Appendix one: publication one

PEACOCK, S. and HOOPER, J., 2007. E-learning in physiotherapy education. *Physiotherapy.* September, vol. 93, no. 3, pp. 218-228.

Aim of this paper

An exploration of physiotherapy undergraduate and postgraduate tutor and student experiences of, and comings to understandings about, learning in a Virtual Learning Environment.

Accessed online and/or downloaded	**Citations**	**Impact factor of journal**
2,167 times (accessed online) in June 2013 (information provided by Scopus)	9 citations In January 2015 (data combined results from SCOPUS and Web of Science)	Impact Factor of 2.106 It ranks 12th out of 63 journals in the rehabilitation subject listing in Journal Citation Reports (data provided by QMU librarian)

Approval from publisher for inclusion in PhD

Provided by
Ms Sarah Davies
Publisher, Physiotherapy
02/06/2013

Background to the Research Project – basis for P1

Title of the research project

How do diverse groups of learners in the health sciences respond to a new virtual learning environment?

Aim of the Research Project

To investigate learners' responses to their first exposure to a new learning experience in a VLE

The Research Team

I was the lead researcher working closely with Dr. Hooper

Date research undertaken with a further year for dissemination	Affiliation
2003 – 2005	Learning, Teaching and Support Network (LTSN) for Health Sciences[1]

Overview

In 2001, QMU began its implementation of our VLE, WebCT. By 2002, evaluation of the tutor and learner response was timely. The subject area, Physiotherapy, had been an early adopter, at both under- and postgraduate levels, and as a department, they were keen to evaluate the student and tutor response to this new learning tool. My role had been to introduce and support the academic staff when using the VLE. At the same time, Dr Hooper, one of our physiotherapy tutors, was involved in the trial and subsequent implementation of InteractiveCSP[2]: an online resource and networking community space for members of the Chartered Society of Physiotherapy (CSP). Dr Hooper understood, being a practising physiotherapist, how much the profession was changing to become evidence-based and the implications for those working in the profession. Physiotherapists would need, more than ever before, to take responsibility for their Continuing Professional Development and have appropriate skills to learn from online resources and in community networking spaces. Limited research had been undertaken from the student as well as the tutor perspective in blended learning experiences at that time.

The purpose of this funded mini-project was to offer insights into the differing learner/tutor perspectives and inform practice within and outwith QMU. Each group used the VLE for very specific but differing purposes. Dr Hooper and I worked collaboratively, but I led the design of the inquiry process with feedback from my co-researcher. Dr Hooper organised for the students and tutors to be introduced to the project. A convenience sample was used and data collected through semi-structured interviews: individual and groups (based on interview guides) supplemented with descriptive information gathered in questionnaires. I developed the questionnaire and conducted the interviews, and briefed another researcher, Dr Anderson, to undertake the focus groups. Data analysis was an iterative process on which Dr Hooper and I worked over a period of several months. I led the writing of the report and the associated literature review.

[1] This was subsequently known as the HEA Subject Network: Health Sciences and Practice.
[2] Further information about the InteractiveCSP is available at: http://www.csp.org.uk/csp

Shared outputs of the inquiry process (dissemination)

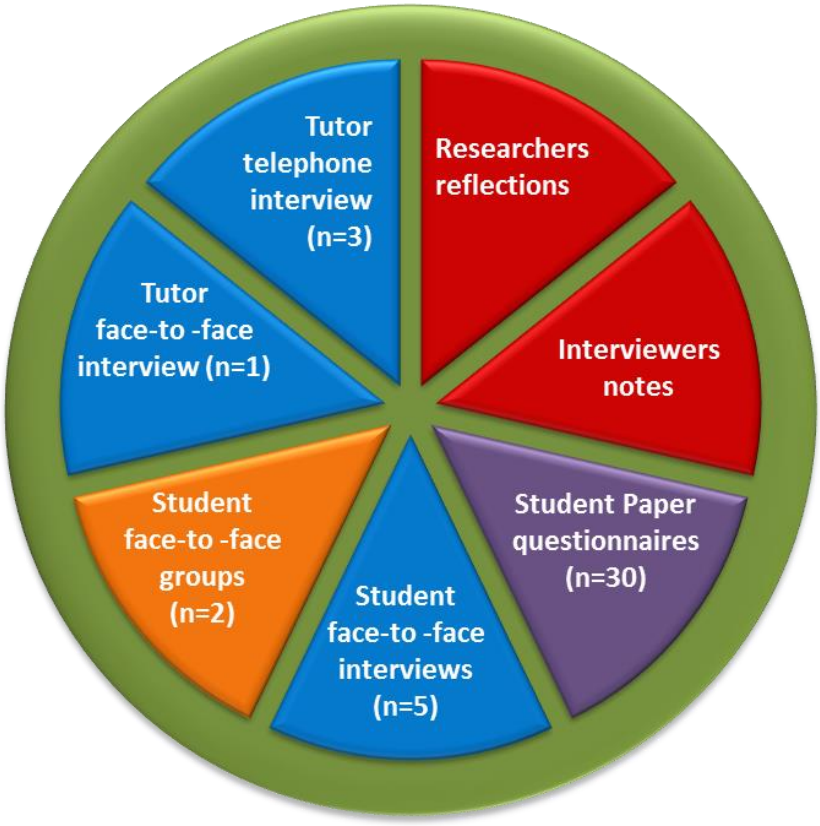
Final report available on Internet
Sent to the funder and was available on the archived website for the Higher Education Academic Subject Network: Health Sciences and Practice: http://repos.hsap.kcl.ac.uk/content/m10223/latest/

