RESEARCH ARTICLE

Evaluating Telesupervision as a Support for Clinical Learning: an Action Research Project

Lucy Chipchase,[1] Anne Hill,[2] Ruth Dunwoodie,[2] Shelley Allen,[2] Yvonne Kane,[3] Kristen Piper[1] & Trevor Russell[2]

[1]School of Science and Health, University of Western Sydney, Campbelltown, Australia

[2]School of Health and Rehabilitation Sciences, The University of Queensland, St Lucia, Australia

[3]Department of Physiotherapy, Townsville Hospital, Townsville, Australia

Corresponding author:
Lucy Chipchase, University of Western Sydney, School of Science and Health, Campbelltown, NSW, Australia
Email: L.chipchase@uws.edu.au, Phone: +61 (0)2 4620 3758

Abstract

Telesupervision is a process whereby distant supervision is provided using electronic information and communication technologies. This study aimed to investigate whether telesupervision can be used as an effective method of supervision to complement traditional face-to-face clinical supervision in physiotherapy, speech pathology and occupational therapy education.

Three action research cycles were undertaken between July 2010 and December 2012 in Queensland, Australia. A shared supervisory model was employed whereby telesupervision was used as an adjunct to face-to-face supervision in a variety of clinical contexts. Phase 1 was undertaken as a metropolitan pilot while Phase 2 was conducted in a regional city and Phase 3 in a geographically isolated rural town. Participants included 30 students from entry-level programmes in Physiotherapy, Occupational Therapy and Speech Pathology and five remote clinical educators (CE), and five on-site CEs. Evaluation consisted of clinical educator and researcher observations, a student satisfaction survey and a student learning survey. In later phases, data were collected from individual semi-structured interviews with students, remote and on-site CEs.

Results demonstrate that student learning is not compromised when telesupervision is used to complement face-to-face supervision. Further, when used with small educator to student ratios (1:4), students were satisfied with the process. Many of the benefits of the telesupervision experience appeared to be due to the shared supervisory model. Limitations were low bandwidth and unreliable connectivity that interrupted learning; however, cyclical problem solving by educators and students improved the telesupervision learning experience.

Keywords: action research, telesupervision, clinical learning

PBLH, Vol 2, Issue 2 (July 2014)
doi:10.11120/pblh.2014.00033

Introduction

Experiential learning in the form of clinical experience is a substantial yet integral component of entry-level health professional education. During clinical placements, students are able to put theory into practice and develop the professional skills and competencies critical for entry-level practice (Boud & Edwards 1999, Chipchase *et al.* 2012a). For health professional students, a formal face-to-face supervision process, whereby experienced clinical educators (also known as clinical facilitators/supervisors or practice-based educators) oversee the learning experience, is integral to the learning experience and acquisition of clinical competence (Higgs 1992, Fowler 1996, Williams 2010, Chipchase *et al.* 2012b, Thistlethwaite 2013).

Around the world, the demand for health care has escalated due to dramatic changes in life expectancy, growth in chronic disease incidence, and increased community expectations (Greengross *et al.* 1997, Towle 1998). In Australia, a key government strategy to meet rising health care demands has been to train more health professionals. This has resulted in dramatic increases in the number of university courses and entry-level university places catering for the health professions (McAllister 2005, Rodger *et al.* 2008). Paradoxically, this increase in student numbers places strain on an already burdened health care system with greater requirements for clinical education (practice-based learning or work-integrated learning) and supervisors (HWA 2010, Thistlethwaite 2013).

This need for greater capacity in clinical learning has occurred in an increasingly challenging and complex health care environment. Workforce shortages, increased acuity and complexity of clients along with fiscal constraints impact on the ability and willingness of clinicians to provide additional student education (HWA 2010). This is particularly true outside metropolitan centres where increasing rurality has been strongly associated with greater workforce shortages and subsequent inability to provide essential supervision experiences for students (Murray & Wronski 2006, Wagner *et al.* 2008). The requirement for alternative and innovative methods of providing clinical learning opportunities has led to a number of ground-breaking strategies, one of which is telesupervision.

