Blended Learning in Practice

Autumn 2022

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Editorial

Welcome to the Autumn 2022 edition of our e-journal Blended Learning in Practice. In this edition we have three research articles from participants on the Post Graduate Certificate in Learning and Teaching in Higher Education (PGCertHE) programme at the University of Hertfordshire. In addition, we have contributions from Muhammad Jamro from the School of Physics, Engineering, Computer Science and Phil Hill from one of the university's consortium partners, West Herts College.

In this edition:

Jenny Bebbington investigates and discusses the research question 'What are they key characteristics for teaching evidence-based practice to undergraduate mental health nursing students in the United Kingdom, and what do pedagogic theories tell us about addressing challenges?'

Roberta Colombo questions the format and her role in the Crit as an educational process. She investigates the benefits as a learning tool, as well as the established adverse connotations that diminish its effectiveness to enrich the students learning experience. It is not her intention to challenge the overall educational system but to search for practical shifts in approach's that will benefit the students discovering their architectural voice.

Rebecca Tomlin investigates the barriers that cultural taboo subjects can create between patients and health care professionals. The aim of the research is to analyse which strategies and pedagogy were successful in teaching taboo topics and altering stigmatising attitudes. Guided by personal reflection, she draws parallels from wider literature to inform future teaching practice.

Muhammad Jamro discusses the use of statistical parameters with Canvas quizzes that allow for useful insight for academics and learning technologists. Muhammad carries out a psychometric analyses of Canvas quiz components based on auto-generated statistical parameters, such as standard deviation; distractors; difficulty, and discriminatory indices. There parameters are then used to consider the quality of individual questions and complete overall for graded assessment.

Phill Hill considers the development and use of continued reflective writing that encourages learners to engage with the process of self-reflection and evaluation. A number of approaches are considered and the authors own experiences of working with students are discussed.

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Jenny is a senior lecturer in mental health nursing at the University of Hertfordshire. She is an alumna of the University, completing BSc and MSc programmes in psychology and nursing. Working for a local mental health NHS Trust in adult community services, Jenny was passionate about research and evidence-based practice and encouraged students to access research materials in practice. Jenny joined the University of Hertfordshire mental health nursing team in March 2021, inspired by her experience she hopes to encourage more students to embrace research to evolve mental health practice.

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Roberta is a creative architect with over 20 years commercial experience. She has worked on a wide range of projects, both UK based and abroad, including Projects offices, mixed use residential/commercial, as well as transport hubs. Most recently her work has focused on private residential schemes and a proposal for the hospitality sector. In 2017 Roberta launched her own practice. She is a Visiting Lecturer in Architecture at the university.

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“This is the module I worry about the most” Exploring the evidence to support student mental health nurses’ education in an evidence-based practice module

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Abstract

Nursing students can discuss in detail the necessity of evidence-based practice yet teaching of its theory evokes feelings of great anxiety and self-doubt. The professional code of conduct (NMC, 2018) stipulates nurses must practice in line with the best available evidence. An essential part of nursing education and fundamental to nursing practice, theory of research has become a struggle for both learners and educators. The paper aims to address the research question ‘What are the key characteristics for teaching evidence-based practice to undergraduate mental health nursing students in the United Kingdom, and what do pedagogic theories tell us about addressing challenges?’ It also aims to: note the discrepancy between professional requirements and paucity of available evidence-based practice teaching frameworks; similarities between student and educators perceived anxieties towards evidence-based practice education; suggested pedagogic theories and the current strategies used within teaching of evidence-based practice; and lastly, how authentic assessment may address these issues in nursing education.

Background

Integration of research and teaching is widely discussed, with the benefits of these skills being sought after as graduate attributes. For example, the University of Hertfordshire graduate attributes incorporate ‘Learning and Research Skills’ (University of Hertfordshire, 2022), describing opportunities to develop effective learning and research abilities. Furthermore, it is also well established that engaging students in research and inquiry supports learning (Mieg, 2019). The Nursing Midwifery Council stipulate that evidence-base practice (EBP) is fundamental to nursing care, nurses must use the best evidence available and that this must be incorporated into nursing education (NMC, 2018). The World Health Organisation (WHO) promotes EBP and innovation as one of its priorities, stating EPB should be supported and enabled by leadership, research, and education (WHO, 2021). The benefits and professional requirements of engaging in research is well established. Frameworks and guides have been developed to help EBP understanding, commonly used is The Seven Steps of Evidence-Based Practice (Melnyk, Fineout-Overholt, Stillwell & Williamson, 2010). Yet, research has found the teaching of EBP is still not sufficiently integrated in nursing curricula (Skela-Savic et al. 2020) despite it being well established as a necessity, the key question for EBP within nursing education is how best to teach it (Kyriakoulis et al. 2016).

Undergraduate students at the University of Hertfordshire take part in the Research and the Evidence Base for Mental Health Nursing module during their second year. The module looks to support students in developing an understanding of a range of research perspectives and methodologies, in order for students to critically analyse, use and apply research findings to their practice. The module is assessed through two equally weighted summative assessments, an online multiple-choice quiz, and a written essay. This article was inspired by the current students who expressed their anxieties regarding the module content to the module lead, yet expressed they understood the importance of the topic. The apparent contrast of understanding something as important but fearing the academic exploration posed the author to consider what this means for EBP education. Therefore, the objectives of this article are: 1. Conduct a systematic search of published and grey literature for papers on EBP education. 2. Explore the barriers identified for EBP education. 3. Identify relevant pedagogic theories that can be applied to the identified barriers. 4. Propose recommendations to support EBP education for teaching undergraduate mental health nursing students.

Methods

The inspiration for this article then led to the formulation of the following research question: 'What are the key characteristics for teaching evidence-based practice to undergraduate mental health nursing students in the United Kingdom, and what do pedagogic theories tell us about addressing challenges?'

The search was initially completed using four electronic databases: Scopus, CINAHL Plus, Cochrane Library and ERIC. The databases were selected to cover a broad range of health disciplines and educational approaches. No limits for language or type were used, this was to ensure inclusion of international research. Dates for original research were limited to the last 10 years to ensure up to date evidence. Some further research was identified through reference lists and citations from the yielded evidence in the initial searches. Titles and abstracts were screened for suitability. An additional search for non-discipline specific pedagogic theory was conducted via the Online Library at the University of Hertfordshire.

Results

Teaching Strategies

Currently, there are no frameworks or guidance on how EBP should be taught in nursing education in Europe. There have been suggestions of developing a standardised toolkit (Ruzafa-Martínez, 2019). Keiffer (2018) looked at pedagogic theory to engage nursing students in EPB learning and concluded that designing projects that students could apply to clinical practice supports engagement and achievement of desired learning outcomes. Skela-Savic et al. (2020) conducted a descriptive study, looking at the teaching of EBP in the

nursing curricular for undergraduate, master's level and doctorate programmes across six European Higher Education Institutes. They found teaching varies across countries and programs and is mostly integrated within subjects and some standalone courses. At bachelor's level, integrating EBP fell in two types of subject groups; the first, emphasising clinical work must be evidence-based, the second, developing research knowledge. They found that typically at undergraduate level, teaching time was focused on introducing basic research concepts and the importance of EBP but does not address all seven stages of EBP (Melnyk, Fineout-Overholt, Stillwell & Williamson, 2010). Skela-Savic et al. (2020) concluded that guidelines of a standardised teaching approach and content need to be developed, allowing for more efficient integration of EBP teaching.

Until such standardised approaches and frameworks are available, nurse educators and institutions are required to formulate their own approaches. Typically, curriculum is designed around intended learning outcomes (Race, 2019) and within EBP, these are typically based around knowledge, attitude, and skill (Ellis, 2019). Kyriakoulis et al. (2016) conducted a systematic review of EBP teaching strategies for undergraduate healthcare students, including medical, nursing, pharmacy, and other disciplines. The studies investigated educational interventions to increase EBP competences and contained quantitative data of the effectiveness of the approaches on competence, knowledge, attitude, and skills. Their findings suggested that a multifaceted educational approach, over a period of several weeks, is more likely to improve undergraduate students' knowledge, skills, and attitudes towards EBP compared to single short-term or no intervention. This includes a combination of approaches consisting of lectures, lab sessions, journal clubs, group discussions and assignments. The multifaceted approach supports learning by *doing*, providing students evidence of achievement of the learning outcomes (Race, 2014).

Reviews into nursing education call for a more integrated approach of theory and practice, with recommendations to shift from decontextualized knowledge to "action" in clinical settings (Benner et al., 2009). It is acknowledged that EBP is taught as decontextualized knowledge, supporting students to understand the relevance of this knowledge can be achieved through clinical practice application (Ciliska, 2005). A scoping review by Fiset et al. (2017) found of twenty-three studies evaluating educational strategies encouraging applying EBP within a clinical situation, twenty of the interventions reported positive outcomes. Reporting one study focusing on pain management strategies had significant improvements in knowledge and use of the evidence-base. This strongly suggests that EBP teaching should include practice application, encouraging students to problem solve using the evidence-base to encourage knowledge and understanding of EBP. Fiset et al. (2017) also looked at barriers and facilitators in EPB education for students, highlighting that these stem from both educators and students; therefore, both need to be looked at in more detail.

Barriers and Facilitators

With clear indication of the importance of EBP, and some established evidence of teaching EBP available, understanding why this evokes strong feelings of anxiety requires an exploration of the barriers and facilitators to learning. Horntvedt et al. (2018) thematic literature review looked at the current teaching strategies, in seven European undergraduate nursing programmes, used for developing knowledge and skills in EBP. They found despite research on recommended teaching strategies to develop students' knowledge and how to utilise research, when it comes to implementation of these strategies, they were given a low priority. Further investigation suggested some of the challenges highlighted for nursing academics to implement recommended teaching strategies in EBP were gaps in their knowledge on these strategies, and time constraints due to workload to address these gaps to learn them.

A qualitative descriptive study by Hoffman (2019) looked at the experiences of nurses entering educational roles in the USA and identified four themes: Perpetual Novice, Faculty as a Resources, Teaching Ambiguity, and Student as my Patient. The Perpetual novice encapsulated feelings of being unable to fully understand their role, with one participant commenting it is a consensus amongst their team that it takes '3 years' to feel established, one the author of this article has also experienced. Teaching Ambiguity covered feelings of lack of preparedness and ambiguity of course content, even with established class frameworks. These themes suggest that even with established support frameworks in place, educators can feel unsure and underprepared about their roles. Alongside findings from Horntvedt et al. (2018), this poses the question that if the educators are unsure about themselves and teaching EBP, what impact might this have on our students we are teaching.

It is important to consider the role of the educator in modern education. The idea of the 'sage on the stage', with the students undertaking a passive role in learning, suited to the lecture style of teaching, has shifted. Morrison (2014) discussed the concept of roles and responsibilities of students and educators needs to be re-examined, with the idea that educators are now considered 'guide on the side' in learning-centred models. Learning-centred models place both students and educators as learners, which arguably aligns itself with the themes nurse educators highlighted within Hoffman's (2019) research. This is not a new concept, Rogers and Freiberg (1994) advocated for learning to be 'facilitated' and for the 'facilitator' to show genuineness, by being authentic and honest to students about their knowledge and capabilities, to be more effective. Shifting this notion that nurse education is a one-way flow of knowledge from teachers to students, that educators do not need to be source of all knowledge students have to passively absorb, may alleviate some of the nurse educator fears and allow students to see them as human, genuine and there to facilitate learning.

Ambiguity about intended learning will impact motivation, Race (2019) encourages educators to outline the intended learning competencies so students can identify when they

have achieved them, in turn supporting motivation. Elken & Wollscheid's (2016) systematic review of the relationship between research and education highlights the ambiguity of the term 'research' used in literature. Noting a difference between disciplines and individual academics interpretations and what they consider to be 'research'. They suggest broadening the definition, enabling students and teachers to connect education and research across disciplines and individually. Whilst this may suggest difficulty in achieving clear learning outcomes for EBP teaching if the term 'research' should be broadened, there are elements of EBP that are clearly defined. For example, EBP frameworks, such as The Seven Steps of Evidence-Based Practice, clearly distinguish each stage of the research process (Melnyk, Fineout-Overholt, Stillwell & Williamson, 2010). This framework combines all these elements of 'research' in a step-by-step formulation, for clear understanding of which stage you are in of the research process. This suggests that perhaps learning outcomes for EBP teaching should incorporate elements of EBP frameworks, supporting students to define what 'research' means in the context of EBP.

Race (2019) considered the 'need' to learn being a successful driving force of learning through necessity, which can negate if there is no desire to 'want' to learn which drives motivation. As established, understanding EBP is a need for student nurses, however student nurses understanding this is a 'need' may not be enough. One of the steps for EBP involves critical appraisal of the evidence (Melnyk et al., 2010), assessing the validity and importance of these results and the applicability to the clinical question. Howard (2021) explored barriers and enablers for undergraduate Mental Health nursing students understanding and skill in critical appraisal of evidence. Students reported emotional and psychological barriers such as anxiety as having a primary influence on their engagement with appraisal process and acquisition of skills. However, they highlighted that their findings for enablers to learning aligned with the theory of performance feedback; access to supervision to check their learning which reduces discrepancies between their current knowledge compared to desired understanding (Hattie & Timperley, 2007). Therefore, students having access to academic supervision should help enable students to take ownership of the need to learn critical appraisal.