Dissemination to learning technology communities

Poster
How do diverse groups of learners in the health sciences respond to a new virtual learning experience? (ALT-C 2005)

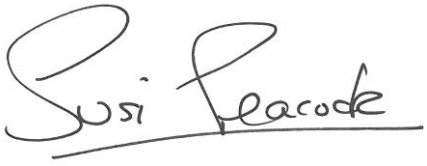
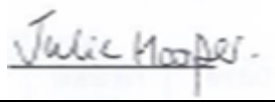
Presentation
An investigation of how diverse groups of learners in the health sciences respond to a new virtual learning experience (WebCT conference 2006)

Pictorial representation of research methods used in P1



Authors' contributions to P1	
70% by Susi Peacock	I was the lead author establishing the structure of the article, conducting the literature review on e-learning, drafting the paper and organising the presentation of the data.
30% by Dr. Hooper	Dr. Hooper provided feedback on the drafts of article, especially the presentation and analysis of the data. Julie provided particular information about the CSP.

1

Signatures		
Susi Peacock		03/04/2015
Dr J Hooper		03/04/2015

Physiotherapy 93 (2007) 218–228

Discussion paper

E-learning in physiotherapy education

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Abstract

This paper reports the findings of a 1-year research project into the role of e-learning as a mechanism to support and enhance the learning environment for pre- and post-registration physiotherapists. The findings reveal tutor and student perceptions about what study entails, the anticipated respective roles of individuals in the learning process and how those individuals believe learning should occur when supported by e-learning in a tertiary education institution. Critical differences between the two groups of students, at different stages of their professional education, and their different uses of virtual learning environments are highlighted. This study raises some key issues that need to be addressed by educational institutions deploying e-learning in order to prepare students to engage with such a learning medium, which is likely to be unfamiliar to them at the outset of their undergraduate studies. In addition, physiotherapists need the skills, time and resources to regularly access and actively participate in the online environment. These points are essential if online communities such as interactiveCSP (www.interactivecsp.org.uk) are to be sustainable. Employers have a crucial role in promoting the professional development of staff by supporting such initiatives and ensuring that they are inculcated into an organisational culture which promotes the sharing of expertise and practice that is evidence based.

Keywords: E-learning; Online networks; Online communities; Online discussions

Introduction

Previously in the health sciences, when students embarked on professional education training, they needed to acquire a specific knowledge and skills base to become a professional in their field. However, physiotherapy education has undergone enormous change; for example, there are now opportunities to enrol for a Master's degree not only for experienced clinicians post-qualification but also (more recently) for students on qualifying programmes. Furthermore, many students wish to study flexibly, in surroundings and at times that suit them [1,2]. The nature of professional work is also changing, and now, physiotherapists are required to develop different skills to enable lifelong learning in order to work and respond to the demands of evidence-based practise. The Chartered Society of Physiotherapy has responded to the ongoing learning requirements of physiotherapists by recently launching a website called interactiveCSP (www.interactivecsp.org.uk). Interactive CSP enables physiotherapists to keep up-to-date, to interact with their peers and to share knowledge and resources; this website has the potential to transform communication and knowledge-sharing across the profession.

In many cases, the educational institutional response to these developments has been to introduce online learning (e-learning) through a virtual learning environment (VLE) such as Blackboard, WebCT or MOODLE. These programmes allow tutors to provide a wealth of content to their students as well as offering a range of online learning tools such as synchronous and asynchronous discussions. Consequently, students are able to contact other students without necessarily having to be in the same place at the same time and to exchange ideas and engage with a learning community which they would otherwise not be able to do. Furthermore, the deployment of e-learning is often linked to encouraging students to take more responsibility for their own learning in order to become independent learners. This shift is, perhaps, even more relevant in the area of

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educating health professionals, who often need to spend periods of time on placement away from either the academic institution where they are studying or their workplace, whilst learning.

There is already a large and developing body of literature on the design and development of e-learning programmes and student online experiences [3,4]. There is also extensive literature on techniques for tutorial assistance and support for students [5–7]. However, literature focussing specifically on student perceptions of their e-learning experience has only emerged in the last few years [8–13], especially in the area of education of health professionals, who have come late to distance learning and often even later to the use of e-learning [14].

This study focussed on the deployment of an institutional VLE (WebCT) for two student cohorts: undergraduate students who were enrolled on a qualifying programme and postgraduate students who were completing a Master's degree post-qualification. The aims of the study were to gather insights into:

- students' perceptions of what studying at a tertiary education institution with e-learning involves, through the experience of two different groups of physiotherapy students;
- students' expectations of their and their tutors' role in the learning process, which is supported by a VLE especially focussing on online communication;
- tutors' views about e-learning and how technology such as VLEs can be incorporated in the learning environment.

Our findings not only offer insights into how different student cohorts respond to e-learning through a VLE at different stages of their professional education but also provide indicators of key issues that may need to be addressed for the successful implementation of online learning in physiotherapy programmes.

Methods

The study

Students studying in two separate modules were involved in the project. 'Introduction to Psychology' was a first-year module in the BSc (Hons) qualifying physiotherapy programme, which used the VLE with the aim of facilitating peer and independent learning. In this module, WebCT was used to house tutorial, workshop and timetable information, which was also provided in paper format to the students. There were also links to the website for the core text, which had online quizzes, experiments and summaries of chapters. In addition, students worked in pairs to provide summaries of lectures, workshops or tutorials, which were published in WebCT after being reviewed by the tutor.

