Blended Learning in Practice

Autumn 2016

Contents

Editorial

Welcome to the autumn 2016 edition of our e-journal Blended Learning in Practice. In this edition as well as our regular Staff Voice and Student Voice features we have seven research articles from participants on our Post Graduate Certificate in Learning and Teaching in Higher Education (PGCertHE) programme.

Dominic Bygate

Within this edition:

Rosalind Fallaize a Lecturer in Nutrition and Dietetics reviews the pedagogical landscape of Simulation Based Medical Education. She discusses the idea of threshold concepts and reviews their use in undergraduate health-related disciplines.

Mary Madden is a Senior Lecturer on the Masters Physiotherapy Programme. Her article discusses how the difficulties in sourcing mentors willing to supervise students on placement might be overcome. She has conducted an exploration of how technology could support remote clinical supervision carried out via desk-based, secondary research. She then considers the relevancy of these findings to postgraduate physiotherapy clinical placements.

Helen Barefoot

Christopher Keating is a Senior Lecturer in Pharmacology and his article reviews Case Based Learning, evaluating it in terms of its overall effects on student learning. He then critically appraises it in terms of key educational theories and teaching paradigms.

Sue Conn from the School of Health and Social Work has conducted a literature review that considers models of reflective practice and critical reflection. In particular the review explores a model of reflection used in the fast track social work education initiative Step Up to Social Work Programme.

Peter Thomas is a Lecturer in Aerospace Engineering. Peter examines the effectiveness of using a tablet PC in an engineering education setting from the point of view of both lecturer/instructor and student. Peter identifies the key benefits and limitations with regards to suitability, functionality and implementation.

Digital History Lecturer Adam Crymble discusses the issue of gender barriers in open online learning communities. Gender barriers were identified in *The Programming Historian,* through an open online discussion, which informed an anonymous user survey. Findings are put in the context of the literature on gender and online communication, abuse, and online learning communities.

Rory Saggers has written an article that explores undergraduate student Paramedics' experiences of how their communication skills have developed over the course of their first year. He contrasts the influences of student's campus based practice with those from placements in a clinical environment.

Contributor Profiles

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Rosalind Fallaize joined the University of Hertfordshire as a Lecturer in Nutrition and Dietetics in April 2015. She completed her undergraduate studies at the University of Surrey and is a registered Dietitian with the Health and Care Professions Council (HCPC). Rosalind's doctoral research on the feasibility and efficacy of gene-based personalised nutrition was conducted alongside the EU-funded study Food4Me (www.food4me.org) at the University of Reading, where she continues to work part-time as a Research Fellow. Her research focuses on dietary assessment, behaviour change, nutrient-gene interactions and personalised nutrition in vulnerable groups. In this issue of Blended Learning in Practice, Rosaline reviews the use of threshold concepts in undergraduate health–related disciplines.

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Sue Conn is a Senior Lecturer in the School of Health and Social Work where she undertakes teaching activities and organises social work student placements. Having undertaken a career in the social work profession for many years where most recently she was a Principal Social Worker for a local authority, Sue has always been interested in staff development and undertook the lead role for learning and development of social workers. She came to the university a year ago and is a Module Leader on the BSc and MSc Readiness for Practice module. Sue has recently completed the PGCert in Learning and Teaching in Higher Education at the University of Hertfordshire, and been awarded a Fellowship of Higher Education.

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Chris Keating is a Senior Lecturer in Pharmacology, and has been active in neurogastro-enterology research since 2004. He received his PhD from the University of Southampton and after postdoctoral stints in Chicago, Toronto and Brighton, Chris moved to Sheffield to work on studying sensory signaling pathways in the gut. Chris joined the University of Hertfordshire in 2013, where he is pursuing research into how processes such as ageing and inflammation regulate the function of gastrointestinal sensory pathways. Chris is also a module leader on several undergraduate and postgraduate courses. In this issue of *Blended Learning in Practice* Chris discusses case-based learning techniques as a model system for enhanced learning within undergraduate bioscience modules.

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Peter Thomas is a Lecturer in Aerospace Engineering in the School of Engineering and Technology after joining the University of Hertfordshire in July 2015. He lectures in the areas of flight mechanics, control systems, and aerodynamics. Previously he was a post-doctoral researcher at the Universities of Cambridge and Bristol, after receiving his PhD from Cranfield University in 2012. His research interests are in experimental and theoretical flight mechanics, bio-inspired robotics, and autonomous systems. His current research is concerned with biomimetic flight and control of morphing wings. He is also interested in the use of technology and technology-based methods for improving learning and teaching. In 2014 he spearheaded a faculty-wide study on the use of, and barriers to, uptake of digital devices and online tools for the engineering faculty at the University of Bristol.

Contributor Profiles

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Adam Crymble is a Lecturer in Digital History at the University of Hertfordshire and a member of the Digital History Research Centre. He is also a founding editor of *The Programming Historian,* an open access resource containing more than 50 peer-reviewed tutorials aimed at helping historians learn new skills to improve their research processes. His research focuses on the history of migration and community in eighteenth and nineteenth century Britain and Ireland.

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Mary Madden is a Senior Lecturer on the Masters Physiotherapy programme since 2014. She completed her Masters in Neuro-musculoskeletal Rehabilitation at University College London in 2005; following which she worked as a specialist musculoskeletal physiotherapist at Chelsea and Westminster Hospital. She was an Extended Scope Physiotherapist at Chelsea for eight years and combined this with postgraduate physiotherapy clinical placement mentorship. She has continued this interest in clinical placements with her current dual clinical/teaching role. Mary is Module Lead for the postgraduate physiotherapy clinical placement module and teaches on a number of postgraduate physiotherapy modules.

Contributor Profiles

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Rory Saggers is a Senior Lecturer in Paramedic Science. He has held this post since 2014 after graduating from UH and registering as a Paramedic in 2011. He continues to hold a fractional appointment as a Paramedic Clinical Team Leader with the London Ambulance Service providing clinical leadership to frontline ambulance crews. He is entering his final year of his MSc studies, and has recently completed his PGCert in Learning and Teaching in Higher Education. His current research interests are in prehospital respiratory and cardiac care.

A review of the use of threshold concepts in undergraduate health-related disciplines

Rosalind Fallaize, School of Life and Medical Sciences

Abstract

Background: Threshold concepts (TC) are transformative, irreversible and integrative discipline-specific concepts that bind a subject together and help students in the understanding of 'troublesome knowledge'. Recently several researchers have identified TC across higher education programmes for the re-development of curricula. This review aims to explore the use of TC in undergraduate health-related disciplines, including medicine and dentistry, considering both the identification of TC and application in curriculum design. This work will provide a foundation for the development and revalidation of an undergraduate Dietetics degree according to TC.

Methods: A systematic search of PubMed and Educational Resources Information Centre (ERIC) databases was performed in March 2016 using the key words: "threshold concepts" AND health OR medicine.

Results: Seven peer-reviewed journal articles were identified for review in the fields of: physiotherapy and occupational therapy (n=1), occupational therapy (n=3), nursing (n=2) and medicine (n=1). Two of the publications (occupational therapy) utilised systematic research methods, involving academics and students, to identify programme-wide TCs. Programme-wide TC were also proposed for medicine following a thematic review of original research articles. The remaining articles focused on a single module or TC.

Discussion: In general, there is a relative lack of research on TC in health-related disciplines, particularly on their use in curricula design. Whilst commonalities existed between programme-wide TCs for occupational health, the approach and methods used to identify these differed. The benefit of single module TC on student learning is unclear and further research is needed to establish this. TCs are yet to be identified for radiography, dietetics and dentistry, although work is ongoing in dentistry.

Conclusion: This review provides an overview of the TC used in health-related disciplines to date; including the methodologies used, and will assist in the identification of further TC.

Key words: threshold concepts, healthcare, nursing, higher education, curriculum

Introduction

'Threshold concepts' (TC) were first defined by Meyers and Land as transformative (significantly changing the perception of a subject), irreversible (unlikely to be forgotten) and integrative (exposing the interrelatedness of knowledge) (Land et al., 2005). TC can be ''considered akin to passing through a portal, or conceptual gateway, thus opening up a new and previously inaccessible way of thinking about something." (Meyer and Land, 2003) They are proposed to help bind a subject together and assist students in the understanding of "troublesome knowledge" (Meyer and Land, 2003). Early adopters of TC in Higher Education (HE) include economics (Davies and Mangan, 2005), accounting (Lucas and Mladenovic, 2007) and computer science (Zander et al., 2008).

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Key benefits of TC include, identifying barriers to student learning, focusing student learning, contributing to curriculum design and ultimately enhancing the student experience. TC may also help to 'overcome the stuffed curriculum' and focus students learning onto core principles, although they have also been critisised for being conceptually challenging, tacit, foreign and ritualised (McAllister et al., 2015). Meyer and Land suggest that shifting to a new 'conceptual space' can be problematic and discomforting for students, and those unable to do so may adopt a state 'mimicry' (Meyer and Land, 2005). A higher level of input may be required for students who struggle to transform their learning (Senior and Telford, 2015).

TC may be of particular benefit in health-related disciplines such as nursing and dietetics, whereby formal knowledge must be applied to real-life challenges in experience-based learning (e.g. practice placements). For example, it is reported that practice placements can be particularly difficult for students as they undergo a transformation from student to healthcare professional (Clouder, 2005).

Defining TC however, can be challenging and should involve input from both academics and students, and practitioners or clinicians for health-related programmes. Recently, the Delphi technique has been advocated for use in the identification of TC (Barradell, 2013). The Delphi technique is a data collection method that aims to establish a group consensus for a given research question (Hasson et al., 2000).

Once identified, TC can be used to design, or re-develop and re-validate HE curriculum. With this in mind, Land et al. recommend that curricula should be designed systematically according to the following principles: a) content sequence, b) the learners experience; the processes by which learners recognize and appraise TC and c) students and teachers recognition of TC attainment (i.e. assessment) (Land et al., 2005). To date, TC have been defined across a variety of science-based programmes including engineering (Male and Baillie, 2011), biology (Ross et al., 2010) and occupational therapy (Nicola-Richmond et al., 2015, Rodger et al., 2015).

TC have been identified for both discrete subjects of study (modules), which have been highlighted as 'troublesome' and entire programmes; the sequence of study that comprises a degree (undergraduate or postgraduate). The aim of this review is to provide an overview of the TC identified in health-related disciplines, for both modules and programmes. The use of these TC in curriculum design will also be evaluated where available and included in the articles. This work will provide a foundation for the characterisation of an undergraduate Dietetics degree according to TC.

Methods

Review inclusion criteria

Articles that outlined the identification of TC in health-related programmes including nursing, occupational therapy, physiotherapy, dietetics, radiography, medicine or dentistry were eligible for inclusion. Peer-reviewed, published articles written or translated into English were included in the review. Due to the dearth of research in this area, publications

restricted to discrete subjects of study (e.g. surgical training) were also included. Unpublished articles, conference abstracts, editorials and commentaries were excluded.

Search strategy

An extensive literature search was conducted in PubMed and Educational Resources Information Centre (ERIC) to identify the use/ definition of TC in health-related disciplines. Terms used in the search were "*threshold concepts*" AND *health* OR *medicine,* with further refinement conducted using: *curriculum, higher education, health, nursing, physiotherapy, occupational therapy, dietetics, nutrition, dentistry, biochemistry and medicine.* Database searches were conducted on article titles and abstracts ([Title/Abstract]).

Study Selection

Article suitability was assessed using information provided in the title, abstract and keywords. Full texts were retrieved for further scrutiny where needed.

Data extraction and analysis

The following information was extracted for consideration: health-related discipline, defined TC, methods of identification (participants and sample size) and subsequent use in curricula (prospective or retrospective accounts).

Results

A total of 11 peer-reviewed published articles (from 1993-2016) were identified on ERIC, and a further 14 on PUBMED (from 1975-2015). Figure 1 shows the handling of search results and reasons for exclusion. Following data extraction and analysis, seven articles were included in the review.

Figure 1: Flowchart of systematic search

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The results are presented according to health and medical science discipline: physiotherapy and occupational therapy, occupational therapy, nursing and medicine. The results of the analysis are presented in Table 1.

Table 1: Threshold concepts identified across health-related disciplines

Discipline	Author	Methods	Threshold concepts
Occupational Therapy	Nicola-Richmond et al. 2015	Delphi technique, multistage surveys: academics (n=10), final-year students (n=11), clinicians (n=21)*	1) Understanding and applying the models and theories of occupational therapy; 2) occupation; 3) evidence-based practice; 4) clinical reasoning; 5) discipline specific skills and knowledge; 6) practicing in context; 7) a client-centered approach; 8) the occupational therapist role; 9) reflective practice; 10) a holistic approach
	Rodger and Turpin, 2011	Action research and thematic analysis involving the identification of troublesome knowledge by academics*	1) Purposeful and meaningful occupation; 2) client-centered practice; 3) integral nature of occupational theory and practice; 4) identity as an occupational therapist; and; 5) thinking critically, reasoning and reflecting
	Fortune and Kennedy-Jones, 2014	Literature review	1) Relationship between occupation and health
Medicine	Neve et al. 2015	Thematic review*	1) Nature of evidence; 2) population perspectives; 3) embodied shared care; 4) active inaction; 5) the relationship between inequalities and health; 6) empathy; 7) ethical challenges
Nursing	Stacey and Stickley, 2012	Theoretical review (mental health nursing)	1) Recovery
	McAllister et al. 2015	Literature review	1) Care; boundary transgression, dehumanization, adversity and the burden of care; 2) overcoming stigma; 3) person-centeredness
Physiotherapy & Occupational Therapy	Clouder 2005	Review: longitudinal study data (unstructured interviews), occupational therapy students; action research, physiotherapy students (n=260)	1) Caring

Physiotherapy and occupational therapy

In a 2005 research article, Clouder combined data collected during a three-year longitudinal study (unstructured interviews) with undergraduate occupational therapy students and from an on-going action research study involving physiotherapy students (n=260) to propose 'caring' as a key TC for healthcare professionals (Clouder, 2005). The action research project focussed on student experiences of practice placements, which are a common component of health-related courses. The author stated that the TC of 'caring' should be more explicit in healthcare curricula and tackled at an early stage in the programme, citing difficulties students had faced whilst on placement.

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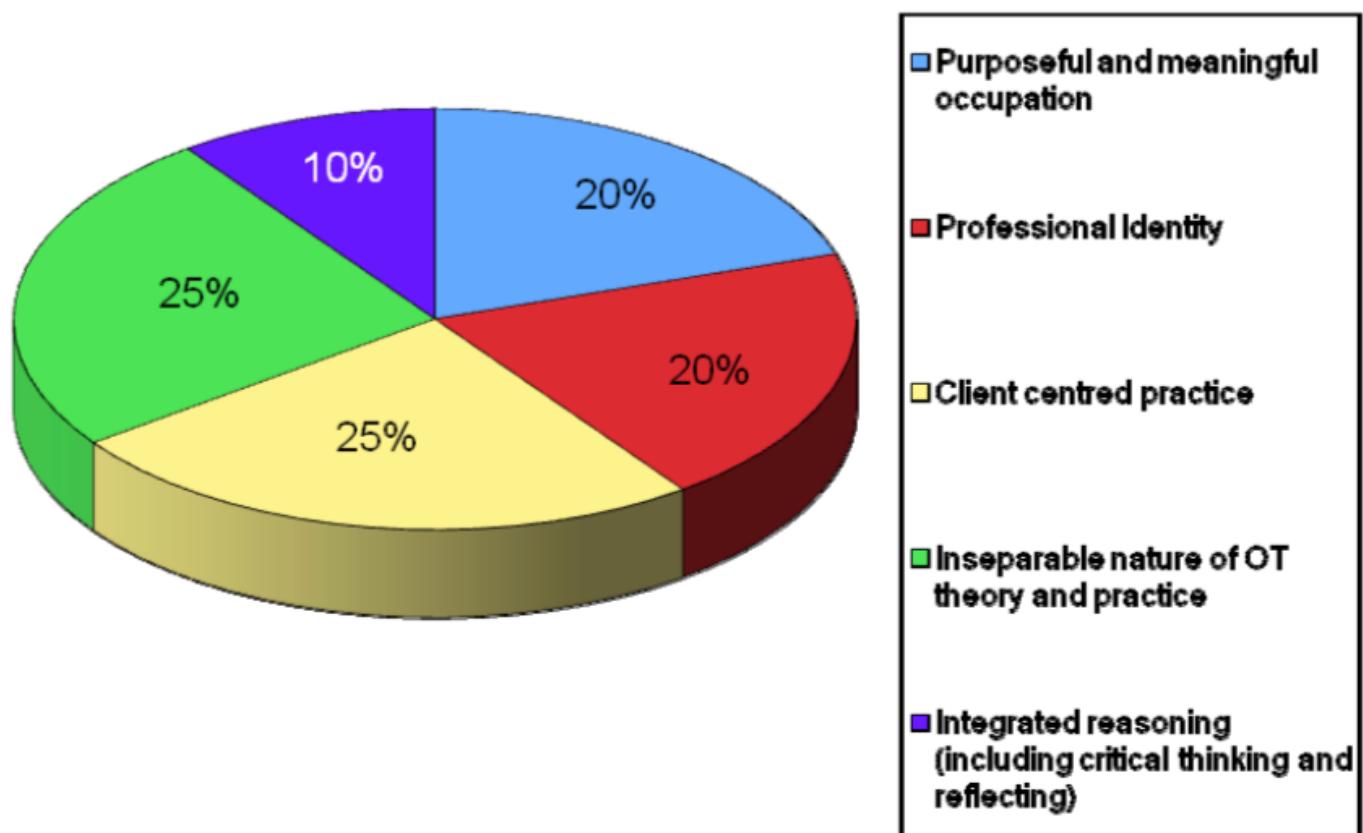
Occupational therapy

Three further articles on TC were identified in the field of occupational therapy, all of which were from Australian institutions. The first, published by Nicola-Richmond et al. used the Delphi technique to identify TC (Nicola-Richmond et al., 2015). The technique was used with academics (n=10), final year occupational therapy students (n=11) and clinicians (n=21) and involved multistage research surveys (Nicola-Richmond et al., 2015). In total, 10 TC were identified: 1) understanding and applying the models and theories of occupational therapy; 2) occupation; 3) evidence-based practice; 4) clinical reasoning; 5) discipline specific skills and knowledge; 6) practicing in context; 7) a client-centered approach; 8) the occupational therapist role; 9) reflective practice and; 10) a holistic approach. The methods used in this article were clearly defined facilitating replication in subsequent research. The authors noted statistically significant differences between academic, student and clinician responses signifying the importance of multi-stakeholder involvement. For example, academics were less likely to perceive that 'practicing in context' was troublesome compared to clinicians and students (P<0.05) (Nicola-Richmond et al., 2015).

Rodger and Turpin identified 5 TC in undergraduate and postgraduate occupational therapy programmes, these were: 1) purposeful and meaningful occupation; 2) client-centered practice; 3) integral nature of occupational theory and practice; 4) identity as an occupational therapist; and; 5) thinking critically, reasoning and reflecting (Rodger and Turpin, 2011). The TCs were defined using an approach described by Cousin (Cousin, 2006), which involves asking students about the concepts they found difficult to understand and master. This 'action research' involved academic staff and occupational therapy student feedback. Troublesome concepts were systematically identified from the literature (n=20) and thematically analyzed to enable TC to emerge (n=5) (Rodger and Turpin, 2011).

In a subsequent article, Rodger et al. reviewed the experiences of academic staff in using TC in a reformed undergraduate curriculum using retrospective analysis (Rodger et al., 2015). TCs were applied to the curriculum using pie charts to visually represent the percentage contribution of each TC to a given module (see Figure 2). Focus groups were used to evaluate staff members' perspective on the use of TC, which were 'overwhelmingly positive'. Staff identified the benefit of a 'shared language', consistent approach and integration of the TC within the curricula. Difficulties included learning about TC, identifying the TC; described as "challenging" and "time-consuming", learning the language of TC and applying the TC.