Telesupervision or e-supervision is a process of providing supervision with the educator at a distance using electronic information and/or communication technologies (Chang & Trealese 1999, Dudding & Justice 2004, Wood *et al.* 2005, Reese *et al.* 2009, Grady 2011). With telesupervision, clinical eduactors provide supervision from a distant site via technologies such as email, video conferencing or mobile technologies. Pilot investigations into telesupervision using synchronous technology, such as video conferencing, as a vehicle to support clinical supervision have been reported in medicine, psychology, psychiatry and physiotherapy (Sorlie *et al.* 1999, Jin *et al.* 2000, Wood *et al.* 2005, Austin & Rocchi 2006, Reese *et al.* 2009, Hays 2012). For example, psychology students were successfully supervised on a 12-week placement both in person and by video conferencing. Results from this and other studies indicate that telesupervision does not impact on the nature of the supervisory relationship. However, these studies have been limited to one-to-one student to educator models. Barriers to adoption of telesupervision appear to be due to issues of portability, with educators and clients required to be in a certain place at a designated time, and inconsistent quality of transmission (Dudding & Justice 2004).

The opportunity for direct 'at bedside' telesupervision has been made possible with the advent of portable telehealth devices. Telehealth devices, such as the eHAB™ system (NeoRehab Pty Ltd, Brisbane) have been used successfully for telerehabilitation in a variety of practice contexts in rural and remote settings (Constantinescu *et al.* 2010, Russell *et al.* 2011, Lade *et al.* 2012, Theodoros *et al.* 2013). However, no published study has yet explored the role of this technology in the clinical supervision of allied health

PBLH, Vol 2, Issue 2 (July 2014)
doi:10.11120/pblh.2014.00033

students. In particular, no study has explored whether telesupervision can be used to assess student–client interactions 'at the bed side' where the therapy is being delivered. Finally, no previous report has assessed whether telesupervision preserves or enhances clinical learning. Therefore, the broad objective of this study was to evaluate whether telesupervision can be used as a reliable and effective method of supervision of clinical learning in physiotherapy, speech pathology and occupational therapy education. Specifically, we aimed to evaluate whether telesupervision, used as part of a shared supervisory model, impacted on student learning. Further, we aimed to evaluate student and supervisor satisfaction with the telesupervision model. To answer these questions, we conducted an action research project over two years.

Methods

Action research is well suited to situations in which the researchers work collaboratively with key stakeholders to identify problems and find innovative solutions (Holloway 2008, Meyer 2008). This design was selected since the focus of the study was to investigate the transfer of the telesupervision model into a variety of clinical learning environments. Thus, the action research methodology enabled participants and researchers to provide input and feedback to further enhance the model. This research gained ethical approval from the Medical Research Ethical Committee at The University of Queensland and the relevant institutional ethics boards at participating facilities.

The research was conducted at an allied health and rehabilitation school in an Australian university in collaboration with rural and remote clinical facilities in Townsville and Mount Isa, Queensland. The action research consisted of three phases between July 2010 and December 2012 corresponding to three different clinical placements for third and fourth year students (Table 1). Phase 1 was undertaken as a pilot phase with high-level on-site supervision support. Phase 2 was conducted in a regional city with moderate level on-site supervision support. Phase 3 was conducted in a geographically isolated rural town with limited on-site supervisor support, a location considered to have the most potential to benefit from successful telesupervision.

Table 1 Student fieldwork placement details.

Phase	Placement location	Distance from remote supervisor	Period of telesupervision*	Length of placement (weeks)	Service type	CE: student ratio
1	Brisbane	Same building, different level	2 days/week	5	PT: Musculoskeletal clinic	1:4
					SP: Paediatric clinic	1:4
					OT: Role emerging placement	1:16
2	Townsville	1358 kms	2 days/week	5	PT: Outpatients public hospital	1:4
					SP: Adult inpatient and paediatric outpatients	1:4
3	Mount Isa	1824 kms	3 x 4 hr sessions/week	5 or 6	PT: Outpatients, public hospital	1:1
					SP: Paediatric outpatients	1:2

*Note: On remaining days of the week, students were supervised face-to-face by a local CE.

PBLH, Vol 2, Issue 2 (July 2014)
doi:10.11120/pblh.2014.00033

Clinical educators (CEs) were defined as remote (i.e. provided telesupervision) and on-site (i.e. provided face-to-face supervision and facilitated the telesupervision where necessary). The remote CEs were clinicians experienced in clinical education who provided supervision as part of a block placement to the University of Queensland. In each phase, telesupervision replaced a portion of the standard face-to-face block placements. Each supervisor was the same profession as the students they were supervising.

