognitive antecedents were also added by Cui et al., (2019) to include attention and language processing.

Another potential influence on statistics anxiety is self-efficacy (Baloglu, Abbassi and Kasici, 2017; Wu, Lin and Shih, 2018). Self-efficacy is an individuals' belief in their own capacity to perform a task (APA, no date). Low self-efficacy has been associated with increased statistics or mathematics anxiety; however, it has also been shown not to moderate the effect of achievement goals on anxiety (Gonzalez-DeHass *et al.*, 2017). Baloglu et al., (2016) have also shown that along with self-efficacy; increased task value, intrinsic goal orientations and reduced test anxiety also contribute towards reduced statistics anxiety. Statistics anxiety has been shown to be negatively predicted by motivational factors (intrinsic value and self-concept), while anxiety predicted engagement, characterised by deep processing, self-regulation and persistence (González *et al.*, 2016). Anxiety has also been shown to be predicted by personal adaptability, commitment and academic self-concept (perception of one's academic ability) (Najmi, Raza and Qazi, 2018).

Statistics anxiety could be caused by any number of factors. One factor that the literature mentions frequently is the likelihood of declining mathematical skills in undergraduates (Carpenter and McDonald, 2017), with reduced mathematics scores and increase in attempts to pass mathematics tests over a 21 year period in the US, interestingly coinciding with a 7% increase in SAT scores (Carpenter and Kirk, 2017). In addition, in the UK comparing psychology undergraduates from 1992 to those in 2002 significant reductions in their skills in calculation, algebraic reasoning, proportionality and ratio, graphical interpretation, probability and sampling and estimation were shown (Mulhern and Wylie, 2004). Those from a non-mathematics background have been shown to have increased statistics anxiety and feel challenged due to inability to process the language, which typically results in poorer performances on statistics courses (Malik, 2015).

What are potential strategies to reduce statistics anxiety?

Recommended strategies from previous reviews suggest reducing the mathematical emphasis of formula and calculation, a focus on puzzle and problem solving skills, applied problems and examples, motivating students and reducing procrastination, targeting misconceptions, critical and statistical thinking and an understandings of assumptions (Tishkovshaya and Lancaster, 2010; Chew and Dillon, 2014). The understanding of assumptions is highlighted as a necessary inclusion by the BPS (BPS, 2017) while the critical thinking is mentioned frequently in APA guidelines (Tomcho *et al.*, 2009). In addition, research has shown that statistics anxiety reduces once students have started a course or at the end of it (Chamberlain, 2017; Huang, 2018; Rode and Ringel, 2019).

Therapeutic interventions designed to reduce anxiety and stress or the impact of these on performance were described in the literature. For example, Social-emotional learning, where students are taught to develop mindsets, information and skills to manage emotions such as anxiety. This has previously been shown to be effective in schools in the USA to reduce anxiety and improve university students' ability to identify potential stressors as challenges rather than threats (Stocker and Gallagher, 2019). Similarly, a combination of mindfulness and growth-mindset based interventions, showed effectiveness in reducing mathematics anxiety and increasing self-efficacy for mathematics in university students (Samuel and Warner, 2019), while focused breathing exercises were shown to reduce anxiety and aid mathematics performance (Peper et al., 2016) (Kiss et al., 2019). These appear to have been minimally researched at present in this particular area of anxiety, however meta-analyses of mindfulness interventions have shown low-medium effect sizes of improvements to anxiety and mood (Hofmann et al., 2010, Blanck et al., 2018). Additionally, many student unions run mindfulness or meditation classes that may be of particular benefit for students to implement during these stressful and anxiety inducing modules, tests and assignments.

Interventions based around compassion and self-compassion have also shown effectiveness in reducing self-criticism and improving academic achievement in highly anxious students (Veiskarami, Rezaei and Mansouri 2017) and reducing assessment anxiety (McEwan, Elander and Gilbert, 2018). However, some research has shown no effect of compassion interventions on anxiety (Ko *et al.*, 2018). Expressive writing intervention has also been suggested for reducing statistics anxiety (Kiss *et al.*, 2019), as this has shown to be very effective at reducing the effect high mathematical anxiety can have on academic performance (Park et al., 2014) and shown significant improvements in exam scores for those with high anxiety (Ramirez and Beilock, 2011).