The study also involved part-time MSc students undertaking the module 'Paediatric Physiotherapy and Occupational Therapy: a Critical Approach' as part of a post-qualifying Master's degree. Resources were made available through the VLE including online articles, module timetable information, a calendar, a list of web links and case study material. Students also used the online discussions to communicate with the tutors, who posted scenarios and queries to stimulate online discussion and provide support throughout the module. There was an online student cafe´ (an area where students could socialise online) and a private tutor's area where students and tutors could 'talk' informally. In addition, the assessment tool allowed students to submit formative assessments electronically; these were then marked and returned with individual feedback using the tool.

It is important to note that there were fundamental differences between the groups of undergraduate and postgraduate students, the structure of the respective programmes of study and the way in which the VLE was used to support learning for the different cohorts. The undergraduates, embarking on a programme of higher education, were at a different stage of their professional education compared with the postgraduates, who were undertaking a Master's degree as experienced clinicians. The undergraduate module was set up predominately as a repository of information to support conventionally delivered teaching for students who were institutionally based and studying full-time. However, the postgraduate module was designed to be a dynamic environment through which students, who were studying part-time and were physically distanced from the institution and from each other, could communicate and study.

Study design

Qualitative research methods were used for the purpose of this study which included individual in-depth interviews and focus groups. A paper-based questionnaire was also given to each student grouping to complete to provide demographic and descriptive data.

Student focus groups

A range of topics was addressed in the student focus groups. To aid data analysis, especially between groups, a semi-structured approach was followed [15]. Open questions were developed to introduce certain topics, which were then developed further and expanded according to the response of the participants. An external researcher, who was briefed about the project, the use of WebCT in the two modules and provided with access to the WebCT modules [16], ran the focus groups.

Tutor and student interviews

Semi-structured interviews for tutors and students were undertaken based on a list of questions covering predetermined topics. This allowed participants to discuss topics in more detail, if appropriate, but again provided some con-

sistency between the interviews to aid data analysis [17]. All of the interviews were undertaken by one researcher, who was not involved with the delivery of the modules and was known to the tutors but not to the students. Due to the geographical location of the tutors, several of these interviews were conducted by telephone rather than face-to-face. To help the tutors prepare, the pre-defined questions were emailed to them in advance.

Participants

The sample was one of convenience recruited from module tutors and two student cohorts at Queen Margaret University (QMU), Edinburgh, UK: level 1 undergraduate physiotherapy and postgraduate physiotherapy students. All of the students enrolled in the two modules were eligible for selection. The sample consisted of students and tutors who volunteered to participate in the project and complete the questionnaire and/or attend interviews and/or focus groups. No incentives were provided for students to participate in this study as this may have influenced the trustworthiness of the results [18].

The BSc module was delivered by one full-time tutor employed by QMU. Four tutors were involved in the delivery of the MSc module: one, employed by QMU, was responsible for the administration and organisation of the module and was one of the two researchers (JH) involved in the study. In addition, three part-time visiting lecturers, geographically dispersed across the UK and working as physiotherapists in the field of paediatrics, were responsible for facilitating the module. The three postgraduate tutors had never used a VLE before, but the tutors who were members of staff at QMU had some limited experience.

Procedure

At the launch of the modules, students and tutors were informed about the project and given an information letter. The students were shown how to use WebCT by the tutors, asked to logon to the system and navigate through the materials. All students were given the opportunity to be involved in the study and those who volunteered were asked to complete consent forms. Fig. 1 shows the procedure followed in this study.

Data analysis

Descriptive analysis of the data from the questionnaire was carried out using SPSS v.12. The individual and focus group interviews were transcribed verbatim from the tape-recorded interviews by a professional typist at QMU [17] who was unknown to the participants and played no other part in the study. Copies of the transcripts from the tutors' interviews were sent to each tutor to ensure accuracy. This process is known as member checking and is a means of enhancing the validity of the data [19]. The transcripts were returned and corrections were made, if necessary.

The following bibliographic details of the researchers are included to enable readers to evaluate the possible influences the researchers' backgrounds may have had on their interpretation of the results. The two researchers who performed the coding were academic members of staff at QMU; one worked as a physiotherapy lecturer in the School of Health Sciences (JH) and the other was a lecturer in the Centre for Academic Practice (SP). Both are female, white and in their forties and have a history of undertaking educational research focussing on learning technology.

The flowchart (Fig.2) provides an overview of the iterative procedure carried out during this study:

- initial analysis of the qualitative data: focus groups and interviews (with some responses from the questionnaire) to create the seven themes of the matrix;
- further analysis (iterative and cross-checking) of the transcripts using the matrix (see Appendix A);
- comparison of the undergraduate and postgraduate student/tutor groupings;
- development of the seven theme summaries.

The grounded theory approach of Strauss and Corbin [20] was used as a guide to analyse the data. Initially the transcripts were read independently, and all the descriptions in the interviews were broken down into discrete parts, closely analysed and coded, being compared for similarities and differences (open coding). When the two researchers had completed initial coding they met to compare and discuss their results. Important aspects relating to the students' and tutors' experiences of using WebCT were grouped together systematically under themes:

- reactions to WebCT;
- advantages of WebCT;
- disadvantages of WebCT;
- role of IT in learning and teaching; • technical issues;
- training issues.

During a further step in refining the coding process (axial coding), additional discussion took place regarding the naming and appropriateness of sub-themes which became evident within the seven different themes. This allowed connections to be made, thereby linking sub-themes around the axis of a theme and also comparisons to be made between (and within) student and tutor groups (see Appendix A). Transcripts were re-analysed and discrete parts (specific comments) were individually numbered for reference purposes (to allow cross-checking) and allocated to one of the seven themes (Fig. 2). This process is known as peer review and minimises researcher bias, thereby enhancing reliability of the analysis [21]. Finally, a summary of each theme, supported by appropriate quotations from the transcripts was produced.