A key component of the research was the use of a portable telerehabilitation system (eHAB™) for telesupervision. The eHAB™ (Version 2) includes a laptop with software, camera and echo-cancelling microphone in a lockable case (Figure 1). The system uses a wireless mobile phone connection (3G) and can be battery powered for two-three hours. As a wireless system, the eHAB™ functions as a mobile videoconferencing tool. However, unlike other videoconferencing tools, the eHAB™ has the ability to capture high resolution and high quality video and audio footage independently of the video conference. In addition, the eHAB™ has data sharing capabilities such as displaying instructional images and video clips, remote camera control capabilities and touch screen facilities to enable direct interaction.

Figure 1 The eHAB™ system.

The eHAB™ equipment at the fieldwork placement site focuses on the student and client while the one at the university site focuses on the remote clinical educator (CE). The remote CE can control the camera on the student's eHAB™ with software that allows videotaping or audiotaping of the student assessment or treatments. In addition, instant written feedback can be provided onto the screen or sent as text files. Students can also communicate readily with the remote CE using verbal or written messages. In summary, the technology relies on the Internet for transmission and combines Skype™-styled video conferencing with store and forward audio-visual recording and written feedback mechanisms over a secure private network.

Data collection

Data collected in Phase 1 (pilot phase) consisted of clinical educator and researcher observations, a student satisfaction survey and a student learning survey. In Phases 2 and

PBLH, Vol 2, Issue 2 (July 2014)
doi:10.11120/pblh.2014.00033

3, data were collected from individual semi-structured interviews with students, remote and on-site CEs (i.e. no surveys were completed in these phases). One researcher (SA) used an interview guide developed by the senior author (LC) to address the research questions. Informed by action learning principles, the interview questions covered, amongst other areas, what was planned in terms of clinical caseloads and how the equipment was to be used, what did happen, what worked well, what did not work so well, why, and what should be done differently next time . The sequence of questions was adapted in response to the issues raised by each participant. As participants were geographically dispersed, interviews were conducted by telephone at mutually convenient times in the fortnight following completion of the student placement. Interview times ranged from 20 minutes to 45 minutes, and averaged 30 minutes.

Table 2 Participant details by phase.

Phase	Remote CEs	On-site CEs	Student
1	1 PT	1 PT	4 PT (4th year)
	1 SP	1 SP	4 SP (4th year)
	1 OT	1 OT	16 OT (4th year)
2	1 PT	1 PT	2 PT (4th year)
	1 SP	1 SP	2 SP (3rd year)
3	1 PT	1 PT	1 PT (4th year)
	1 SP	1 SP	1 SP (3rd year)

Key
CEs = Clinical educators.
OT = Occupational therapy.
PT = Physiotherapy.
SP = Speech pathology.

Participants: recruitment and details

All CEs and students involved in the telesupervision placements were informed about the study and invited to participate. Each consented to participate, making a total of 42 participants with the remote CEs for physiotherapy and speech pathology for Phase 2 also supervising in Phase 3 (Table 2). In Phase 3, one student who had consented to be interviewed was later not available due to ill health.

Data analysis

Data from Phase 1 were analysed collaboratively by four researchers. A report of the findings from Phase 1 was presented to members of the research team before Phases 2 and 3 commenced. Data from Phases 2 and 3 were fully transcribed before textual data were coded and categorised by one researcher (SA). A five-stage thematic framework approach was used to analyse data (Ritchie *et al.* 2003, Pope *et al.* 2006). This approach enabled the texts addressing the main research questions to be grouped together while the analyst remained sensitive to the additional themes, issues and concerns raised by the participants. Findings from each phase were discussed with the CEs at the planning stage of the next placement to improve implementation of the telesupervision model.

PBLH, Vol 2, Issue 2 (July 2014)
doi:10.11120/pblh.2014.00033

Rigour in the research included triangulation in data collection and analysis as data were collected during three phases from three participant groups (students, remote CEs, on-site CEs) and involved researchers, students and CEs from three allied health professions (PT, SP, OT). Participants knew the researchers' stance in relation to the research, that is, all researchers had extensive experience and interest in improving clinical education. Data were collected by one independent qualitative researcher (SA), who was not on the academic staff, to remove the potential for influence by teaching staff. This researcher's memos ensured transparent interpretation and promoted discussion between researchers. All disconfirming cases were analysed and resulted in more nuanced interpretation of the results.

Findings

The findings are presented by phase. In each phase, participants compared their experiences of telesupervision with face-to-face learning, commented on technical and connectivity issues impacting on learning and highlighted areas for improvement in the next phase. In each phase, students attended their usual clinical placement, generally a five-week full-time placement, with approximately 12–14 hours per week provided by telesupervision (Table 1). Participants' quotes are coded based on whether they are a student (S) or clinical educator (CE), their profession (PT, OT, SP) and their number. For example, S-PT-1 reflects a quote from a student physiotherapist whereas CE-SP-2 represents a quote from a clinical educator in speech pathology. Note, there are different students in each phase of the project.