An exercise that seems to be frequently considered in the literature is the role of cooperative/collaborative learning. Here students work in small groups or teams, often of differing abilities to work together to improve their understanding. Results however have

been mixed with some success shown in positive attitude change (Liau, *et al.*, 2015), and performance (Kinkead, Miller and Hammett, 2016), however only some show reduced mathematics or statistics anxiety for collaborative or peer-based learning (Gorvine and Smith, 2014; Kinkead, Miller and Hammett, 2016). Group work is an important part of the graduate attribute "professionalism, employability and enterprise" at the University of Hertfordshire and is already included extensively in research methods modules in the teaching of psychology. Continuing its inclusion in the curriculum is a must, even given the limited evidence in the results in reducing anxiety.

Kiss *et al* (2019) also highlight the importance of a strong community, positive environment and communication between students and staff. They suggest applied and interactive instructions allowing for collaboration between students and allowing for the asking and answering of questions without students feeling embarrassed or 'silly'. It has been suggested that many students with high statistics anxiety are afraid of asking for help (Kiss *et al.,* 2019) and this is demonstrated by being part of how statistics anxiety is measured (Nielsen and Kreiner, 2018). Kiss *et al.,* (2019) suggest that simple support systems such as flexible office hours and prompt responses to students can help with their anxiety, as well as ensuring that responses to questions are available to all students. This latter point would also remove the issue of receiving the same questions from many students and is something I have used with some success with my students. The development of a strong community within the cohort would also allow for help to come from within the peer group.

Technological ideas such as software use (Yamashita and Crane, 2019), the flipped classroom (Nielsen, Bean and Larsen, 2018) and tutorial videos (Breneiser, Rodefer and Tost, 2018) have all been suggested as technological solutions to anxiety. The flipped classroom has been shown to potentially reduce the impact of mathematics anxiety on performance (Nielsen, Bean and Larsen, 2018). Use of tutorial videos and online course structures have shown to be poorer in terms of completion rates, however performance once this was controlled for was not different to traditional students (Breneiser, Rodefer and Tost, 2018). These would allow students unlimited access to resources and flexibility in the devices they can use for statistics analysis (improving access).

The idea of introducing humour in the form of mnemonics (Mocko *et al.*, 2017), 'fun items' (Lesser, Pearl and Weber III, 2016) or songs (Lesser et al., 2019) have also shown some effectiveness in reducing the anxiety of students in the classroom as well as improved performance. These appear particularly useful when combined with other interventions or pedagogic techniques (McGrath *et al.*, 2015).

Assessment and feedback have also been considered in terms of the effects of statistics anxiety. For example, the use of formative assignments (McGrath *et al.*, 2015) and open book exams have shown to help reduce anxiety (Malik, 2015). In terms of feedback the evidence is somewhat limited, but research has suggested that regular feedback sessions

with tutors can improve performance in mathematics and also reduce the impact that anxiety has on performance, if not reduce anxiety itself (Núñez-Peña, *et al.*, 2015).

Reflective thinking has also been suggested to help relieve anxiety in students as well as helping lecturers and researchers to see the progress of confidence and anxiety through a course/year (Denton, 2018). Motivational models have been considered such as the ARCS motivational model. This incorporates attention, relevance (e.g. goal orientation), confidence and satisfaction (internal or external reinforcement). This was incorporated into an e-book for mathematics students to reduce anxiety, with some success (Turel and Ozer Sanal, 2018). Preparatory modules have been suggested to help deal with fears, anxiety, confidence, motivation and knowledge of key concepts, this would also help to bridge the gap for students with less of a mathematics background to those with some prior knowledge (O'Sullivan *et al.*, 2017).

Finally, combined interventions to reduce anxiety and improve performance in statistics courses have been explored. Andersson and Logofatu (2017) explored a blended learning module design. This incorporated online materials such as lecture notes, exercises, screencasts of lectures, mock exams and tutorials for using software; with self-study materials, weekly web conferences, optional (formative) assignments, and face-to-face workshops. This was shown to reduce the reputation of high failure rates in the course, the additional materials available helped to address issues with lack of prior knowledge in some students, used real world problems to help address motivation and worth of the subject and allowed students to explore real data.