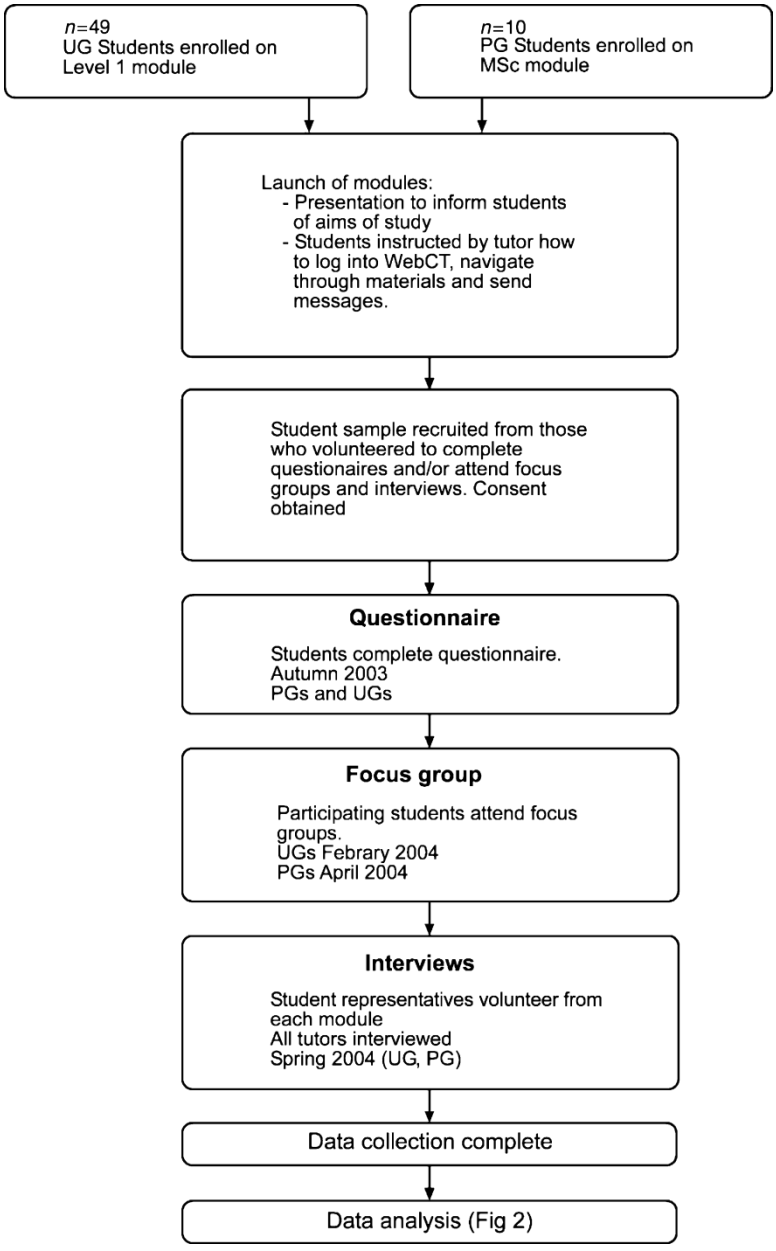

Fig. 1. The study procedure

Results

This overview of results, drawn from the theme summaries, includes actual quotations from the transcripts of the interviews and focus groups. All quotations are shown in italics and for ease of reference indicate their source:

- individual interviews with postgraduate tutors 1–4 (PGTutor 1, PGTutor 2 etc.);
- undergraduate tutor interview (UGTutor);
- postgraduate student interview (PG Student);
- undergraduate student interview (UG Student);
- postgraduate focus group (PG FG);
- undergraduate focus group (UG FG);
- questionnaire undergraduate (QR UG).

For example, PGTutor 1:21 refers to an interview with postgraduate tutor 1, quotation number 21. See Table 1 for results.

Discussion

The findings from this study offer some insights into the advantages and disadvantages of using a VLE within physiotherapy education.