Phase 1: Brisbane

This pilot phase's objectives were to test the eHAB™ equipment and to assess whether telesupervision facilitated student learning and student satisfaction with the supervisory process.

Phase 1 Findings impacting on student learning

Students completed a student learning survey evaluating the extent to which they perceived that telesupervision facilitated their clinical learning. The student learning survey was developed by the research team and piloted prior to the study. Sixteen questions were rated on a 5-point Likert scale ranging from strongly disagrees to strongly agrees (Table 3). The mid response indicated that they 'neither agreed nor disagreed'. In addition, students were able to respond to an open-ended question about their thoughts on the telesupervision process. Mean scores for 10 of the 16 questions were above 3.5, indicating agreement that telesupervision facilitated their learning. In addition, students disagreed with two negative questions, which suggests that the students believed that the remote CE was able adequately to assess performance and provide feedback.

Generally, students appreciated the dedicated time and instant feedback on performance and agreed that the telesupervision model facilitated their learning (Table 3). One student (S-PT-1) said: "[It] allows for on-the-spot feedback." Another (S-PT-2) said: "I felt that it was a very rewarding experience. I enjoyed the opportunity and the amount of dedicated time that I would spend with the [clinical] educator compared to the normal clinic."

Students were also asked to rate their satisfaction with telesupervision. Out of a maximum score of 32 (eight questions, each with four possible responses), the median score was as follows: PT (30), SP (26) and OT (18). Questions focused on whether they received the kind of supervision they wanted, whether their supervision needs had been met and their overall satisfaction with the amount and type of supervision. This meant that PT and SP students were more satisfied with the telesupervision than were OT students. This was due to the

PBLH, Vol 2, Issue 2 (July 2014)
doi:10.11120/pblh.2014.00033

Table 3 Facilitation of clinical learning.

Comments	Mean (SD)*
I understand the role of my remote CE	4.24 (0.61)
I received sufficient feedback from my remote CE	3.86 (0.72)
Feedback from my remote CE was effective in creating change	3.71 (0.93)
I felt safe asking my remote CE about my performance	3.82 (1.13)
I believe that my remote CE was able to assess my performance validly	3.48 (1.25)
My remote CE activity engaged me in clinical learning opportunities	3.88 (0.60)
My remote CE was able to identify the level of teaching and support I Required	3.65 (0.97)
It was difficult to receive feedback from my remote CE	2.64 (1.03)
The telesupervision model effectively facilitated my learning	3.38 (0.91)
Telesupervision is a reliable and effective method of delivering CE	3.45 (0.71)
I was satisfied with my learning within the telesupervision model	3.71 (0.93)
My remote CE encouraged me to reflect on my performance	3.65 (0.62)
My remote CE assisted me in integrating knowledge into practice	3.58 (0.87)
My remote CE could not adequately assess my performance	2.59 (0.91)
My remote CE actively engaged me in learning	3.82 (0.58)
My remote CE provided specific feedback on clinical skills	3.47 (1.10)

Key: *Mean score for ratings on 5-point Likert scale where 1 = strong disagree and 5 = strong agree.

fact that the OT placement was a role- emerging placement with a supervisor to student ratio of 1:16.

Changes made after Phase 1

After observing and reflecting on Phase 1, it was decided that OT students would not participate in Phase 2. This was due to the large disparity between educator and student numbers (ratio 1:16) compared with that of the other student groups. In addition, the diversity of their fourth year fieldwork placements, which were non-traditional (role-emerging) placements, required more attention and discussion than would be possible with one camera focused on a large group. Role-emerging placements are designed to promote occupational therapy in a setting where there is no established occupational therapist role or programme (Overton *et al.* 2009). This meant that the on-site supervisor was neither an occupational therapist nor were they an experienced clinical educator. Thus, the OT students relied on their academic staff member for indirect supervision and it was this that was perceived to be difficult, due to audio and video limitations, in a large group setting.

The results from Phase 1 indicated that the system of supervision worked in the clinical environment with no major technical issues and no apparent detrimental effect on student learning. Thus, the objectives of Phase 1 were met, so establishing the feasibility of using eHAB™ equipment for Phases 2 and 3.