Research tells us that anxiety has a negative impact on learning and understanding higher education, with calls for more pedagogic support for students with anxiety (Russell & Topham, 2012). However, the implications of not addressing student anxiety may have a wider impact than just students' understanding and learning. Research suggests that anxiety and negative emotions can also lead to issues related to academic integrity, a sign of low motivation in learning (Race, 2019). Tindall et al. (2021) found students with negative emotionality predicted both plagiarism intention and behaviour, urging HEI's to consider the ways to reduce stress caused by assessment design. Describing high-stakes assessments evoking negative emotionality within students, such as stress. Therefore, consideration to the design of assessment to reduce stress, may mitigate risks of academic integrity concerns and misconduct. This would support guidance by the Quality Assurance Agency for Higher

Education (2018) who stipulate that higher education providers must minimise opportunities for students to plagiarise their work for assessment.

Assessments

It is readily acknowledged that assessment can be a primary motivator for student learning (Race, 2019), and when done well, learning can be more effective. Race (2019) argues that achievement of the learning outcomes is so often based on written types of examination, rather than other types of evidence. The two most common assessment types in education are exams and essays, Race (2014) questions the validity of essays, the essay-writing skill is unlikely to be needed once students leave education and the connection between essays and the real world is tenuous. This is true for healthcare; nurses are not required to write essays in their clinical work. In education, we are encouraged to ensure assessments are valid, fair and linked to the word outside higher education (Quality Assurance Agency for Higher Education, 2018). Considering the findings of Fiset et al. (2017), students respond well to authentic application of EBP when applied to answering a question they may face in clinical practice. Therefore, it is reasonable to suggest that incorporating authenticity into student assessment using methods other than written exam or essay, should support learning.

One must consider what could be deemed to be authentic assessment in mental health nursing that has relevant application to practice. Thinking back to teaching EBP, Rholdon et al. (2021) challenged the traditionally used pedagogical strategies applied in nursing education of didactic components with clinical experience, as it has been found these methods often fail to include active participation from the students learning about EBP (Fiset al., 2017). Rholdon et al. (2021) designed an embedded EBP project for an undergraduate nursing programme in Louisiana, United States of America. The project involved students being placed into groups, with members of faculty providing facilitation. Students identified a research question, completed a literature review, and appraised the evidence and finally created a poster to display findings. They found using a practical application of subject material, there was significant reported improvement in students' frequency of use of EBP, attitudes concerning EBP, retrieving and reviewing evidence and sharing and applying evidence. Rholdon et al. (2021) suggest inclusion of an experiential learning project may help to educate students how evidence shapes healthcare policy and affects outcomes. This approach would also appear more authentic, given the students are to identify a clinical problem and apply evidence-base, as they would be expected to in clinical practice.

Group assessment can be used as a type of authentic assessment to support undergraduate students in acquiring skills for academic and workplace success (Kearney, 2013). To be authentic, the design must require students to apply their knowledge and skills to real-world situations, an example of this for nursing students would be a project design as seen in Rholdon et al. (2021). However, it is important to note that challenging collaboration within

group tasks was identified as a barrier to EBP learning (Horntvedt et al, 2018). Therefore, to base the entire assessment on a group task may have a negative impact on some students learning of EBP. Archer et al. (2021) discusses the integration of practice and theory and describe these as essential elements of authentic assessment and 'real world' learning. They recommend that authentic, real world learning assessment must include a reflective element as part of assessment process. Reflection is well established in nursing practice and reflection of knowledge, skills and attitudes through critical reflection is an essential skill for student nurses who are preparing for transition to registered nurse (Darvill et al, 2018). Naber and Markley (2017) propose that reflective writing can help synthesise classroom and clinical knowledge. Therefore, Archer et al. (2021) suggestion is in line with nursing education practice and perhaps the inclusion of a group assessment, alongside a solo reflective piece, would incorporate all these elements whilst remaining authentic.

Recommendations and Conclusion

The inspiration for this article was as the module lead for Evidence-based Practice module for 2nd year undergraduate mental health nursing students. Students expressed fear regarding completing the module yet and understanding of what EBP is. Finding these apparent contradictory feelings towards the module from students, an exploration of healthcare EBP and pedagogic literature was completed to attempt to find applicable solutions to teaching, to address the students concerns. Establishing that EBP is fundamental to nursing care, and should be supported in practice (NMC, 2018; WHO, 2021) yet there are no frameworks or guidance on the teaching of EBP. Until standardised frameworks and guidance are developed, nursing educators and institutions must design their own. This may explain why some of the barriers to student education in EBP stem from the nursing educators themselves through lack of understanding or resources (Horntvedt et al., 2018; Hoffman, 2019).

To reduce fears from ambiguity for students, clearly establishing the learning outcomes can encourage students to identify achievement (Race, 2019). One way this can be incorporated into teaching is providing the students with a learning outcomes grid, the students can tick the outcomes when they feel that they have achieved them. A multifaceted educational approach should be adopted (Kyriakoulis et al., 2016), this can be done by combining lectures, small lab sessions for group discussions, assessments and encourage students to start a journal club. Journal clubs are an important addition and often conducted in healthcare settings as they can create an environment to support practitioners in applying EBP skills (Aronson, 2017).

Theory has told us that applying theory to clinical practice is fundamental for students to contextualise their knowledge and skills. Including a practice application of the evidence-base to a clinical question has been found to improve understanding of EBP (Ciliskka, 2005; Fiset et al., 2017). This can be conducted in the smaller group lab sessions, facilitating sessions for students to address a clinical question by finding the evidence-base. The

students understanding of EBP being important, but still expressing fear about the topic, can be explained by the 'need' to learn. It has been highlighted that the need to learn is not enough, students need to take ownership which academic supervision seems to support (Howard, 2021; Race, 2019). Therefore, incorporating regular academic supervision for students to check their learning through feedback should enable learning. This can also be facilitated in the smaller group lab sessions, this may also help address academic's fears by moving away from passive student learning towards a learning-centred approach of teachers as facilitators (Morrison, 2014).

Finally, the assessment process must be considered. Currently, students are required to complete a multiple-choice exam for 50% of their grade, and a written essay assignment for the other 50% of the Research and Evidence-Base module. The validity of written exams and essays is questioned beyond education, which is true for nursing, essays do not form part of nursing roles and responsibilities. Therefore, the current assessment process for this module is not authentic for undergraduate mental health nursing students. Group assessment can support authenticity and skills and knowledge acquirement (Kearney, 2013). A group experiential learning project identifying a clinical problem and applying the evidence-base could provide authentic assessment for students, with students collectively creating a poster for final assessment for 50% of the grade. Combined with a solo written reflective piece, as essential for student nurse transition to practice and synthesise theoretical and clinical knowledge (Darvill et al., 2018; Naber & Markley, 2018) for the other 50%. These two assessment types would address the need for authenticity, whilst reducing any academic integrity concerns and acknowledging assessment as a primary motivator for learning.

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The value of the 'Crit' format in the context of a contemporary architectural education

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Abstract

The term 'Crit' (Design Review, Jury, Panel) describes a recurrent learning event students undertake in their architectural education journey. This process is part of Design Studio-based projects education particularly in architecture. In the Crit students present their proposals for discussion, analysis, and critique to promote the development of their projects. The format sees the student orally presenting visual material to instructors (teachers), fellow students, and invited external panellists (on occasions). The practice should promote students' learning and critical thinking as well as simulate the architectural design. What should be an event that encourages learning through reflection, often can become an intimidating and negative experience for the students. There is often an imbalance of perceived knowledge and power between the presenter and the group of judges critiquing, where the student learning growth and self-discovery are undermined by aggressive and coercive commentary. When architects recount their studies, it is the 'crit' and the emotional experiences felt that they mostly remember of their education. Although it is recognised as a painful experience by students, it is a practice that has been perpetuated in a similar format since the early 20th century. The level of stress, anxiety, and loss of confidence students may experience after a tough review of their work is often accepted and viewed as the rite of passage to becoming an 'ARCHITECT'. When recently I found myself in the role of the instructor aggressor, I decided I wanted to investigate the subject in depth, looking at social, psychological, and pedagogy studies to implement changes in view to improve the learning experience of my students.

Introduction

This research would like to question the format and my role in the Crit as an educational process. I will argue the benefits as a learning tool, as well as the established adverse connotations that diminish its effectiveness to enrich the students learning experience. It is not my intention to challenge the overall educational system but to search for practical shifts in my approach to benefit the students discovering their architectural voice.

In this paper, I will use the word 'Crit' (design review) when referring to this formative assessment process. At the University of Hertfordshire, Crits are only used as formative assessment.

Architecture Design Studio: Reflective learning in practice

In order to understand the position of the ‘Crit’ within the educational structure of an architecture course, one needs to introduce the concept of Design Studio-based education.

Architecture education principal pedagogy approach is project-based learning. Its origin derives from the old practice of apprenticeship, with students learning the trade from established architect masters, this system was later applied to architectural higher education pedagogy. University Architecture courses apply a mix of traditional academic methods with an emphasis on practical problem solving as a direct connection to professional practice. The design project sees students applying learned theories and skills to design problems closely mirroring the reality of the industry.

Donald Schon (Schon, 1983/87) in his books ‘The reflective practitioner: how professionals think in action’ and ‘Educating the Reflective Practitioner’ uses the architecture educational system as a successful archetype model applicable to all professional education pedagogy. The theories proposed by Schon, that students should engage in projects reflecting real life situations, the importance of reflection in the learning process, and combining research and practice were, in his writings, well established in the studies of architecture. In particular, the theory of ‘Reflection-in-action and Reflection-on-action’ fitted the model of the design studio format. This was represented by students' engagement in cycles of observation, creation/thinking, discussions, and revisions of their work both in one-to-one conversations with their tutors or via regular design reviews (the crit), (Schon, 1983).

According to Schon, Architectural design works in parallel between the functional, with the creation of buildings for human habitation, and the artistic where buildings are conceived as an aesthetic representation. It is in a reflective practice that an architect is able to successfully deliver both sides in their proposals (Schon, 1987).

Although Schon's model of reflective learning had an immense impact on education pedagogy, criticism from architectural pedagogy scholars pointed out Schon's limitations, for example, the lack of social and political implications, with the focus primarily on individual development, and the implied primary learning method: teacher to student (Webster, 2008).

In fact, the design studio is an environment where students actively engage intellectually and socially, constantly moving the thinking between rational, representational, and evaluative formats with exchanges with tutors, peers, and in isolation while creatively developing projects (Dutton, 1987).

Before introducing the next section exploring the crit process in detail, it is worth mentioning an additional distinctive characteristic in Architecture schools, which is the absence of formal pedagogic training of the design teaching staff, the majority drawn directly from practice. This setting although representing a valid historical and tested

educational system of teaching/learning as master and apprentice can sometimes reveal flaws and failures in identifying the needs and mechanisms of effective teaching/learning.

Interestingly the curriculum content and approach to teaching design are of significant importance in shaping architectural schools' reputations and distinctiveness. The post-industrial revolution Schools of Architecture like the German Bauhaus based their whole ethos on highly intellectualised conceptual design and pedagogic experimentation. This perhaps shows that architecture studies apply a kind of hidden curriculum involving an implicit indoctrination into architecture values, tastes, and beliefs (Dutton, 1987). Contemporary schools such as the independent Architectural Association (AA) in London, established as a student-run collective in 1847, have been at the forefront of architectural education adopting models that challenged the conventional teaching methods, emphasising architecture as a socio and cultural practice (Ockman, 2000).

image of a typical Crit (Frist in Architecture n.d.)

The Crit as a teaching and learning tool

If the Design Studio and project-based assignments are the educational settings, the crit represents the most significant learning component in the training of an architect (Anthony, 1991; Parnell et al., 2007). From my experience as a student, practitioner, and now a design tutor the practice of designing and reviewing follows cyclical patterns and stages. Within the academic setting architectural projects are mostly set out using this method: students are given a design brief and a time scale in which they have to respond by explorations and research, and then present ideas and proposals during a Crit. Crits can be set at various stages of the project development. The format sees students (usually individually) presenting to a panel of reviewers whose role is to listen and understand the student presentation/ project concept, followed by questions, then give verbal feedback on the

qualitative content of the work, its positive aspects, as well as highlight areas for improvements.

The panel is formed by the course tutors (always), external invited guest reviewers (on important dates), and fellow students (usually not a substantial number). Students develop their proposals along with design and history theories lectures, technology studies, and one-to-one guidance from their personal design tutors. The crit aim is to encourage critical design thinking, an important skill to acquire in the journey to become a qualified architect.