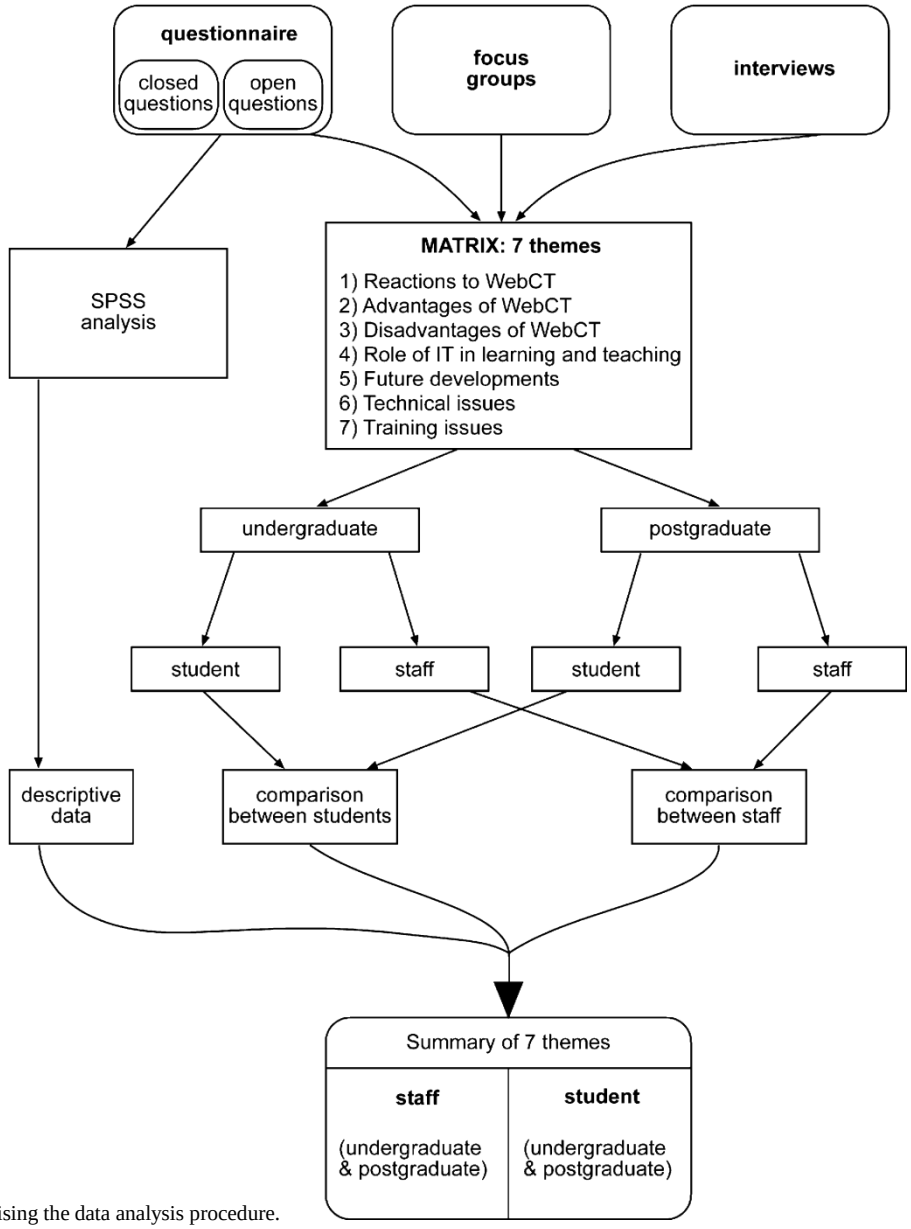

Fig. 2. Flow chart summarising the data analysis procedure.

The VLE as a tool to support and enhance learning and teaching

(i) A one-stop multimedia information shop

The findings indicate that VLEs can serve as an easily accessible one-stop, online, multimedia shop for all students (Table 1, Sections 2.2, 4 and 5):

Using the computer to access lots of information has affected my learning enormously. Using the electronic library is like saying 'Abracadabra!'—it's fantastic as I live in the sticks and we haven't got a library. (PG Student 1:120)

Furthermore, it can offer opportunities for student rehearsal, reinforce tutors' lectures, increase student engagement, improve motivation and reduce time required for processing administrative information:

I found that everything was there that you needed ... you didn't need to go and ask. (UG Student 1:13)

Used in this way, VLEs may also support motivated students to research more widely into their subject area.

(ii) Supporting online communication

In comparison, student response to the online discussions was much more varied. Most undergraduates felt online discussions were not appropriate since their need to be in contact was fulfilled via face-to-face, often unstructured, meetings with peers and tutors (Table 1, Section 2.1).