Figure 2: Pie Diagram of Threshold Concepts in one Occupational Therapy Course in 2010 ((Rodger and Turpin, 2011)

Fortune and Kennedy-Jones (2014) identified 1) Relationship between occupation and health as the primary TC for occupational therapy in a literature review on TC in occupational therapy. In contrast to Nicola-Richmond et al. (2015) and Rodger and Turpin (2011), the authors proposed that TC should be narrowly defined and fundamental to the practice of the discipline. Previously defined TC including 'client-centered practice' and 'thinking critically' were described as "cross-disciplinary" concerns, and not specific to occupational therapy (Fortune and Kennedy-Jones, 2014).

Nursing

In a theoretical article, 'recovery' was identified as a TC for mental health nursing (Stacey and Stickley, 2012). The authors describe the need for transformative learning in this area, which is said to challenge historical perspectives on prescribed interventions and psychiatric services. The article cites key discipline specific literature and describes how the TC adheres to the characteristics proposed by Meyers and Land (Meyer and Land, 2003).

McAllister et al. discusses several nursing TC following a literature search (McAllister et al., 2015). The main purpose of the article is to explore the use of creative teaching techniques,

including immersive aesthetic learning (humanities-based learning using novels, memoirs and picture books), for communicating TC to student nurses. Though exploration of key texts and case studies, TC relating to 'care'; boundary transgression, dehumanization, adversity and the burden of care, 'overcoming stigma' and 'person-centeredness' were discussed, although not explicitly. TC's were framed in the context of the nursing curricula, for example it was suggested that students should engage with 'care' TC's prior to clinical placements to enhance resilience and coping. Overcoming stigma, which was related specifically to mental health nursing, was proposed to be a key TC for all healthcare professionals (McAllister et al., 2015). The article neither considered a single module or entire curricula, rather key aspects of nursing practice in relation to creative teaching.

Medicine

In a review of TC, Neve et al. suggest that: 1) nature of evidence; 2) population perspectives; 3) embodied shared care; 4) active inaction; 5) the relationship between inequalties and health; 6) empathy and; 7) ethical challenges may be key TC in undergraduate medicine (Neve et al., 2015). The authors also highlight potential TC for medical educators (representing and valuing the voice of service users; sustaining student engagement in learning and; thinking processed are more important than correct answers). The authors acknowledge the relative lack of research in the discipline and the potential benefit in designing curricula and supporting learners.

Discussion

The most well classified health-related discipline in terms of TC was occupational therapy. Research on the use of TC in nursing, medicine and physiotherapy was limited and radiography, dentistry and dietetics are yet to be defined. Although, a phenomenographic pilot study has been conducted on staff and students perspectives of a dental education curriculum and the theory of TC at Kings College London, specific TC are yet to be identified (Kinchin et al., 2011, Kobus, 2013).

For occupational therapy, similarities existed between Nicola-Richmond et al. (Nicola-Richmond et al., 2015) and Rodger and Turpin's (Rodger and Turpin, 2011) TC including 'client-centered practice'. The necessity of client-centered practice was also discussed by Stacey and Stickley (Stacey and Stickley, 2012), who referenced Carl Roger's person-centered therapy (Rogers and Koch, 1959) and McAllister et al. (McAllister et al., 2015). Thus, it appears that this TC may be common across the health-related disciplines. Furthermore, Nicola-Richmond et al. state that the TC identified in their study may be perceived as generic to other healthcare disciplines. Although, researchers have also disputed whether TC in occupational therapy should be perceived in this general manner (Fortune and Kennedy-Jones, 2014); and further discussion regarding the discipline specific nature of TC is warranted. The TCs 'identity as an occupational therapist' and 'relationship between occupation and health' are specific to occupational therapy although, the concept

of professional identify is likely to relate to all healthcare, medicine and dentistry qualifications. Whilst Rodger and Turpin identified five TC for occupational therapy (Rodger and Turpin, 2011), Nicola-Richmond et al. identified ten (Nicola-Richmond et al., 2015) and Neve, seven (Neve et al., 2015). It is unclear whether the number of TC defined would have an impact on the application of these to a curriculum design or programme. However, given that academics in Rodger et al.'s study noted that the process of applying TC to an occupational therapy programme was challenging, it could be surmised that a reduced number of TC would be preferential (Rodger et al., 2015).

A further common TC identified across healthcare disciplines was 'caring'; physiotherapy and occupational therapy (Clouder, 2005), and nursing (McAllister et al., 2015). Similarly, 'empathy' was identified for medicine (Neve et al., 2015). In terms of course progression, both Clouder and McAllister et al. suggested that this TC should be encountered prior to practice placements and early on in the course (Clouder, 2005, McAllister et al., 2015).

A variety of methods were used to identify TC in the articles reviewed including thematic review, the Delphi technique and action research involving academics. The four-stage action research described by Rodger and Turpin, incorporated evidence from the literature and student feedback, although was devised by academics (Rodger and Turpin, 2011). The Delphi technique used by Nicola-Richmond et al. uses multistage surveys that are qualitatively analysed to establish the level of agreement in participant responses to a given research question and repeated until consensus is attained (Barradell, 2013). This research incorporated multi-stakeholder involvement from students, academics and clinicians (Nicola-Richmond et al., 2015), which is cited by the authors as a key benefit of the analysis.

The need for wider stakeholder involvement, beyond academics, for curriculum reform and re-development across healthcare courses has also been highlighted by Barradell and Peseta (Barradell and Peseta, 2014). It is suggested that this enables the identification of relevant TC, which facilitate the transformation of student to competent practitioner. In the paper by Nicola-Richmond et al., three rounds of surveys were conducted with the participants (n=42). Of the three methods used the Delphi technique appears the most complicated to apply, yet also the most comprehensive and rigorous (Barradell, 2013). Furthermore, given that Nicola-Richmond et al. observed significant differences in opinion between academics, and students and clinicians, it is unlikely that consulting just academics will result in optimum selection of TC. Thematic review of existing literature, as per McAllister et al.'s paper, it also more likely to result in selection bias.

A key aim of the present review was to provide a foundation for the development and revalidation of an undergraduate Dietetics degree according to TC. A search of 'threshold concepts' AND dietetics OR dietitian OR dietician in PubMed and ERIC revealed no published items, highlighting the absence of research in this area. However, several of the TC identified in allied healthcare disciplines, such as nursing and physiotherapy could be

considered immediately applicable to dietetics including: 'caring', 'client-centered practice', 'reflective practice' and 'thinking critically, reasoning and reflecting'. These TC are also those that students have found troublesome in the past, particularly in relation to reflective viva voce and critical appraisal assignments. Whilst some TC, although not presently defined at such, are introduced early in the dietetics programme (e.g. 'caring'), 'thinking critically' is introduced at the end of the first year and evolved throughout the degree course. Mapping TC using the pie charts suggested by Rodger et al. could be a useful way to display this evolution across a programme (Rodger et al., 2015). Furthermore, certain modules, such as practice placement modules, may contain more 'caring' TC content than others (e.g. biochemistry); the pie chart visual would help to conceptualise this to students, enhancing their understanding and experience of the module. Further work by the author will focus on the identification of TC for dietetics, using the Delphi technique and multi-stakeholder involvement (students, academics, clinicians, practitioners and regulatory bodies), and application of these TC to an undergraduate curriculum.

Limitations of the present analysis include restricted search terms and the use of just two journal database search engines (PUBMED and ERIC). In addition, a single researcher conducted the review; it would have been preferable for two researchers to independently extract and refine the data. Critical appraisal of the studies included using a quality assessment tool such as the Critical Appraisal Skills Programme (CASP) (Critical Apprisal Skills Programme (CASP), 2013) may also have improved the validity of the findings. Additionally, several papers excluded from the present systematic review discussed 'TC learning', also referred to as transformative learning. Whilst TCs were not identified in these articles, they may provide a foundation for further thematic review.

Conclusions

This review provides an overview of the TC used in health-related disciplines, including the different methodologies used. Key TC identified across occupational therapy, physiotherapy and medicine include 'evidence-based practice', 'care/empathy' and 'client-centered practice'. It is anticipated that these findings will assist in the identification of further discipline-specific TC. Occupational therapy is the most well defined healthcare programme in terms of TC, and TCs are yet to be defined for nursing, dietetics, radiography, dentistry and medicine. Further research is warranted on the generalizability of certain TC across health-related disciplines.

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Case-based learning systems for enhanced learning within undergraduate bioscience modules

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Abstract

It is now known that students learn more effectively when they are actively involved in the learning process. The case-based learning (CBL) system is one method in which increased student involvement in their learning can be achieved. In order to implement a CBL system more fully onto a newly designed second year pharmacology module it is important to determine whether such a CBL system would work within the overall structure of the module. In this brief review CBL is evaluated for its overall effects upon student learning and is critically appraised in terms of key educational theories and teaching paradigms. The overall consensus is that CBL has face value as a learning tool within a modern bioscience module and aspects of this learning style should be utilized more fully in the new module.

Introduction

The Biotechnology and Biological Sciences Research Council (BBSRC) has identified that the 21st century will be the age of bioscience. This scientific revolution will therefore require well trained and motivated scientists to engage with research and teaching activities in the bioscience sector both in the UK and abroad. As a university biomedical science department, it is our role to provide such scientists. However while the good news is that student numbers are being maintained in the biomedical science arena, issues exist: notably that science teaching is seen as "boring, hard or presented in a not very interesting way". Didactic approaches to teaching are seen as complex and irrelevant to real life situations. This approach is further compounded by practical classes that are seen as overly complicated and menu driven with little or no opportunity to stimulate creative thinking in what should be a highly creative environment. These issues need addressing if we are to instill in undergraduates an interest in science that inspires life-long exploration and learning in this subject. Therefore how do we create courses that engage and inspire students whilst simultaneously educating these people to become highly sought after employees once they graduate?

Studies show that students can learn more effectively when actively involved in the learning process (Bonwell and Eison, 1991; Sivan et al, 2001). Similarly it has been shown that learning may be improved by focusing on various aspects of student's educational needs. As Dee Fink states, "the key to learning is the ability to create significant learning environments" (2003). These environments should include formulating and communicating learning goals with appropriate feedback and assessment procedures and generating teaching and learning activities to support the learning goals and integrating the component parts.

Teaching and learning styles are, by their very nature, changing and in recent years there has been a noticeable move from lecture-based activities towards more student-centred activities. Two such student-centred activities embraced by this umbrella term are problem-based learning (PBL) and case-based learning (CBL) systems, although there are similarities between each model. CBL can be loosely defined as a form of enquiry-based learning which links theory to practice through the application of knowledge to solve authentic cases.CBL encompasses structured and guided learning and serves a purpose in

medicine by preparing students for clinical practice through the use of authentic clinical cases.

CBL is also popular form of teaching in many other subject areas (Thistlethwaite et al., 2012) and has an important role in developing skills and knowledge in students. The CBL approach can enhance active learning strategies and is adaptable for use within lectures, workshops and practicals. We are currently in the process of re-designing our second year pharmacology module as part of our bioscience program here at Hertfordshire. In response to student feedback on the value of assessments and learning paradigms we wish to incorporate more student centred activities into this module. Case-based studies, which already form a component of this module, could become a bigger feature within this new module format. Therefore the purpose of this review is to evaluate the use of CBL approaches to support biomedical science programs within universities with a specific emphasis on bioscience and pharmacology teaching. Furthermore, we will attempt to discuss the use of CBL in assessments, and how this model could be better implemented within a reformatted second year pharmacology module here at Hertfordshire.

What are case-based learning systems?

Case studies can be described in simple terms as student centred activities in which theoretical concepts are explored in an applied setting (Davis and Wilcock, 2003). One advantage of this system of learning is that while it is a student centred activity, the learning paradigms can be guided by the lecturer. This differentiates it from purely problem based learning systems in which the students define their learning needs. In this respect, case studies more closely resemble project-based learning systems (Savin-Baden, 2003) than PBL systems although in practice there is an overlap. Table 1 summarises the difference between both PBL and project-based learning systems.

Table 1. *Differences between problem-based learning and project-based learning (adapted from Davis and Wilcock, 2003; Savin Baden, 2003).*

Project-based Learning	Problem-based Learning
Predominantly task orientated and mainly set by the tutor	Problems usually provided by staff but what and how they learn defined by students
Tutor acts as supervisor	Tutor acts as facilitator
Students produce solutions or strategies to solve set problems	Solving the problem may be part of the process but the focus is on problem-management, not on a clear and bounded solution
Mainly supported by lectures which aim to equip students to undertake activity. Elsewhere the students are expected to draw upon knowledge from previous lectures	Not typically lecture driven since students are expected to define the required knowledge needed to solve the problem

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CBL can embrace a number of different formats, but mostly they exist as a short story involving problems which need to be resolved although some case studies do not have one obvious or clear solution. Fry et al (1999) described case studies as complex examples which give an insight into the context of a problem as well as illustrating the main point. They can be based upon real events, or can be modelled upon events which could reasonably occur. The complexity of case studies can range from the straightforward (working through and analysing simple stories) to providing solutions to complex information employing data and graphs. Since it is envisaged that case study examples in our new module would be used within lectures, workshops, and practicals as well as in summative assessments, this allows us opportunities to explore the full range of case study activity.

What are the advantages of CBL systems?

One of the key advantages of CBL is that it uses a process of guided enquiry and provides a more structured learning environment for small class discussions and lecture environments. This gives CBL systems an advantage over other student centred approaches when considering the role of a lecturer in this form of teaching and the time constraints put on assessing work in a modern curriculum-based university. There have been a series of studies which have assessed the effects of CBL upon student learning (reviewed by Thistlethwaite et al, 2012). The main conclusions from these studies were that CBL had positive effects upon learning through increasing such diverse characteristics as creativity, challenge, interest and enjoyment (Mayo, 2002), whilst also improving their understanding of what they were being taught (Rabe and Cardona-Carlos, 2007). In a major study at two USA medical schools, PBL was compared to CBL for 1st- 3rd year medical students, and the overwhelming majority of students preferred CBL over PBL since it provided fewer unfocused tangents, less busy work, and more opportunities for clinical skills application (Srinivason et al., 2007).

In a further study, this time focusing on pharmacology students in which CBL was compared to traditional lectures, the majority of students thought that CBL was an effective learning tool for them (82%) and that it improved their learning skills (83%), independent learning skills (74%), analytical skills (70%), and their level of preparation for exams. A large proportion of students thought that CBL improved their communication and collaborative skills (68% and 80%, respectively) and their ability to work within a team (79%). The real-life situations modelled in CBL appear to be highly rated, since it puts into perspective the module content that they are being taught (Mayo, 2004). Overall CBL was found to help students comprehend the course material better and foster a high degree of self confidence in personal learning. Within the medical and veterinary education arena CBL was also found to improve students' attitude to education (Jamkar et al., 2006; Krockenberger et al., 2007). CBL using online delivery systems were found in some cases to be preferable to traditional

lectures (Morrow et al., 2010) raising the possibility of designing online case studies with guided answers which could help in assessing large quantities of course material. The major conclusion from this and other studies is that CBL improved students' satisfaction, motivation and enthusiasm for learning as well as improving personal confidence (Tayem, 2003).

Pedagogic studies surmise that CBL invokes a shift from surface to deeper approaches to learning (Figure 1, Hofsten et al. 2010) and that CBL enables students to see the relevance of their subject area and facilitates the development of reflective thinking and deeper conceptual understanding of their subject area (Hofsten et al., 2010; Krockenberger et al., 2007; Schwatz et al.,1994). Student motivation is increased and their ability to remember information when taught using CBL increases (Hong et al., 1998). Whilst these theories are clearly important, an often overlooked additional factor is that students enjoy CBL (Struck and Teasdale, 2008) since it enables them to connect theory to "the real world", engage better with the teaching process and that it fosters a more active and collaborative learning environment. This enjoyment of the study process could in theory aid learning. CBL also contributes to the transferable skills flagged by employers as important attributes in graduates. As is shown in Table 2, CBL approaches can also embed superior transferable skills into students, therefore aiding their post-university employment prospects.

Table 2. *Transferable skills acquired through case study learning (adapted from Thistlethwaite et al., 2012)*

Skill Set	Notes
Team work	Enables collaborations, sharing of personal experiences, and emergence of leaders. Care is needed when sorting groups out to ensure balance
Individual study skills	Encourages the development of researching relevant information outside of a lecture environment
Analysis of information resources	Encourages a critical appraisal of information, and where it was obtained
Time management	Planning and performing tasks to set deadlines can be utilised within a case study format
Presentation skills	Oral presentations, posters, articles can all be utilised effectively by students to present their results
Practical skills	Case studies involving practical work on the syllabus being studied

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Implementing CBL on a new pharmacology module

In designing a new module we need to be aware of what the learning outcomes for this module will be. These learning outcomes shape the content and organisation of the module and form an important role in determining the assessment criteria for the course. On our current module there are five basic learning outcomes that the students are expected to attain. These can be condensed into three key points:

- **Understanding the core concepts underpinning basic pharmacological theories**
- **Retaining knowledge from lecture-based material and applying this knowledge in a real world situation**
- **Using current lecture-based knowledge to appreciate the need for the development of new therapeutic approaches to the treatment through a detailed understanding of the pathophysiological basis of disease.**

Clearly there is a strong component in these learning outcomes of linking theory to practice and as such CBL activities could provide students with access to higher cognitive learning opportunities and therefore contribute to a better understanding of the course content. On our current module there are some good examples of CBL being utilized effectively in clinical simulation experiments, and in workshops. However improving and expanding this mode of learning could add to the positive feedback our module receives and to the learning outcomes achieved by the students.

How then do we implement these learning activities? Used formatively CBL can enhance workshops in which students have to answer questions based around a case study presented via the lecturer. This could include class discussions and additional lecture material provided by the teacher. These have potential for measuring application of knowledge, analysis, problem-solving, evaluative skills and principles applicable to real-world situations. In terms of learning attributes these situations correlate to the "synthesis" and "evaluation" levels of Blooms Taxonomy for learning (Bloom et al, 1956) whilst also interacting with all levels of the VARK learning system (Fleming, 1987).

Used summatively, short cases are relatively easy to design and mark due to the guided format of these assignments. Marking for grading and feedback are about as fast as essay marking. Longer case study answers pose a problem for marking large quantities of work in a limited time which impacts upon the feedback that can be provided. Since students' rate assessment and feedback as the crucial areas of their study program this can be a problem. However group-based case studies utilizing online study techniques such as wikis could well provide an answer to these issues, and is already implemented successfully in several modules here at Hertfordshire. These methods can make marking relatively straightforward, although gauging the relative contributions of individual group members towards the overall assignment can be more time consuming and problematic. Within a summative ex-

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am situation case-based studies can be used within a traditional multiple response questionnaire (MRQ) section to allow for a diverse testing environment (Lione, 2008). Confidence based MRQs (Gardner-Medwin, 2006; Barr and Burke, 2013) or case study MRQs can be used successfully in summative assessments, but other examples can also be used such as drug autobiography multiple choice questionnaires (MCQs) or MRQs which would enhance the summative testing procedure.

Case studies based around a set of questions revealed sequentially over a set period of time may be used in teaching or assessment for developmental or judgmental purposes. These CBL strategies encourage reflection and analysis and are reliable and easy to manage. Case studies can and should be implemented more rigorously in laboratory situations to enhance the learning outcomes of practicals. Simple steps can be utilised here, for example providing students with a brief outline of an imaginary experimental set-up and providing a series of questions, which the students have to answer by performing a set of experiments. These questions could start with simple steps determining the basic pharmacology of two antagonists which have been provided in coded bottles, and end with students having to design a brief experiment of their own to answer a specific question provided as part of the practical.