Another combined programme (McGrath *et al.*, 2015) incorporated humour, songs, anecdotes and addressing of the challenges of statistics in the teaching of the content, with no formal tests but instead assignments based on a chosen area of psychology. They also incorporated teaching exercises based on role-playing. Statistics anxiety was reduced, while self-efficacy increased, which students attributed to the teaching practices of the module. Programmes such as these incorporate a number of the individual elements described above as well as the recommendations of studies highlighting the necessity of applied examples, early support, selling the value of statistics (Carpenter and McDonald, 2017). These also still allow for the covering of the key concepts from the APA and BPS (Tomcho *et al.*, 2009; BPS, 2017).

Discussion

There are a number of approaches that have been investigated recently in relation to reducing statistics anxiety. However, the depth of evidence of any one technique is fairly weak for some of those described. It has also been commented on in the past that there is little linking in the literature between research investigating statistics anxiety and practical changes that can be made to teaching (Chew and Dillon, 2014; Ralston *et al.*, 2016). However, some elements have shown some consistent success, are practical and relatively

easy to implement into most courses and have strong pedagogic theory to support them. The majority of the interventions explored in the literature fall into 4 main areas: lecturer role; student role and individual activities; course/class structure and feedback; technology. Each will now be discussed in turn along with the integrations between these, with examples of what has worked well in my own practice and what might need to be considered when integrating these.

It is essential that the lecturer or another staff member is approachable and a figure that the students can easily approach for help. A more anxious student might need additional support – even if they do have the necessary skill and knowledge to engage with the subject. However, they might also have difficulty approaching a lecturer due to physical barriers or their own anxiety and fear (e.g. embarrassment at asking "silly" questions). Alternatively ensuring approachability and easy access to staff would be difficult if the staff member has a higher workload, teaches multiple cohorts and/or larger cohorts of students. The use of proctors (teaching assistants in lab-based environments) and personal tutor's roles might be important, to reduce the pressure on the lecturer and to allow for the student to still receive the necessary support network. Having multiple ways to ask questions (online, interactive exercises, one-to-one or small group meetings) as well as having multiple people to go to for help could help to reduce the difficulty in finding help.

Students also need to a have a role in their own wellbeing and in helping to reduce their stress and anxiety in these subjects. Ensuring that students have time, support and encouragement to seek academic or emotional support and ensuring resources such as mindfulness, compassion and relaxation practices are available to students can help them to help themselves. This is true in a number of different elements of anxiety and stress in higher education, not just subject specific, for example in social anxiety (Russell and Shaw, 2009), financial stress, academic distress or family and peer support (Jones, Park and Lefevor, 2018). There is also evidence to suggest that with distance learning becoming more common or necessary, that these social and emotional stressors might become worse (Elmer, Mepham and Stadtfedt, 2020). While the evidence of these exercises in reducing statistics anxiety specifically is limited, the role of these in reducing these other areas of anxiety is strong and the importance of reducing anxiety in these other areas cannot be ignored.

The structure of statistics and research methods modules should be considered with a focus on collaboration, interaction and peer learning. This might also link with the role of the lecturer and other staff members being changed to a support figure rather than an authority. They might act more as a facilitator of discussion and peer support than the source of all the answers. This can be integrated into the use of technology and distance learning techniques. Technology might be seen as an aid to reducing anxiety in allowing for the constant access to materials, flipping the roles of lectures and in-person teaching sessions to be more of a support session and giving students extra time to process and learn independently. However, they can also be seen as a limitation in causing distraction or putting greater distance between an individual and their community, support networks and academic staff. Technology can be used to encourage collaboration from quieter students and those for whom a traditional lecture style of teaching would not work. It can also provide a method for quick or instant feedback, focusing attention on the topic and increasing engagement (Meguid & Collins, 2017).

However, it is clear that some of these approaches might work for some lecturers better than others and for some courses better than others. For example, introducing humour into lecture materials will come naturally to some lecturers and will work well for them and will likely work much better in person than online. Similarly, in distance or heavily online based courses the building of a community and a focus on collaboration and group work will be more difficult.

Given the move towards and the current necessity for distance and online learning, ensuring the maintenance of support networks between peers and staff is necessary to help reduce and control student anxiety in statistics courses and in other subjects than might be particularly anxiety inducing. If students feel more isolated and unable to seek help their anxiety will likely get worse, it is also possible that those who would previously (in a face to face environment) feel more supported, will no longer feel this way and will experience increased anxiety. Investigation of the roles of these environments on student anxiety (both in general and in specific subjects) is necessary to help identify those who might be of more need of support and how best to support these students. Ensuring that resources and support are available regardless of the distance and that a strong community is maintained are vital to helping learning, and reducing stress, isolation and anxiety.