Table 1
Results from data analysis

1.Reaction to WebCT	Despite some anxieties about their lack of computer skills, all the postgraduate tutors were excited at the prospect of using technology in the learning environment. The VLE was described as: *a fantastic tool* (PGTutor 1:30) and one which *the students were extremely lucky to have* (PGTutor 3:131). This contrasted to the students' and undergraduate tutor reaction: the postgraduate students' response was quite positive and they were eager to try the VLE despite some nervousness. The undergraduate tutor and students' response was much more varied: some liked the idea of using computers in their learning, whilst others were unsure if they would use WebCT. By the end of the module it was noticeable that for the undergraduates this ambivalence remained and some continued to feel that WebCT offered no significant benefits, whilst others focussed solely only its use as an information repository.
2.Advantages of WebCT	Postgraduate tutors liked the online discussions because they acted as a support vehicle stimulating student and staff
2.1. Online discussions	dialogue. For example, the virtual student cafe´ was a popular online meeting place, providing invaluable peer support: *I think it's very difficult as a part-time masters student when you've got a work life and a personal life outside, as you're not just focussing on being a students as it were. I think the ability to contact people in the rest of the group and have on-going discussions and conversations with them about, you know, work you're preparing, I think that this is really useful* (PGTutor 3:137). The online discussions also encouraged student engagement with their learning materials and directed reading: *I think it [the online discussions] engaged the students in their pre-reading; it gave them some sort of impetus to read it and then to have to relate it to their practice, which is what I wanted them to do* (PGTutor 1:21).
2.1.1 The tutor response	By posing questions and providing feedback, the tutors could encourage students to post their own views on the subject under discussion; such online debates were often stimulating and thought-provoking. This enabled the tutors to direct and focus the discussions in new and more challenging directions and encourage students to relate and share their own relevant clinical experience: *I liked to feed back to say to them (the students) well this was very good, think a little more about this* (UGTutor:42). As a result the postgraduates started to explore subject areas before meeting face-to-face with their tutors. This allowed the tutors to identify the level of the students' knowledge at an early stage and help students with any difficulties they were experiencing.
2.1.2. Student response	The student groups responded very differently to the online discussions: only a few undergraduates considered this a valuable tool, mainly for reading administrative-type notices. In comparison, postgraduates praised its role in their learning: *I think having done modules at other universities, I've really enjoyed having WebCT as a tool. The other modules I've done have been, you know, one day a week but with WebCT you've got this continuous sort of connection with the other people on the module* (PG FG:203). WebCT enabled them to communicate at a personal level (through the student cafe),´to share concerns and provide mutual support, especially whilst balancing work and studying: *Seeing that other people felt the same as you at certain stages helped a lot* (PG Student 1:117). Students reported the desire to log on frequently to read and follow the discussions and most responded either immediately or after reflecting on the topic under discussion. A few students just followed the line of the discussion but did not participate: *Reading the discussions I'd find that I'd have to go and read up on a topic because the others had discussed it* (PG Student 2:48) and *Sometimes I wasn't sure of the topic being discussed e.g. legislation in Scotland so I'd go away and read up on the topic, by the time I got my own ideas the discussion had changed so I didn't tend to post I'd just go in and read messages* (PG Student 2:49).
2.1.3. The role of the tutor	The postgraduate students particularly valued the input of the tutor to the online discussions: *The role of the tutor is critical because the quality of the discussions are [is] changed perceptibly by the questions posed by the facilitator* (PG Student 1:117). Regular involvement and feedback from the tutor was a motivating factor and helped students 'to stay on the right track': *It was good to get feedback as you went along* (PG FG:193).
2.2. Improved access to content	All tutors and students valued the improved access to content offered by the VLE, for instance: *To have reading material for* content *the study blocks 'at your fingertips' is a tremendous asset* (PGTutor 3:134) and *It made the access to reading material as easy as sitting in a library, which was very, very good* (PG Student 1:105). The undergraduates liked the quick and easy, reliable access to web-based materials at any time: *I always felt it was there* (UG Student 2:23). This provided them with a security net, a 'one-stop shop' where they could find the materials without bothering anyone else: *I found that everything was there that you needed ... you didn't need to go and ask ...* (UG Student 1:13). They liked the summaries because they clarified ideas in more depth, and used them for revision by reading the summaries prior to examinations. They also liked the quizzes and reviews for providing a different learning experience: *You can get a wee bit bored of just writing away ...* (UG FG:116).
2.3. Time saving features of WebCT	The postgraduates valued the assignment dropbox within WebCT because it provided them with more time to write the WebCT assignments rather than worrying about allowing sufficient time for posting: *... it saves time, you can go up to the last minute, do corrections and then send it* (PG Student 2:53).
3. Disadvantages of WebCT	Postgraduate tutors and students were frustrated by the online discussion tool and the limited time available to respond
3.1. Online discussions	to postings. Tutors expressed concern that there was a lack of participation by some students; some students logged onto WebCT but acted *like sponges* (PGTutor 1:30) and *lurked* (PGTutor 2:78) in the online discussions. Students and tutors also disliked the anonymity, *It did feel a bit strange to be posting something to people I'd never met* (PGTutor 2:63), lack of non-verbal cues and time-delayed feedback, which were all barriers to their participation. For example, students were uneasy about posting a message about a subject area with which they had limited clinical experience. However, those students who did post were annoyed by 'lurking' students and were aggrieved that due to the lack of an assessed component in WebCT those who did participate were not given any credit for taking part in online discussions. There were also concerns about tutor skills in moderating an online discussion: in face-to-face situations, students felt that tutors were able to 'read' a class very well as a result of the verbal and non-verbal cues and thus able to explore areas which were confusing. In comparison, in the online area, students were concerned that tutors might perhaps be less able to recognise when students may need help.

Table 1 (*Continued*)