Poster sessions or group presentation sessions also allow students to engage with CBL. In these sessions, students are given questions on a topic relevant to one of their modules. Split into groups of 4, they have to address the question and, with the benefits of some background reading, produce a poster, or a PowerPoint presentation. They then present this work to their peers during a tutorial session. The goal is to use their lecture notes, and background reading to answer related but new questions. Working through this problem would reinforce what they have learnt in the lecture, and put their knowledge into a wider context. The format for this study situation has been discussed previously (Keating, personal communication) and the advantage of this sort of study is that it would test the students capacity to present findings and interpretations succinctly and attractively. There is feedback potential from tutors, peers and themselves. Marking for grading is fast. The disadvantage, mainly that there is a danger of focusing unduly on presentation methods, can be avoided by the use of simple criteria which also reduces variability. In a study focusing on a Biochemistry module in the USA, poster sessions were found to significantly enhance the students' enjoyment of their module and improve their grades (Sisak, 1997).

An important consideration of this process would also involve assessing the impact of introducing CBL on our students' learning experiences. Do our students enjoy CBL? Do they learn better with it? The first parameter would be easy to quantify through using student feedback, whereas the second marker is harder to define but could use comparisons of

module marks and student attendance before and after introduction of CBL as initial tests of CBL impact on this module.

Conclusions

It is obvious from these studies that students enjoy the learning opportunities that CBL provide and think that it helps them learn better. This can help create a positive learning environment which can further help them become more engaged and motivated. A further finding from this work is that CBL is an enjoyable teaching experience, possibly as a by product of increased student engagement. Furthermore, CBL provides a more realistic learning environment and online CBL is popular and can work well providing attention is paid to the online learning environment. Other useful advantages of implementing this style of learning within a module is that it could pave the way to delete the academic stigma that pharmacology is a somewhat dry subject, and instill an interest in science that inspires life-long exploration and learning: factors that will be important in producing a generation of scientists ready for the 21st century bioscience revolution. Consequently we will be looking to utilize CBL in our new module in both learning and assessment situations.

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Does teaching reflective practice help to prepare student social workers for the world of work?

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Abstract

This literature review considers models of reflective practice and critical reflection and in particular explores a model of reflection used in the fast track social work education initiative Step Up to Social Work Programme. The social work literature indicates the importance of developing reflective practice skills during training as they can be transferred in to the workplace. Following graduation newly qualified social workers undertake an intensive Assessed and Supported Year in Employment (ASYE) Programme where there is a requirement to consistently demonstrate reflective practice. Although there is considerable literature about the subject of reflection there is limited research available to examine whether the learning gained during reflective practice sessions at university has been beneficial for newly qualified social workers. This review suggests further studies need to be carried out to ascertain the usefulness of this approach considering the time and funding of social work training and its implications for practice.

Key Words: reflective practice, critical reflection, social work, social work education,students

Introduction

The topic for this article was prompted by my recent involvement with a group of social work students undertaking the Step Up to Social Work Programme for graduates. The students were meeting together for the first of a series of twelve reflective practice sessions. My role in these sessions was to act as their facilitator. The students were at the beginning of an18 month programme and this led me to consider how reflective practice can help to prepare the social workers in training to be reflective practitioners once qualified.

Social Work education, training and registration developments

Social work is a demanding profession and at the completion of a social work degree the aim is to have equipped students with the experience, skills and knowledge base required of a newly qualified social worker commencing their first year of practice.

Until 2012 the only routes to train as a social worker had been via a traditional three year undergraduate or two year postgraduate course. However, more recently the government has introduced what it refers to as intensive fast track routes for social work qualifications that run alongside the traditional courses. The Step Up Programme falls in to this latter category.

The Quality Assurance Agency for Higher Education (QAA) and The Health Care Professionals Council (HCPC) are the regulatory bodies that approve social work courses. The HCPC assesses the standards of education and training programmes (SETS, 2014). A programme which meets the SETs allows a student who successfully completes that programme to meet the HCPC standards of proficiency (SOPS, 2012). They are then eligible to apply to the HCPC for registration.

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Following the Social Work Reform Boards recommendations The College of Social Work (TCSW) were tasked with developing an overarching professional standards framework. The nine domains of the Professional Capabilities Framework (PCF) published in 2012 includes a domain dedicated to critical reflection and this sets out the requirements for social workers from training through every stage of their careers. Whilst the PCF describes the capabilities required of social workers at all stages of their career the SOPs set out what a social worker must know, understand and be able to do when they start practising for the first time. The PCF and the SOPS have been mapped so students and social workers can clearly see the correlation between the two bodies (TCSW, 2012).

Although teaching reflective practice is a key pedagogic element of social work courses the way in which it is taught varies across Higher Educational establishments. However, as part of the students training programme they are required to undertake two mandatory work experience placements. During these intensive placements they undergo a progressive and holistic assessment of their learning and development matched against the standards of the PCF and the SOPS.

Student social workers may encounter a variety of different types of reflective learning activities and approaches during their studies and these typically include:

- **Learning logs**
- **Personal development plans**
- **Portfolios**
- **Critical reflective practice groups**
- **Reflective practice modules**
- **Critical incident writing and discussions**
- **Action learning sets**

Literature review

I am reviewing the literature to inform my understanding of how reflective practice during social work training can prepare students for the world of work.

The subject of reflection is broad and for the purpose of the literature review it has been limited to consider a seminal work in this field and is the model used by the Step Up to Social Work students. This section will consider pedagogic and professional social work literature as part of the review.

What reflective practice is not about?

Before going on to explore what constitutes reflective practice it is important to clarify what it is not. Thompson, N & Thompson, S (2008) have identified six areas of misconception linked to the notion of reflective practice:

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- **A luxury we cannot afford**

  There is not enough time in a busy work schedule to make space for reflection. However, by making space to undertake this activity you may in turn be able to create space to think and plan ways in which to reduce and manage the pressures.

- **A solitary pursuit**

  Reflective practice is often seen as something you do on your own and whilst this is true to a degree there is a growing body of knowledge concerning groups and organisations undertaking reflective practice activities (Gould & Baldwin, 2004).

- **A magical process**

  There is an assumption that reflective practice is just about stopping and thinking about our actions and then magically as if by osmosis the behaviours change. Connections need to be made in order for learning to take place and practice to develop that involves thought and activity.

- **An alternative to theory**

  A considerable component of reflective practice involves the process of examining the learning from our experiences although this is not the whole picture. It can be misconstrued that this is the whole purpose of the activity when in fact it is equally important to make linkages to theory and research to inform the learning from the practice.

- **Displaced by evidence- based practice**

  Evidence-based practice is based upon the findings of research and best practice and is sometimes seen as the golden thread to good practice. With this newer approach it brings in to question whether reflective practice is necessary. However, in the social work profession it would be a mistake to slavishly follow this approach without considering the use of reflective practice to help to integrate the findings from an evidenced based approach.

- **Limited to education and training programmes**

  Reflective practice is not only an aspect of academia it is also encountered in the workplace. It can be perceived as being appropriate to undertake as part of a course of learning but not valued as an integral part of the working experience and may be linked to the ' too busy' misconception above. By committing to ongoing reflection at work it will offer added value with regard to consolidation of learning, skills and confidence.

What is reflective practice?

The notion of reflective practice is not a new concept although in recent years interest in the subject has grown within social work practice and social work education (G.Ruch, 2002; Thompson, N & Thompson, S 2008).

In essence and at its most simplistic reflective practice involves exploring thoughts, analysing and developing self awareness (Thompson N & Thompson, S 2008).

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Although Dewey (1916; 1933) wrote about this subject in the early part of the twentieth century it was the seminal work associated with Schon (1983) that brought reflective practice into the spotlight. Schon's approach has been embraced by professional educators including within higher education. Schon understood that is was not enough to rely upon a professional knowledge base in order to make sense of an issue in terms of what should be done and how it should be done.

Schon was sceptical of the technical rationality model which is a professional practice approach that has fixed methods of working and correct procedural responses. In response to this rigid model he suggested an alternative strategy that was more fluid and could adapt the knowledge base to meet individual circumstances. In this scenario the reflective practitioner would act as a tailor and cut the cloth in the form of a solution to fit or meet the needs of the individual circumstance.

Schon (1983) differentiated between reflection in action and reflection on action. The first concept describes how a person reflects whilst in the moment of doing or practising. Reflection on action describes how a person reflects after the event has happened. In an ideal world these two models should interconnect and inform each other to be able to develop the integration of learning and practice, there by ensuring theory is fully embedded in practise.

Drawing upon Schon's work in relation to Higher Education, Brookbank and McGill (2007) believe making reflective practice available to students gives them the ability to be more aware of their own learning styles and methods of learning. Through the process of being reflective, students can consider alone or with others about learning within their disciplines and how they approach learning. Brookbank and McGill see reflective practice as a key attribute to reflective learning and have used this approach in their work with undergraduate and postgraduate learners. Barnett (1992a) has built upon Schon's work and states that all students are able to undertake reflective practice.

However, Thompson, N & Thompson, S (2008) believe there are areas for development within Schon's model concerning:

- A focus upon the individual that to a degree excludes consideration of broader social and organisational influences

- Critical reflection is not addressed fully in this model of reflection and therefore, does not address issues of power

- Emotional considerations are limited in relation to how they impact upon our ability to be reflective

Others have taken reflection a step further and talk about the importance of reflexivity as a concept. By this they are describing the influence of self on situations and vice versa (Fook & Askeland, 2006). Thompson, N & Thompson, S (2008) argue that to be a reflective practitioner you need to have elements of both reflection (thoughtfulness) and to be self aware (reflexive).

Whilst Barnett (1997) suggests that one of the duties of higher education is to help learns to make linkages between knowledge, understanding of self and actions within a critical framework.

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Taking the idea of being critical a step further leads to the notion of critical reflection which is defined as consisting of both a critical depth (identification of underlying argument, assumptions and misplaced reasoning) and critical breadth (acknowledgement of social and political issues including power, discrimination, stigmatisation and exclusion) Thompson, N and Thompson. S (2008).

Building upon the earlier works of Schon and others and developing the idea of being a critically reflective practitioner is the work of Jan Fooks. She specialises in working with health and social care professionals and it is her model of reflection that the group of Step Up to Social Work students are using as the basis for their reflective practice sessions.

Fooks along with Fiona Gardner has developed a model that ''involves the unsettling and examination of hidden assumptions in order to rework ideas and professional actions. The model draws upon reflective practice; reflexivity; postmodernism: and critical perspectives.'' (Fook & Gardner, 2013 p.21).

Fooks is particularly interested in the use of language during reflective sessions as she highlights the way words are used to describe a situation or an emotion can be linked to issues of knowledge and power. Through the critical reflective process an analysis of power dynamics within the workplace or in relationships can be explored and she purports transformative change can take place.

Therefore, the Fook's model focuses upon uncovering buried and strong assumptions whilst also giving power to group members and enabling an individual to act upon their own free will. Fooks (2010) suggests by working in this way she can get to the centre of an issue including emotional aspects. In essence this model is an amalgamation of several different reflective practice styles.

In this model there are two distinct stages of which the first stage asks a participant to use a critical incident to draw upon hidden assumptions and theories. During this initial phase of the reflective session led by a facilitator the rest of the group ask non judgemental and open style questions in order to gain factual information about the critical incident being explored. Through this process Fooks argues that the person who presents is able to make sense of these feelings by uncovering their own assumptions and personal biases.

In the second stage of the process the participant is helped by the group to come to an awareness of deeper and hidden assumptions and review their learning from the initial stage. The way in which this is achieved is through the presenter reflecting on their learning in the first stage and reflecting upon their assumptions and reasons for their thinking. By doing this Fooks argues that the person who has presented and explored their critical incident is now in a position to be able to identify how their own personal theory and practice might need to be adapted (Fook & Gardner, 2007).

Review of methodology

This literature review has taken the form of a deskwork exercise. It has included reading a selection of books pertaining to reflective practice, some of which were selected in relation to the theory of reflection and others because the focus centred upon integrating reflective practice in to the workplace or in relation to higher education and its application.

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The literature review undertook a search of journals and search engines using keywords (reflective practice, critical reflection, social work, social work education, students) to refine the search via Google Scholar, Google and websites including ResearchGate. The initial reflective practice search resulted in 5, 380, 00 elements which I then narrowed down to a review of critical reflective practice and this elicited 3, 630, 00 results. A more targeted search of critical reflective practice in social work contained 1, 51,000 results and finally a search of critical reflective practice in social work education resulted in 1, 330, 00 examples.

A request via ReseachGate for relevant articles was made directly to some authors because they had produced materials about reflection and social work education. Unfortunately they did not reply within the timescale of producing this journal and therefore, no information could be analysed or included from these additional sources.

Social Care Online and the British Journal of Social Work have been other sources of investigation along with consideration of relevant government and professional bodies. These have included the Department of Education, Department of Health, The British Association of Social Workers, The College of Social Work and Skills for Care publications that address social work training and post qualification education.

Findings

Schon's development of an approach to reflective practice has strengths with regard to providing an appreciation of the connection between professional understanding and practice.

It also offers a stage for ongoing wisdom and the best possible outcomes as a result of improved standards of practice. These elements link with the social work Professional Capabilities Framework and the HCPC standards of practice requirements. However, as mentioned above areas for development within this model include limited acknowledgement of the wider social and organisational factors; a lack of consideration of how power relationships impact upon individuals and situations and there is a limited awareness of how emotions impact upon the reflective process. All of these factors are important for trainee social workers (and other related professions) to take account of and to consider within their reflections and practice.

The Fooks model however, does acknowledge the fundamental importance of power dynamics, the broader organisational and social impacts along with how emotions affect our attitudes and experiences. As an approach it does appear to be quite prescriptive in terms of the different steps and stages of the model when compared to other well known models of reflection for example Kolb's four staged Learning Cycle and Gibb's six staged Reflective Cycle. These latter approaches do stipulate a cycle to be followed however; they do not make restrictions with regard to the length of time allocated to each stage or the type of questions to be asked.

From my experience of having facilitated the first session I was aware of keeping an eye on the time as each element of the session was time limited and the way in which questions could be asked had to be in line with the model and could not be deviated from. As the students and I become more experienced in the model it hopefully will feel less mechanistic and prescribed as a method of reflective practice.

Does teaching reflective practice help to prepare student social workers for the world of work?

There is a considerable array of literature in relation to the topic of reflection, critical reflection generally and with regard to education. However, it has been difficult to obtain information about reflective and critical reflective practice and its application in relation to social work education and reflective practice group work in particular. There appears to be limited research with regard to how reflective practice techniques help to prepare students for the world of work which is the research question I set out to answer. Having done an initial scan of the literature when I reviewed the contents much of it was not about the transition I was hoping to investigate.

Discussion of key findings

The question I set out to answer about whether teaching reflection to social work students helps to prepare them for the world of work in my opinion is an important area for further consideration. Especially considering the time and funds invested in training social workers.

It is relevant to know if the reflective practice opportunities throughout the course, including the Step Up to Social Work reflective practice sessions have provided insight into what reflective practice means and whether the newly qualified social workers are able to draw upon this learning to be reflective in the work place.

The College of Social Work Professional Capabilities Framework (PCF) is a holistic document that emphasises the importance of reflective practice for social workers. The PCF dedicates one of nine key domains setting the standards and capability statements for social workers to meet and aspire to at whatever stage of their career.

Conclusion

If social work graduates have not developed reflective practice skills during training they will struggle to complete the first year of practice as newly qualified social workers as the ASYE programme is founded upon critically reflective practice. During this intensive year of practice newly qualified social workers have to complete nine reflective logs and take part in regular reflective supervision and action learning set sessions.

If I were to utilise the literature review I would use it to undertake research of students at the beginning and end of their training and of the newly qualified social workers in first and subsequent years of practice to establish if the skills of reflective practice learnt in university have aided their ability to be reflective practitioners. I would probably do this via questionnaires and focus group sessions.

I would also consider using the Step Up group with their permission to devise a questionnaire and carry out a focus group. I would conduct this outside of the reflective sessions as a small sample to test out whether they believe the group work sessions have aided their learning in preparation for the world of work.

Does teaching reflective practice help to prepare student social workers for the world of work?

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A study of effective and best practice usage and implementation of tablet PCs in engineering education

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Abstract

There are certain limitations with traditional presentational-style ('PowerPoint') lectures that must be addressed in order to improve the quality of lecturing and meet students' expectations on lecture quality and experience. Tablet PC devices can offer a suitable compromise between the progressive style of delivery of traditional blackboard/overhead projectors, and the ability to deliver multimedia material in an integrated session. In this paper the effectiveness of a tablet PC in an engineering education setting was examined from the point of view of both lecturer/instructor and student. This was done via a survey of existing work fousing on four key usage models : i) a device for lecture delivery, ii) a device for student study, iii) a channel for instructor -student communication and iv) a device for productivity. From this the key benefits and limitations were identified with regards to suitability, functionality, and implementation. A series of best practice approaches were then devised to best implement tablet PCs into engineering education courses. Tablet PCs are shown to be very effective in creating active learning environments (ALEs) which are are beneficial in catering to more learning styles, improving engagement, and, subsequently, cognition and attendance.

Keywords: Tablet PC; Engineering education; Active learning environment.

Introduction

The modern lecture

Lectures, in a traditional sense of the word, are a formal, one way transfer of knowledge by spoken or illustrated word. Due to constraints on time and the ubiquity and ease of creating presentational style Microsoft PowerPoint lectures, they have become the norm for a large number of university and instructional courses . Lectures serve to impart information to students and are the most direct and efficient means to do so. However, this alone is not sufficient for building understanding— that ideally comes from a student's own studies, complimentary tutorials, and seminars. Lectures are effective in *instruction* and *delivering knowledge ,* but are not sufficient for *learning.* A form of verification (i.e. reflection) is required via feedback, peer assessment, and/or demonstration of knowledge (Anthony, 1996).   Unfortunately, over time, the lecture has taken on a more prominent role in student's expectation of the learning activity, but can only ever be one part of it.

Research by Sander et al (2000) highlighted that students would like to be taught through a combination of interactive lectures and group based activities. Formal lecturing appears to be the least favourite method of students. Indeed, the effectiveness of PowerPoint slides is greatly limited due to the inability to adjust content in reaction to students' responses (Goh et al, 2013). This lack of interaction stifles student engagement and thus cognition. It is perhaps unsurprising then that students mostly dislike lecturing, preferring instead smaller group seminars and tutorials (Kandiko & Mawer, 2013).

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Due to the significant change in the higher education market in the UK in 2012 there has been a business-driven need for universities to improve the perceived quality and consistency of its courses to students. Several concepts have been promoted in recent years to achieve this: the flipped classroom model in particular (see Lage et al, 2000, or Crouch & Mazer 2001, for example) has been proposed as a means to increase interactivity by transforming the lecture into a seminar like discussion of material that students are asked to view before hand. This creates more time for tutorial style interaction, but is still of limited use in large classes, and imposes a requirement that students view the material prior to the session. It also requires a fundamental restructuring of a lecture course. Instead, there are possible options to maintain a traditional class structure, but improve the pacing and interactivity of slide based, lecture sessions. IT resources are believed to play an important part in improving the student experience by leveraging technology to provide more effective sessions, as well as provide flexible study resources and create intuitive channels of communication to students (Gordon, 2014). An increasingly popular tool being explored to that end is the tablet PC.

Tablet PCs

Bill Gates is credited with the term 'Tablet PC' in 2001. The electronic ink (e-ink) capability is the crucial functionality that sets it apart from other portable computers. One arguable benefit of overhead projectors (and their modern equivalent: the document projector) that was lost in the transition to PowerPoint slides was the progressive manner of development of material in the lecture through written material. Such a feature is significant when delivering complex engineering concepts. The synchronisation of both visual and verbal information is likely superior for student cognition (Hegarty, 2004; Walker et al, 2008). With PowerPoint slides it is very difficult to recapture this behaviour, which in the moment may be critical to help students follow the development of information and maintain focus. There is also more chance for interaction and discussion with students when material can be added to a live document or sheet. Tablet PCs are well suited for this capability and would make it possible to provide both progressive delivery of information with computer based multimedia content. Benlloch-Duulde et al (2010) provide a very thorough conceptual map for the possible uses and advantageous features offered by Tablet PCs.