Principal benefits of the crit

The following paragraphs illustrate key aspects of the design reviews as a learning medium, and their value for advancing, understanding, and producing architectural design.

- It represents a chance for students not only to present their work but to view it against the work of the whole cohort. This helps to appraise individual work in context with the general response. Access to what other students have produced is particularly crucial as the contemporary design studio environment is no longer the working community space shared by students. In fact, students today tend to work in isolation away from college. The informal nature of the Crit can therefore encourage group discussions and exchanges. Crits by providing immediate qualitative feedback allow students to view their work progress in relation to the tutor's expectations and/or a comparison to the work of their peers.

- As a formative assessment, the students have a chance to reflect on their project development beyond the achievement of grades. The different reviewers can also offer a range of diverse viewpoints, suggesting the validity of multiple solutions to a single problem. This can enhance deeper thinking and make the crit a tangible link between theories, learning, and eventual evaluation.

- Crits can help students improve verbal communication and presentation skills, and the ability to talk about their proposals in front of an audience, preparing them to receive judgement with confidence while developing critical thinking skills. The practice in many ways reflects how real practice clients' presentations could be structured.

Having now listed the beneficial connotations of a design review it is important to highlight that the reality can be different and the positive learning goals may not be always achievable.

What are the limitations of the crit? (Wilkin, 2000)

Below is a series of premises categorised as follows: language, time and management issues, feedback format, reviewers and students' power dynamics, and students' anxieties/emotions.

Language:

The use of the word 'Crit' in itself may have a negative impact with students interpreting the word as criticism. Unfamiliar and complex language from the tutors/guest reviewers (specific to the discipline) can be confusing resulting in students shying away from engaging in discussions. This is a particular problem with first-year students, international students, and students with language difficulties.

Unhelpful negative comments without positive guidance can leave students with little to take away from the process.

Time and management issues:

Time and management issues can interfere with a fair presentation of students' work. The imbalance of the ratio of students/tutors imposes shorter and unforgiving time schedules, with crits sometimes being chaired by one reviewer (funds may not be available to pay for external visiting panellists). For lack of time, the reviewer may enter the crit without a proper briefing on the project requirements and the dynamics of the cohort, which could lead to poor and disparate reviews.

In order to achieve a balanced and uniform review across the cohort, it is essential to organise a clear and studied schedule. For example, if all the good students present at the start of the proceedings (when reviewers are fresh and enthusiastic) and the problematic or less confident students present at the end, the crit inevitably will not deliver the same qualitative feedback at both ends of the timetable. It is unlikely that a tired and maybe bored reviewer will be able to be partial and receptive to poor quality work or listen to someone unable to orally articulate their work. As a consequence of a negative Crit experience, some students may never come back to present their work, and not presenting inevitably has a negative impact, in particular on those that are already performing below the standard.

During this academic year, I noticed that not presenting has become the norm for students with lower grades.

Feedback format:

A problem that could arise from crit panel feedback is its unpredictability in the quality and style of delivery. The standard Crit Day of a full class is generally divided into groups operating simultaneously and independently. Coordinated and consistent feedback is difficult to achieve, with potentially negative effects on students as they may be guided in opposing directions in each group. Feedback is given verbally immediately after the presentation. So, it is important that what is said and discussed is formulated correctly and consistently by all participants.

Students' achievement and feedback received are connected, and when good and balanced feedback is given improvements can be achieved in the quality of work students produce. (Taylor and McCormack, 2004).

Students should be able to understand, relate, review, respond and take ownership of the feedback in order to effectively learn (Hattie, 2007). If the Crit setting is viewed by students as hostile and alienating their active participation and ability to absorb the comments is undermined.

Hattie, 2007, pp 86:

Effective feedback must answer three major questions asked by a teacher and/or by a student:

- *Where am I going? (What are the goals?)*
- *How am I going? (What progress is being made toward the goal?)*
- *Where to next? (What activities need to be undertaken to make better progress?)*

Consistency and positive outcomes could be achieved by using standard procedures and rules coupled with personalised variations to reflect each individual presentation. This method should guarantee a level of fairness without becoming a mechanical and rigid format. After all, it is the creativity and inventiveness in students' work that should be stimulated.

For my practice:

1. Investigate what students perceive as helpful feedback during crits.

2. Recognise the emotional aspect of receiving feedback.

3. Establish rules and objectives for all reviewers to adhere to.

Set up a questionnaire to distribute to my students (first year) and evaluate comments made about their experience of the Crit process both positive/negative. Organise a short instruction manual for reviewers to read prior to each crit raising the awareness of the potential damage certain types of feedback can have on students, reviewers may not be consciously aggressive, the guidance could promote a level of control over the type of comments delivered encouraging panellist to adopt a reflexive practice. (Webster, 2007)

Reviewers and students' power dynamics:(Webster, 2007)

Another identified problem of the crit format is the power dynamic between students and reviewers. To simulate client/architects' rapport, and to evaluate the students' communications skills tested against the real practice, invited reviewers are selected from professional practitioners, and discipline specialists. This specific set-up has the potential to create a power imbalance in view of experience in the discipline, the role of the reviewer as

'Judge', and the acceptance that these panellists already belong to the professional 'club' from which students are now excluded.

The divide between reviewer and student is also physical with the student often presenting alone standing by their work, and the panel sitting opposite in a block formation. Osborne and Crowther argue that the changed role of the class tutor from an informal and supportive guide as experienced during tutorial sessions becomes a clearly distinct separate figure representing authority and judgement during the crit. (Osborn, and Crowther, 2011, p.4) A further power dynamic imbalance may hinder a good presentation delivery.

External reviewers may respond differently when viewing work from good and less competent students. While good students are acknowledged and treated almost like equals receiving enthusiastic and in-depth contributions. The less able students tend to receive a more critical and negative commentary. It is not unusual to have reviewers interrupt abruptly these presentations to point out inaccuracies or faults and use dismissive language. The discrepancy in response to the two types of students publicly singles out the vulnerable. Often these students feel humiliated in front of their peers with detrimental consequences for their studies (Webster, 2007).

Students' anxieties/emotions:

The emotionally charged presentation can be intimidating and stressful. Students often arrive physically and mentally tired following days and nights preparing for the review. Quiet and shy students find the group presentation daunting and may not perform well regardless of the quality of their work.

Cultural/gender/social differences can potentially cause conflicts or misunderstandings if not acknowledged and managed prior to and during a crit. It is important that reviewers take on board reflexive practices to guarantee appropriate support and encourage debate in Crits. (Webster, 2007)

First-year students are not explicitly introduced to the rules and values of the Crit potentially creating misunderstandings that undermine the appreciation of the format triggering anxiety and fear of the process.

As the work presented by students is generally a representation of their discoveries and ideas a frustrated presenter delivering aggressive and negative feedback may be perceived as a form of personal and crushing attack, with students adopting either a defensive and antagonistic attitude or may experience self-doubt and loss of confidence. (Tucker and Beynon, 2012).

Students Experience

"Think about the general nightmare of standing nude in public, and add something else you fear, like standing nude on a scale."

"My experience was a lot like boot camp, only in the military they break you down to build you back up into a team player, here they break you down and leave you to put the pieces back together.".

"It's like a gladiator spectator sport. And yes, it can be traumatic." (FINKE, 2006)

Art Student's observations following crits of their work (at this time I could not find direct comments from Architecture students and the timing of writing this paper did not allow the use of a questionnaire with my current students but having experienced the Crit first-hand the sentiments expressed above resonate in my mind).

When architects recount their architectural university days, it is the 'crit' and the emotional experiences felt that they most remember of that period. The level of stress, anxiety, and loss of confidence students may experience after tough reviews are often accepted and viewed as the rite of passage to becoming an 'ARCHITECT'. Students can learn to perform within this intimidating practice. Indeed, the crit can be almost seen as a theatrical performance and the participants are the actors. Unfortunately, there is no script to read or prior understanding of the props to use, therefore students have to learn the art of presenting at the same time as their work is being assessed.

Although I have heard students making comments on their experience of the crit as stressful and terrifying often these sentiments have been used to actually stimulate them in the design process, using the edgy emotional state to feed positively into their creativity. Unfortunately, not all students are able to channel stress in that same direction, for others the opposite may be the result.

The two different interpretations of how stress is handled are very much linked to the two ends of the student's spectrum: the successful students feed on stress to improve, while the less successful students are only hindered by stress.

Clearly, it is important to recognise these differences and appropriately adjust the review setup to benefit the largest number of students.

Conclusions - Improvements to the format and my practice

When recently I found myself in the role of the instructor aggressor, I thought it was important to investigate the subject in depth, looking at relevant pedagogy studies to understand the underlying mechanisms that could improve my teaching/feedback methods and the learning experience of my students.

Review/Implement the following:

- Provide students with information for understanding the significance of the Crit as a learning tool. This is done at the very beginning of the year. Set out rules and illustrate both the positive and possible negative outcomes. Equip students with the means to

actively participate and to be able to enter the Crit with confidence to maximise their learning potential.

- Engage students with the concept of emotional detachment from the work presented. Explain the implications of adopting defensiveness.
- Communication and use of language – control and heighten awareness by delivering verbal feedback (all reviewers).
- Invited guests panellists need to be appropriately briefed (both on the project and the students they will review)
- Promote social responsibility and shared goals – encourage student to student feedback.
- Organise a balanced presentation order based on a mix of achievements and levels, to benefit students and reviewers, provide a fairer setting, keep a high level of interest, and helpful feedback from start to end.

As identified in the section on anxieties/emotions, students' designs are personal and emotionally charged products. Students work long hours and express their most inner thoughts within the design produced, the outcome becoming almost one with the student persona. This state is often problematic during the Crit as students do not accept with objectivity any form of comments that are not in support of their work. This defensive mechanism does not help the learning process, in fact, it stops the student from using the comments to improve their work. At the same time, it is not entirely to be viewed as a negative trait, architectural design requires a degree of personality evident in the outcome of a project. But students should be formally made aware of the potential negative impact this may have during a crit.

At times during my architectural education, I was the culprit of this same type of attitude. I wish I would have been made aware of the negative aspects and how and when to use an emotional attachment. Certainly, great during the design process but to be controlled during reviews. I would definitely add a workshop at the start of the year (I teach first-year students) to illustrate all the positive and negative aspects of a design review – the Crit. I can see how students at the beginning of their architectural education could benefit from receiving a formal introduction to this process.

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IMAGE: https://www.firstinarchitecture.co.uk/how-to-prepare-for-your-architecture-crit/ [Accessed 7 April 2022].

Teaching the poo taboo: lessons to be learned from other disciplines to tackle stigma in nursing education

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Abstract

Bowel function is not polite conversation. Everyone poos – why does no one talk about it? This taboo contributes to stigma in society, which directly affects lived experience for individuals with bowel conditions – in life and in healthcare settings. By nature of the taboo, there is a dearth of literature around this stigma, and even less around teaching this topic. After reflecting on teaching experiences and surveying student nurse's knowledge and attitudes around bowel function, wide literature was explored to explore effective teaching of controversial and uncomfortable subjects. Knowledge and empathy are essential to breakdown taboos and therefore work towards reducing stigma. Different methods of how to develop these in a safe, yet intellectual manner were explored, drawing on personal reflections in order to inform future teaching practice. Exploring taboo in a supported educational setting, with reflection and active learning generally prepares individuals to advocate in the wider world.

Introduction

In over a decade working as a nurse with patients with bowel disease, I have observed varying degrees of taboo. Whether it is the look of surprise, uncomfortable laugh and then swift change of subject when asked which area of nursing I specialise in, or an excessive use of euphemism and avoidance of topics from healthcare professionals. It is generally accepted within society that it is not polite to talk about faeces, flatus (passing wind) or toileting habits. Neither is it polite to pass flatus in public, or burp, and certainly not to defaecate. The functions of the gastrointestinal tract are shrouded in privacy, embarrassment, and often only mentioned publicly in a low-brow humorous context. In a medical setting, however, they are essential to address - but this taboo creates a barrier. A career change into nursing education prompted an interest in how this taboo topic could be taught if people are uncomfortable talking about it, and whether better education could impact on the cultural taboo. The aim of the research is to analyse which strategies and pedagogy were successful in teaching taboo topics and altering stigmatising attitudes. Guided by personal reflection, parallels were drawn to the topic of bowels from wider literature to inform future teaching practice.

Background

Where taboo exists, stigma and shame inevitably follow. It is widely acknowledged within the gastrointestinal healthcare community that stigma exists for individuals with bowel conditions (Black & Notter 2021). Chelvanalagam (2014) explored the issue of taboo and

stigma for individuals with altered bowel habit and found a paucity of literature on the topic. Stigmatisation and shame regularly appear in literature exploring the lived experience of individuals with bowel conditions (Guo et al 2020; Black & Notter 2021), yet little exists in which this is the primary focus. Individuals often cite difficulties with body image and sexuality, withdrawal from social activities and subsequent reduced quality of life which can have a profound impact on mental and physical health (Taft et al 2009; Vonk-Klaassen et al 2016).