Investigations should focus not just on measuring anxiety quantitatively using questionnaires but also on student reflection, interviews and feedback. Qualitative data on what students feel works best for them, the environments they feel more or less supported in and how they think they might be better supported would add to the quantitative data already collected of the effects of anxiety on achievement, attendance and wellbeing. A collaboration between students and staff to help build course content and assessment would help make students feel heard and ensure that they are a part of a community.

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Developing Resilience in the NHS: Using ACT-based short workshops and webinars to improve staff wellbeing

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Abstract

Healthcare workers in the NHS are under both chronic and acute stress, related to shortages in staff numbers, stretched resources, and an increasing number of patients. This ongoing stress can have a negative impact on their personal resilience, which is their level of psychological flexibility to healthily manage distress and adversity. It has been shown that Acceptance and Commitment Therapy (ACT) can provide essential tools and interventions to build up psychological flexibility and resilience, which counter the effects of long term stress. This project has sought to adapt a four-part series of workshops using ACT skills into a one-day workshop, using collaborative teaching methods, to work with the challenging nature of healthcare worker schedules. This study took baseline measures and afterworkshop measures to determine how much information was or was not retained and consideration of the possible impact on overall resilience. Although there were challenges related to Covid-19 shut-downs, this study has been able to show initial promising results that one-day workshops can be effectively facilitated and result in participants who retain the provided information. Further work has now been done to make this process even more effective and to provide this workshop through webinars to reach more participants, particularly in response to Covid-19 restrictions.

Background

Resilience is a fundamental personal attribute that has a wide-ranging influence on an individual's overall well-being, particularly during times of stress and during the work (Taylor, Dollard, Clark, Dormann, & Bakker, 2019). It can be considered to be a way of understanding how well a person is able to develop their self-efficacy and confidence, coordinate their efforts, show composure even when feeling anxious or distress, and find meaning in adversity (Zimmer-Gembeck & Skinner, 2016). Particularly, it would be expected that if a person is resilient, they would be seen to have characteristics which include an ability to engage with others for their own support and development, manage their negative emotions, assert their influence whilst understanding and accepting external controls, learn from past experience, and practice their own protective factors (Neenan, 2017).

Whilst resilience is an important characteristic for an individual to develop for their own ability to develop greater meaning and psychological flexibility in their day to day lives, it is also important to an organisation such as the National Health Service which increasingly needs to ensure that their staff is able to manage their increasing workloads and stretched resources (McKinley, et al., 2020). Staff resilience is important for the quality and sustainability of continued public health services (World Health Organization, 2017). Where resilience is poor or limited, there is an increase seen in problems with sickness (Cohen, Murphy, & Prather, 2019), absence from work (Black, 2017), less effective communication within teams (Matheson, Robertson, Elliott, Iversen, & Murchie, 2016), and reduced compassion shown to patients and carers (Chambers & Ryder, 2018). Therefore, it can be said that improving and sustaining the resilience of staff is a key focus for the NHS to maintain the quality and safety of care.

Acceptance and Commitment Therapy (ACT) is a therapeutic modality which is known as a Third Wave Cognitive Behavioural Therapy (CBT) approach. For a therapy to be considered as a "third wave CBT approach" it means that it involves the "thoughts" and "feelings" of the individual, but that the therapy moves away from a focus on 'what' is thought and felt, and instead focuses on how the individual 'relates to' what they think and feel) (Hayes, 2016). ACT seeks to develop an individual's ability to first become aware of their thoughts, feelings, and experiences through developing mindfulness skills; to then become more open to these experiences through the development of skills of acceptance; and to finally become more aware of their personal values and commit to acting on these values even when experiencing distressing emotions and thoughts (Harris, 2019). The end result of this therapy is to hopefully develop a greater feeling of meaning in a person's life, even when going through challenges. Rather than seeking to change internal or external factors that may be causing distress or changing the thinking around those factors, ACT seeks to help an individual learn to live with those factors and continue to have a meaningful life (Strosahl & Robinson, 2017).