Much is made of the tablet PCs in providing a platform to produce an active learning environment (ALE). A rather loose definition of this is provided by Prince (2004):
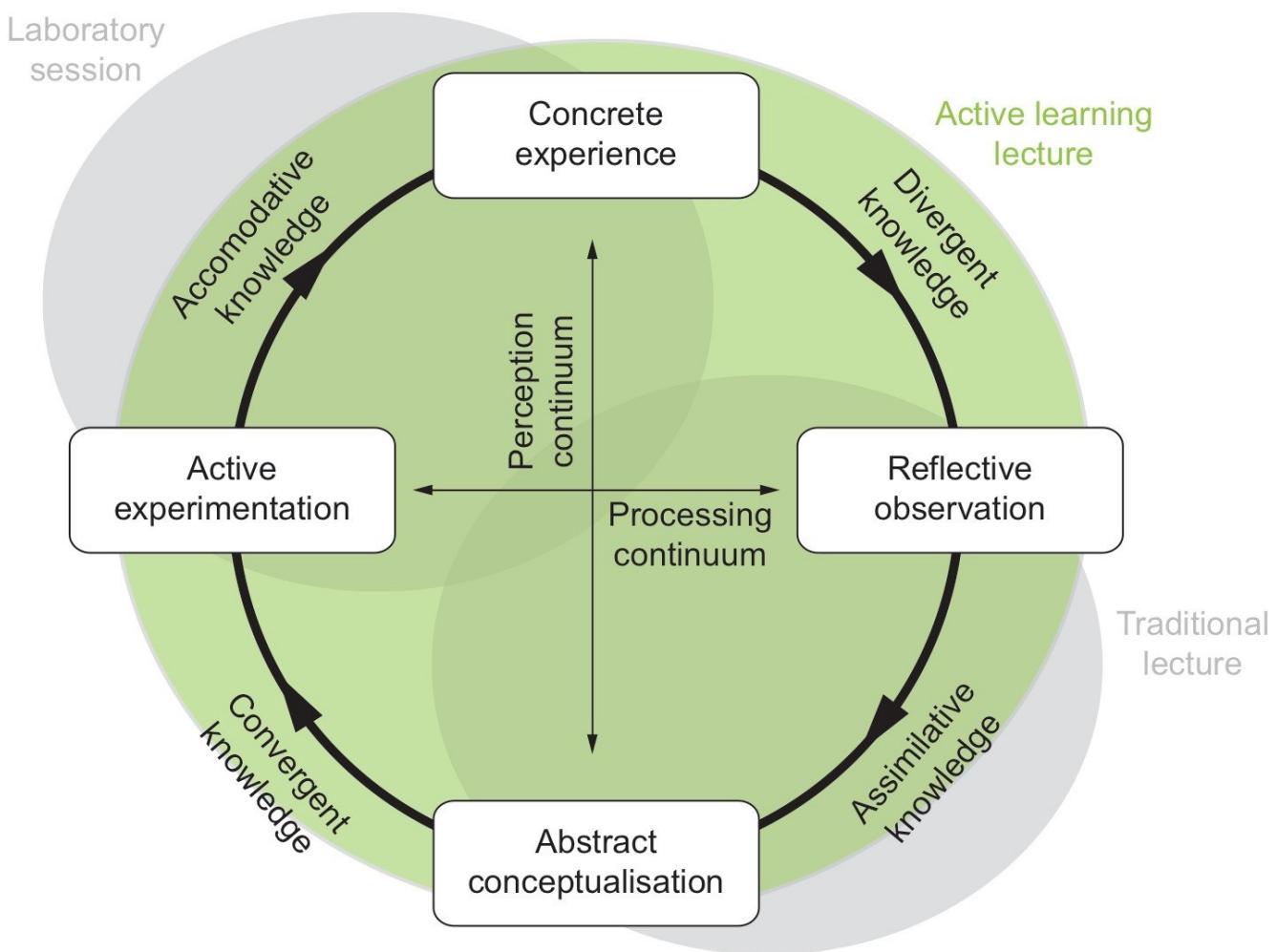
"Active learning is generally defined as any instructional method that engages students in the learning process. In short, active learning requires students to do meaningful learning activities and think about what they are doing. … Active learning is often contrasted to the traditional lecture where students passively receive information from the instructor."

Learning is evidently a process, and modern thinking places greater importance on a multi-faceted approach (i.e. connectivism; see Lachman, 1997) rather than a specific method to create a desired product (the behaviourist model). In that sense the term 'active' learning is somewhat spurious since 'true' learning must always be active (see Adler, 1982).

The benefits of tablet PC use in creating ALEs are illustrated in Fig. 1, utilizing Kolb's experiential learning cycle (Kolb, 1976, 1984). A traditional lecture may only capture the bottom right quadrant of the cycle. with reference to Honey and Mumford's (1986) learning

Fig.1. The extent of traditional, laboratory, and active learning environments on capturing Kolb's experiential learning cycle in sessions.

Styles such as lectures would exclusively favour 'Reflectors' – those who prefer to watch and listen, gathering information before utilising it to solve problems. However, many commentators have observed the majority of engineering students to be visual, inductive, active learners (Felder & Silverman, 1988; Water-Perez et al, 2012). Tablet PC-based sessions have been demonstrated to facilitate a broader inclusivity of learning styles (Stickel, 2009; Kothaneth et al, 2012), and thus support the entirety of Kolb's learning process in one session.

The aim of this paper is to review the current literature on the use of tablet PCs in the education disciplines in a university context, and establish from them best practice uses to implementing them in a lecture session. As the devices are of use to both staff and students , the benefits to both will be reviewed and to what extent these benefits come at different scales of implementation

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Best practice use of Tablet PCs

Methodology

The analysis of the literature has focused on four different uses for tablet PCs: i) a device for lecture delivery, ii) a device for student study, iii) a channel for instructor-student communication, and iv) a device for productivity. The majority of the literature falls within the first three of these categories. The literature surveyed has also been restricted mostly to that involved with engineering education as they deal with specific issues related to the discipline; namely the delivery of system diagrams, conceptual frameworks, and theoretical and mathematical derivations. Existing works were searched for primarily using Google, Google Scholar, SCOPUS, IEEE Xplore and using combination of the search terms "Engineering Education", "Tablet PC", and "Active learning" A more general review of tablet PC use can be read in other works (e.g. Mckenzie & Franke, 2009).

i) A tool for lecturers

The most widespread use of tablet PCs in a lecture/instructor environment is by modifying lecture slides with parts to complete in class via e-ink. Even this relatively trivial implementation is reported by students to have benefited their attention and engagement (e.g. Walker et al, 2008)

In a recent tablet PC trial undertaken by Thomas (2014) the devices proved very capable in achieving the desired changes in pacing and interactivity of their lectures, which most students preferred over PowerPoint slide based lectures. A similar observation was made previously by Singhatanadgid & Sripakagorn (2012). Hieb & Ralston (2010) comment that due to the use of a tablet PC instructors increased eye contact with students and made significant savings in time and energy by not needing to erase material from a whiteboard. Generally, lecturers have been positive about the natural writing mechanism that tablet PCs support (Tront, 2006). The ability to sketch over existing figures and diagrams, or create new ones live, as well as make annotations and comments is very consistent with the development and instruction of engineering material.

ii) A tool for students

Virginia Tech is widely referred to as a pioneer of achieving an integrated, committed active learning environment with its mandatory policy of every first year student purchasing a tablet PC for their engineering college. The ground work for integrating tablet PCs into the college's curriculum came with pilot studies in 2002 into exploiting the tablet's e-ink features (Tront, 2007). By 2005 they were experimenting with two-way student-instructor communication (see next section) and student collaboration in classes (specifically, a trial of 20 shared tablets between 40 students). In 2006 they introduced their tablet PC policy for every student. Other universities, such as the University of Louisville, have also adopted the same policy.

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For students a tablet can facilitate the ability to work interactively within the lectures, collaboratively with other students, and allowing note taking in a natural manner which has been shown to increases cognition (e.g. DiFesta and Gray, 1972; Colwell, 2004; Tront et al, 2007). This is explained in terms of greater cognitive processing that occurs when longhand note-taking students are required to summarise or paraphrase notes, whereas laptop users almost invariably transcribed lectures verbatim, even when encouraged not to (Mueller and Oppenheimer, 2014). Furthermore, the digitisation of their notes makes it easier to organise, search, and review. This is especially important in an engineering context as it can instil in students the important skills of recording design decisions, analysis history, and minutes from meetings and communications (Firth & Surgenor, 2006). Lohani et al (2008) used this aspect effectively to teach and encourage students to maintain a properly laid out electronic logbook. Kothaneth et al (2012) had students work cooperatively with tablet PCs in class, which helped them to share ideas and engage in peer instruction and review.

iii) A tool for student-instructor interaction

As tablet PCs are typically wireless enabled devices they can be used as part of an integrated wireless ALE for real-time student assessment and feedback. The key requirement for this kind of integrated session is a classroom management software (CMS). One such CMS is Anderson's popular 'Classroom Presenter' (Anderson, 2006). Classroom Presenter is particularly powerful in providing bi-directional communication and sharing between instructors and students, via a localised ad-hoc wireless network. Existing lectures in PowerPoint can be converted to a proprietary format to enable effective annotations to be added to slides. Whilst menial to do, it can provide opportunity to introduce more involved activities with students (Tront, 2005; Bonastre et al, 2006; Cao, 2014). Other software available includes 'DyKnow Vision' (see Fang, 2012) or 'NetSupport School' (Enriquez, 2005, 2007). This software was also used by Rawat et al (2008) who argue it can encompass all of Chickering & Gamson's (1987) seven principles of good practice into the classroom. At Virginia Tech the lecturers noted significantly higher levels of active participation in set exercises in their ALE (Tront, 2005). Students were reported to prefer these interactions to CRS (classroom response system) clickers due to to the increased communication, enabling the instructor to assess the process in the task development, not just the final results.

A significant feature of these CMS is that students can access the lecturer's slides (with recently added annotations) in class, and add their own annotations. The lecturer can also receive the students' annotations and display to the rest of the class. In the same way as CRS systems this can remove barriers to engagement. Additionally, the benefit of this kind of wireless bi-directional communication is very rapid detection of student comprehension, which can then inform immediate feedback (see also Koile & Singer, 2006). The feedback (both instructor and peer) can be more comprehensive than that possible from CRS. This is very beneficial as feedback is one of the main aspects students are frequently critical of (Dearing, 1997, p. 117; also still apparent in recent National Student Survey results to date) despite often being indifferent to it (Wotjas, 1998; Duncan, 2007). Students regularly have difficulty in critiquing their own works, and guided reflection in the context of the purpose and rationale for the work has noticeable improvements (Thorpe, 2002). ALEs would facilitate this behaviour well.

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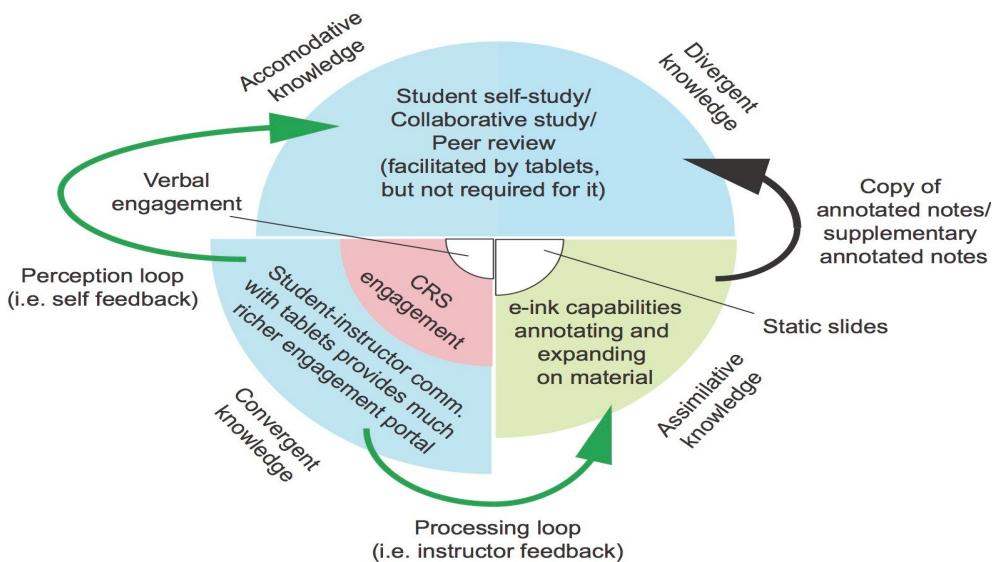
iv) A tool for productivity (staff and students)

It is also worth pointing out that tablet PCs can offer productivity improvements out-of-class, particularly in terms of workflow and assessment marking. Many lecturers have also expressed the improvements in efficiency and detail of feedback in marking assessments that the e-ink capability provides (e.g. Gorgievski et al, 2005). There are examples of tablet PCs being effective in laboratory classes (Rawat et al, 2008) and as electronic log books for students (Lohani et al, 2008). One example suggested by a lecturer was a wireless mobile user interface for a Labview-based lab session (Thomas, 2014). The portability of the devices also makes them very attractive for field work where time savings can be made (Benison et al, 2006). As capable multimedia devices they also provide a gateway to VLEs as well as external learning resources. Note that this is useful for both staff and students.

Implementing tablet PCs into lectures effectively

Following a review of the literature, the benefits of tablet PCs have been summarised in Fig. 2. In this diagram, which maps loosely to Kolb's learning cycle in Fig. 1, the greater distance from the centre illustrates greater expected student engagement. Whilst it may be possible to encourage accommodative and divergent knowledge in lecture, much of this would be expected to occur outside with student self-study where they have the chance to experiment and experience the knowledge obtained in the lecture. A tablet PC used by a lecturer may greatly improve the assimilative phase of the lecture, but real improvement elsewhere requires input from the students, where student-operated tablet PCs may help. It must always be remembered that using a tablet is not sufficient to create an ALE. The aims of this paper have been to show how tablet's can be used to assist and facilitating their implementation.

Fig.2. Useful functionality of tablet PCs in an active learning environment. The green quadrant is provided for by a lecturer/instructors tablet PC. The blue part is provided for by student tablets.

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Small scale (individual bespoke) use

With sufficient planning a lecturer with a tablet PC can implement an effective ALE session. A relatively simple way of achieving this is breaking the lecture up with exercises, tests, or peer review sessions on a student's tablet PC (e.g. Robson & Kennedy, 2013; Rawat et al, 2008). Price and Simon (2007) used this approach to pursue a social constructivist methodology, hoping to show students that direct verbatim notes are not adequate. The desired result was somewhat positive, but not conclusive. Enhanced mobility has also been cited as a benefit of the device. Using a wireless link to a data projector, lectures can achieve full mobility in the lecture theatre without loss of functionality (Goh & Calligan, 2013). Saving handwritten notes and sketches made on the slides and making them available to students after class via a VLE is also a very useful feature (e.g. Enriquez, 2007; Singhatanadgid & Sripakagorn, 2012), especially as it generates a record of the exact content discussed in the lecture. Lecturers can also take advantage of the inbuilt audio and screen-capture recording features in such devices to create supplementary voice-overs and videos to create further offline resources to further support the bottom right side of the learning cycle (e.g Furse, 2011). These will be of particular use for distance/ off-campus students. As established in the previous section, outside the lecture class these devices can also offer significant efficiency and time savings in terms of assessment marking through richer feedback (e.g. diagrams, flowcharts).

Issues for lecturers adopting any new technology in an existing course are how to best introduce the capabilities in a meaningful way. Integrated use of a tablet PC will often mean rebuilding a course from the ground up. Nevertheless, benefits can be made by thoughtful modification of existing material and delivery. One disadvantage would be the need to make similar annotations each time the course is run, but this is somewhat unavoidable given the nature of the task. Microsoft OneNote is commonly used throughout the literature since it possesses a lot of functionality for making and arranging notes and drawings, but it does not have the presentational output that PowerPoint offers. However, since there is little practical use in the majority of lectures having a presentational style, OneNote is possibly a better software tool when dealing with explanations of topics and developing system concepts and mathematics.

Large scale (department-wide) use

University education is quite varied due to the individual styles of each lecturer. Thus, for a fully consistent ALE experience departments/colleges/institutions must put in place a strategy to effectively propagate this kind of environment (c.f. Virginia Tech). The main barriers to an institute-wide distribution of tablets and establishment of an integrated tablet -based ALE across the board are the cost (equipment and time) and individual lecturer styles and resistance to change.

Whilst more consumption-orientated devices (Google Nexus, iPad, etc.) are now available at lower costs, feedback from students on their suitability has generally been poor, citing poor notetaking capabilities and a preference for full scale tablet PCs (Thomas, 2014) . Furthermore, the focus on consumption is likely to result in far more distraction than actual

productivity in class; this would explain the difficulties of maintaining student on-task focus encountered by Romney (2015). Designing such an ALE is also fraught with tensions with respect to screen readability (compared to paper), limited battery life, and lost equipment. Some of these problems can be eliminated by combined digital and paper-based activities (Liao et al, 2008). There is an inherent issue with providing students the freedom of a digital device in a classroom environment. Students are known to be easily distracted, especially when digital and social media are easily accessible (Kraushaar & Novak, 2009). Perhaps then the e-paper style of devices, that lack the ability to access these distractions, would be more suitable for students. However, such a problem should ideally be addressed with social (re)conditioning not authoritative restriction , though this is clearly a much larger issue. Another common concern is the robustness of the wireless network between devices –if it fails it can grind the session to a halt.

Whilst additional time needs to be devoted to the planning of an ALE session, the extra preparation time is arguably justified by the benefits of the investments (Lord and Perry, 2006). However, this preparation time is often additional time required of lecturers so, if departments want staff to invest in improving lecture quality, they should be mindful of the extra pressures designing effective ALE sessions places on staff (Romney, 2015). Evidently, department-wide implementation is a considerable investment and needs to be supported sufficiently. The use of technology "champions", who are motivated and engaged with the technology are very important in ensuring a broad, large scale ALE is successful.

Discussion: is there a real case for tablet PCs?

In this paper the author has attempted a comprehensive, but by no means complete, analysis of the current commentary on tablet PC use in engineering education. It is however accurate to say that the majority of the literature, evidenced by classroom-based experiments, is consistently positive in the improvements in engagement by students in classes incorporating tablet PCs. However, to address the elephant in the room: are these observations perhaps purely due to the novelty of the device compared to the more frequently experienced equivalent (PowerPoint presentations)? Were tablet PC use more prevalent, would it be as engaging to students at the same level as observed in studies? Some works have attempted to show improvements in the performance, and thus ultimately the grades, of students in classes that incorporate tablet PCs. Some small scale studies (e.g. Sutterer and Sexton, 2008) found no significant improvement in students final scores compared to a traditional didactic lecture course. Both Ellis-Behnke et al (2003) and Enriquez (2007) report statistically significant improvements throughout class and exam performance, but only report these for a one-year period. There needs to be more longitudinal studies to conclusively inform the effectiveness of tablet PCs in contributing to assessment performance.

The majority of studies to date have been undertaken with surveys and questionnaires from staff and/or students. Whilst useful there are inherent limitations and oddities with such methods, no less in terms of comparability between different studies. Regardless, the improvements observed in inclusivity of learning styles and student engagement that tablet PC-orientated sessions can produce is perhaps enough to make its use warranted. The use

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of tablet PCs in facilitating an ALE for students who respond more positively than to a conventional lecture was demonstrated across many examples in the literature. However, tablet PCs are not essential to achieve this kind of environment. Collaborative Project-Based Learning, for example, is a popular name for project-focused student group activities that try to incorporate multiple instructional strategies. Whilst tablet PCs can support these greatly, they are not crucial in achieving the desired results (Water-Perez and Dong, 2012). A mandatory device policy for students could be excluding to those students from disadvantaged socio-economic backgrounds and those with computer-operational disabilities. Subsidy schemes and study needs agreements could be way of alleviating this and possibly entice students to enroll.