Social withdrawal and issues around body and sexuality are particularly linked with social taboos and shame. Discomfort talking about the subject, inappropriate or euphemistic language, misconceptions and lack of knowledge can be found in healthcare professionals as well as lay folk (Norton 2004; Guo et al 2020), which exacerbates stigma and taboo. We know from LGBTQ narratives and sex education that taboos, avoidance and misconceptions can lead to negative and harmful experiences for individuals (Maguth & Taylor 2013; Dave et al 2017), therefore it is useful to draw on explorations of stigma within these topics. The functions of sex and reproductive organs are treated with the same communication taboo as the functions of the digestive tract (Chrisler 2013), and there is often overlap.

As well as impacting the lived experience of individuals with bowel symptoms, the inability to talk about bowel function could potentially lead to delayed diagnosis of serious conditions. Bowel cancer is the third most common cancer, and the second most common cause of cancer death in the UK (Public Health England [PHE] 2016) with incidence increasing globally (World Health Organisation 2022). Prognosis is significantly better for early diagnosis. Palmer et al (2014) found that taboo, shame, and the prospect of handling faeces were significant barriers to uptake of screening in the UK; PHE (2016) also cite cultural taboos around handling faeces, gender, ethnicity, socio-economic status as well as misconceptions about bowel habit to be significant barriers screening. Individuals may not recognise symptoms or possess accurate vocabulary to explain them.

Poo taboo transcends culture (Mungai et al 2021; Petersén & Carlsson 2021) and inequalities exist within access to bowel screening (Mosquera et al 2020) as well as healthcare in general. Inequality is in itself a contentious topic, difficult to talk about and teach. The demographics of nursing students are diverse predominantly female with higher numbers of mature and non-white students than other courses (Health Education England 2018). Therefore, there is a need for this topic to be delivered in a culturally competent manner. Student nurses need to be able to talk respectfully, accurately, and compassionately about bowels, and have a social responsibility to promote health (Nursing and Midwifery Council 2018a), including actively working to reduce health inequality. For healthcare professionals to get it right seems like a good start to tackle this global taboo. One could also argue that education should prepare individuals for the 'wider world', to think critically and challenge the status quo - part of this is to face uncomfortable or

controversial topics - therefore there is transferability in the lessons learned from this paper.

Overview of literature search

On a personal mission to tackle this taboo, I sought to explore how best to teach it. I wanted to know what is happening at an education level that affects nurse's attitudes and confidence around this topic, and was disappointed, though not entirely unsurprised, to find a paucity of literature specifically relating to taboo or teaching. It was therefore necessary to look outside of bowels, and nursing, to see if lessons could be learned from the teaching of other controversial topics, and to evaluate the pedagogy utilised.

An initial search of education databases and within specific nurse education journals was conducted, combining teach* with several terms relating to bowels, stomas and faeces. This revealed a handful of studies about teaching clinical skills. A search on teaching bowel related taboo to nursing students revealed nothing. Widening this to include a truncation of multiple controversial topics, and including attitudes OR teaching revealed some studies deemed relevant to this paper – around HIV/ AIDs and drug use. The topic of HIV/AIDS is particularly relevant to consider in this context as both topics are stigmatised and involve a discussion of body fluids and private functions. The search was widened further to beyond nursing, to include papers on sex education, sexuality, and gender. Snowballing techniques were utilised to obtain more papers, in order to overcome the lack of explicit literature. The search was influenced by my own reflections and feedback from students from recent workshops and feedback from students around stoma care and bowel function.

Key findings/Themes

Learning by doing

Several papers explored the use of simulation to teach the clinical skill of stoma care. Simulation involves use of technology and mannikins in order to 'simulate' real life situations without risk to safety. Scenarios range from 'high fidelity' - incredibly realistic and highly technical mannikins, with a carefully constructed, dynamic and realistic scenario; to 'low fidelity' with static scenarios and less technical mannikins (Hardman 2007). The underlying pedagogy is that of learning by doing, drawing on Kolb's experiential learning theory (1984). Findik et al (2019) found that low fidelity simulation was useful for student nurses to learn the psychomotor skills involved in providing stoma care – the students expressed increased self-efficacy around the clinical skills but found that using a mannikin meant that the emotional component of the task was not realistic.

Merely learning the procedure does not address the communication, patient education or caring elements to the task of stoma care. Vural et al (2021) utilised a different approach to simulation. They discussed the experience of student nurses who wore stoma bags as an exercise in empathy. They found that the challenges the students faced, including issues

around taboo, stigma, and social withdrawal, reflected those found in lived experience studies of individuals with bowel stomas. Interestingly, they found that there was no significant difference in the lived experience between those with more prior knowledge about stomas. They specifically refer to taboo around sexuality, positing that this taboo in Turkish culture is responsible for the participant's lack of knowledge about sexuality with a stoma. Sexuality and body image are intrinsically linked to quality of life for individuals with bowel symptoms, and the taboos around this and faeces often overlap. Based on my own experience, discussions around sexual activity and body image with bowel stomas or symptoms (for example incontinence, anal disease) are uncomfortable for many students to talk about. Many of my students, when surveyed, were comfortable providing clinical care or factual information, but not comfortable exploring sexuality with their patients.

Kerr (2015) and Hood et al (2018) also studied immersive simulation and experiences of wearing a stoma bag. Neither study specifically mentions taboo, shame or stigma but the themes that emerge are consistent with these concepts. All three stoma wearing studies state that this experience was effective in enhancing empathy amongst the students, as well as increasing practical skills around the stoma care. Kerr (2015) addresses sexuality, though the paper is lacking depth of exploration. Deconstructing stigma and taboo is complicated, but generally accepted to stem from the concept and experience of 'otherness' and individuals being diverse from the norm (Link & Phelan 2001). Empathy is essential for nurses in general, but also integral to reducing stigma as it provides a bridge across this 'otherness' therefore it needs to be fostered when teaching taboo topics.

A central tenet to the pedagogy of simulation is the inclusion of structured and supported debrief (Cheng et al 2016; Decker et al 2013). Debrief allows several things to occur for the learner: process the experience and develop a shared understanding of the event, explore reactions to the situation to ensure any negative emotions are resolved, identify knowledge or skills gaps through self-assessment and guided feedback, and analyse events to ascribe deeper meaning and understanding (Cheng et al 2016). This builds on the 'learning by doing' aspect to consolidate learning, make connections and build affective skills such as empathy. For both the clinical skill and the stoma bag wearing simulations, debrief ensured that the students were not left with any negative emotions about the experience (for example low confidence if they struggled with skill, upset from social implications wearing the stoma bag). Debrief ensures links are made between theory and practice, as well as embracing and exploring emotions involved.

The role of safe spaces and open discussion

Integral to several studies exploring taboo and controversial topics was the inclusion of a 'safe space' as a foundation for open discussions (Maguth & Taylor 2013; Ulner et al 2016; Kolenz & Branfman 2019). It is recognised that some subjects could trigger strong emotions or flashbacks to negative (even traumatic) experiences. In healthcare education there is a high mental health morbidity (Nolan & Roberts 2021), possibly due to the nature of intense

clinical experiences as well as many potentially upsetting subjects (i.e., death, illness, inequality). An additional barrier to open discussion is the fear of ridicule, judgment or embarrassment (Holley & Steiner 2005). I have observed this first-hand, particularly when discussing bowel habit and sexuality – other students can be quick to judge the opinions and knowledge of their peers. As a lecturer, if a prejudiced opinion is voiced, it can be difficult to react professionally, but it may be necessary to respectfully challenge certain statements (Zaidi et al 2021). Students may also avoid honest participation for fear of it opposing the lecturer (Holley & Steiner 2005). Challenging one's own beliefs, attitudes, bias, and preconceptions can be threatening to individuals' psychological safety and self-concept (Holley & Steiner 2005; Ulner et al 2016) however this is often integral to open discussion, particularly when exploring taboo and stigma. A safe space enables students to participate in a respectful, non-judgmental, reflective and emotionally supported way.

Critics of safe space pedagogy argue that it can be infantilising or pandering to a less resilient generation (Ulner et al 2016; Nolan & Roberts 2021) which leaves students unprepared for the real world. This is particularly relevant to health and social care education, as the education provider cannot control exposure students will have on clinical placements. Trigger warnings are used increasingly by educators as precursors for sessions on controversial or upsetting subjects, however some argue that they can be seen as self-fulfilling prophecies and create sensitivities, or that they give students opportunity to opt out from the session to avoid discomfort (Nolan & Roberts 2021). Discomfort can be seen as essential to learning and challenging the status quo – some subjects should provoke discomfort or disgust (such as injustice) therefore students need to learn how to respond to distressing topics (Zaidi et al 2021). Holley and Steiner (2005) however, argue that 'safe' does not equal comfortable – students ought to be encouraged to be uncomfortable, to grow and learn, and confront their own beliefs, attitudes, and bias. However, the 'safety' of not being judged, ridiculed, or penalised for a contrary opinion is paramount. Equally, a trigger warning which is not then followed up with appropriate support has no value; signposting and facilitating support may be necessary.

Ulner et al (2016) and Maguth & Taylor (2013) discuss sessions exploring sexuality and transgender issues, which have been highly contentious in recent years. Their approaches to the content are very different – the former engages with a video of Caitlyn Jenner to explore the concept of otherness, whilst students in the latter analysed a legal bill on LGBTQ rights. Both studies establish a safe space as integral to facilitating open discussions with respectful interactions and a caring environment, and both utilise reflection throughout. Both studies found open discussion essential to debunk myths, explore attitudes, develop empathy and engage with diverse opinions and values. Students had strong opinions on this topic, and a fear of offending others. This is relatable to bowel functions as strong opinions exist about personal and social behaviours, acceptable habits and there is a close link with body image and sexuality which also engender strong opinions. Reflecting on teaching practice, I have encountered situations where participants have themselves had undisclosed bowel

conditions which are revealed in the session or have discussed anal sex in relation to bowel conditions which elicited reactions from peers. There is always the potential, therefore, for individuals to become offended during a discussion.

Kolenz and Branfman (2019) explored the impact of laughter to teach the taboo topic of sex education. They argue that laughter serves to break tension, build communities, create a safe and respectful learning environment which facilitates open discussion and enhances learning. They draw on libertarian feminist pedagogy and seek to use laughter to subvert social conventions. Their approach is interesting in the context of poo taboo, as it directly challenges social norms and uses humour to acknowledge discomfort around, for example, depictions of the vulva in popular culture. This could be directly transferable to faeces, bowel function and anatomy as similar taboos exist. People are often used to laughing at toilet humour in the same way that the vulva and menstruation are used for comedic purposes (Chrisler 2013; Norton 2004): Kolenz and Branfman seek to turn that humour on its head and use it as a teaching tool.

Sorcer et al (2017) take an entirely opposite approach in their study in India. They designed a tailored, culturally sensitive computer programme to teach about HIV and AIDS. Much research went into how they could circumvent taboos entirely to avoid heavy censorship from education authorities. A key aspect was that the students studied privately, independently, and anonymously, and the programme was designed to be inoffensive. Culturally appropriate euphemisms and animations were used to avoid any explicit content, including limiting the amount of breast shown to be visible for a breastfeeding mother. Whilst the authors acknowledge that this type of education will not tackle taboo in society, there is an immediate health protection need to improve knowledge around transferability of HIV. Some misconceptions and stigma could be improved for the individual students through improved knowledge. It could be argued that this is still creating a 'safe space' – by removing the social aspect of learning, in the context of a culture with very deeply ingrained taboos, the students are safe to learn content which would otherwise be forbidden. Whilst this approach was effective within the context, I seek to address taboo and stigma more actively. It is important to consider however, as many nursing students and UK patients are from this cultural background.

Engaging in narratives

Akansel et al (2012) explored the effects of HIV/AIDS education on attitudes of student nurses in Turkey. They found many students avoided care, feared contracting HIV and held prejudice against individuals with HIV and AIDS [IWHA]. After an education session, they found improvements in clinical knowledge but no statistically significant improvement in attitudes – students still avoided care and demonstrated negative, stigmatising attitudes towards IWHA. The education session was a 2-hour presentation. Pickles et al (2017) explored attitudes towards student nurses around IWHA amongst a multi-cultural Australian population, with many students from Asian countries. Many of the students held

stigmatising beliefs, particularly around sexuality, intravenous drug use and fear of transmission. 'Othering' was a recurrent theme, and students with personal or professional experience with IWHA demonstrated less prejudiced beliefs. The authors argue that informational content alone is insufficient to challenge deeply held perceptions stemmed from cultural taboos, which may explain the outcome of Akansel et al's study. Dave et al (2017) also found no improvement in attitudes towards communicating about sexuality in their intense sex education programme. Whilst this programme involved social learning targeting care givers and youths, it was conducted within the Bible belt of America – a community with deeply ingrained taboos about sexuality. This intervention, whilst intensive, focused on healthy sex and improving sex education, rather than wider issues such as taboo and HIV/ AIDS.