Previous research has shown good results in ACT's ability to increase resilience and meaning for nursing staff (O'Brien, Singh, Horan, Moeller, Wasson, & Jex, 2019); a wider review of the literature has shown consistently that there can a strong connection between improved resilience and learning ACT and mindfulness skills (Cleary, Kornhaber, Thapa, West, & Visentin, 2018). This previous work in using ACT within a healthcare setting has provided the backdrop for considering how effectively it might be used in this healthcare staff.

Introduction to the Current Study

Following the previous research on resilience and nursing staff, a four day workshop series has been created that offers healthcare staff the opportunity to meet for two hours at a time to experience ACT exercises and practice these skills, as well as learning about particular skills to take into their own lives. These workshops were assessed for their impact on psychological inflexibility and experiential avoidance (Bond, et al., 2010), burnout (De Beer & Bianchi, 2019), and their subjective feelings about their work place in relationship to how safe, cared for, and valued they feel they are (Schalast, 2016). They were asked to provide qualitative feedback throughout the process and at the completion of the series;

this qualitative feedback was important for ensuring that the group was perceived to be comfortable to attend and the series worthwhile, outside of psychometric scoring.

The feedback consistently showed that the staff both valued the workshops for what they experienced within the sessions and also that there was a reduction in psychological inflexibility and burnout, as well as an improvement with their perceptions of their work place environment, all of which gives credence to the idea that the workshops were indeed increasing the personal resilience of the staff members.

However, whilst the workshops themselves were received positively and were showing the results that were hoped for, there were significant practical challenges that were making the workshops struggle with the initial aim of improving the overall resilience of the majority of healthcare staff in local services. The primary challenge was one of scheduling; staff worked swing shifts ('swing shifts' here refers to scheduling patterns which change between day shifts and night shifts, in a repeating pattern) wherein they would work for months on day shifts and then transfer to night shifts. When they were on night shifts, it was impossible for them to attend workshops during the day. Additionally, due to the shortages of healthcare staff experienced by local services, it was nearly impossible to get the same staff member released for workshops four times in a row across several months.

Therefore, a plan was made to attempt to consolidate the four workshops into a single allday workshop or into two three-hour workshops offered as a hybrid in-person and online option. There was already some research to suggest that single day workshops can have some impact on staff resilience in healthcare settings (Tyrberg, Carlbring, & Lundgren, 2017). It was agreed with senior management and team leaders that this could be facilitated and the response from staff to being offered a single all-day workshop or an online option was significantly positive. However, what was not known was whether or not the information and skills that were previously taught across a longer space of time—which allowed for home practice and email reminders—could be effectively taught in a single day or if the material could be converted effectively to online content.

Therefore, the current project seeks to assess whether it can be shown that using more collaborative teaching methods and more experiential learning will be sufficient to help take in the same amount of information in a much shorter time frame.

Pedagogic Theory in Support of this Project

One of the primary pedagogic theories used to consider how best to move this workshop from a four-part-day series to a one-day (or two half-day) workshop, was that of the Collaborative Pedagogy. This theory had its beginnings in the process theory of rhetoric and composition, and states that individuals learn better if they engage with others (Chenault, 2017). This theory moves away from the previous thinking that individuals learn better in isolation and shifts towards maximizing critical thinking, learning, and skills development through group interaction and connecting with other people who are also learning.

There is, of course, more to this theory than can be dealt with in detail here, but it is worth considering the importance here of linking collaborative pedagogy to cultural awareness and inclusivity. Collaborative learning works best in environments and groups wherein people feel safe to 'think out loud' and to engage their imaginations with a certain light playfulness (Graham, 2019). This focuses on the process, rather than the end result.

This method of learning is very much in line with Acceptance and Commitment Therapy, which focuses primarily on the process of interacting with a person's thoughts, feelings, and experiences, rather than on the content itself (Zhang, Leeming, Smith, Chung, S., & Hayes, 2018). Indeed, many of the skills are focused on taking a metaphorical step back from the thoughts, feelings, and experiences, to allow the individual to examine them from a distance. Having another person engage in that process is very much in line with the key theories of ACT working and learning.