Similarly for CMS software: a lecturer at the College of Engineering at Boston University implemented a crude (and not real-time) ALE using student submissions to Dropbox and Google Docs (Romney, 2015). This example highlights that personal aptitude of software and communication systems plays a significant part in the viability of different ad-hoc methods. A properly integrated, department-wide ALE policy is therefore a significant training investment. However, just as students have their own preferred learning styles, lecturers too have their own preferred learning and lecturing style. Attempting to force lecturers to use technology they are not comfortable with will not elicit the possible benefits.

Equally, caution must be raised in over-use or poor implementation of novel and quaint technologies. Kandiko & Mawer (2013), in their study, point out that students are generally not concerned with pedagogical benefits of technology, or innovative uses in teaching, caring instead for more contact time and functional, efficient IT resources. Poorly thought through distribution and implementation in a curriculum will likely lead to limited usage (see for example Burke et al, 2005). An interesting question to consider is which group of students (first/last year) would benefit most from tablet PCs?

Conclusions

It is clear from the literature that tablet PCs are favoured almost universally in terms of student engagement and active learning they promote in a lecture session. From reviewing the literature this paper has identified the suitability and best practices of using tablet PCs to facilitate active learning environments. Using simple modifications of existing lecture material and incorporating the feature offered by e-ink devices is sufficient by an individual lecturer in improving the engagement, and hence learning process for students. When the capabilities of a wireless tablet device are leveraged in an integrated, department-wide manner, the effect on students' perception and education can be transformational. Some of the issues and barriers to implementation were also discussed in this paper and are hopefully of use to other academics and policy makers.

Given the complexity of many engineering problems addressed, particularly in final year courses, the greater flexibility of delivery, greater interaction, and engagement is of great benefit to both lecturers and students. The capabilities discussed here possible with a tablet PC (and other technology in general) is perhaps key in shifting the role of the lecturer

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from an instructor, to a facilitator, of learning. This is however only realizable if the implementation is managed and implemented well.

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Identifying and Removing Gender Barriers in Open Learning Communities: *The Programming Historian*

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Abstract

Open online learning communities are susceptible to gender barriers if not carefully constructed. Gender barriers were identified in *The Programming Historian,* through an open online discussion, which informed an anonymous user survey. The initial discussion pointed towards two barriers in particular: a technically challenging submission system and open peer review, as factors that needed consideration. Findings are put in context of the literature on gender and online communication, abuse, and online learning communities. The evidence suggests that open online learning communities such as *The Programming Historian* should work actively to promote a civil environment, and should listen to their communities about technical and social barriers to participation. Whenever possible, barriers should be removed entirely, but when that is not feasible due to financial or technical constraints, alternatives should be offered.

Keywords: gender; open learning communities; digital humanities; accessibility; peer review; technology

Introduction

The Programming Historian is an open-access peer-reviewed publication of digital history methodology that accepts public submissions. Tutorial-style papers aim to provide historians with practical digital skills to directly aid their research processes. As such, it is a publication of methodology. As digital humanities is an interdisciplinary field, this subject-neutral space offers an important venue for sharing the 'how' of digital research. The project was initiated in 2011 by a group of scholars, which included the author.

Many authors use the tutorial-writing process as a space in which to master new methodologies, following the idea that there is no better way to learn than to teach. In keeping with the open ethos of the project, peer review is conducted openly on an online message board hosted by social coding website, *Github*. The editors hoped that this would increase the civility of peer review and foster an environment in which authors could hone skills in a supportive space. While all work is thoroughly reviewed, the editorial policy is always to work closely with authors to improve the work until it is publishable. This is distinct from the editor-as-gatekeeper model, and instead provides mentoring as needed. In this regard, the editorial board views *The Programming Historian* as both a scholarly publication and an open online learning community.

Until November 2015, the editorial board believed that the community was gender neutral, as the team had not consciously constructed gender barriers. However, a self-assessment revealed a different picture. Since launching in July 2012, the project had published 45 tutorials by 30 different authors. Of those, only seven authors (23%) were women.

According to the Royal Historical Society's recent report on gender (2015), women make up nearly 40 per cent of academic staff in British university history departments, and a slight majority of A-level history students. This suggests that the gender imbalance of *Programming Historian* authors is unrepresentative of the potential authorship pool. As this had been unintentional, the editorial board solicited feedback from the digital humanities

community in an attempt to identify invisible barriers so that they could be addressed. Building on Kirk *et al* (2013), who concluded that 'awareness is the first step towards action' when seeking to remove barriers to participation, this paper shares the findings of that assessment for the benefit of other open online learning communities.

Literature Review

Studies of women in online education often focus on the formal university online classroom rather than open communities. However, there are useful parallels because of the asynchronous web-based communication common to both. As such there are also fruitful connections to be made with research into gender and online communication. It is worth noting that studies can sometimes perpetuate gender stereotypes, and a belief that gender is binary: male / female. Remmele and Holthaus (2013) challenge the inherent inflexibility of this approach to understanding gender. Instead they believe we should think of gender as something we *do* rather than something we *are.* They argue that our misunderstanding may lead to gender stereotypes, such as the belief that men are better at working with technology.

Stereotypes in research are particularly important to understand in studies conducted outside one's own cultural context. For example, studies from countries in which women are still assumed to be the primary care giver can give a skewed view. These studies often tout the flexibility of asynchronous online education, making it possible for women to balance family, work, and study needs. These include studies from Turkey (Yukselturk & Bulut, 2009) and Mauritius (Gokool-Ramdoo, 2005), but also the United States (Eudey, 2012).

There are clearly situations in which women are affected differently than men in an online communication environment, which includes communities like *The Programming Historian*. Herring (2000) rejects the idea that online environments are gender neutral. Her analysis of online bullying and harassment (1999) showed that women in early socially-focused chat rooms were routinely subjected to abuse tactics by men. She noted that men in a chat room frequented by English-speakers of Indian descent felt that women's role in chat rooms was to flirt, and if they refused to do so, they were quickly subjected to *ad hominem* attacks. She noted that the men frequently asserted their opinions as 'fact', and often reverted to sexually explicit or crude language (Herring 1992, 1993, 1996). However the problem was not unique to Asian men; even in more academically focused online spaces of predominantly Canadian and American scholars, Herring (1999) found that women were expected to provide 'minimal participation, in keeping with the traditional expectation that public debate is predominantly a male preserve'. Several other studies confirm this, including Rovai (2001) and Chan *et al*, (2013), who found that men were much more likely than women to adopt an assertive online tone, in contrast to a more supportive and helpful approach by women. Rovai and Baker (2005) believe this comes down to different strategies in an online space. They argue that women seek to establish intimacy, whereas men often seek to establish a hierarchy. However, a study by Ma and Yuen (2011) showed the opposite was true in Hong Kong, and thus this finding may be culturally specific.

Online abuse is particularly pertinent to thinking about open peer review, which is used at *The Programming Historian.* Peer review involves a power relationship between reviewer and author, and if women are more likely to fear online abuse, the model may be a gender

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barrier. McSporran and Young (2001) warned that it was important for educators to prevent a 'locker room atmosphere' in an online learning environment, and that building 'people-friendly' spaces was a fundamental first step in building an online learning community. In the context of the *Programming Historian*, the 'educator' would be the 'editor' – the person in charge of the environment. This role of educator as moderator is an important theme in the literature. Burge (1998) warned that educators must watch for 'male domination of discussion'. According to Herring (2000), women tend to prefer policed online environments that ensure on-going civility, and are more likely to fall silent or drop out of conversations when faced with aggression. Browne (2003) argued that it was crucial for students to trust their tutors in an online environment, and that it took time to build that relationship to the point where a community of learning could establish.

There are of course parallels in other industries; Hughes and Smail (2015) noted that students transitioning to university were most worried about the social aspects of joining the community rather than worries about their academic abilities. As a number of *The Programming Historian's* authors are relatively new to academic publishing, the parallels are even greater. Physical spaces (university campuses) and online spaces (digital journals) may look different, but the social requirements of participating in both are very similar. In many respects the online space may be more challenging, as there are rarely opportunities to gauge body language or other non-verbal cues when all communication occurs in writing. Thus, those building online learning communities should also keep in mind these fears about social barriers in unfamiliar spaces.

Importantly, the gender of the educator appears not to be significant as long as they are trusted and maintain civility and focus (Rovai and Baker 2005). Torrens (2007) believes that online models of learning achieve their greatest potential when they become collaborative places to construct knowledge rather than platforms for the transmission of ideas from expert to student. This position is supported by Rovai and Wighting (2005). This suggests great potential for open peer review if the other challenges can be overcome. Eudey argues that 'constructivist' approaches to online pedagogy were most effective, such as those described by Rudestam and Schoenholtz-Read, as well as Sherman and Hurshan, which de-emphasised the instructor as the 'transmitter of knowledge' and instead promoted student-centred learning (Eudey, 2012).

If policed effectively, an online learning environment has several advantages over an in-person classroom. Online environments typically offer asynchronous communication, and thus remove the immediate pressure of seminar discussions. Lin and Overbaugh (2009) noted that in blended classrooms (online & offline), two-thirds of participants engaged in online activities preferred asynchronous modes of communication to immediate communication methods such as messaging systems. This was true regardless of gender. Browne (2003) notes that this allows for greater chances for reflection and careful construction of a contribution. Ma and Yuen (2011) as well as Little-Wiles *et al* (2014) noted that women expressed themselves more frequently in online environments than in face-to-face courses, which they argued may have been influenced by the chance to reflect before making a contribution. If true the previous research suggests great potential for a well-policed system of open review.

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Methodology

To understand the extent of gender barriers in *The Programming Historian*, the editorial board solicited two forms of feedback from members of the digital humanities community.

The first was an open call for suggestions on the project's online discussion forum, hosted on *Github.com*. *Github* is a popular online social coding platform used by software developers, which offers collaborative spaces to discuss and build digital projects. Asynchronous message board facilities are built into the site. *The Programming Historian* website is developed on *Github* so it was a natural place to host the discussion. This open conversation attracted ideas from 25 people (14 women and 11 men) who contributed a total of 58 comments. As these comments were posted on an open forum, the identity of contributors is clear, and includes many members of *The Programming Historian*'s editorial board and prominent members of the digital humanities community. The author initiated the thread and was amongst the contributors to the discussion.

Insider research is potentially problematic from an objectivity point of view, as he or she may have a vested interest in covering up findings that prove threatening to the ongoing survival of the project under review (Taylor, 2011; Humphrey, 2012). However, as Foster (2009) notes, insiders have advantages, as they may bring greater motivation and a particularly relevant set of experiences to the research that is not available to outsiders. To mitigate the potential risks of insider bias by the author, the initial open consultation described above was used primarily as a scoping exercise to inform the second stage of the self-assessment.

The second stage was an anonymous survey, developed with the help of Heather Froehlich, a community participant. Initial comments in the open conversation made it clear that the choice of venue (*Github*) was a gender-barrier, as *Github* is associated with male geek coding culture. To contribute, someone had to sign up for or already have a *Github* account. They must also be comfortable with the forum, which has a design and social norms that may be intimidating.

The survey was an attempt to focus the conversation and provide a more accessible way to participate. It required no registration and removed many of the pressures of posting in public. The anonymous survey, which can be read in full in Appendix A, received 47 responses (49% women). These included questions on demographics; self-assessment of one's technical skills, as well as familiarity with the project; open ended questions about particular aspects of the project highlighted as barriers in the open discussion; and an opportunity to provide additional suggestions. While the questions about barriers identified in the open discussion are undoubtedly leading, they were included to focus the discussion in ways that the project team felt would lead to practical suggestions.

The ten-question survey took approximately ten minutes to complete. All questions were optional and most questions had a response rate of >75%, with lower response rates on free-form questions 8 and 9 (Appendix A).

In both the open forum discussion and the anonymous survey, the participants were self-selecting. The survey was advertised via the project website, the discussion board, and through Twitter.

Findings & Discussion

In general, responses on the open discussion board suggested a wider gulf between men and women than did the anonymous survey. This suggests that women who posted their thoughts publicly may represent an outspoken or confident minority, and may not reflect the breadth of concerns of the wider community. That is not to suggest that those open contributions should not be taken as seriously as the anonymous responses, but merely that the format of the open discussion may have resulted in some potential participants thinking again before sharing ideas. As the open discussion occurred on an asynchronous open message board, early respondents had the opportunity to direct the conversation.

The early posts largely put forth concerns of parents trying to balance work and service commitments. A number of self-identified mothers suggested that they were too busy with child-minding to contribute more actively to online learning communities. While this is undoubtedly an important concern, not all women were comfortable with the stereotype this risked perpetuating. One female contributor acknowledged that 'it is currently more likely that a child's primary caregiver will be a woman, but I don't know that further gendering the role is helpful'. This disagreement connects well to Remmele and Holthaus (2013) and their warnings about presenting cultural gender roles as gender characteristics. The conversation also suggests that a future study might require differentiation between the needs of parents and non-parents to determine barriers that affect each group.

'Busyness' was also suggested as a barrier for female digital humanists with strong technical skills. A number of these women said they received frequent requests to contribute, as every project seeks female team members. Limited supply means these women can be stretched too thin. However, this may not be a gender problem. One contributor acknowledged the problem of over-commitment, but suggested that she saw 'no particular evidence' that these women were busier than their male colleagues.

While no consensus was reached amongst participants of the open discussion, a number of themes emerged which informed the development of the anonymous survey. The original intention of the open discussion was to identify problem areas with the project, so following up on these emerging themes helped the editorial board focus the contributions of the subsequent consultation towards practical suggestions that could make a clear difference to the project.

Those suggestions included (but are not limited to):

- The submission system for authors was too technically challenging.

- The project's policy of open peer review may raise fears of online abuse.

- The ratio of men to women on the editorial board may deter women.

- The option of mentoring for authors may encourage more submissions.

- Encouraging co-authorship for women with ideas but not enough time may increase participation.

These themes informed the survey, which for reasons of time and the need for focus, concentrated on understanding the first two issues.

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The Submission System
The Programming Historian has no active budget, so uses free open tools to run the website and message boards. At the time of the survey, potential contributors of a tutorial had to write their submission in a format known as 'markdown', which uses symbols to denote parts of the text. For example, instead of using the formatting features in *Microsoft Word* to create a section header, you would write:

#This is my header

There are similar formatting options for creating links, bold, italics, underline, lists, and other common styles used in tutorial writing. This format is designed by computer scientists to be sustainable as no proprietary software is needed. It is intended to be both human and machine-readable (once you learn to ignore the symbols).

Submissions were uploaded using what's known as a *Github* 'pull request', which involves using your computer's command line to send files to the project website for review. This requires an understanding of 'pull requests', which is common amongst computer programmers but unusual amongst digital humanities scholars.

The editorial board acknowledged that this was not the most intuitive system, but it was free, and the editors hoped that detailed instructions would prevent it from becoming a significant barrier. While the survey suggested that many users, both male and female, were supportive of the use of *Github* and markdown for submissions, and understood the economics behind the decision, the community was divided on this use of technology. One male contributor implied that the system was a good way of ensuring only *real* digital humanities scholars were submitting lessons, noting: 'Lovely vetting process. You must be this tall to ride the ride'. However, a number of men and women strongly expressed their dislike for the option; women were more likely to be lukewarm or openly disdainful, suggesting that this was a significant barrier.

A number of female respondents noted it was 'very inaccessible', that 'I can see the intimidation factor' and that they 'really don't have time to learn another format'. However, men too expressed their dislike for the system, one of whom noted, 'That's terrifying to me'.

One reason for this gender-disparity may be that the women who contributed to the survey, self-assessed their awareness of markdown significantly lower than male contributors (less than half of 21 women were able to 'describe markdown casually to a friend' versus 65 per cent of men) Markdown stood out as distinctly male amongst self-assessed skills. Women declared themselves more familiar in most categories, including HTML and CSS (women: 95%; men: 71%), and XML (women: 67%; men: 47%). Surprisingly, markdown is similar to HTML and XML, so the leap between them should not be far for new learners, but the barrier persists.

A number of respondents suggested clearer documentation and guidelines for the process would help, as well as the option to use another system. The clear response from reviewers was enough for the editorial board to begin exploring other submission options. Other digital humanities projects using *Github* or markdown should consider how they might pose obstacles for potential contributors.

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Open Peer Review

Openness is an important tenet adopted by many digital humanities projects. *The Programming Historian* is an open-access publisher, requires tools and techniques to use open access software whenever possible, and practices open peer review. This last policy was adopted to promote civility in the peer review process. Many academics will have experience with *ad hominem* reviewer comments from anonymous peer reviewers, and this has led to a number of journals experimenting with open review to promote civility, as long as the online learning community is well-policed by editors (Burge, 1998; Herring, 2000; McSporran & Young, 2001; Browne, 2003; Rovai & Baker, 2005).

Peer review itself is of course not a gender neutral process, but the research suggests that anonymous peer reviewing may put women at an advantage over men. Perhaps surprisingly, research by Lloyd (1990) showed that anonymous female reviewers were considerably more likely to favour female authors, accepting 62 per cent of their submissions compared to only 10 per cent by male authors. Men on the other hand, did not gender discriminate in the study. This finding was supported by Borsuk *et al* (2009), who showed that female postdoctoral researchers were the most critical referees in peer review.

However, open review may not be the most preferred gender-neutral alternative. A 2001 study by Melero and López-Santoveña found that 75 per cent of reviewers were in favour of the anonymous option, perhaps in the belief that it protected reviewers and gave them the option of honesty without fear of repercussion. As noted in the literature review, many women have had negative experiences with open online communication, and thus may be hesitant to participate in this form of review. Some members of the community may be concerned about 'making mistakes out in the open', particularly as these comments could be used to judge someone's scholarly prospects (Herring 1992, 1993, 1996, 1999; Rovai, 2001; Chan *et al.,* 2013).

Despite potential pitfalls, in this study both men and women were overwhelmingly positive about open peer review (29 like, 6 neutral, 3 dislike, 9 skipped – no gender difference), with the caveat that moderating by an editor who stepped in to prevent 'nastiness' was crucial to a successful system of open peer review. One female respondent noted: 'I *love* review systems where civility is prioritised', while another noted that open review would increase her likelihood of contributing because 'double-blind can result in (sometimes not fully intended) abuse'.

Though a few participants suggested the gender imbalance of the editorial board was important (at the time: 4 male, 2 female), interestingly male respondents raised this concern as often as women, and in both cases it was rare. This lack of widespread concern about the gender of editors supports the findings of Rovai and Baker (2005), who noted that civility was more important than gender.

Despite overwhelming support for open review, some respondents suggested that there were legitimate reasons why some authors would want an alternative option such as double-blind review or closed review, and that online learning communities that involve peer review should consider offering this option.

Conclusion

The number of respondents (24 in the open discussion and 47 in the survey) was modest relative to the site's hundreds of thousands of readers, but is proportionate to the size of the active community that participates in the project through peer review, authorship, or by contributing to the site's message boards, whose numbers typically include a few dozen scholars at any given time. The quality of the responses was high and provided thoughtful considerations of a project with a wide user base. The results of this open discussion and survey provided useful insights into the needs of women in open online learning communities. This was particularly the case as those needs related to technical (a complicated submission system) and social (open peer review) barriers.

The study found that technical barriers such as the submission system should be replaced when technically and financially possible. When this is not feasible, alternative options should be offered that lower the barrier, and if necessary, that shift any burden onto project leaders rather than community members. The findings support the conclusions of Eudey (2012) in particular, that platforms must be developed with the needs of users, not community managers, in mind.

Despite some respondents expressing concern about the open peer review system, overwhelmingly the community was in favour as long as civility was a priority. This reinforces claims by a number of previous studies including McSporran and Young (2001) about the importance of community leaders maintaining standards of civility to combat historically grounded fears of abuse. However, this finding challenges earlier work by Melero and López-Santoveña (2001) that reviewers prefer anonymity, suggesting that in the digital humanities community, a carefully managed open peer review is welcome and that the gender barrier can be overcome.