Frain (2017) however, sought to actively tackle stigmatising attitudes amongst student nurses in the Midwest of America. Similar attitudes were found as in the Turkish and Australian studies, namely judgments around promiscuity, sexuality and drug use (Akansel et al 2012; Pickles et al 2017). The educational intervention in this study, however, utilised testimonials from expert speakers in person. The speakers were professional experts in the field and IWHA. As well as increased knowledge of the subject, the students also showed reduction in negative attitudes and stigmatising beliefs. Another aspect of the intervention was to watch and reflect upon a documentary on the early pandemic, an approach similar to that of Ulner et al's (2016) exploration of transgender issues discussed earlier. Dion (2019) utilised testimonials from professional and personal experts when teaching student nurses to decrease stigma against individuals who use intravenous drugs and yielded similar results. Storytelling is an established technique within health and social care education (Christiansen 2011; Haigh & Hardy 2011), drawing on transformative learning theory. Involving service users in the story telling process, as well as in simulation sessions is a developing practice (Scammell et al 2015). Students in both Frain (2017) and Dion (2019) were able to relate to the individuals on a human level and were forced to confront their bias. This links with the empathy developed through simulation, and the exploration of beliefs found with open discussions.

Caz and Sarmasoglu-Kilikcier (2021) involved a service user, also described as expert by experience [EBE], in their simulation session on stoma care. The expert patient was questioned by the students about their lived experience, gave a short talk and demonstrated the activity of changing their stoma bag. Before the session students expressed excitement, but also some negative attitudes – they expected the stoma to be dirty and smelly, and assumed the individual had a poor quality of life with many challenges due to living with a stoma. After the session the students expressed more positive attitudes towards stoma care, reduced prejudices, increased confidence, improved communication skills and altered attitudes towards living with a stoma. A limitation of the study is that it does not explore the perspective of the service user. A barrier to involving EBEs could be the risk to their own psychological safety – the students could potentially express disgust, as is

often found in reactions to faeces (Norton 2004), trigger negative experiences or ask disrespectful questions. Jack (2020) found positive feedback from students involved in an EBE programme in mental health nursing education. Students found a reduction in the theory/ practice gap as they could connect the experience with evidence base. The NMC (2018b) explicitly promote the use of EBE in all nursing education programmes. The impact of involvement in nursing education by EBE needs more research, but the foundation of a safe space should alleviate any concerns for the wellbeing of the individual.

Recommendations

From the literature explored, and reflections on my own teaching experience, it is clear that a multi modal approach would be the most effective method to teach the poo taboo. The use of simulation showed positive results in improving the confidence and efficacy of student nurses to learn stoma care. There are other procedural skills involved in bowel care which could utilise this approach, such as hygiene care, rectal medication administration and complex wound care involving the anus. Those students who experienced wearing a stoma bag and going about their everyday lives with one in situ showed great insight into the lived experience of individuals with stomas. Whilst these experiences are promising in increasing empathy for individuals with stomas, they did not address the huge myriad of bowel conditions and symptoms people can experience. Whilst many students found it easier to cope with stoma bags than they thought, many altered their habits or shied away from normal activity. This attitude is reflected in students I surveyed – many assumed having a stoma bag would be a negative, life altering experience whereas for many individuals it can mean a new freedom or lease of life. It is therefore necessary to embrace the complexities of this topic through more than just simulation activities.

Open discussions were very successful in frankly exploring controversial issues around sexuality and gender. Learners need to have an open, safe forum to explore hitherto ‘forbidden’ subjects around bowels, to breakdown misconceptions and learn the correct information and language about bowel functions and conditions. Understanding of the lived experience of individuals, and the impact of body image, sexuality and mental health on physical health are essential. Expert patient involvement has been shown to be a positive learning experience for student nurses. Central to all of the successful teaching strategies was the idea of debrief and reflection. Reflective practice is well established in health and social care education but can often be rushed or incomplete. A structured programme combining clinical simulation, wearing a stoma bag (or other activity to simulate bowel symptoms) followed by open discussion with expert patients – with reflection at every stage – could provide a comprehensive and transformative learning experience. Moving forward from this paper, such a programme will be designed and studied. The experience of the facilitator, students and EBE need to be considered, and the efficacy of such methods in tackling taboo evaluated.

Conclusion

Teaching a topic which is not acceptable to talk about in polite society presents many challenges. Using literature from teaching about other controversial topics – HIV, sex education, drug use and mental health – has provided useful insight into how other educators approach this. Pedagogy within nursing education is developing, such as simulation and EBE narratives. Integral to many studies was the foundation of a safe, respectful teaching space, and reflective practice. As much as this work is drawn from wider subjects, the lessons learned can be transferred outside of nursing as the principles uncovered are firm foundations for teaching many difficult, controversial, or socially challenging topics.

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Psychometric analyses of the Canvas Quizzes and STEM Staff's Anxiety

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Abstract

Quizzes are the most frequent tools used by academic tutors in the module assessments of the programme of studies. This article focuses on the use of statistical parameters of the Canvas quizzes that possess very intriguing features for academics and learning teaching technologists. Some useful psychometric analyses of the quiz items are scrutinised based on auto-generated statistical parameters. For example, standard deviation; distractors; difficulty, and discriminatory indices, respectively, are effectively used to ensure the quality of questions and overall quizzes for graded assessments. The main thrust of this article is to value the staff's good practices and dedication in developing quizzes fit-for-the purpose despite their increasing workload and encourage young learning technologists and quiz-enthusiasts to invest more efforts in making use of the statistical parameters in evaluating the quality of the quizzes, items in the quizzes, the sustained learning of the students, and fulfilling academic quality assurances' requirements to cover overall learning objectives of courses and programme of studies.

Introduction

Psychometrics is a field of study within psychology and education concerned with the theory and technique of testing, measurement, assessment, and feedback-related activities. This has been even more researched during the ongoing COVID pandemic due to the unprecedented shift of education onto the online domain (DeCoito & Estaiteyeh, 2022; Sim et al., 2021; Telles-Langdon, 2020; Tuah & Naing, 2021). The quizzes are the prominent method of students' assessments when using "virtual" learning management systems (LMSs), which have become dominant online platforms for the delivery of modules [1] and programmes of studies for diverse disciplines ranging from science, technology, engineering, and mathematics (STEM) to non-STEM (or applied-STEM) disciplines. There is healthy literature available for enthusiastic academics and pedagogic critics to compare various features of worldwide dominated learning platforms, e.g., Canvas, Blackboard, Brightspace, and Moodle (IBL_News, 2019; Kiran, 2020; Öztürk & Gürler, 2020; Paynter & Barnes, 2021; Swerzenski, 2021). Looking at the current market trends in recent years, Canvas appears as a new implementation sweeping UK, Ireland, and North American education market sectors (Justin, 2021, 2022). Regardless of their different brands, all these platforms have useful tools and third-party apps for effective delivery of courses for various programmes of

[1] Some universities refer to these as 'courses', both terms are used interchangeably.

studies. Nevertheless, both students and staff have no choice to pick or choose these platforms but to learn about the various features of learning management systems' resources provided by their institutions, whose top hierarchical management decides the choice of platform considering strategic and sustainable solutions. All this increases staff's workload if the learning platform keeps evolving and in a worst-case scenario if there is a switch-over or shift in learning and teaching resources.

The quiz statistics is one of the most interesting, yet not much shared as, good-academic practice. Some staff do publish quiz-related pedagogic research outcomes seeking academic inspiration, however; a majority of academic staff remains detached from potential widening participation, but Schools value staff's professional contributions towards the TEF, REF and KEF frameworks, and departmental portfolios (Johnson, 2022; van Miegroet et al., 2019). Historically, online quizzes became powerful tools for learning, teaching, and assessments (LT&A) with the advent of computer-assisted assessment "CAA" (Bull & McKenna, 2003) and massive open online courses (MOOCs), (Bali, 2014; Shah, 2019; Yıldırım, 2020). A holistic approach is needed in strategic planning to keep the fresh blood pumping in particular the training and development of EdTech professionals and academics supporting the LT&A delivery platform of the institution.

In this article, some intriguing statistical features of Canvas quizzes are shared to help the technology enthusiastic young community of learning technologists, academic staff of STEM, and applied-STEM disciplines to make use of auto-generated statistical data of the quizzes. By adopting these, the staff can help themselves without feeling over-burdened and extend much-needed support to the academic quality assurance (AQA) office, the students, and the academic community, respectively. There are various missing features in current Canvas quizzes that can be implemented if the learning technologists, STEM, and applied-STEM community give their due input, anticipating the future challenges to LT&A and feedback systems. This is a much-needed strategy to achieve greater pedagogic sustainability meeting the requirements of the future education, moving from digital to deep learning and AI-based tools, and industrial learning experience platform (LXP) producing big-data analytics. The interested Edtech members can find more relevant information in the useful list of references (A Kaklij et al., 2020; Atif et al., 2021; Diaz & Young, 2021; Selwyn, 2019).

Quizzes, and Challenges of Modern Learning Management Systems

Historically, the University of Hertfordshire (UH) had its' legacy digital online managed learning environment (MLE) system known as StudyNet for about two decades, which also supported various quizzes features including QuestionMark perception, and tutors practised various online and in-class quizzes for individuals and groups (Jamro, 2017) and electronic voting systems (EVS) 'Clickers' for quizzes and seeking quick feedback via Microsoft® PowerPoint slides based on TurningPoint Technologies® (Jefferies et al., 2013). The former

School of Engineering & Technology[2] immensely used this electronic system issuing the EVS devices to individuals for their entire degree programmes. Staff benefited as individuals in their academic personal development, and programme teams by the virtue of the clicker's statistical software, which produced spreadsheets containing valuable post-assessment data for individuals' and cohort performance analysis.

In 2019, TurningTechnolgies® was acquired by echo360, and recently they have added a smartphone assessment app, replacing the bulky clicker devices, supporting the real-time, in-class, and/or anywhere for both Android® and IOS® operating systems. These apps can be synchronised with Canvas via Learning Tools Interoperability (LTI), which is a new initiative to standardise the integration of third-party or open-source tools with different LMS (IMS-Global, 2019). Currently, there are more than 450 apps, out of which 29 are quizzes related and can be linked to Canvas, but each requires institutional purchase (e.g., LockDown Browser, BigBlueButton, Ouriginal, WebPA, QuestionMark Perception, etc are commonly used by most academics). The interested learning technology developers, instructors, and academic enthusiasts can find more details of various Canvas apps in the web-link [3]. Additionally, Canvas is planning to launch "New Quizzes" in June 2024 with advanced features (Canvas_Community, 2021).

All aforementioned technology enhancements demonstrate that popular software and favourite tools keep evolving and staff adopt them as a regular part of their job. It is noteworthy to mention that recently, with the help of their professional learning technologists, trained staff known as 'StudyNet Champions' and 'Students Technology Mentors', the University of Hertfordshire has completed migration to Canvas making it fit-for-the-purpose, smart, and mobile-friendly (Bamwo et al., 2020; Hudson & Barefoot, 2018). Student technology mentorship is the highest trust in students' partnership, where a student becomes the professor's mentor. Academic staff always invest their efforts and dedicated time to develop assessments appropriate to the degree qualification levels. In this venture, the migration onto another or new learning platform does put off some staff, who must redevelop the assessments adapting to the new platform.

In contrast with other types of assessments, quizzes are the most time-consuming and involve the highest efforts, making these "inclusive assessments" with auto-generated marks including comments as feedback for each correct and wrong answer. Imagine the staff's frustration in resurrecting tens of thousands of questions for different modules, when migrating from old StudyNet quizzes to Canvas Quizzes, being not compatible. In higher education, staff's workload is becoming a veridical paradox issue, where staff are expected to carry out additional responsibilities other than delivering regular academic activities (i.e.,

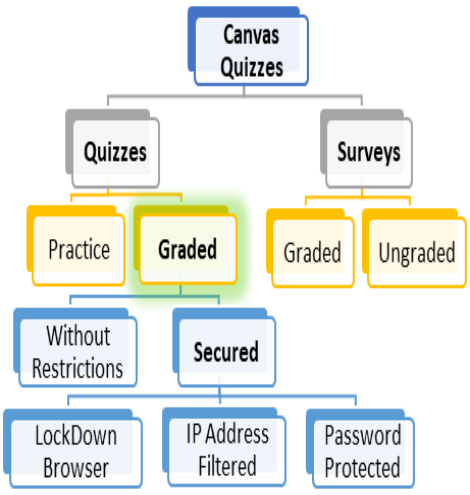
[2] Now known as the School of Physics, Engineering, and Computer Sciences (SPECS)
[3] eduappcenter.com (Edu App Center is provided and maintained by Instructure).

admin, research, and personal development) meeting institutional challenges of various excellence frameworks (Johnson, 2022).