Phase 2: Townsville

Phase 2 involved telesupervision of PT and SP students during a placement at Townsville Hospital. This model was a shared supervisory model requiring both supervisors (on-site and remote) to discuss their views of the students' performance and contribute to the overall assessment (Tables 1 and 2). In this phase, themes that emerged from the interviews included adapting to telesupervision, the value of CE communication and collaboration, connectivity issues and suggested improvements.

PBLH, Vol 2, Issue 2 (July 2014)
doi:10.11120/pblh.2014.00033

Adapting to Telesupervision

Participants compared telesupervision to face-to-face supervision. Four students and CE participants reported that although the telesupervision was initially difficult, they adapted to the telesupervision experience. This is highlighted by the following quote (S-PT-1): "Initially it was a little bit – it was a little bit weird, I guess, trying to talk to a patient and then talk to the screen and – so the normal little interactions that you might have with an educator who's in there with you at the same time were suddenly a bit different, but we got used to it." However, three students retained a clear preference for the face-to-face modality, which is highlighted by the following (S-PT-2): ". . ..but I wouldn't like to have that [telesupervision] as my only method of clinical education for a whole prac. . . . I think that would be quite limiting and probably detrimental to both patient and student. . . . Yeah. Definitely not the preferred option [compared] to having the face-to- face model."

All students expressed satisfaction with the shared supervisory model that was enabled by the telesupervision system. One (S-SP-3) said, "So that was definitely good getting feedback from two different people." Similarly, another student (S-PT-1) noted: "There were some things that each [CE] would do a little bit differently, but I took that as a positive in terms of getting two different perspectives about how to think and go about this particular patient".

Telesupervision also posed some challenges for learning. Students faced the problem of learning technical or manual skills without a CE physically present in the same room to demonstrate on the client. As one student noted (S-PT-1): "If I'm there assessing, say, a joint as being hypermobile, or I'm not too sure . . . then I would ideally like to be able to have someone [laughs] who can come in."

Yet, educators and students were able to work around this. For example, one student indicated that he was able to learn manual skills adequately with direction from the remote CE. The student (S-PT-2) suggested that the remote CE could use models of a skeleton or a human body to demonstrate a technique more effectively. In addition, the same student suggested that the CE could show "where hands should be that way. I mean everybody's got different shapes and what not . . .. [but] I can't see why that couldn't be done."

Speech pathology students and CEs found that working with children could be more difficult in the telesupervision context. For although children like being *"on TV"* in SP sessions, parents and other siblings may accompany the child and the resultant noise levels make it difficult for the remote CE to hear. This is exemplified by the following: "It took a little bit more of my concentration with those younger children" (CE-SP-3).

Importance of CEs' Collaboration and Communication

There was a consensus among students and CEs that regular communication between CEs would result in better scheduling of sessions for students and sharing of information to aid student learning. As one CE (CE-PT-2) noted: "I also found chatting with the remote clinical educator who is very experienced . . . that was good for me in terms of confirming my observations around the students and giving me more confidence in developing particular strategies for their learning."

Connectivity Issues

All eight participants frequently mentioned the negative impact of dropouts in connectivity. Connectivity problems overshadowed the positive experiences of eHAB™ by increasing frustration and reducing learning continuity for the majority of student participants. Connectivity issues arose because the signal strength of the mobile phone networks was limited in the clinical areas of the hospital where student education was conducted.

PBLH, Vol 2, Issue 2 (July 2014)
doi:10.11120/pblh.2014.00033

Suggested Improvements

Participants provided a range of suggestions for how to improve student learning in the telesupervision model. These included: (a) ensuring that CEs at both locations discussed students' learning and performance at a regular pre-arranged time and by agreed methods; (b) utilising telesupervision audio and video recording features more fully for later feedback; and (c) scheduling shorter sessions because a four-hour block "was a fairly long stint for the [CE] to be one on one with any one student" (S-PT-1). In addition, a number of suggestions were made to increase efficiency of telesupervision. Examples included screening for suitable clients until a student "becomes a bit more experienced" (S-PT-1) and gaining client consent prior to the session with students.

Phase 3: Mount Isa

Phase 3 involved telesupervision of PT and SP students participating in a placement at Mount Isa Hospital. Mount Isa is a rural town in northern Queensland with a population of approximately 22,000. The same shared supervision model was used as in Phase 2.