	Both undergraduate tutors and students felt that the online discussions were not appropriate and that it was easier and more informal to talk face-to-face rather than online.
3.2. Time constraints	Time was a major obstacle for students and staff when participating online: *I think you need a lot of time to sit down and do it; by the time I sort of got my laptop out, set it up, plugged it all in, got onto the internet and then got onto WebCT and you know if you're writing messages and things the time just sort of goes and it puts me off going in because I know that I am going to see messages I want to respond to and I haven't always got time to sit and think about it* (PG FG:198). This problem was exacerbated by lengthy postings which lacked focus; as the postgraduate tutor reflects: *I think I'd be more precise about how I want them to answer the questions, like the amount I want them to write and perhaps also be a bit more specific. I think perhaps it was my fault that they wrote so much because I said something like – how do you think this relates to your practice? – and off they went! So, I think I would be more careful next time and make sure I was getting them to think more specifically about the questions* (PGTutor 1:32). However, all tutors felt that e-learning required time: *At first learning technologies were seen as time-saving but it was found that WebCT needs time, like a garden to be set up and then maintained, for example, students had to be chased for their summaries. It was also important not to overload students as well as staff by using WebCT* (UGTutor:67).
3.3. Lack of appropriate content	In comparison, the undergraduates' criticisms focussed on the available appropriate content in the VLE; they felt that the material was irrelevant, insufficiently interactive and a few disliked it because it was not paper-based. Some disliked the summaries because they did not appear on a regular basis and there was also some reluctance about using peer-sourced information: *I think for the summaries you would have to be careful, like some people might think that things are important and you might not think that is important ... so I prefer to just do my notes by myself* (UG FG:100). Furthermore, students wanted materials that were three-dimensional, animated and perceived to be more memorable and more fun: *... everything moved and it was good, it wasn't just like reading a bit of paper ...* (UG Student 1:16-18).
4. Role of IT in learning and teaching	Access to materials was a key concern for students; postgraduates appreciated that they were able to study at a distance and yet access materials: *... using the computer to access lots of information has affected my learning enormously. Using the electronic library is like saying 'Abracadabra!'—it's fantastic, especially as I live in the sticks and we haven't got a library* (PG Student 1:120). They also appreciated the opportunity to explore topics more widely because of IT in their learning: *You come up with much wider issues when reading different journals than you would tend to by just keeping up with your own professional journal. I think information technology makes you look at a wider scope* (PG FG:210). Some undergraduate students had concerns about accessing materials online and said they liked and felt safer having paper copies, which were easier to read and where text could be highlighted: *I still like to have books and paper* (UG FG:112-113).
5. Future developments	Postgraduate students and tutors wanted protected time to participate fully in the online discussions: *Tutors need to go in quite frequently to actually steer the discussion in perhaps a new or more challenging direction* (PGTutor 2:97). Prior to commencement of their studies, students wanted to be informed about the expected time-commitment to online discussions in order to negotiate appropriate study leave with managers. In comparison, undergraduates had considerably fewer suggestions for this section and tended to focus on improved access to content (including overviews of books), more personalised content and more relevant links to additional resources which would reduce the time: *looking through loads of stuff that's not relevant* (UG Student 3:42).
6. Technical	Initially there were some technical issues, such as lack of access to WebCT from work (usually due to firewall restrictions) and home: *I had a lot of trouble logging on from home, which is where I do most of my studying* (QR UG). Although these problems were quickly resolved, undergraduates continued to have access issues throughout the study and were unable to find a reliable, fast PC at QMUC, especially at assignment time: *The supply is woeful* (UG Student 3:52).
7. Training	Tutors felt that: *People need to get their hands dirty* (PG Tutor 2:93) As soon as possible when using technology in the learning environment an initial training session for tutors and students was considered essential and should include the rationale for using WebCT as well as how to access WebCT and where to find materials: *It was excellent to have an initiation session with the students to cover common ground ...* (UGTutor:27–30). It was felt that this would increase participation in the online discussions particularly.

However, postgraduate students were very positive about online discussions to provide support, improve dialogue, increase motivation and deepen their engagement with the learning materials. The online postgraduate student café provided an ideal opportunity for social interaction:

Seeing that other people felt the same as you at certain stages helped a lot. (PG Student 1:117)

An analysis of the students' response to these two roles of a VLE in learning and teaching provides some insights into students' attitudes to technology in the learning environment. Furthermore, it also provides us with a few glimpses into students' ideas about what studying at a university entails. For example, the postgraduates were usually studying voluntarily to improve aspects of their clinical practice.Although keen to pass their programme of studies,they had a very different perspective on learning and knowledge acquisition to the undergraduates. The postgraduate students undoubtedly wanted easy access to current materials, especially journal articles, to help inform their interactions in the clinical and academic setting. However, for these postgraduates knowledge was something to be internalised and dissected: an artefact to be the basis of an informed dialogue with their peers and tutors:

You come up with much wider issues when reading different journals than you would tend to by just keeping up with your own professional journal. I think that information technology makes you look at a wider scope. (PG FG:210)

Due to the nature of their lives (work commitments, personal responsibilities) it was necessary for these dialogues to be online rather than face-to-face. Hence, the online discussions became a flexible communication channel which deepened their engagement with their learning materials.

In contrast, the undergraduate students appeared to be more focussed on gathering, storing and absorbing knowledge rather than active engagement with it. This seems to concur with the work of Saunders and Klemming [22], who point out that students traditionally seem to view higher education as 'an information-gathering exercise', and therefore do not engage in problem-solving work and discussions sufficiently to gain real benefit. Such ideas were reflected in the undergraduate students' initial reaction to, perceptions and use of an online environment: a 'one-stop shop' for gathering information but one that did not encroach onto their traditional perceptions of how learning at a 'bricks and mortar' academic institution was undertaken (Table 1, Section 2.1) [23]. Therefore, online discussions were seen as inappropriate to them since they did not fit in with this passive approach to learning.

For institutions deploying e-learning, this raises a number of issues especially regarding the 'one-stop' multimedia information shop approach to using a VLE, which when used without direct links to the learning objectives of the module may reinforce a passive, knowledge-acquisition model of learning and could even lead to surface learning. For example, undergraduates objected to ... *looking through loads of stuff that's not relevant* (UG Student 3:42). In comparison, a more advanced implementation of the VLE, which considers what students potentially may do with the wealth of learning resources available to them within the online environment, can foster independent learning and assist in supporting in-depth engagement with the materials. Hence, the postgraduate tutors, by providing feedback on student postings in the online discussions, could steer their students into new and more challenging directions as well as encouraging them to relate theory to practice (Table 1, Sections 2.1.2, 2.13 and 5):

I think it [the online discussions] engaged the students in their pre-reading; it gave them some sort of impetus to read it and to then have to relate it to their practice, which is what I wanted them to do. (PGTutor 1:21)

The role of the tutor in online communication

Tutor participation motivated students to participate in the online discussions (Table 1, Sections 2.2 and 2.3):

The role of the tutor is critical because the quality of the discussions are changed perceptibly by the questions posed by the facilitator. (PG Student 1:117)

The postgraduate students all referred to the need for the tutor's active presence in the online discussions; they did not state that they wanted every one of their individual postings replied to by the tutor, but they needed to know that the tutor was checking that the discussions were on the 'right track'.