Regardless of the challenges involved in the adaptation of the new LMS platform, pedagogically, the quizzes are most effective only if they are created following cognitive science, which is an interdisciplinary scientific investigation of the mind and intelligence. The quizzes challenge the process of retrieval (i.e., bringing the information to mind), which supports problem-based learning (e.g., learn by doing it), and overall, enhances the learner's ability to apply the information in changing learning environments (e.g., based on physical locations, contexts, and diverse cultures, etc). Thus, the study of quizzes and corresponding generated data can be valuable to identify the issues with individuals and the entire cohort, and a tutor can develop necessary support material, and make necessary changes in future assessments.

Types of Canvas Quizzes, Questions, and their effectiveness

In Canvas, there are two categories of Quizzes, namely: quizzes and surveys, which are further divided into four types as identified in Figure 1(a), and the types of questions and their effective applications are described in Figure 1(b).



(a)

Multiple Choice
True/False
Fill In the Blank
Fill In Multiple Blanks
Multiple Answers
Multiple Dropdowns
Matching
Numerical Answer
Formula Question
Essay Question
File Upload Question
Text (no question)

Type	Effectiveness
T/F	Basic knowledge of a topic, quick proficiency testing.
MCQs, multiple	General recognition of the subject.
Fill in the blanks, multiple, Matching	Checking depth of specific process or rules. Testing chronological, hierarchical, layered fundamentals.
Numerical answer	Testing numeracy skills, accuracy
Formula question	Assessing everyone individually via same question on various STEM's fundamentals, mathematical concepts.
Essay question	Assessing critical thinking, discussion & negotiation skills.
File upload	Similar assessments to Essay type question, but more details of typical method or process that cannot be asked via other Canvas questions.

(b)

Figure 1. (a) Types of Canvas Quizzes, (b) Type of Questions and their effectiveness.

The two types of survey are given as 'Graded' and 'Ungraded' respectively, which can be used for seeking students' experience and satisfaction with specific components (i.e., peer review, delivery of the module, or a course or the entire programme of study). For greater transparency, both types of survey quizzes can be set for anonymous submission using the

Likert scale. These surveys have an additional 'Free Text/Essay' option, which is usually offered to students to suggest any improvement or blog their likes/dislikes other than the points mentioned in the questionnaire. The other category of quizzes is used for formative and summative assessments of learning. The summative quizzes require more scrutiny as these must be offered to students to achieve the desired learning outcomes of a module being linked with the overall programme of studies. After creating a summative assessment (i.e., graded quiz), Canvas automatically sets a column in the Gradebook. If all the questions are set for automatic markings, then the results can be immediately available in the Gradebook. The individual results can be marked and viewed on the 'SpeedGrader' page. Some questions may need manual assessment and marking (i.e., file upload and Essay type questions, respectively).

In graded quizzes, there are protection features to keep students staying on a single browser (e.g., via using Canvas App 'LockDown Browser'), start with a schedule, avoid impersonation or cheating, etc. The tutor can set up an 'access code' that students need to enter before taking the quiz. This means the students will not be able to see or start the quiz until the tutor shares the access code. Furthermore, a tutor can also set a range of IP addresses that are allowed to access the quiz (i.e., within a Lab or on-campus, etc) and students can only take the quiz using computers with an allocated range of IP addresses. For the allocation of IP addresses, the tutor needs some technical assistance from central computing services. The IP address restriction type quizzes are not smartphone friendly as it requires the use of dedicated PCs in the lab.

There are eleven different types of questions as depicted in Figure 1(b), which can be set for both STEM and Applied-STEM disciplines. These can be set to challenge various cognitive levels evaluating the gained skills. In Applied-STEM type quizzes, most objective type questions may deal with the answers, which are based on certain facts and candidates can easily answer by reiterating (i.e., True/False, MCQ, Matching), which are considered to assess the lower order thinking skills (LOTS), based on Blooms' taxonomy, thus do not promote higher order thinking skills (HOTS) (Narayanan & Adithan, 2015; Zaharin et al., 2018; Zaidi et al., 2018). To induce HOTS features, such questions must be asked to conclude by applying the prior knowledge based on logic or computations. Additionally, some questions should be set for assessing students' 'interpretive' or performance measuring skills rather than just for the acquired knowledge.

However, due to time constraints, quiz environmental limitations, and element of chance involved in quizzes, it may not be possible to assess comprehensively a learner using a few types of questions meeting targeted learning outcomes. In this case, the 'Essay' and 'File upload' type questions can be used to effectively test the depth of knowledge, clear understanding of a subject, and critical thinking skills (i.e., market analysis, research on-going industrial and unresolved ethical, environmental and technical business issues, e.g., space junk and Starlink satellites, insurance business of driverless vehicles, humanoid robot

teachers, IoT security and enhancing the quality of services (Jamro, 2021). It is not intended here to cover the implementation of quizzes and questions, however; there are useful video tutorials for academics, tutors, admin, students, and observers in online Canvas resources (Canvas, 2022). In this reference, one can find most of the needed tools and tips from beginner to developer level, developing quiz resources, exploring new quiz features, and more importantly following up on the product roadmap, transitional, and interoperability standards.

Quizzes' Learning Outcomes and Moderation process

The quizzes must be designed with the tutor's planned learning objectives, meeting the desired learning outcomes (LOs) of the module (i.e., MLOs). The LOs are the specific, measurable knowledge, skills, and abilities that the learners are expected to gain by taking the required courses, which are exclusively written for each taught module in the corresponding definite module document (DMD). Several modules LO's are integrated with the LO's of the programme of study (i.e., PLOs), described in the programme specifications. These documents are accredited by PSRBs, centrally reviewed periodically by the university, and updated locally by the Schools. The tutors must make their assessments compliant with these LOs. Therefore, missing out on one small fraction of learning in MLOs can cause a dent in PLO and could create a large vacuum in the learning consequently, devaluing the degree qualification.

In this view, the use of various types of questions and their appropriate use in designing a specific quiz meeting the desired LOs is an artistic creative work of justifying the assessment criteria and meeting the requirements of each LO. The virtual or online quizzes can be different from in-class exams in the operational procedure where besides the invigilators, the academic staff is on standby besides their phones to take students' queries and or verify if there are any mistakes, or errors, or omissions in the quiz paper. In the worst cases of online quizzes, the vulnerable students will get more frustration when they need some clarity about questions, which can be technical, comprehension issues, or could be syntax errors. To avoid such annoyance, a tutor should develop some communication channels via Microsoft Outlook® and Canvas email, Canvas Discussion, personal messages, office phone calls, etc, however; the outlook and Canvas email system require synchronisation and manual enabling of notifications, otherwise, staff may not receive students' queries. This is why the moderation process has an important place in quizzes.

In general, the moderation of assessment is a process that involves instructors, tutors, programme leaders, external examiners, students' mentors, and others involved in a course to discuss student work, award marks on work, give feedback ensuring that marks and feedback are interpreted similarly by all in the moderation group. As a good practice, the moderation must be completed pre- and post-marking, meeting the desired objectives of academic quality assurance. The pre-assessment moderation must analyse the quiz structure, qualification level-appropriate questions' settings, variety of questions,

individualised, customised, and a randomised group of questions, time allowance covering reading and preparation time (RAPT), and more importantly a backup plan if there happens to be an Internet outage or service problems during on-going quiz test. The moderator must also check the availability of all students without any clash in their assignment landscape. The post-marking students' quiz samples must reflect 'inclusive' assessment features to ensure consistency, and equal opportunities for all students (i.e., special needs agreement 'SNA', repeat students, borderline cases, etc.) to demonstrate learners' knowledge, skills, and abilities on the same challenging content (Sadler, 2016; Wilson & Scalise, 2006).

Structure of the Quiz Questions

Pedagogically, the objective-type questions can cover more subject matter than descriptive or essay-type questions. It is important to brief students about various types of quiz questions, their formats, and more importantly tutor's expectations. The questions must be simple, clear and must be consistent with marking, effort, and time constraints. The active students may appreciate the creativity features but the tutor must ensure that the topic is within the context (i.e., not out of course). The quizzes must be designed with the tutor's planned learning objectives, meeting the desired learning outcomes of the module (MLOs). To ensure the quality of a question, the tutor must maintain the main characteristics of an objective-type quiz question, which must contain the necessary elements, including, standard; stimulus; stem; key, and suitable distractors. These elements ensure the quality of the assessment meets the typical learning objectives of a test (Burton et al., 1990; Haladyna et al., 2002; Krish, 2017).

The "standard" establishes the purpose and topic of the assessment item where candidates should be able to read the question and immediately get an illusion of expectation and required action. The standard setting determines a suitable opening or beginning of the problem statement, followed by the problem. The "stimulus" must provide the necessary background information to understand the problem. For STEM disciplines, it can be an expression, equation, or problem whereas for an applied-STEM it can be the background material setting up the challenge. The "stem" identifies the actual problem to solve and must direct correctly to conclude the first two elements (i.e., standards and stimulant). If the stem is irrelevant to the context of the standard, then the assessment will not be suitable for the qualification level. The "key" is the genuine answer that should be unambiguous to skilled learners. Finally, the "distractors" are the other options for the assessment item (i.e., incorrect answers). It is quite a challenge to develop suitable distractors, for example, for students with sufficient KSAs, a distractor should be visible to them, nonetheless; distractors should be challenging enough that they could be seen as the correct answers (i.e., if the learner missed a step or applied a common misconception or tried to guess).

Canvas Quiz Analytics

At any time, the front page in the Canvas module can display a list of things, on the right-hand side, which includes 'New Analytics' as shown in Figure 2. This will show further details of all the Assignments and Quizzes being completed. These analytics contain almost everything a tutor might need for checking the assessment features, students' grades, data plots for writing a module's coursework report for PSRB, module boards, and email contact options to individuals or selected groups for communication and feedback as identified in the upper inset of Figure 2.

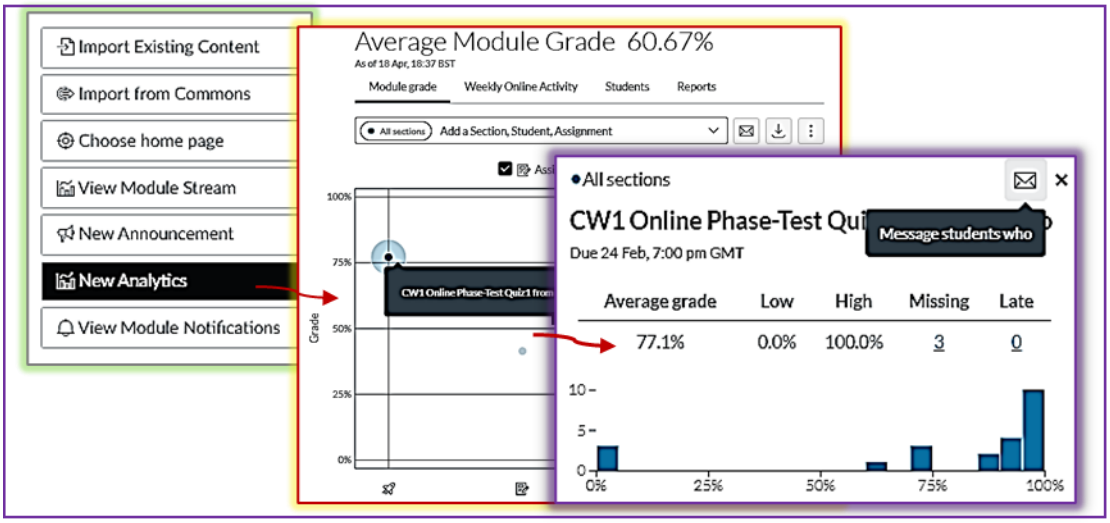


Figure 2. Analytics for Assignments and Quizzes.

Quiz Analysis for Post-marking Moderation

After completing an assessment and releasing marks, the tutor can analyse the quiz statistics based on individuals' performance a Quiz summary is automatically generated showing overall statistical performance with their grade marks as shown in Figure 3. The Y-axis shows the number of students achieving a particular % score displayed as a bar on the X-axis. There is a technical limit for displaying such a plot based on the number of students and or the number of questions.

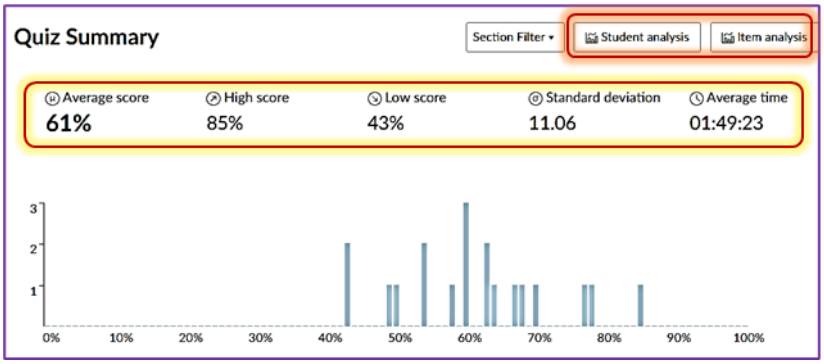


Figure 3. Quiz Summary displaying statistical results.