Finally, the open discussion in particular made it clear that many people have concerns that are connected to the challenges of motherhood and the pressures it poses upon time available for scholarly activity. However, as some participants pointed out, these are concerns that do not only affect women, and do not affect all women. Therefore, future studies should seek to understand the unique needs of people with caring responsibilities.

While women did identify a number of barriers to their further participation in *The Programming Historian*, the findings of this study suggest that these barriers were generally not gender-specific. This suggests that practices that are good for women may also be good for men, promoting the importance of best practices in open online learning communities.

Perhaps most notably, this study has shown that one of the best ways to identify gender-barriers in online learning communities, is simply to ask your community members.

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Appendix A – Anonymous Survey Questions

1. Which of the following ways have you engaged with *The Programming Historian* **(check all that apply)**

> **As a reader to learn a new skill**
>
> **As a peer reviewer**
>
> **As an editor**
>
> **As an author**
>
> **As an educator, facilitating the learning of others**
>
> **None of the above**
>
> **Other (please specify)**

2. Which ways would you be interested in contributing to *The Programming Historian*?

> **As a reader to learn a new skill**
>
> **As a peer reviewer**
>
> **As an editor**
>
> **As an author**
>
> **As an educator, facilitating the learning of others**
>
> **None of the above**
>
> **Other (please specify)**

3. On a scale of 1 (novice) to 6 (advanced), how would you rate your confidence with technology?

4. Please select which if any skills you have well enough to describe casually to a friend

> **Command Line**
>
> **Markdown**
>
> **Git / Version Control**
>
> **XML**
>
> **HTML / CSS**

Programming Language (eg. Python, R, etc)

Scholarly tool use (eg, topic modelling, GIS)

Other (please specify)

5. Do you consider contributions to *The Programming Historian* **a form of academic publication? Please tell us why or why not.**

6. *The Programming Historian* **asks contributing authors to submit their lessons in 'markdown format' and to make submissions via a 'Github Pull Request'. As an unfunded project, this free workflow allows us to minimise costs and editor time. Do you have any comments on this submission workflow and its accessibility?**

7. *The Programming Historian* **uses an open review process, in which both the reviewers and authors post publicly during the review and editing phase. It is our hope that this openness maintains civility between all parties, which is often lost in double-blind reviews. Thinking about your own feelings about open online conversations, would this policy increase or decrease your enthusiasm to submit a tutorial? Why?**

8. If you had to make one change to *The Programming Historian* **to make it more accessible and open, what would it be?**

9. Is there anything we missed in this survey? Please tell us and give a suggestion about how to account for it.

10. Which best describes how you identify your gender?

male

female

none of the above

I prefer not to say

Teaching communication skills to undergraduate Paramedic students: in the university environment or in practice?

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Abstract

The role of Paramedics requires excellent communication skills to be able to relay important, difficult and sensitive information to service users and other health care professionals (HCPs). To date there is a paucity of evidence about how these skills are currently being taught to Paramedics or the most effective means by which to do so. However there is a growing body of evidence from other medical educational literature to suggest effective methods for the development of these skills in healthcare students. The purpose of this study was to evaluate the evidence supporting these methods and subsequently to evaluate undergraduate student Paramedics' experiences of how their communication skills have developed over the course of their first year, which may be critical in forming and shaping their development in this area. A literature review was used to explore the current evidence base and subsequently a survey was administered to evaluate the students' experiences. The emerging trend from students was that certain modules from their university education had developed their communication skills more effectively than a placement in an alternative clinical environment, despite the literature suggesting that alternative placements have an important part to play in the development of these skills. Recommendations to be drawn from this study are that further emphasis needs to be made on integrating communication skills teaching into the curriculum with a greater emphasis on formative or summative assessment of these skills. In addition further exploration into the use of alternative placements for students is required.

Introduction

The aim of this evaluation is to investigate how undergraduate Paramedic students could be most effectively taught the communication skills which are so vital to their roles but which from a higher education view appear to be provided insufficient emphasis. A review of the international published literature was first undertaken to establish the current state of play with regards to the teaching of Paramedics and undergraduates of other healthcare professions. This review also identified many pedagogic suggestions from other healthcare professions which to date appear to be deficient in the teaching of undergraduate Paramedics. Subsequent to this a survey was administered to current first year undergraduate Paramedic students at one institution to ascertain their views on how their communication skills have been developed over the course of their studies. Finally, the survey sought to determine whether the students felt inclusion of an 'alternative' placement into the current first year curriculum aided the development of their communication skills.

Background

Since the introduction of higher education programmes to develop Paramedics 18 years ago, there have been repeated anecdotal reports from qualified staff that university graduate Paramedics have excellent knowledge and technical skills but lack the so called

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'soft skills' to be able to effectively communicate with patients, colleagues and other professionals (Donaghy, 2008). These anecdotal reports are supported by the work of Ross (2012), Neumann et al (2011) and Lazarsfeld-Jensen (2010) who concurred that whilst a high degree of clinical knowledge and skills are important, they are not isolated from the requirement to have good communication skills. Whilst both of these studies were based on an Australian model of Paramedic higher education, the Australian model is notably similar to that of the United Kingdom. Furthermore, Lazarsfeld-Jensen (2010) suggests that this is not a situation which is unique to the Australian situation, nor is it isolated to just Paramedic education, but that it is a global concern with all higher education healthcare studies.

To date, the University of Hertfordshire (UH) Paramedic Science curriculum for first year undergraduate students has focussed to a large degree on acquisition of skills and knowledge. This has been due in no small part to the placement timeline placing students on their first clinical placement on a front line emergency ambulance only eight weeks into the course. This has meant the focus for academic staff has been to rapidly progress the students' clinical abilities to such a point that they can gain maximum benefit from their early clinical exposure. This focus on knowledge and skill acquisition has no doubt resulted in a neglect of the 'softer' communication skills. First year students undertake a module entitled 'An introduction to interprofessional education' in which it is presumed that they will begin to develop their communication skills (see appendix 1). It has also been presumed for a long time that students can be expected to develop these skills in practice (on placement) with the assistance of their practice placement educator (mentor). However, it continues to be informally reported by practice placement mentors that students are not possessing the necessary communication skills to build rapport with patients or have reasoned discussions with other healthcare professionals. In addition, with the increasing time and clinical demands on front-line ambulance crews, there is less opportunity for mentors to constructively develop these communication skills.

This academic year the students' practice placements have been reviewed with the resulting first placement, which is traditionally on front line ambulance, being substituted for a placement on a non-front line Patient Transport Service (PTS) ambulance. These ambulances deal with generally much lower acuity calls with the intended aim of this placement being that a lower acuity workload would remove the pressure of rapid development of clinical knowledge and be replaced with an opportunity to develop the students' communication skills. It is the intention that in part this review will evaluate students' opinions around how this change has influenced the development of their communication skills, in addition to reviewing and evaluating whether there are any further curriculum alterations which could be made to improve the students' communication skills.

As identified by Ross (2012), there remains to date a distinct paucity of Paramedic specific literature around the subject of communication skills teaching. This is undoubtedly due in part to the relative juvenility of Paramedics as a profession, having only been a recognised profession since 2000 (Donaghy , 2008). In addition there remains to date, no national or international Paramedic educational journals. Despite this there are distinct similarities between the educational methods of Medicine, Nursing and Paramedics; therefore the educational literature for these professions, can to a degree be applied to that of Paramedic education.

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Shulman (2005) described the teaching of medicine as being a profession with a 'signature pedagogy'. He described this signature pedagogy as one which teaches students how to be a physician, but in its current form, neglects to teach them how to act with caring (Shulman, 2005). This is a pedagogical dilemma which equally affects the Paramedic profession (Lazarsfeld-Jensen, 2010; Willis, 2009). Willis (2009) suggests that the 'signature pedagogy' of Paramedics is that of experiential learning; where students gain their knowledge through either direct experiences and reflections or those of their lecturer. She identifies that this poses a problem for the teaching of communication skills because currently those who teach the supporting sciences lack the knowledge of Paramedic work and are therefore unable to cater to the experiential pedagogical demands of their students, meanwhile those Paramedics who teach technical skills fail to link their teaching to their own experiences (Willis, 2009). These are sentiments echoed by Breunig (2005) and Kolb (1992) who suggest that practitioners who employ experiential pedagogy often lack congruence between the pedagogical theory and their actual classroom practice. Estes (2004) goes further, suggesting that practitioners who employ this pedagogy are often too teacher-centred and not student-centred enough.

Search strategy

The databases of PubMed, Scopus and Google Scholar were searched. In addition the discipline specific journals were searched, of which some are known not to appear in database searches. Subsequently the reference lists of all relevant articles were also examined for any additional sources of information.

Search terms were combinations of below search terms (Table 1), which included the use of (where possible) Medical Subheading (MeSh) terms to attempt to improve results.

Table 1: Search terms

Population	Intervention	Subject
"Paramedic", "prehospital", "emergency medical technician", "emergency medicine"	"education", "university", "teaching"	"communication"

A vast number of articles were returned using these search terms. This was expected due to the non-specific nature of the terms used. Articles were then screened for duplication and age, due to the absence of Paramedic higher education before 1998. The subsequent removal of duplicates and resulting articles used for analysis are detailed in the PRISMA flowchart.

Ethics

The surveying of students about an element of the curriculum which has already happened is classed as a reflection and evaluation of current practices and therefore is covered by the

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University of Hertfordshire's (2015) 'Protocol for reflective practitioner work by academic staff' (UPR RE01). All standards within this protocol will be adhered to and made clear to the voluntary participants of the survey.

Literature review

There appear to be two recurring but distinct themes throughout the literature as to how to best teach communication skills to healthcare students. These include the placement of students in 'alternative' areas of practice, away from their usual place of clinical exposure to enable students to focus predominantly on the 'soft' skills rather than their clinical skills. The second is the pedagogical practicalities of how to incorporate the teaching of these skills into the university based teaching.

Lucas et al (2014) recognised that the role of the Paramedic has changed from an emergency responder role to a holistic, person-centred practitioner and that this requires a balance of clinical and non-clinical skills. They placed 31 final year Australian Paramedic students into a 5-day placement in an aged care facility and surveyed the students' pre and post placement. Their quantitative data found statistically significant improvements in students' self-reported confidence around their interactions with other healthcare professionals. It is unclear why the authors did not assess the students' confidence in their communication skills with patients in a similar quantitative way, however they did obtain a significant volume of qualitative data on students' views on their communication skills with patients. This data produced predominantly positive themes around how the placement developed the students' ability to communicate with patients (Lucas et al., 2014). Two notable drawbacks of this study in its application to UK practice are that the aged facilities the students were sent to were specifically for care of dementia patients, so whilst the students' may have felt that their communication skills with this group of patients has improved there is no definite transferability of these results to other patient groups. In addition, this placement period ran concurrently with the placement of nursing and medicine students in the same facility and structured interdisciplinary activities between these groups were planned from the outset. Whilst this is most certainly a positive for the students in this example, this is a model which would prove highly difficult to facilitate in a UK higher education due to the fragmentation of healthcare education distancing the professions from each other. Notwithstanding this, the study clearly evidences the benefit of placing Paramedic students away from their usual area of practice, something which thus far has not been routinely included on the UH undergraduate Paramedic programmes.

Molema, Koopmans, and Helmich (2014) placed 36 medical students into a placement period in a nursing home. The authors then interviewed the students as part of focus groups. The focus groups all reported improvements in their communication skills not just with patients but also with family members in that it improved their ability to consult with family members in the decision making for a patient. It was suggested that the distinct lack of advanced medical assessment equipment required them to rely on and therefore hone their communication skills; a predicament summed up by the authors as "dealing with less, learning more" (Molema et al., 2014, p.499). The most evident limitation with this study is that the students being studied are medical students and not Paramedics, however this

apparent necessity for advanced medical equipment to undertake clinical duties is a predicament very common to Paramedics and therefore it could be suggested that Paramedics might achieve very similar results. A similar response was gained by a small scale study involving Nursing students sent to holistically care for disabled patients on a visit to Lourdes (Purdie , Sheward & Gifford, 2008). The students in this study reported that being left unaccompanied with patients whom required greater emotional and spiritual care than medical care necessitated the students to improve their communication abilities. These studies further support the findings of Lucas et al (2014), that across the healthcare professions the placement of students in alternative settings may prove significantly beneficial for developing their non-clinical skills.

There has been an evolving movement in medicine over the past decade or so to develop effective methods of teaching communication skills in higher education. Von Fragstein et al (2008) compiled a UK consensus with all medical schools detailing the minutiae of skills that require teaching to undergraduate medical students, but they provide no guidance as to the practicalities of how to integrate these into the curriculum. Deveugele et al. (2005) suggested that it is certainly possible to integrate the teaching of these skills into the mainstream curriculum, but that didactic techniques are not adapted to the nature of the subject. Instead they suggested that teaching would require a high degree of interactivity by utilising role-playing, and reviews of recorded patient consultations. This adds support to the proposed theory that Paramedics' signature pedagogy is an experiential one (Willis, 2009). The technique of role-playing and clinical simulation is one supported by Perry and Linsley (2006) and Pearson and McLafferty (2011) in their work around the teaching of communication skills to undergraduate nursing students. All these authors recognise the significant additional workload involved in simulation and role-play for the teaching of a skill which may well be able to be developed in clinical practice.

G rant and Jenkins (2014) reviewed all the evidence to date around the theme of communication education for Nursing students and found that the quality of evidence is insufficient to support the relatively high cost of high-fidelity simulation. Silverman (2009) suggests that "without integrating communication back into the larger medical curriculum, communication will be perceived as... an inessential skill rather than a basic medical skill relevant to all encounters with patients" (p.363). This suggestion that the teaching of these skills requires tight integration into the curriculum is a view expressed by many academics who have investigated this area. Rosenbaum and Axelson (2013) conducted a rigorous qualitative study of medical students' opinions on how their clinical communication skills had been developed over the course of their studies. The overarching theme of the students' responses was that integration of the teaching of communication skills into all clinical modules rather than just as a stand-alone module was key to demonstrating the relevance of these skills to students and allowing them to utilise their tutors as role-models (Rosenbaum & Axelson, 2013). This continues to resonate with the principles of good practice in higher education, which suggests a high degree of student-faculty communication and that the faculty staff communicate and subsequently self-demonstrate their high expectations (Chickering & Gamson, 1987).

One of the predominant suggestions for assisting with the integration of these skills into the mainstream curriculum is to include an element of assessment. Silverman (2009) suggests that assessment is absolutely crucial for driving a curriculum in two ways; firstly,

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students perceive that if a subject is not assessed then it less important and requires less engagement; secondly, assessment drives faculty staff to integrate the subject into mainstream teaching. This view is shared by Deveugele et al (2005) who suggest that to ensure integration of the subject throughout all year groups the subject must subsequently be assessed to some degree every year. This is supported by the theories of Price et al (2008) who discuss the integration of assessment into all aspects of the curriculum to shift away from a paradigm of 'Assessment of Learning' and towards that of 'Assessment for Learning'.

Overall the prevailing themes suggested by the literature are that pedagogic methods are not yet fully integrated in the Paramedic Science curriculum nor, it could be argued, in any healthcare curriculum. Whilst the utilisation 'alternative' placements has begun this academic year, their efficacy is yet to be evaluated. In addition, the current programme curriculum sees clinical academic staff over-reliant on one standalone module to develop students' communication skills, whilst the remaining modules focus almost entirely on the development of clinical knowledge and skills, with little to no integration of the communication skills education they have received in the standalone module.

A comprehensive literature review by Ross (2012) revealed that at the time there were no published studies investigating communication skills teaching specifically to Paramedics, and only six relevant high quality papers investigating the teaching of communication skills to Nursing students. This is concurred by Grant and Jenkins (2014) and Chant et al (2002) who conducted systematic reviews of the nursing literature and found all studies to be of generally poor methodological quality. All of these papers were reviewed as part of this literature review and a subsequent search has revealed only one paper specifically looking at the communication skills education of Paramedic students. As a result the search was broadened to include publications discussing this issue in Medical and Nursing undergraduate courses.

Methodology

This is an initial exploratory and descriptive evaluation piece, seeking to identify the current state of play with regards to what is currently being done in the international Paramedic curricula as well as the wider healthcare curricula in terms of teaching communication skills. Initially this involved an in-depth review of the current literature seeking to answer whether communication skills are a competency which can be taught in a university environment or whether it is a competency requiring development in practice. Subsequently, an online survey was conducted asking students about their experiences of communication skills education. A convenience sampling strategy was used as the study was proposed to first year of undergraduate Paramedic education at the University of Hertfordshire. The survey was open for a period of one month.

Group differences were explored using Fisher's exact test for categorical variables, Wilcoxon signed-rank test for comparisons of median of ordinal variable distributions.

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Survey results

As part of a larger module evaluation survey, students were asked a subset of questions relating to the development of their communication skills throughout their first year of education (see appendix 2). Questions included a self-rating of their communication skills before they commenced the course and again now; whether or not their university education improved these skills (and if so which aspect); and whether they felt their 'alternative' placement developed these skills. Finally the students have an opportunity to provide some qualitative data around improvements they feel could be made.

Twenty-one students responded to the questionnaire out of a possible 54, providing a response rate of 39%.

Self-reported communication skills:

Students were asked to retrospectively assess the quality of their communication skills before they began the course and then again as they entered their first placement with the differences displayed below.
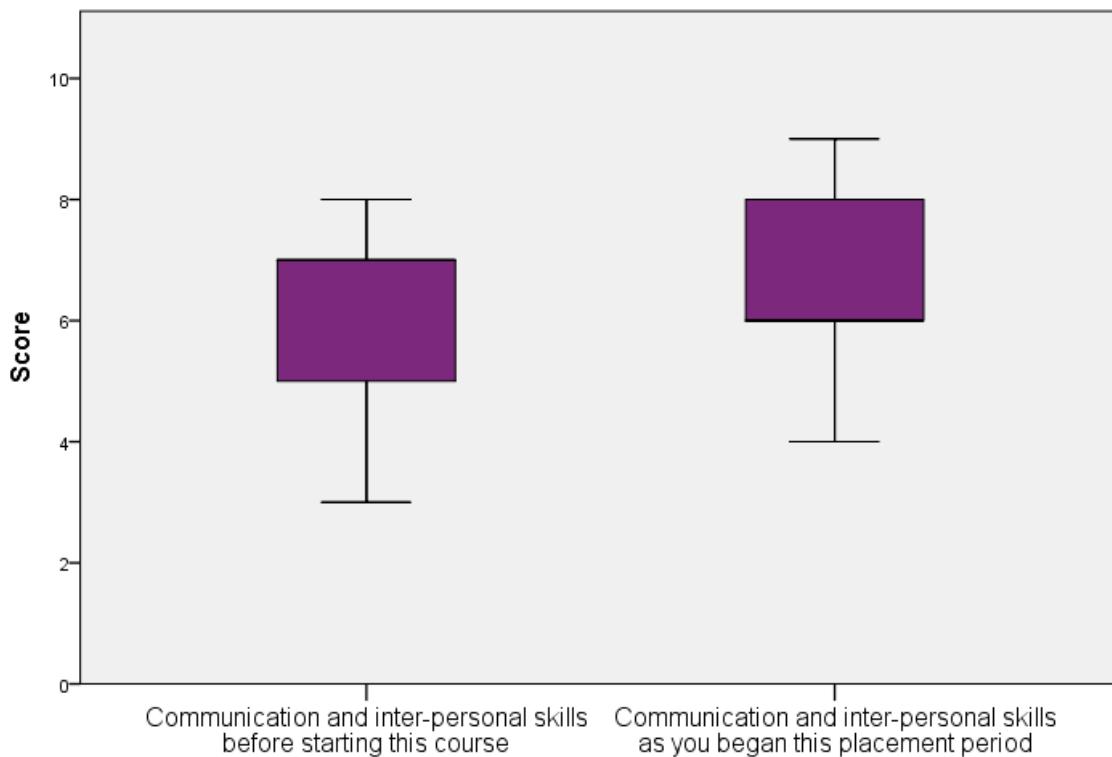

Figure 1: Boxplot graph of the self-reported communication and inter-personal skills before starting the paramedic course and before starting the placement.