The study also demonstrated that tutors need to adapt their role to the online environment, especially when moderating online discussions [24]. For example, tutors must help students familiarise themselves with what can be perceived as the anonymous space of the online discussions with its emphasis on text [1] and lack of spontaneity and visual cues. Tutors also have a role in dealing with 'lurkers'; lack of participation by others frustrated some students and tutors. In this instance, the postgraduate tutors have decided to change the assessment process to incorporate online discussions to ensure that all students actively contribute in the future (Table 1, Sections 3.1 and 7).

For undergraduates, tutors will need to prepare students for working and communicating online, especially by challenging student perceptions that the tutor is the 'font of all knowledge'. Although students often state that they like the idea of independent learning, in practice, they are usually more comfortable with the traditional approach of the tutor providing information [25]. This is illustrated by some of the undergraduates' attitudes to other students' work submitted to the online environment:

I think for the summaries you would have to be careful, like some people might think that things are important and you might not think that is important ... so I prefer to just do my notes by myself. (UG FG:100)

Additional areas for consideration

Other key issues highlighted by the study, which may influence the deployment of a VLE include:

(i)Technology in the learning environment

In the academic and clinical setting, information technology systems are not always robust. It appears that issues relating to student and tutor access to internet-enabled computers persist (Table 1, Section 6). Attitudes to technology in the learning environment were also very mixed: some undergraduate students did not perceive that technology had a role in their learning and disliked using computers: *I still like to have books and paper* (UG FG:112–113), whilst others welcomed a more varied interactive learning environment, for instance, by use of animation (Table 1, Sections 1, 2.2 and 3.3).

(ii)*Time—the new distance*

Throughout this study lack of time has been a major barrier to the implementation of VLEs (Table 1, Sections 3.2 and 5). Tutors referred to the lack of time available for planning, deploying and maintaining an online presence. Students also reported restrictions in the amount of time that they could devote to their studies and wanted specific guidance on the

amount of dedicated time required to participate in this new way of learning:

At first learning technologies were seen as time-saving but it was found that WebCT needs time, like a garden to be set up and then maintained; for example, students had to be chased for their summaries. It was also important not to overload students as well as staff by using WebCT. (UGTutor:67)

(iii)The importance of induction

All tutors felt that a hands-on induction, with an interactive exercise for students to complete, was essential (Table 1, Section 7). This should not only focus on the *how* of using the online environment but also on the *why*: the integral role of the VLE in supporting and facilitating learning in the context of their programme. This links to the work of Leung and Ivy [25], who note that tutors should make clear from the outset the goals and objectives of online materials. For undergraduates this would help them to visualise the role of the VLE in assisting them to become independent learners.

Rigour

Qualitative research is often criticised for its lack of rigour and may be perceived as anecdotal [26]. Throughout the data collection (specifically drawn from a range of sources) and analysis procedure, we sought to demonstrate that our methods were reproducible, reliable and consistent. For example, the two researchers sought to cross-check the coding and emergent themes, regular meetings were held to discuss the coding and procedures followed, and on several occasions the researchers reviewed/re-analysed the original transcripts.

Conclusion

E-learning is becoming increasingly popular: it is used in professional education programmes offered by tertiary education institutions and by online communities such as interactive CSP to support professional development. This study offers some important insights into key issues which need to be addressed if e-learning is to offer *another dimension* (PGTutor 3:8) for all students during their lifetime of learning. It is hoped that physiotherapists will benefit from the use of online learning, not only within formal types of professional education but also from the opportunities online communities provide to access, debate and share knowledge and examples of good practice.

Therefore, educational institutions need to consider how they will prepare students for such initiatives and how they will assist physiotherapy educators in creating and maintaining an online learning environment. In addition, providers and moderators of online networks need to address issues such as, access, induction, time-requirement, IT skills and the purpose of the online network so that the opportunities afforded by creating an online presence can be optimised. The role of the online moderator will be crucial, as well as that of employers and professional bodies, in actively supporting such initiatives to f oster professional development and professional socialisation.

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Ethical approval: Not required.

Appendix A. Matrix

	PG Students	UG Students	PG Staff	UG Staff
1. Reactions				
1.1 Initial				
1.2 Final impression				
2. Advantages of WebCT				
2.1 Learning and teaching 2.1.1 - summaries 2.1.2 - communication 2.1.3 - support (peer/staff) 2.1.4 - deep learning (reflection, focussed thoughts, discussions, revision) 2.1.5 - access to content				
2.2 Motivation				
2.3 Administration				
2.4 Timesaving				
2.5 Skills and experience gained by using				
3. Disadvantages of WebCT				
3.1 Learning and teaching – non-participation (lurking) 3.1.1 – access to material 3.1.2 – lack of interactivity and diagrams 3.1.3 – anonymity				
3.2 Students perceive WebCT as 'technology'				
4. Role of IT in Learning and Teaching				
5. Future Developments				
5.1 Interactivity (for example, quizzes, moving images) 5.2 Communication (early task setting) 5.3 Assessment 5.4 Dedicated time 5.5 Content 5.6 Expectations 5.7 No ideas about developments 5.8 More co-ordination with other modules 5.9 Improved access				

Appendix A (*Continued*)

6. Technical				
6.1 Access 6.1.1 – accessing WebCT (security, logons, firewalls) 6.1.2 – accessing a computer 6.1.3 – access to computers that are reliable 6.1.4 – knowing how to access WebCT				
6.2 Support - for technical issues (accessing assignments on line)				
7. Training				
7.1 Face-to-face/hands-on session for students 7.2 Training for staff 7.3 Documentation 7.4 On-going requirement 7.5 Information literacy skills				

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