For example, a quiz with 200 or more questions or 1000 participants will not generate a quiz statistical plot for the visibility feature, however; about 75 or a smaller number of questions will generate a decent quiz plot displaying main statistics. The corresponding data of two useful analyses (i.e., 'Student analysis' and 'Item analysis'), can be downloaded in the CSV (comma separated values) file format of Microsoft Excel® spreadsheets. These provide useful statistical information about quiz analysis, moderation, and class discussion that can be used for reporting to the AQA office about the assessment. Most of the analyses are based on conclusive results comparing various statistical parameters, which are obtained simply based on multiple stages and steps described in the CSV file. For example, the 'Item analysis' contains various useful statistical detail as shown below:

Example of statistical data contained in a typical CSV file

Question ID, Question Title, Answered student count, Variance, Standard Deviation, Alpha score (for the whole exam), Difficulty Index, Discriminatory Index, Top student count (students in the top 27%), Middle student count (students in the middle 46%), Bottom student count (students in the bottom 27%), Quiz question count (total number of quiz questions), Correct student count (number of total students who got the answer right), Wrong student count (number of total students who got the answer wrong), Correct student ratio (ratio of students who got the answer right), Wrong student ratio (ratio of students who got the answer wrong), Correct top student count (students in the top 27% who got the answer right), Correct middle student count (students in the middle 46% who got the answer right), Correct bottom student count (students in the bottom 27% who got the answer right), Point biserial of the correct answer (reliability index), and Point biserial of the first incorrect answer or distractor (followed by the second, etc.).

Each of the aforementioned statistical parameters is based on standard formulas with widely acceptable assumptions. Most of the parameters give various meaningful analyses of individuals, selected groups (top, average, bottom, failed, etc), and also the quality of the quiz and items in the quiz. The fundamental parameter in all the statistical analyses is the variance", which determines the possible number of variations in the data set. It is used to compare, how the selected group's performance varies compared to the sample. Thus, a variance is a simple measure of dispersion (e.g., a process of measuring the distance of each number in the dataset from the mean). The variance is used to calculate the "Standard Deviation", which is a statistical measurement that determines how far a data (or a group) is situated from the mean (i.e., deviates from average). Both these parameters are fundamental to quiz statistics to get analytics of quizzes and questions, therefore; it is essential to understand both.

A simple example is presented here to explain how both these parameters work together.

Example:- Suppose a series of 6 numbers require to determine the standard deviation for a random group. Assume, the numbers to be 4, 18, 34, 2, 26, and 12.

Step #1 Determine the mean (or average) of the numbers:

$$mean = \frac{4 + 18 + 34 + 2 + 26 + 12}{6} = \mathbf{16}$$

Step #2 Subtract the mean from each number, then square the result:

$(4\text{-}16)^2 = 144$

$(18\text{-}16)^2 = 4$

$(34\text{-}16)^2 = 324$

$(2\text{-}16)^2 = 196$

$(26\text{-}16)^2 = 100$

$(12\text{-}16)^2 = 16$

Step #3 Determine the mean of the of the squared values to calculate the variance:

$$variance = \boldsymbol{\mu} = \frac{144+4+324+196+100+16}{6} = \mathbf{130.67}$$

Step #4 Take the square root of the variance to get the Standard Deviation:

$$Standard\ Deviation = \sqrt{136.67} = \mathbf{11.43}$$ It suggests that each number deviates from the mean by 11.43 points on average.

The standard deviation reflects the dispersion of the distribution that is described by a bell-shaped 'Gaussian' profile as given in Figure 4. A low standard deviation indicates that the data value is located close to the mean (i.e., expected value), whereas a high standard deviation indicates that the data values are spread out over a wide range. Three different standard deviations with a normal distribution profile are shown in Figure 4.

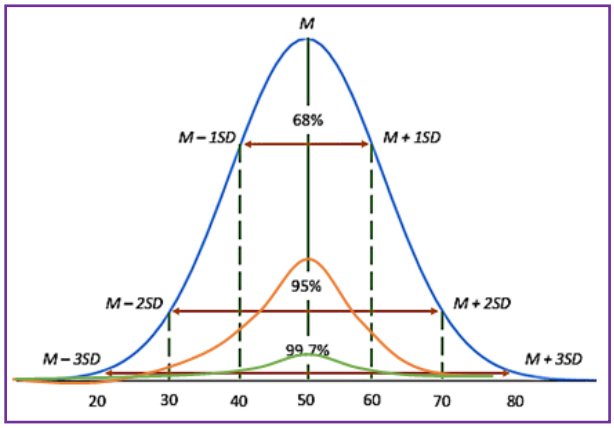


Figure 4. Standard Deviation from a mean value.

The blue bell-shaped curve demonstrates the one standard deviation from the mean value of 50 with standard deviation, it will produce empirical values between 40 and 60, that is about 68%. The 'two standard deviations' will press the height down (i.e., reducing

amplitude) and consequently disperse (i.e., flattening on the x-axis). Now the data has mean values located between 30 and 70 (i.e., about 95%). The 'three standard deviations' will result in 99.7% further deviating the expected data values from the mean within a diverse range between 20 and 80. Fundamentally, the curve with the lowest standard deviation has a high peak and a small spread, while the curve with the highest standard deviation is flatter and data is widespread (i.e., it contains the least expected values).

There are also useful statistics that determine the quality of questions that can be used to evaluate hidden features of questions. For example, for some tutors, a multiple-choice question (MCQ) may appear as a simple selection of options but from a psychometric point, it is a complex process, which demands to develop of reasonable but incorrect options (i.e., distractors) for each item is a subject of research for content specialists (Shin et al., 2019). The distractors undergo a test based on students' most common misconceptions, to qualitatively identify whether all the alternative options functioned as intended. The poor distractors will appear as irrelevant options in the True/False or MCQs or MRQs and must be removed from the options of the quiz test. The quality of distractors is measured by using the point-biserial correlation coefficient that relates observed item responses and is particularly used when one set of data is dichotomous (i.e., separated into two mutually exclusive or contradictory optional groups, e.g., right and wrong). For a quiz question, it calculates the values based on correct and incorrect responses. Additionally, Canvas quizzes also deal with the distractors to identify the quality or efficiency of each distractor. Based on Pearson's correlation coefficient the point biserial correlation coefficient can be calculated after finding the relationship between correct and incorrect answers given by the participants (Papenberg & Musch, 2017):

$$r_{pb} = \frac{\overline{Y_1} - \overline{Y_0}}{S_y} \sqrt{\frac{n_0\, n_1}{n^2}} \qquad \ldots\ldots\ldots\ldots \qquad \text{Eq. 2}$$

The term 'y1' is the mean test score of students correctly identifying the solution (i.e., group 1), whereas 'y0' is the mean score of students choosing the distractor (i.e., group 0). The parameter 'Sy' is the standard deviation of all test scores. The 'n1' is the number of students choosing the solution (i.e., group 1), and 'n0' is the number of test takers choosing the distractor (i.e., group 0), and the 'n' is the total number of students (i.e., both groups 0 and 1).

The other two useful parameters are the difficulty and discrimination indices, which are also determined from the data produced as an excel spreadsheet. The 'Difficulty Index' parameter 'r' (also known as the p-value) determines the challenge (i.e., if the question was too easy or too difficult). It can be expressed based on the data obtained for the top and bottom groups, given by an expression (Gronlund & Linn, 1990):

$$\rho = \frac{Tc + Bc}{n} \qquad \ldots\ldots\ldots\ldots \qquad \text{Eq. 3}$$

where the terms, 'TC' and 'BC' are the participants, who answered correctly from the Top third high achieving group, and Bottom third low achieving groups, respectively. The 'n' represents the number of total participants in both groups. The p-value should lie anywhere within a range of ±1. A value of below 0.25 suggests that the question is very difficult, and the tutor must review the question for complications, missing details, and confusing language, and must highlight that topic for more students' support, or should check if the question is level appropriate or not. On the other hand, the values above 0.75 are considered very easy and must not be set for high marks or can be removed from the future summative tests. The values between 0.25 and 0.75 are considered average or moderate.

The Discrimination Index determines the quality of the cohort describing how well it discriminated between high and low achievers. It inspects each quiz item and evaluates how well an item can differentiate between good and less able students. Overall, it provides a performance comparison of stronger vs weaker students in the quiz. Mathematically, it can be written as an equation:

$$DI = \frac{Tc - Bc}{\frac{1}{2}(n)} \quad \text{.....} \quad \text{Eq. 4}$$

Theoretically, a DI could have any value within ±1, where the closest to +1 is more effective. Nonetheless, it is not an absolute measure but does help mostly identify the effectiveness of the most objective type of quiz questions where students are offered options with distractors (e.g., T/F, MCQs, MRQS, and Matching). In Canvas quizzes, +0.24 or lower values are considered as the poor scores, whereas a higher than +0.25 is a better performance indicator. Interestingly, a DI of zero shows all students getting the quiz question right (or wrong). Reusing the high DI values in the next quizzes is recommended, as these possess higher cognitive thinking abilities (i.e., HOTS). The poor discriminative questions must be either removed or revised for improvement. The DI can be found in the 'Question Breakdown' of a quiz providing a comprehensive report of the respondents with corresponding percentages of correct, and incorrect answers, thereby displaying a 'Discrimination Index' as shown in Figure 5.

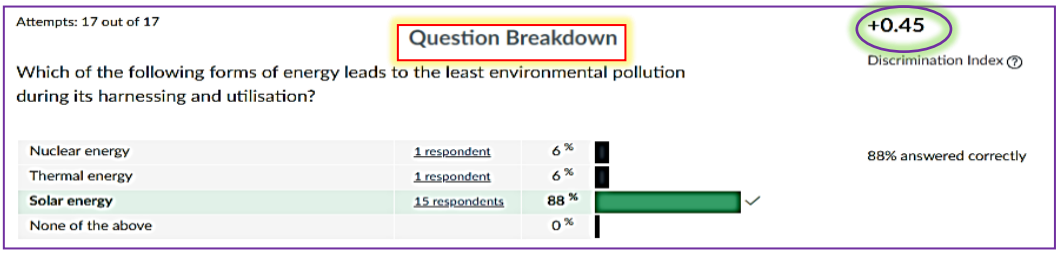


Figure 5. Quiz question showing Discrimination Index value.

There are various possibilities to analyse the data confirming the statistical assumptions of the surveys and quizzes. For example, to determine if a difference between "observed" and "expected" data is purely due to a chance, or if there exists a relationship between the

variables used in the test. In quizzes, this can be used to study the quality factors with objective-type questions (e.g., T/F, MCQs, MRQs, Matching, etc). One such analysis is always performed via a test is known as Chi-square ($\chi 2$) test, which can be given as a simple expression (Comrey & Lee, 2006):

$$\chi^2 = \sum_{i=1}^{n} \frac{(O_i - E_i)^2}{E_i} \qquad \ldots\ldots\ldots\ldots \qquad \text{Eq. 5}$$

where the terms '*O*' and '*E*' represent the observed and expected values, respectively. The range is determined from *i* =1 to '*n*'. There can be three main types of Chi-square tests, the test of goodness of fit (e.g., if data fits a particular distribution), the test of independence (e.g., if the test is independent of two factors), and the test for homogeneity (e.g., if the differences are consistent).

Overall, the statistical analysis after completing an assessment offers a useful SWOT (Strengths, Weaknesses, Opportunities, Threats) that determines the behaviour, confidence, and sustained learning of the participants, respectively. These are essentials of a "pedagogical framework" that determines the integrated LT&A values and instructor's consistent practice and support within the institution (AlMarwani, 2020; Granić et al., 2009; Longhurst et al., 2020). In this view, the quizzes analyses can effectively be used to diagnose students' behaviour, incentives and pressures to engage in cheating misconduct, or opportunities that arise from different patterns of online learning and assessment (i.e., pre, post-COVID-19, and during the pandemic) (White, 2020). In response to various SWOT analyses on online quizzes and assessments, a common academic debate suggests that the educational institutes want students to avoid cheating practices in online quizzes, thus they must educate academic members, set resilient protections, and encourage good practice in LT&A and feedback. It is therefore recommended that the summative quizzes with more marks allowance must be seriously commissioned by the relevant LT&A team members. The central and schools' AQA, L&T, and HR teams must involve in the staff's development opportunities (e.g., peer teaching observation, internal moderation, and continuous professional academic development; CPAD) encouraging young academics to make efficient use of quiz statistics for their teaching modules.