In analysing the interviews with participants from Phase 3, it became clear that participants placed greater emphasis on "adapting telesupervision" to improve student learning than on "adapting to telesupervision", a theme in Phase 2. In particular, experienced CEs made adaptive changes to overcome problems encountered in Phase 2. The sub-themes of valuing dedicated individual time, shared supervision and timely feedback on performance, evident in Phases 1 and/or 2, recurred in Phase 3. However, participants continued to experience some audibility and space problems, connectivity issues, and made recommendations for future implementation.

Adapting telesupervision

Participants reported overcoming telesupervision barriers to learning PT techniques that are customarily learned by "kinaesthetic experience . . . by placing your own hands on [the student's] hands" (CE-PT-1). Instead, the remote CE not only described but also demonstrated on a child in her clinic via the eHAB™ system. This enabled the student to mirror her hand positions more accurately than when directed with words alone. For S-PT-1, the resultant combination of "visual and practical learning" was compatible with his preferred learning style and "just completely changed my technique and, you know, it's just improved my ability treating necks about 10 times".

The SPs also benefited from implementing a range of "more structured and organised" communication strategies including regular weekly communication between the remote and on-site CEs to ensure they maintained complementary roles and responsibilities for student learning and assessment (CE-SP-1). Other changes introduced by CEs and which improved student learning included: (a) meeting the students before their departure for placement; (b) encouraging students to minimise the screen when paediatric clients were "really distracted and disrupted by seeing themselves and seeing me in the screen" (CE-SP-1); (c) using landline with speaker phone or mobile phones for voice contact or text messaging especially during drop-outs; (d) initially having joint sessions in which one student "would have ownership of the session and the other student would be watching or assisting with the teleHab [sic] machine and [communication]" (CE-SP-2); and (e) asking the students to email copies of the resources which they were using so that they could be seen clearly (CE-SP-1).

Audibility and space problems

Some issues with audibility and space were noted. The SPs experienced reduced audibility during sessions with children. In addition, the physiotherapists found that the small size of the therapy cubicle meant there were sounds coming from nearby cubicles and also limited

PBLH, Vol 2, Issue 2 (July 2014)
doi:10.11120/pblh.2014.00033

space for positioning the camera to view the whole body. Participants suggested options for improving this with multiple cameras and better audio capacity.

Dedicated time and timely feedback

In Phase 3, student participants emphasised that dedicated individual student learning time with an experienced CE was a particular advantage of telesupervision. The scheduled telesupervision sessions not only gave predictable structure to a placement but also enabled students to develop their clinical reasoning more rapidly than in a clinic where educators are present intermittently while supervising four-six students. CE-PT-1 stated that interaction with students helps them learn "what might be the important triggers to assist them to make more mature decisions for their future".

Phase 3 participants concurred with Phase 2 participants that having two rather than one CE on the placement was preferred because it meant exposure to more diverse learning about assessments and interventions. One student (S-PT-2) said that his local supervisor "really reinforced" what he had learned at university, while his experienced remote CE "was able to pick it up straight away what I was doing wrong . . . I thought that was excellent, teaching different styles, different techniques, different approaches." These comments highlight the value of the shared supervisory model that using the eHAB™ can provide.

Student participants commented on the immediacy of feedback on performance offered with telesupervision compared to traditional placements. When the CE provided immediate video feedback of a student's treatment it was "really amazing . . . he realised that there was quite a difference." (S-SP-2) stated: "I had a really positive learning experience with the eHab . . . the feedback was always scheduled in after the client left."

Connectivity Issues

As in Phase 2, Phase 3 participants spoke highly of the eHAB™ technology but found that frequent frustrating drop-outs in the network reduced learning while increasing stress and discontinuity of sessions. Telesupervision required more preparation time than face-to-face supervision because of the potential for drop-outs. However, through discussion with experienced CEs, students were more prepared to trouble-shoot than in Phase 2. Nevertheless, one CE (CE-PT-1) cautioned that a "more anxious student" might find drop-outs a "difficult situation [to cope with]".

Recommendations

There was general agreement that for the students two days of telesupervision and three days of face-to-face supervision were workable. As noted by one CE (CE-PT-1), a for-hour block of time is a long period for anyone to concentrate, such that a number of remote CEs may be required.

Discussion and conclusions

This is the first study to demonstrate the utility of telesupervision as an adjunct to face-to-face supervision in a variety of clinical contexts for allied health students. Results from this action research project suggest that student learning is not compromised through the use of a telesupervision system. Further, as participants became familiar with the technology they identified and developed strategies that enhanced learning during telesupervision. Ultimately, they adapted telesupervision to the learning task rather than adapting to telesupervision. The learning of kinaesthetic manual skills highlighted this where CEs developed strategies to foster the students' acquisition of these skills in the absence of a face-to-face demonstration.