Figure 1 shows there is a visible trend of improvement in their self-reported communication and communication skills. Subsequent statistical analysis between the two scores was performed with a Wilcoxon test demonstrates this is not statistically significant ($Z = -1.336, P = 0.182$).

Students were then asked to state to what degree they felt their university education had aided the development of their communication skills and which modules contributed most to this (Figure 2).
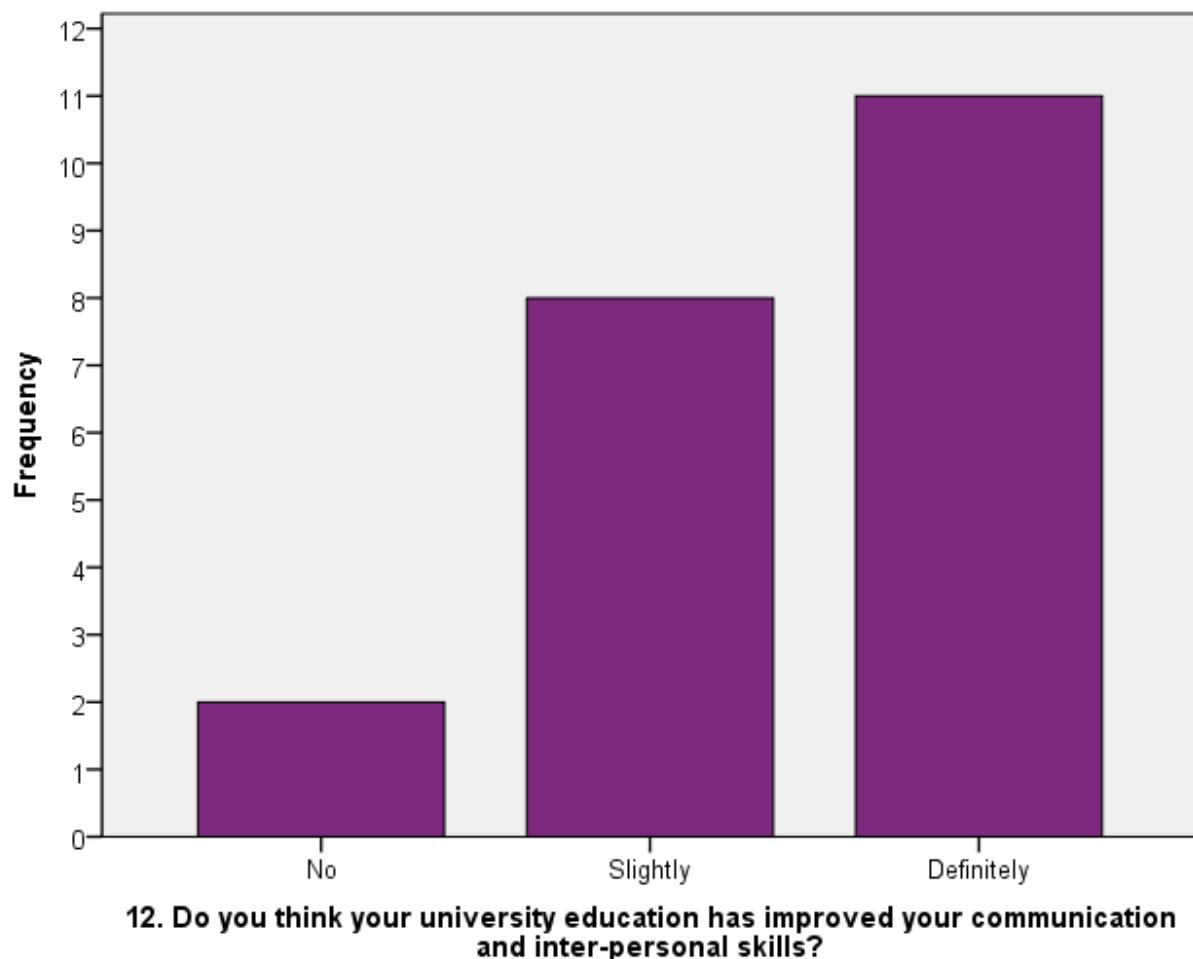

12. Do you think your university education has improved your communication and inter-personal skills?

Figure 2: Self-reported students' communication and inter-personal skills improvement from university education
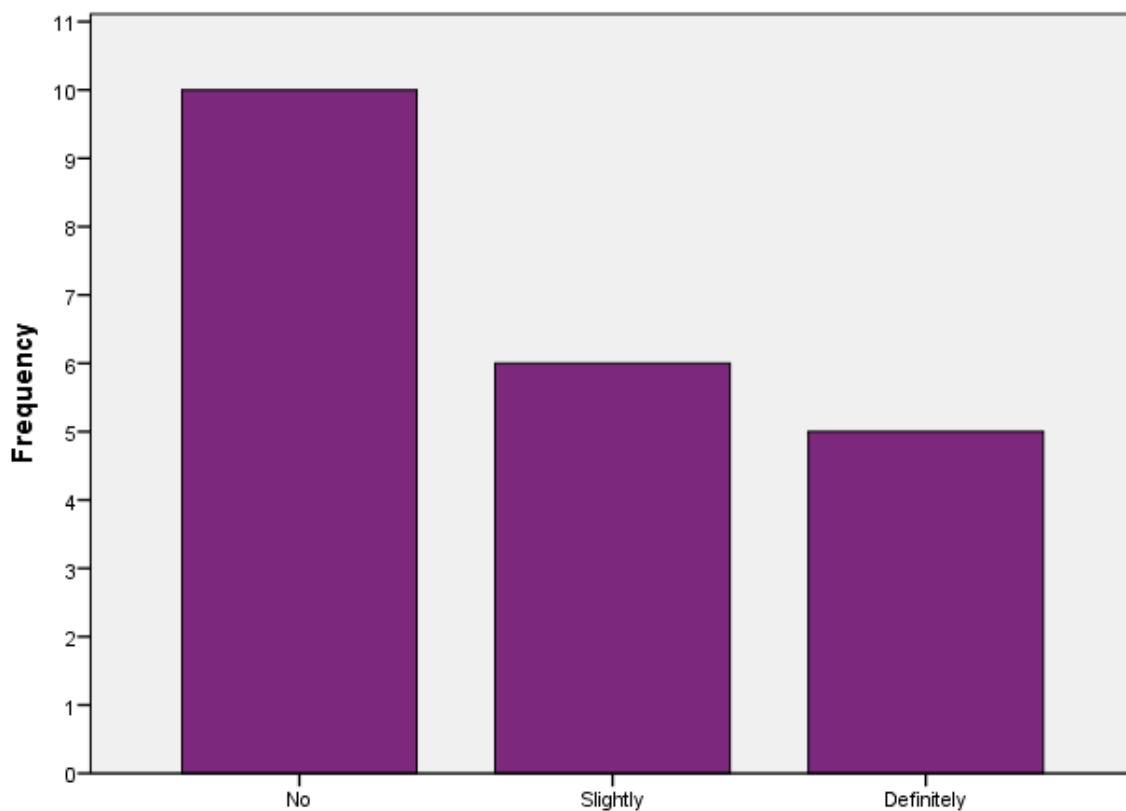
The Fisher's Exact test results showed that a statistically significant number of students reported that their communication skills were developed most effectively in the modules *Practice Education* (P = 0.002) and *Patient Assessment and Management* (P = 0.02). There

was no association for the module titled *Behavioural and Social Issues for Paramedics* to contribute towards the development of these skills (P = 1) as was the case for the module *Interprofessional Education* (P = 0.743).

Alternative Placements:

Finally students were asked whether they felt their alternative placement had contributed to the development of their inter-personal skills (Figure 3).

14. On reflection, do you think your first placement on Patient Transport Service (PTS) improved your ability to communicate with patients and colleagues?

Figure 3: Self-reported students' communication skills improvement contributed by first placement on Patient Transport Service.

The Patient Transport Service placement had moderate impact on the students' communication skills improvement: 47.6% (n = 10) of the students stated that PTS did not contribute towards their communication skills development, whereas 28.6% (n = 6) reported a slight improvement and 23.8% (n = 5) reported a definite improvement.

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Discussion

Despite being unable to demonstrate statistical significance, the students did demonstrate a trend towards an improvement in their self-reported communication skills from the commencement of the course to their first front-line clinical placement. This effect was predominantly attributed to their university based education rather than the use of an alternative placement. Both the Patient assessment and Management module and the Practice Education module had a statistically significant impact on the development of these skills. Interestingly, these are both modules which are taught in their entirety by Paramedic lecturers, and have a strong utilisation of the lived experiences of those Lecturers, whilst also enabling students to participate in those lived experiences, either through theoretical problem-based learning means or through clinical simulation. This adds weight to the suggestion by Willis (2009) that Paramedics' 'signature pedagogy' is that of experiential learning. This is further evidenced by the qualitative comments of surveyed students which included suggestions that more advice from lecturers about how to communicate would be beneficial, and more scenario (role-playing) based work with other HCPs would also be of benefit. These comments also support the recurring theme from the Paramedic and Medical literature that students will utilise their tutors as role-models for their own practice (Rosenbaum & Axelson, 2013; Deveugele et al., 2005).

One theme which, perhaps unsurprisingly, was not mentioned by the students was that of the integration of communication skills into their educational assessments. Whilst further evaluation of this suggestion is necessary to demonstrate conclusive benefit, anecdotally academics will likely agree with the sentiments of Silverman (2009) and Deveugele et al (2005) that if students know that they will be assessed on something, they will credit it with much more attention than if they know they will not be assessed on it.

This academic year was the first time students on this programme had been provided with an alternative placement. Unfortunately a large group of these students encountered significant logistical problems with these placements, which undoubtedly had a negative effect on their overall experience and likely biased their opinions on the benefits gained. Despite this, there was still a very slight trend towards students having to some degree a positive experience with this placement, suggesting perhaps there is scope for these to continue to be used as a learning tool. The current literature suggests that in order to gain maximum benefit from alternative placements, structured activities and maximum exposure to and collaboration with other HCPs is essential (Lucas et al., 2014).

Limitations

The intention of this study was to explore the perceptions of students at only one higher education institution, this produces the notable limitation of reducing its external validity. This was predominantly due to the fact that the survey questions relevant to this study were part of a larger survey exploring student perceptions of a specific module at this institution. In addition, the survey was conducted only once and students were asked to retrospectively consider their views and abilities before the commencement of the course. This is likely to be relatively inaccurate, however the fact that the students still scored themselves as

having improved is perhaps testament to the honesty of the answers they gave. This is re-enforced by the fact that the alternative placement they received encountered many logistical problems which one would have expected to affect their views on their university experience as a whole and subsequently reduce their self-rated improvement in communication skills based on their university and alternative placement experience. However there remained a trend towards both the alternative placement and their university education improving their communication skills, therefore the effect of these issues may not have been as significant as anticipated.

Conclusion

The preliminary literature review of this investigation highlighted the absolute paucity of Paramedic specific literature investigating the effective teaching of communication skills, and the relative paucity of high-quality literature investigating this same issue in both nursing and medical literature. Some recurring themes were noted from the literature however; these provided suggestions that placement of students in alternative settings may be the answer, or likewise a curriculum design with more integration of communication education and assessment.

The subsequent survey of current first-year Paramedic students about their experiences of how their communication skills have developed over the course of their first year revealed trends which appear to support the prevailing themes from the literature. There was a trend towards them valuing their university based education as a tool for the development of communication skills, and they provided suggestions as to how this could be improved which were in-line with the current evidence. Whilst the evidence for the use of alternative placements was not so strong from this group of students, it is likely that the negative logistical experiences unfairly biased their views and that the evidence from the literature to support the use of alternative placements as a learning medium requires continued consideration.

Ultimately further research is required into both the university delivered communication teaching and the use of alternative placements, but the trends are there to support both. Lazarsfeld-Jensen (2010) poses the interesting point that graduates are now abruptly entering an environment which is complex and demanding and this places new challenges upon educators to develop effective pedagogical means by which to provide students with the necessary skills to transition effectively into the workplace. Paramedics, as a growing profession, need to begin to make steps towards defining their own 'signature pedagogy' which will help guide their future educational and pedagogic theories separate from that of medicine and nursing.

Acknowledgement

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Appendix 1

An Introduction to Interprofessional Education

8. Module Aims:

The aims of this module are to enable students to...

Gain an appreciation of the concepts and principles of inter-professional practice and explore how interprofessional education may enhance professional practices and service user experiences.

9. Intended Learning Outcomes:

9a. Knowledge and Understanding:

Successful students will typically:

1) Identify and explain the benefits and challenges of inter-professional practice;

2) Describe how their professional role supports inter-professional practice;

9b. Skills and Attributes:

Successful students will typically:

1) Reflect on the skills required for collaborative learning and explain how they may be applied in practice.

Appendix 2

Student communication survey :   Communication/Inter-personal skills

How would you rate your communication and inter-personal skills (with people you have never met before) before starting this course?

Likert scale 0-10

- 0 = Very poor
- 10 = Excellent

Teaching communication skills to undergraduate Paramedic students: in the university environment or in practice?

Do you think your university education has improved your communication and inter-personal skills?

- **Definitely**
- **Slightly**
- **No**
- **Not sure**

If yes, which module(s) contributed most to this?

- **Anatomy and Physiology for Paramedics**
- **Behavioural and Social Issues for Paramedics**
- **Practice Education**
- **Patient Assessment and Management**
- **Interprofessional Education**

On reflection, do you think your first placement on Patient Transport Service (PTS) improved your ability to communicate with patients and colleagues?

- **Definitely**
- **Slightly**
- **No**
- **Not sure**

How would you rate your communication and inter-personal skills <u>before the beginning of this placement period</u>?

- **Likert scale 0-10**
- **0 = Very poor**
- **0= Excellent**

Please share your opinions on how would you improve the communication and inter-personal skills teaching:

How could technology support supervision in postgraduate physiotherapy clinical placements: a literature review.

Mary Madden, School of Physiotherapy

Abstract

Within the postgraduate physiotherapy Masters programme at University of Hertfordshire, students can chose a clinical placement module. Increasingly, it is becoming difficult to source mentors willing to supervise students on placement. An exploration of how technology could support remote clinical supervision was carried out via desk-based, secondary research. A systematic literature review was devised using the University of Hertfordshire library site, CINAHL, PubMed and Google Scholar. While 27 papers were identified from the searches, six were considered relevant for review. In summary, technology was well received as a method of supervision and recommendations for how to set up technology-supported remote supervision and recommendations for how to set up technology-supported remote supervision were outlined. The relevancy of these findings to postgraduate physiotherapy clinical placements is discussed. Technology-supported placements may play role in postgraduate education. Further consideration is needed as to how this might best be implemented, as there is a lack of clarity in the reviewed research.

Keywords: Postgraduate, physiotherapy, technology, remote, supervision, clinical placements

Introduction:

As part of the Masters in Advanced Physiotherapy qualification, experienced post graduate physiotherapists can choose to embark on a supervised clinical placement. Supervision is provided by between one and three mentors. Successful completion of the Advanced Neuromusculokeletal Clinical Placement (ANCP) module is one third of the mandatory steps required to gain membership of the Musculoskeletal Association of Chartered Physiotherapists (MACP). Acquiring this titles denotes that the member has undertaken extensive postgraduate study and has attained a recognised standard of excellence in neuromusculosketal physiotherapy. In the UK, the MACP is recognised as the specialist manipulative therapy group by the International Federation of Orthopaedic Manipulative Physical Therapists (IFOMPT) (MACP website 2016).

 The ANCP module at the University of Hertfordshire (UH) is a 30 credit module and involves completion of a 150 hour placement, of which at least half must be directly supervised by a clinical mentor. Butterworth & Faugier (1993) best describe the aim of a supervisory relationship as "an exchange between practising professionals to enable the development of professional skills'. Clinical placements take many forms, but in essence the postgraduate student assesses and treats musculoskeletal patients while being watched by a mentor. This forms the basis of an in-depth discussion between the student and mentor, focusing on developing clinical reasoning and building on existing knowledge

The assessment of a new patient and the treatment of a review patient by the students are watched and marked by a university examiner and placement mentor; in addition the student submits a clinical essay based on an identified learning need post-placement. ALL components must be passed for successful completion of the module. (ANCP, 2015)

How could technology support supervision in postgraduate physiotherapy clinical placements: a literature review.

Background:

A major barrier to the ANCP module uptake, experienced by the author, is the lack of mentors available who are in a position to take students on placement. As the health landscape has changed considerably over the last number of years, many mentors are unable to take students on placements due to work constraints. Increasingly, extended scope physiotherapists (ESPs) are spending less time treating patients in physiotherapy departments and more time in triage settings; rendering it almost impossible to mentor postgraduate students. ESP triage involves patient assessments, forming the basis for decisions about referrals, investigations and further management (Cumbria Partnership, 2016). While contacting multiple mentors to place the students currently enrolled on the ANCP module this academic year, mentors consistently mentioned to the author that although they were very interested in taking students, they were unable due to a change in work practices. Tendering for services and re-alignment of services were cited as key barriers to facilitating student placements. Increasingly, ESPs are being utilised for first contact with patients in a attempt to free up medical staff for more complex cases. As a result, local services can be developed to meet need in a patient-centred manner as the whole team potential is maximised. (Saxon et al., 2014; Shapiro, 2009).

In response to changes in ESPs' work practices and the lack of availability to mentor postgraduate physiotherapy students enrolled on the ANCP module, as the module lead, consideration needs to be given to alternative approaches to placement. In order to explore potential options, a discussion was held between the author and the module lead for clinical placements at University of Birmingham regarding the difficulties in finding mentors. The discussion took place under the guise of the University of Hertfordshire Reflective Practitioner Protocol (2015) to unearth possible alternatives to the current placement models. According to Heneghan (2016) during this conversation, the University of Birmingham have used technology to examine students at the end of placement. Based on this conversation, the author resolved to understand how technology could support clinical placement supervision and thus a literature review ensued. The aims of this article are to explore the literature systematically to understand what evidence exists for technology supporting remote clinical supervision and to extrapolate the relevance of this evidence for postgraduate physiotherapy placements at UH.

Methodology:

Consideration was given to the time available for completion of the article and a pragmatic decision was made to gather secondary data rather than embark on primary research (Institute for Work and Health, 2015). A desk-based, exploratory study, a systematic approach was employed. The research question was broken down into its key words and alternate words with the same meaning were compiled as demonstrated in Table 1 (See Appendix 1). This enabled searches to be undertaken on a number of search engines: the University of Hertfordshire Online Library, PubMed, CINAHL and Google Scholar. Boolean Operator conventions were utilised to combine or exclude key words to achieve more focused and detailed results (Alliant, 2016). A detailed listing of each of the specific searches across these four search engines is contained within Table 2 (Appendix 1).

Despite the detailed search terms and linking each of the terms with the "AND" Boolean Operator, a large number of studies were identified. The exact number of articles per search strategy are outlined in Table 2. To ensure the relevancy of papers to the study title, a

secondary strategy was employed which involved each abstract being scrutinised for its pertinence to the review. Where necessary, an article was screened to decide whether or not it should be included in the review. Additionally, a number of articles were sourced by hand searching relevant articles which were identified from the included papers in the review (Cochrane, 2016).

Combining all six searches and including the literature from hand searching, 27 papers were identified. Three of these were excluded as they were books (two) and thesis (one) and were deemed outside of the scope of this paper during the secondary strategy review. Two articles were available as an abstract and not in full text and were also discarded. Seven articles were discounted during the secondary strategy as they were not relevant to the enquiry aims. Generally, this was due to a focus on education in remote rural practice location, rather than the topic of distance supervision. A further nine were not wholly relevant to answer the aims of enquiry, but instead provided some commentary points and were useful for adding to the background and discussion. This left six articles which were deemed suitable to form the basis of the literature review and each of the articles will be presented in turn.