Conclusions and Recommendations

Good-practised features of Canvas Quizzes were explored concerning assessment and feedback, covering the statistical parameters that a tutor might require to design quizzes for students or moderate the quizzes for other staff. Useful analytical features of the Canvas quizzes were scrutinised that a tutor, moderator, or programme leader can use to report to the office of the AQA. It is recommended that the AQA team encourage programme leaders and academic staff to produce psychometric details of their students' assessments, in particular quizzes, and share their good-practised examples in module boards, learning and teaching workshops, seminars and L&T conferences. These must be regarded as similar to "scholarly activities" or research contributions (i.e., REF for subjective research). If staff is

deprived of time, resources, and efforts in developing alternative assessments, making the learning interesting and fun, then staff will not invest their full potential in learning new LT&A and feedback tools. The learning and teaching Innovation centre (LTIC), learning technologists and academics must collaborate on the staff's development opportunities, e.g., continuous professional academic development (CPAD) training academics of STEM and applied-STEM on quizzes statistics for effective use in scholarly activities.

The University of Hertfordshire has completed the initial transaction of the migration to Canvas and there are still more ongoing digitalisation, artificial intelligence and deep learning challenges ahead. The Canvas quizzes will be revised in June 2024 and additionally more 3rd party quiz apps will be added to Canvas, which can effectively produce the required data for writing reports meeting the accreditation bodies' strict requirements. Additionally, the academics must be encouraged to exchange their queries and concerns with the Canvas champions and learning technologies team, who support the implementation of the required technology tools, and apps and continue enhancing the learning and assessments technologies.

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Critical Reflection in Creative Media Practice for FE

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For the past five years, I have been teaching on and supporting curriculum development for the game development pathway on the BTEC Extended National Diploma in Creative Media Practice at West Herts College based in Watford. Learners are 16 to 18 years old with a typical group size of 15 to 20.

The normal approach to assignments would be that learners work on a task framed by the learning outcomes and then follow it with an evaluation of the task at the very end of a project. For first year Level 3 learners this would encompass what is called the 'skills development' unit. This aims to deliver all the baseline skills over the first term of the course. This is a significant challenge for learners, who after spending several weeks on a piece of work, then have to recall all of the specific areas that they had covered during the production of the assignment.

The assessment process detailed in the assessment criteria involves describing what they did for a pass, explain a bit more for a merit, and comprehensively explain for a distinction grade. These are increasingly more detailed descriptions of the task. What is not happening with this kind of descriptive scaffold, even when comprehensive, is how learners demonstrate the impact of the learning that has taken place. They are also not reflecting on that impact and also not considering themselves and the changes that have taken place during the process; they focus on the linear journey of steps that led to an outcome.

The challenge with spending too much time on a written, or even an oral description of the tasks, for the assessor, is that I already know the steps, I wrote the task, so there is no need to describe the classroom activity back to me. This does not demonstrate understanding of the task, only that the learner is able to articulate and remember a process. "First I did the thing, then I did the next things, this part of the thing worked, this part of the thing didn't work, and I would so this thing next time". Time and again, my feedback for this description is why? In fact, I explicitly tell all my learners that I will spend all my time reading through the assignment and looking at the practical outcomes saying 'why' out loud and 'why' in the comments. 'What is the significance of what they did?'

Although this could be done at the end of the project, it would be far better to develop an approach to the work that doesn't focus on the end result and instead considers the whole development process rather than outcomes. This questioning then becomes part of the whole assignment that provides ongoing self-reflection. This could either be edited into an evaluation or submitted with the final work to support evidence of how the learner has evolved over the assignment. Crucially, this allows the learner to recognise for themselves the evolution that they have undertaken.

As mentioned earlier, the first unit is a skills development assessment that lasts for two 12-week terms. It finishes with the learners selecting representative skills that were completed during the assignment, which is submitted as a 'skills portfolio.' To support this, I removed the need for final evaluations and instead developed an 'ongoing critical reflective diary' in the form of a digital document stored on the Canvas VLE as a rolling assignment that remains open for the duration of each unit. Learners are able to submit entries into this at regular intervals and this serves as a way to provide ongoing feedback during formatives, and also during any tutorials, interventions, and also for informal discussion about their work. Additionally, it is easy to see if a learner has not added anything to their diary for a good while, which may be an indicator for other challenges that the learner is facing, creating an opportunity to put strategies in place. The diary is a live evolving document and is flexible enough for learners to still use the format in different ways and different year groups use it differently.

An important benefit of removing final evaluation within the FE environment is learners are more able to access an ongoing document of reflection instead of facing a larger chunk of written work at the end of an assignment. When learners are not focussing on the heavier written documents, which is a key reason for them to attend FE vocational courses, they build up a reflective document with a word count that ends up being higher than a typical 1000-word evaluation with a result that is much more valuable to them and their learning as demonstrated through the increased grades before and after its introduction. Ongoing reflection becomes part of the workflow instead of a chore at the end. Clear academic scholarship remains crucial to the delivery, however. By structuring an assignment in this way, an ongoing reflective diary allows the learner to build confidence in their own self-reflection and writing before we introduce the idea of a longer form version, known as the 'critical review of practice' that builds on personal reflection and brings in understanding of contextual theory and the ideas that underpin the practice and technical skills that are being demonstrated.

The diary continues to evolve as the learner need does, year on year. To support proper reflection, I started by referring to Gibb's Reflective Cycle (Fig: 1) as well as a list of prompting questions developed by the teaching team that are used as a plenary at the end of most sessions to consolidate learner experience and understanding (Table 1).

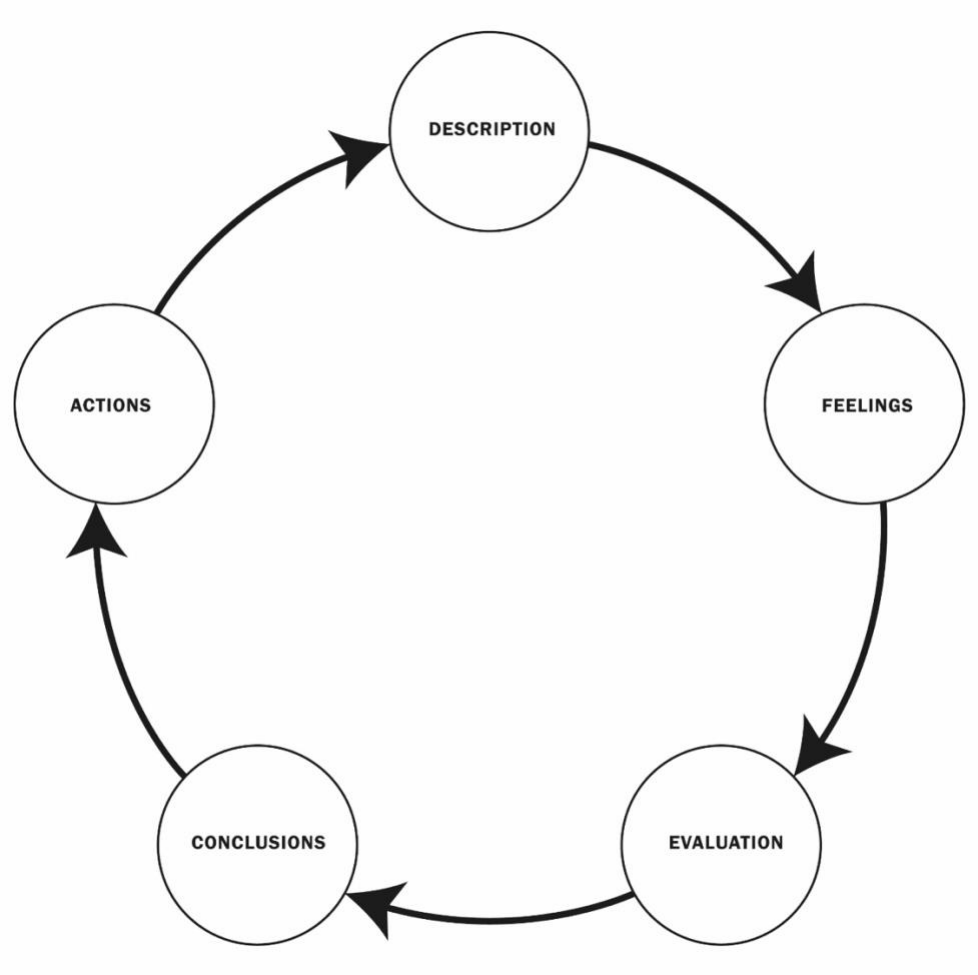

Figure 1: *Graham Gibbs (1988) Reflective cycle model*

What do you think about what you did?
How do you feel about what you did?
How has your thinking changed?
What did you learn?
What are the challenges?
Why did some things work well?
Why did some things not work?
What do you need to do next?
How could you further develop this skill/work?

Table 1*: Reflective questions developed using Gibb's Reflective cycle.*

This was a useful starting point, but it created some challenges in how learners accessed the document. When writing a short reflection at the end of a session, learners assumed that they had to answer all questions even if they were explicitly told they didn't have to if not relevant to the task they had been working on. However, when learners are confronted with this many questions, they found it challenging to prioritise, leading to short answers that didn't go into any depth and lacked significant value for learner development.

For example, Learner A began the 21/23 academic year with relatively good technical skills but was hesitant when it came to evaluation and written work. Early formatives where the diary would be discussed in relation to the current practice demonstrated a missed opportunity in being able to link the development of the work to the technical outcomes that were being shown. This was continued when Learner A was asked to reflect using the above questions (Table 2).

What do you think about what you did? *I think it went alright* *"**How do you feel about what you did?*** *It's okay* ***How has your thinking changed?*** *To add more depth and look from an outsider's opinion* ***What did you learn?*** *Simple Shading in Illustrator* ***What are the challenges?*** *Working around Illustrator"*

Table 2: *Learner A Response at the beginning of the academic year to reflective questions evaluating computer game concept art using Adobe Illustrator.*

After supporting learners to answer the questions during sessions, responses after an initial formative assessment, and feedback from other tutors, I decided to simplify the approach for the learner and found John Driscoll's model of reflection (2007, pp. 27-50) that further reduced the questions to three whilst being ambiguous to stretch the learner's response (Table 3).

The What? **So What?** **Now What?**

Table 3*: John Driscoll Model of Reflection*

The description of the task is confined to the first question 'The What?' which should be concise giving enough detail so that the task that is being reflected on can be recalled. This is vital as mentioned before, learners tended to focus too much on the description of the task over the impact of it. The most important of the three is 'So What?' as this considers the impact of the task, or significance. When delivering the document, I spend time really unpacking what is meant by 'significance' as not only is it about the assimilation of new skills, but it also takes into account the context, such as 'what would be the significance of not fully utilising this skill?' From this understanding can be built into the session about the reason for the skill, its uses in industry, and the importance of continuing to develop it. 'Now What?' builds on the first two questions by looking to set a target based on the activity and skills being developed. This one should be short, related to the previous answers and clearly targets an area of development that was identified answering 'So What?'

The irreverence of the three 'whats' engages a learner by its short attention-grabbing preposition. Whereas Gibb's reflective cycle and prompting questions bombard the learner with too much information at once and is quite intimidating to a 16-18 year-old. Gibb's cycle is focussed on the synergy of the process as demonstrated in the Reflective Cycle infographic (Fig: 1) but how are they able to know synergy of process and outcome when they have rarely considered the whole experience as it breaks down into individual tasks that should build over time?

Driscoll's simplified questions can distil the same concept concisely. It happens deceptively, as the learner ultimately develops the same critical thinking skills that Gibb promotes resulting that they are able to articulate to the same degree by the end of the assignment using more analytical language. By the end of the two-year extended diploma, learners overall are better able to consider the process of their development and also draw from it the transferable skills that are important to progress onto higher education or their chosen industry. This was starting to be demonstrated in the later responses of Learner A who is now answering the questions with confidence and reflecting on technical skills related to game asset creation (Table 4).

What you did - I first started off by finding concept art that really reflected on what I wanted to make for my environment, I put down some information about the environment, what sort of people and animals lived there and also what sort of weapons and utilities that they have to offer in this fantasy world. when I settled on what I wanted to make I started making a mock up in blender then rendered it with some lighting. After I made the concept in blender and rendered it, I moved over to photoshop and further iterated my work by adding a photo-bashed background carefully drew over the concept with a thick black marker to give of more of the cartoon or borderlands feel relating back to my world building portfolio. **Why you did it** - When I was making the scene in blender I wanted to eventually show iterations in photoshop, this shows me that I have proficiencies in other programs and will also shows that I am iterating the concept further and further as I add colour to my concept and a certain style (Cartoon/Borderlands). **What are you doing to do now** - I am going to further my work by adding more iterations showing that the concept can be built further. I have also asked my peers if they were handed this portfolio with no context or information behind it would they get what I am trying to portray to them just from the images in the portfolio.

Table 4: *Learner A developed responses from January 2022 using the 'three whats' model.*

In conclusion, the success of using Driscoll's Model of Reflection with the students is encouraging and has given insight into approaches that can be adopted to allow FE students to start to reflect to a greater degree on their own personal learning than was the case previously.

References

Driscoll, J., 2007. *Supported reflective learning: the essence of clinical.* 2nd ed. London: Baillire Tindall.

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