PBLH, Vol 2, Issue 2 (July 2014)
doi:10.11120/pblh.2014.00033

Many of the benefits of the telesupervision experience appeared to be due to the shared supervisory model. Students noted that having more than one educator was very valuable in that they were able to receive feedback from two educators with the potential for more diverse learning about assessments and interventions. During the course of the project, this model of supervision improved with educators and the project team developing a number of strategies to enhance the learning experience. Successful strategies included regular pre-arranged meetings between the remote and on-site educators to discuss students' learning and performance, screening for suitable clients and utilising the telesupervision audio and video recording features for feedback. Video recording of a student with a client was a useful tool to support the educator's feedback. Targeted training for clinical educators (both on-site and remote) that includes discussion of these strategies prior to telesupervision placements is likely to prepare educators such that students' learning opportunities and outcomes are maximised.

Telesupervision is unlikely to replace traditional face-to-face fieldwork supervision. However, our study found that, subject to good connectivity, the quality of the learning experience in the clinical setting could be maintained. These results are consistent with previous reports of using technology for supervision (Reese *et al.* 2009, Grady 2011). In our study, a shared supervision model with two days of telesupervision and three days of face-to-face supervision appeared to be the ideal combination. As such, the use of telesupervision would be a valuable complement for supporting educators in rural and remote regions, particularly if the goal is to increase student placement numbers in these regions. It is acknowledged that the rural and remote area health workforce experiences a high turnover rate and therefore consistently includes a percentage of less experienced staff (Lowe 2007). Telesupervision may present an opportunity for these on-site educators to be supported by more experienced remote educators, thus affording students a richer learning experience. Furthermore, as the health workforce in general includes a significant percentage of part-time staff (ABS 2006), the possibility of supplementing part-time clinical placements with remote telesupervision presents a valuable addition to clinical placement availability options.

Insufficient bandwidth and unreliable connectivity have commonly been cited as detracting from the telesupervision experience (Wood *et al.* 2005, Morse *et al.* 2011). Participants in our study reported similar issues. While communication technology supporting telesupervision has improved, it is still dependent on connectivity. However, over time participants in this study problem solved to ensure continuity of learning by identifying a number of strategies to mitigate the issue of disrupted connectivity including regular meetings and the use of email.

Because of the context-specific nature of action research the findings may not be easily transferrable to other rural settings with different technology, Internet connectivity and allied health educational and field placement systems. Nevertheless, the authors hope to have outlined the context of the research in sufficient detail to enable the reader to judge if other findings unrelated to technology and Internet connectivity apply to their health care context in Australia or internationally. Sample sizes in this study were small but this limitation is consistent with other studies of telesupervision. Students were aware they were part of a study and this may have influenced their responses. However, an independent qualitative researcher, who was not on the academic staff, conducted all interviews, which removed the potential for influence by teaching staff. Finally, the OT students did not complete Phases 2 and 3 as the telesupervision was not judged to be appropriate for role-emerging placements with large student to supervisor ratios.

In summary, this action research project demonstrated that telesupervision, when used as an adjunct to face-to-face supervision, does not compromise the clinical learning experience. While issues with the technology were identified (connectivity and audibility

PBLH, Vol 2, Issue 2 (July 2014)
doi:10.11120/pblh.2014.00033

problems) during the life of this project, educators and students were able to adapt and find solutions. Telesupervision enabled a shared supervisory model to clinical learning that provided benefits to students and educators alike. However, further research is required to resolve the technical issues and to establish whether telesupervision would be useful in other practice settings such as community placements. In addition, the use of telesupervision for newly qualified staff in remote and rural settings where it is difficult to recruit and retain staff could be explored. As high resolution, mobile technologies become standard, it is not difficult to envisage a day when telesupervision, as an adjunct to face-to-face clinical education and supervision of newly qualified staff, becomes the norm rather than the exception.

Acknowledgements

This study was funded by a Practitioner Research Grant from Queensland Health. The authors would like to thank the clinical educators and students who contributed their time and feedback to the project.

References

ABS (2006) Census of Population and Housing. Canberra: Australian Bureau of Statistics. Available at http://www.abs.gov.au/websitedbs/censushome.nsf/home/data?opendocument#from-banner=LN (accessed 7 November 2013).

Austin, Z. and Rocchi, D.M. (2006) Impact of facilitated asynchronous distance education on clinical skills development of international pharmacy graduates. *American Journal of Distance Education* **2** (20), 79–91.