Findings/results:

Hadley and Mars in 2008 explored videoconferencing implemented within the paediatric postgraduate medical training in the KwaZulu-Natal province of South Africa. The study was designed in response to the lack of specialists to train less experienced doctors. Seventy-one one hour teaching sessions took place via videoconferencing over an 18 month period. All 50 attendees reported that it was an effective alternative to attending lectures at a central location. Eighty three per cent of participants rated videoconferencing as a good or excellent teaching tool. While there were positive responses from both those presenting the teaching sessions and the attendees, the studied population was small and there was no control group with which to compare teleconferencing.

Distance learning and the challenges for chiropractic postgraduate radiology education was the focus for Poirier et al. (2014). This study compared three diverse distance learning methods for radiology mini-courses delivered over a six week period. Three experienced chiropractic radiology faculty members led the courses using a Web-based format. One method was a synchronous discussion board consisting of seven discussion forums based on seven imaging cases. Students were asked individual and group questions. The second method was a synchronous live Web conferencing tool delivering live discussion about radiological cases seen on a visual display. The final method of distance learning involved four asynchronous 20 minute case presentations using voice over PowerPoint. This was self-directed and could be accessed at any time by participants.

In total, 14 students and six observers participated in the discussion board, 11 students and four observers in the Web conference method, and eight students and two observers in the PowerPoint course. Fourteen students in total participated, meaning that all students took part in at least one course, but there was no record of how many took part in two or all three. Evaluation of each course was via 14 qualitative questions with a five point Likert

scale. The PowerPoint method was the most favourable method, but scored lowest for interactive learning opportunities. All methods scored highly for achieving the course objectives, with the asynchronous discussion board rated highest at 4.45 out of 5.

Considering learning potential versus time commitment, the asynchronous discussion board scored lowest, while the other two methods rated very highly. Overall, there was no clear advantage of one method of distance learning over another. Additionally, the small numbers of participating students limits the extrapolation of the findings to other settings. A lack of clarity exists regarding the number of students who took two to three courses, rendering it difficult for adequate cross—comparison between the three distance learning methods.

Stewart and Carpenter (2009) sought to establish whether or not an electronic mentoring (e-mentoring) programme pilot could effectively support physical therapists in rural positions in Canada. The authors designed an action research pilot study and two mentees were supervised remotely for three months. Supervision consisted of daily email communication, weekly iChat (AppleInc) technology and monthly videoconferencing between the mentor and both mentees. Two weeks into the pilot, this changed to twice weekly iChat conversations and email was rarely used in response to mentee feedback.

Outcomes were gathered via a short questionnaire on a 7 point adjectival scale pre- and post-placement, a questionnaire on the technology, six open-ended questions on e-mentoring, and a final group meeting to review the project. The results were positive for clinical reasoning development, increasing clinical confidence and e-mentoring was seen as an adequate replacement of colleagues. Caution should be taken when interpreting these results as the sample size was very small (n=2), technology was a significant limiting factor and there were no long term outcomes measured to understand whether or not e-mentoring benefits continued beyond the end of the project.

Wearne et al. (2015) devised a qualitative study to understand the effect of virtual support on General Practitioner (GP) registrars' learning in isolated locations. From a list of all registered GP registrars that were remotely supervised and those on the family medicine programme, a purposeful sample was invited to participate. Eight GPs in Australia and three in Canada took part in the in-depth interview with thematic analysis. The key factors found to influence registrars' learning included the registrars' attributes and what level of insight the registrar possessed regarding learning needs and knowing his/her limits. The more mature the registrar was the more resilient he/she was likely to be and hence the approach to work, learning and life was more likely to suit working in isolation.

The amount and quality of external support available from the educational organisation and supervisor affected the learning experience. It was found that a supervisor required experience of rural context and needed to be available, approachable, and willing to help. Registrars also benefited greatly from creating an informal network of support consisting of peers and a selected team of experts who could be called upon for assistance. There were a number of environmental factors that benefitted the learning experience. These included registrars' ability to articulate thoughts and questions well enough to be understood at a distance i.e. making thinking audible. This was shown to enhance registrars' ability to learn. The absence of onsite role models was a negative influence on learning. Registrars

participating from Canada could watch experienced GPs once per month, whereas the Australian GPs did not have this as part of their training programme. Reliance on registrars' instincts was seen as a potential negative influence as often one is not aware of what one does not know. The very nature of the flexible and self-directed learning model ensured that registrars' programmes were better suited to their learning needs and hence enhanced the learning experience.

Hays (2012) presented a potential model for remote supervision for health professionals based on the experience of remote doctor supervision. This paper suggested that remote supervision should include a combination of telephone discussions, workshops involving attendances, and visits by a supervisor to the clinical practice site. This was broadly similar to the Remote Vocational Training Scheme (RVTS) in Australia, as outlined in the paper. As a short commentary piece, this proposes a potential model to remote supervision, but the suggestion of telephone conversations as the distance method of supervision has been superseded by more advanced technology such as teleconferencing, Skype or FaceTime. Additionally, primary research was not presented and neither was there an attempt for secondary research; calling into question the basis of the proposal.

Presenting a combination of a literature review, experience of being a remote supervisor, and personal research of remote supervision, Wearne et al. (2013) presented twelve tips on how to set up postgraduate training via remote clinical supervision. These include a close matching of student to supervisor and close monitoring of the supervision by the educational organisation. When choosing registrars, the importance was highlighted of possessing a suitability to remote supervision, having appropriate self-directed skills, good personal communication, and having a willingness to ask questions. Following from this, remote supervision should not be a mandatory part of education and volunteers should be chosen. The paper also states the importance of choosing supervisors suited to remote supervision. Indicators of suitability suggested include being up to date in clinical practice, having experience in a remote situation, and possessing the approachability and availability to respond to registrar's queries with an interest in facilitating the development of registrars.

The next set of recommendations pertain to the setting up of the supervision arrangement. An initial face to face meeting between the supervisor, supervisee, and clinic manager at the remote location is suggested to establish how the placement will work. If possible, there is merit in the supervisor and supervisee spending time in practice together. Ground rules jointly agreed early on, including written documentation of these rules, appeared advantageous. In establishing an appropriate setting, the paper emphasises the value of registrars creating personal, professional, and information support networks. Registrars know, therefore, where they can seek assistance from, when the need arises. Consideration needs to be given to information governance and sharing and employing appropriate technology to achieve a meaningful supervision. The creation of suitable methods of needs to be given to information governance and sharing and employing appropriate technology to achieve a meaningful supervision. The creation of suitable methods of feedback such as case notes reviews, videolinks and clinical visits, can be considered. As with every supervision arrangement, the paper advocates making plans for adverse situations.

How could technology support supervision in postgraduate physiotherapy clinical placements: a literature review.

Discussion:

The earliest recorded attempts to incorporate the use of technology into supervision date from the 1950s and 1960s. Examples of these technologies included bug-in-the-ear devices, closed-circuit television monitoring, videotape review and telephone discussions (Brooks & Hannah, 1966; Schiff & Reivich, 1964). Despite suitable technologies being available for up to 70 years, barriers existed to progression of technology as an aid to supervision due to the lack of technological infrastructure and prohibitive high costs (Wood and Miller, 2005). A further barrier for postgraduate physiotherapy clinical placement may also have been the inability to see real-time what is occurring during the clinical appointment in what is a practical, hands-on profession.

A review of the six studies highlights a number of themes which bear relevance for consideration of how remote clinical supervision may support clinical education for post-graduate physiotherapists and relevant to my role at UH. Whether or not technology supports remote supervision was measured in two of the six papers, while types of remote technology was compared in a third paper. Hadley and Mars (2008) showed high levels of satisfaction with distance lectures, while Stewart and Carpenter (2009) demonstrated how a three month distance supervision pilot for inexperienced paediatric physiotherapists who were lone-working was well received. Poirier et al. (2014) compared three different methods of distance learning technology methods to support registrar radiology training. When comparing synchronous discussion board, synchronous live web-conferencing and asynchronous case presentations using PowerPoint, no one method was superior.

The numbers in each study were relatively small, especially the Stewart and Carpenter study with only two participants. In this regard, it is difficult to assess how effective technology is in supporting remote supervision. It appears that its adoption in numerous fields, such as GP education and psychology training, may be partly based on necessity. The remote locations in certain countries from a perspective of distance between people plus the lack of experts scattered across countries has led to the development of technology-aided remote supervision without a firm foundation in research. Examples of this include Canada, Australia, and Africa evidenced by the number of papers from these countries which were reviewed (Hadley & Mars, 2008; Hays, 2012; Poirier et al., 2014; Stewart & Carpenter, 2009; Wearne et al., 2015; Wearne et al., 2013). On balance, technology as a support for remote supervision was well received in the three reviewed studies that measured satisfaction and efficacy, suggesting that it may be viable to consider for the postgraduate physiotherapy setting.

Two studies focused on what elements of technology-supported remote supervision could enhance or detract from the success of supervision. Wearne et al. (2015) covered two distinct geographical areas and training schemes for GP registrar programmes. The main themes to emanate from this paper include registrars' personal attributes, the external support available and the environmental factors. A number of these factors could be considered in relation to utilising technology in postgraduate supervision including consideration of the appropriate student who has self-directed learning capabilities, ensuring the supervisors have the requisite skills, promoting this method of supervision as being very tailored to the individual's learning needs, and being mindful that this form of supervision is highly dependent on the supervisee's insight. This would need careful

consideration so that a struggling student is identified by other means rather than just self-reporting. Considering the ANCP module, I envisage difficulty selecting appropriate students for remote supervision, given face to face contact with students is limited to a six hour preparation day at the start of the module. If I were to consider implementing technology-supported supervision within this module, I would need to establish a viable method to measure students' suitability for remote supervision. There were no specific recommendations in the Wearne et al. (2015) paper as to how this might be achieved. Consideration might be given to students' ability to work independently i.e. those more used to lone working or working in situations with limited on-site supervision from more experienced colleagues and to those who are more willing to ask questions when they are struggling.

Following on from this, Wearne et al. (2013) itemise twelve good practice points for devising technology supported remote supervision. A number of these would be very relevant points for developing post-graduate physiotherapy remote supervision; namely setting up the supervision model appropriately in advance with ground rules, shadowing for the supervisor and supervisee, and having an exit strategy should the supervision not proceed as planned. Reflecting on the ANCP, I anticipate difficulties for supervisors and supervisees for watching each other in practice and this would need detailed consideration to understand how it might be overcome. Currently, students experience reluctance from their managers to be released for the 150 hour placement. Completing additional hours in excess of the 150 hours may not be feasible, but exploration of how shadowing could work is warranted. Feedback on how this can be achieved is also recommended in Wearne et al. (2013) paper. Caution is needed when it comes to supervision feedback as discussed in Lonie and Andrews (2009). The non-verbal elements of face to face learning, for example facial expressions, physical gestures, stance and voice intonation, can be lost via technology. Hence, care is required when considering implementing technology-supported supervision within the current ANCP module setting.

The reviewed articles present some support for implementing technology to assist with remote physiotherapy supervision. In order to tackle the lack of mentors which is the core problem, there needs to be consideration of how technology can assist with this issue. As outlined in the introduction, the minimum time a student must be supervised while on placement is 50%. The placement can be spread over between four and 12 weeks, meaning that the least time commitment per mentor is 6.25 hours per week. For some mentors this is more than they can free up from their clinical commitments. By having a second or third mentor available via remote supervision to supplement some of this time, increases the chances that mentors may be more inclined to supervise students if they have the support of other clinicians from different geographical locations. Currently, at UH we are trialling a placement where a hospital-based clinician is co-mentoring postgraduate physiotherapy students with another clinician who works for a different organisation. It is too early yet to evaluate the outcome of this placement, but initial informal feedback appears positive. This is an on-site mentorship arrangement, but is a starting point to mentors from different organisations working together to supervise students and may assist with the implementation of remote supervision.

Chipchase et al. (2016) presented the findings of a remote supervisor via a webcam link supplementing the mentorship of an on-site supervisor. The feedback from this study was very positive from students and mentors with regards to the extent that telesupervision

supported on-site supervision. In particular, there was favourable feedback for the richness of supervision where students benefitted specifically from two different approaches to practice by having two different mentors. There were a number of suggestions which emerged from the Chipchase et al. paper which may help with the implementation of the remote supervision in postgraduate physiotherapy placements. These include having time set aside for mentor communication, maximising the connectivity of technology, and ensuring that the blocks of supervision time which occur via technology are well thought out in advance and not too long to exceed students' concentration times.

Consideration should be given to how mentors might respond to the proposed changes of implementing remote supervision. Given that communication via videolink, Skype, facetime etc. has become commonplace, there should be familiarity with such methods among mentors. Provided the videolink is sufficient for remote mentor to sufficiently see and hear the interactions between the student and patients and that there is adequate discussion time between the student and the remote mentor, clinicians are likely to be open to the remote supervision model. It is not the intention to replace on-site supervision with remote supervision. Rather, the aim would be to supplement on-site mentorship to increase the number of available mentors and hence ensure that there will be enough placements to act as an incentive for students to undertake the ANCP module.

Consideration should be given to the UH student perspective and how they might perceive the change to the well-established face to face model of supervision. Under the UH Reflective Practitioner Protocol (2015), an informal discussion took place with students who were eligible to undertake the ANCP module. Some of the deterrents to placement included: the length of time off work was unlikely to be granted by an employer and would exceed the annual leave allowance, the cost of the module, and the perceived idea that supervision would be a negative experience. The latter point seemed to arise from the outdated impression that MACP mentors created a negative learning environment. If this idea prevails, the benefit of having mentors from different locations contributing to a mixture of remote and on-site supervision might be similar to positive experience of multi-mentors demonstrated in the Chipchase et al. (2016) paper. Hence it could remove one of the deterrents to students taking up the ANCP module.

Conclusion:

A literature search of relevant literature pertaining to technology supporting remote clinical supervision provided six articles for review and the main themes were discussed and considered. A number of other articles provided perspective on the topic, while they might not have been fully relevant to the topic. It appears that technology as a support to clinical supervision in postgraduate physiotherapy is worthy of pursuing further to understand how it might support the current dearth of supervisors that are currently willing to mentor our students.

It is clear that further enquiry is necessary to understand the questions raised by some of the suggested changes to how we currently structure our clinical placements. There are no definitive answers regarding the efficacy of technology-supported supervision, despite suitable technology being available for a long period of time. This is in part due to methodological issues regarding small sample sizes and lack of control groups, and

additionally due to relatively few numbers of completed studies on the topic. Notwithstanding this, undertaking this enquiry via a literature search has given me a broad comprehension of the body of literature that exists for technology-supported supervision. The process has highlighted the extent of the use of technology in certain health education sectors.

Focusing on the technology-supported supervision literature has expanded my thinking on how postgraduate clinical placements at UH could be structured in the future and provided me with ideas for further enquiry to tackle the issues raised within the discussion. These issues include feedback, facilitating shadowing between the student and mentor, and selecting suitable students for remote supervision. The value of discussions with colleagues in other universities who lead similar modules to me was also highlighted as it furnished my enquiry with a specific focus. As a result, I will continue to make links with my peers at other universities and engage in discussions to facilitate practice sharing opportunities.

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Appendix 1: Search strategies:

Table 1: Search strategy demonstrating key words developed to answer the research question and alternatives

Key word	Techno*	Postgraduate	Physio*	Placement	Supervis*	Enhance	remote
Alternatives	Equip*		Physical*	Educat*	Mentor*	Improv*	Distan*
	Tool*				Tutor*	Add*	
						Enrich*	
						Develop*	
						Augment*	

* Denotes use of truncation to enhance searching (Colorado State University, 2016).

Table 2: Search terms outlined for each search engine and the number of hits and articles extracted.

Search number	Search Engine	Search terms	Number of hits
1	University of Hertfordshire Library	(Techno* OR Equip* OR Tool*) AND Postgraduate AND (Physio* OR Physical*) AND (Placement OR Educat* OR Supervis* OR Mentor* OR Tutor*) AND (Enhance OR Improv* OR Add* OR Enrich* OR Develop* OR Augment*) AND (remote OR Distan*)	4 with 2 suitable articles
2	University of Hertfordshire Library	(Techno* OR Equip* OR Tool*) AND Postgraduate AND (Placement OR Educat* OR Supervis* OR Mentor* OR Tutor*) AND (Enhance OR Improv* OR Add* OR Enrich* OR Develop* OR Augment*) AND (remote OR Distan*)	3 with 1 new article
3	University of Hertfordshire Library	Postgraduate AND (Placement OR Educat* OR Supervis* OR Mentor* OR Tutor*) AND (Enhance OR Improv* OR Add* OR Enrich* OR Develop* OR Augment*) AND (remote OR Distan*)	10 with 4 new articles
4	PubMed	(((((Postgraduate) AND (Placement OR Educat* OR Supervis* OR Mentor* OR Tutor*)) AND (Enhance OR Improv* OR Add* OR Enrich* OR Develop* OR Augment*)) AND (remote OR Distan*))) AND (physio* OR physical*)	24 with 3 new articles
5	CINAHL	(((((Postgraduate) AND (Placement OR Educat* OR Supervis* OR Mentor* OR Tutor*)) AND (Enhance OR Improv* OR Add* OR Enrich* OR Develop* OR Augment*)) AND (remote OR Distan*))) AND (physio* OR physical*)	8 with 2 articles extracted
6	Google Scholar	Postgraduate AND (Placement OR Educat* OR Supervis* OR Mentor* OR Tutor*) AND (Enhance OR Improv* OR Add* OR Enrich* OR Develop* OR Augment*) AND (remote OR Distan*)	11,800 with 8 articles extracted

Becoming a Senior Fellow of the Higher Education Academy – a personal reflection.

In this video three recent applicants for Senior Fellowship reflect on the experience and how becoming a Senior Fellow has subsequently influenced their practice. The video features:

Surinder Juneja, North Hertfordshire College

Joel Shahar, Hertfordshire Business School

Rebecca Thomas, School of Creative Arts

The video can be found at: http://tinyurl.com/znqttgu

Abraham Afolalu, School of Computer Science

Tell us a bit about yourself

I am studying on the BSc Computer Science degree and I am an International student from Dublin, Ireland. I have always been interested in information Technology and enjoy fixing Computers, smartphones - any kind of technology really. For the past year I have been a placement student working with the UHOnline team

Why did you apply for a placement

I wanted to be able to apply and hone some of the knowledge and skills I had gained on my course and felt that a placement would allow me to do this.

Why UHOnline

I wanted a placement that allowed me to apply my technical skills in a way that I could make a meaningful contribution. Looking at what UHOnline wanted I saw that it was good fit with my skill set and the opportunity to create online resources and to work with clients directly appealed to me.

What kinds of things have you been involved with?

My work is really varied. I am involved in creating and trouble shooting online resources for the Law School and the Hertfordshire Business School. I also create online assessment tools that students use to gauge their learning. I have also been very involved in supporting individual online learners, helping them resolve queries and technical issues.

Have you learnt new skills?

Yes definitely. In addition to the technical side of things I am far more organised now and have a much greater awareness of the importance of time management skills. When I started I was not the most organised of people and would often put off doing things. This is not the case now, I am far more organised.

Have you used the skills from your degree programme

Yes mainly I have used web design skills and HTML and JavaScript. I have also used a lot of the general IT expertise that I have gained over the last two years.

What have you enjoyed the most?

I think working as part of the UHOnline / LTIC team, if I cannot solve a problem there is always someone who will have the answer or will point me in the right direction. Also working in a support role has given me a good insight into the issues involved with online learners who have particular learning needs. My work supporting theses learners has given me some good ideas for my final year project.

What are your plans for the future?

My year-long placement finishes shortly so it will be back to complete my final year. After graduation I think I would like to work in technical support - I have really enjoyed the interaction with the end users and helping to solve their problems is very satisfying.

Incorporating **The Blended Learning Unit** a Center for Excellence in Teaching and Learning