The Collaborative Approach also requires a level of authenticity of experience and collaboration both between the participants, but also between the participants and the facilitator. In this teaching approach, the teacher is very much a facilitator rather than an instructor. Information is not simply provided, rather it is instead guided towards and through. Although this can be a slightly anxiety-provoking method of teaching for those who want to make sure that the information has been provided—and for those facilitators who are keen to ensure they can prove that a shortened workshop can show an improvement in knowledge—it is one which has the possibility of providing a far deeper learning and awareness. Participants who engage directly with the information and with each other are far more likely to retain the information in a way that it can be used flexibly in the future, rather than just regurgitated.

As this appears to be the most useful way to get a large piece of process-focused information to a group of participants and is most in line with the ACT focus on authenticity of experience, this was the chosen approach for this workshop. Therefore, as many interactive group activities as could be created were inserted into the material. Where there may have previously been an individualised piece of work, participants were instead encouraged to discuss with other participants. Everywhere possible, the participants were given the opportunity to answer a question for themselves, before more information was provided by the facilitator. In this way, the slower four-part workshop was consolidated and a one-day, more immersive and interactive workshop was created.

Methodology

The series of four workshops was consolidated into a single day (which was also offered in two three-hour sessions separated by a week) by considering the implications of different

teaching methods and theories to find the most effective manner of engaging the participants with the information from the very first moment. It was decided to focus on a collaborative approach in teaching; this method is very much in line with ACT methodologies which requires a flattened hierarchy (Gil-Luciano, Ruiz, Valdivia-Salas, & Suárez-Falcón, 2017), authenticity of experience (Çekici, 2019), and collaboration between participants (and facilitator, who often takes the position of participant in exercises) (O'Donoghue, Morris, Oliver, & Johns, 2018). The workshops were re-worked in order to emphasise shared learning exercises, learning from each other, and building a framework of theory that is built on with experiential exercises.

Once these changes were put into place, the participants were asked to fill in a pre-session knowledge questionnaire that was written by the facilitator (see Appendix) that was used to assess the baseline knowledge of each participant prior to starting the workshop. They were then asked to fill in a post-workshop knowledge questionnaire shortly after the workshop to assess how much learning had taken place (please see Appendix). They were also asked to fill in the same questionnaires on psychological flexibility, staff burnout, and perceptions of workplace environment as previous groups, so that the overall efficacy could be considered, but these are not assessed in this current paper.

Ethics

As this workshop is in line with normal practice, there is no specific requirement for additional ethical approval to be sought (University of Hertfordshire, 2019). There is no research component or manipulation of teaching included, so does not meet that threshold.

However, it should be noted that there are power dynamics at work within this research project, as the facilitator for the group is of a higher banding within the NHS than many of the healthcare staff who are taking part in the workshop and who may need to work directly together (in this instance, "higher banding" refers to both a higher pay grade and a higher level of seniority or managerial responsibility). Therefore, it was carefully considered how best to ask for this information in a way that was respectful of these concerns and followed appropriate levels of confidentiality. Therefore, all participants were asked to mark their questionnaires with their own chosen memorable word, rather than their names. This was linked in a single physical list until their post-measures were collected. This list was then destroyed. All participants were informed that their responses were optional and anonymous.

Discussion

Due to the current crisis of the Covid-19 pandemic, it was not possible to run this workshop in the intended numbers or more than once as a one-day, in-person workshop. One planned workshop was cancelled and one had the numbers reduced, to help accommodate the NHS emergency planning. Therefore, there are insufficient numbers at this time to statistically analyse the difference between baseline scoring and after-workshop scoring. The current discussion will focus on a qualitative assessment of the results and then continue planning to complete further assessment after the workshop has been adapted to be run remotely.

Eight participants were able to complete the full day of the workshop and provided baseline and follow-up data for their received learning. One of those eight participants had previously completed approximately 75% of a four-day workshop series, but wanted to complete the one day workshop to augment her learning from those workshops and to allow her to cover the material that she missed. The other seven participants had no previous experience of ACT interventions. All participants were healthcare workers, including nurses, health care assistances, clinical psychologists, a forensic psychologist, and an inpatient social worker.

The participant who had completed the previous workshops was able to provide 12 out of 14 correct answers at baseline and improved this to 14 out of 14 at the end of the workshop. The other participants ranged from 0 out of 14 correct answers to 7 correct answers, with an average score of 3.

At follow-up, the score range was from 11 out of 14 to 14 out of 14 with an average score of 13. There was an overall marked improvement in ACT knowledge shown with good retention throughout. However, it should be noted that these scores show an immediate recall and retention, rather than a longer term. There were also priming cues around the room (for example, a large banner in the front of the room was hung with the three pillars of ACT work, for any participant who chose to look up). This retention should ideally be tested again after a portion of time has passed, for example at a month point or three-month point.

The qualitative feedback showed that the participants most valued "having the time and space to reflect on values", "being off the ward with colleagues, but focused on mindfulness", and "the opportunity to learn about new techniques". In particular, participants suggested that material that allowed them to put some space between their thoughts and their connection to those thoughts (called "thought defusion" or "unhooking") and mindfulness meditation were considered most beneficial.

Overall, the participants showed the expected and hoped for improvement in knowledge following the workshop, so that it can be said that the information can be given out in this manner initially. However, it is as yet too early to be able to comment on the longer term ability of the participants to both retain the information and also use the skills that they learned in their everyday lives, both at and away from the workplace.

Conclusions

This project came about because there is an increasing pressure on NHS staff, from nearly every side. The staffing numbers continue to be low, yet patient numbers continue to

increase. There are fewer resources on the wards than are needed, staff suffers from high rates of burnout and stress, and there can often be a perception that upper level management "does not care" about the staff on the ground. Therefore, putting into place a workshop such as this can help to both provide staff with essential psychologically informed interventions to build up their resilience and improve their perception of having meaning in their work and their personal lives, and also to provide them with a clear sign that they are valued. This workshop has a dual purpose of information-giving, but also modelling that their well-being is important to the system, therefore should also be important to them.

However, there can also be the question raised about a deeper message given by reducing a four-day workshop down to a single day. Does this speak to a flexible approach to a challenging schedule set-up or does it indicate that these staffs are only 'worth' one day instead of four? The focus is on identifying what is valued by each participant and then putting those values into practice, but the structure of the workshop itself can waver in its ability to both value the participants, but not always be able to put that into practice.

Regardless of these concerns and considerations, it was seen clearly by the written feedback and the verbal feedback on the day—and afterwards in conversation with the staff—that they deeply valued having the space to reflect on their work, whilst also being taught specific interventions to help reinforce their resilience. As there has been no changing to the challenging shift patterns and scheduling since this paper was begun, it stands to reason that one-day workshops continue to be the way forward. Future consideration will be given to ways in which the participants can have this information reinforced until it is more clearly consolidated. This may be done through refresher workshops, online webinars, or email reminders.

As the pandemic continues to prevent the ability to repeat this workshop to better refine the techniques used, work was started to move this one-day workshop into a webinar format so that more participants can try the new model. There is already research to suggest that this could be a successful approach (Levin, Haeger, Pierce, & Twohig, 2017). As this project progresses, these same evaluations will be carried out repeatedly to assess whether this model is working effectively for the benefit of the participants. It has been shown and evidenced that resilience matters; both personally and professionally to healthcare staff. And in order that they can be helped to develop as much resilience as possible, these workshops will continue to be held in one form or another, with as many assessments carried out as needed to ensure that they are of benefit.

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Appendix

MEMORABLE WORD: _

ACT for Staff Workshop Pre-Knowledge Test

I need to know if it is possible to teach this workshop in a day—to do that, I will be checking your ACT knowledge <u>before</u> and <u>after</u> the workshop. Please do not Google/confer with others/look-up the information you don't know!

2) What are the three pillars of the ACT framework?
1.
2.
3.
3) What are the three main ways to practice mindfulness?
1.
2.
3.
4) What are the three steps to defusing from an unhelpful thought?
1.
2.
3.
5) There are four boxes to the ACT matrix—can you remember them? (Hint: Compass, Thought Bubble, Camera, Camera)
1.
2.
3.
4.
MEMORABLE WORD:

ACT for Staff Workshop Post-Knowledge Test

I need to know if it is possible to teach this workshop in a day—to do that, I will be checking your ACT knowledge <u>before</u> and <u>after</u> the workshop.

1) What does the acronym "ACT" stand for?
2) What are the three pillars of the ACT framework?
1.
2.
3.
3) What are the three main ways to practice mindfulness?
1.
2.
3.
4) What are the three steps to defusing from an unhelpful thought?
1.
2.
3.
5) There are four boxes to the ACT matrix—can you remember them? (Hint: Compass, Thought Bubble, Camera, Camera)
1.
2.
3.
4.

Thank You for taking the time to complete the form!