Boud, D. and Edwards, E. (1999) Learning for practice; promoting learning in clinical and community settings. In *Educating Beginning Practitioners: Challenges for Health Professional Education* (eds. J. Higgs and H. Edwards), pp173–180. Oxford: Butterworth Heinemann.

Chang, B.L. and Trealese, R. (1999) Education of health professionals using a proposed telehealth system. *Proceedings AMIA Annual Symposium*, 496–500.

Chipchase, L., Allen, S., Eley, D., Mcallister, L. and Strong, J. (2012a) Interprofessional supervision in an intercultural context: A qualitative study. *Journal of Interprofessional Care* **26**, 465–471.

Chipchase, L.S., Buttrum, P.J., Dunwoodie, R., Hill, A.E., Mandrusiak, A. and Moran, M. (2012b) Characteristics of student preparedness for clinical learning: clinical educator perspectives using the Delphi approach. *BMC Medical Education* **12**, 112. doi:10.1186/1472-6920-12-112.

Constantinescu, G., Theodoros, D., Russell, T., Ward, E., Wilson, S. and Wootton, R. (2010) Assessing disordered speech and voice in Parkinson's disease: a telerehabilitation application. *International Journal of Language & Communication Disorders* **45** (6), 630–644.

Dudding, C.C. and Justice, L.M. (2004) An e-supervision model: videoconferencing as a clinical training tool. *Communication Disorders Quarterly* **25** (3), 145–151.

Fowler, J. (1996) The organization of clinical supervision within the nursing profession: a review of the literature. *Journal of Advanced Nursing* **23** (3), 471–478.

Grady, J.L. (2011) The virtual clinical practicum: an innovative telehealth model for clinical nursing education. *Nursing Education Perspectives* **32**, 189–194.

PBLH, Vol 2, Issue 2 (July 2014) doi:10.11120/pblh.2014.00033

Greengross, S., Murphy, E., Quam, L., Rochon, P. and Smith, R. (1997) Aging: a subject that must be at the top of world agendas. The aging of populations demands major changes across society and health care. *British Medical Journal* **315**, 1029–1030.

Hays, R.B. (2012) Remote supervision of health professionals in areas of workforce need: time to extend the model? *Rural and Remote Health* **12**, 2332.

Higgs, J. (1992) Managing clinical education: the educator-manager and the self-directed learner. *Physiotherapy* **78** (11), 822–828.

Holloway, I. (2008) *A-Z of Qualitative Research in Nursing and Healthcare*. Oxford: Blackwell.

HWA (2010) Clinical Supervisor Support Program – Discussion Paper. Adelaide: Health Workforce Australia.

Jin, C., Ishikawa, A., Sengoku, Y. and Ohyanagi, T. (2000) A telehealth project for supporting an isolated physiotherapist in a rural community of Hokkaido. *Journal of Telemedicine and Telecare* **6**, 35–37.

Lade, H., Mckenzie, S., Steele, L. and Russell, T.G. (2012) Validity and reliability of the assessment and diagnosis of musculoskeletal elbow disorders using telerehabilitation. *Journal of Telemedicine and Telecare* **18**, 413–418.

Lowe, S. (2007) *Clinical education for allied health students and rural clinical placements*. Australian Capital Territory: Services for Australian Rural and Remote Allied Health.

McAlliseter, L. (2005) Issues and innovations in clinical education. *Advances in Speech Language Pathology* **7** (3), 138–148.

Meyer, J. (2008) *Action Research*, Malden, MA, Blackwell.

Morse, M.D., Raviola, G., Fricchione, G. and Berger, E. (2011) Telesupervision for medical student rotations in global health psychiatry. *Academic Psychiatry* **35**, 415–416.

Murray, R.B. and Wronski, I. (2006) When the tide goes out: health workforce in rural, remote and indigenous communities. *The Medical Journal of Australia* **185**, 37–8.

Overton, A., Clark, M. and Thomas, T. (2009) A review of non-tradidtional occupational therapy practice placement education: a focus on role-emerging and project placements. *British Journal of Occupational Therapy* **72** (7), 294–301.

Pope, C., Ziebland, S. and Mays, N. 2006. Analysing qualitative data. In *Qualitative Research in Health Care* (eds. C. Pope and N. Mays), pp63–81. Carlton, Victoria: Blackwell.

Reese, R.J., Aldarondo, F., Anderson, C.R., Lee, S.-J., Miller, T.W. and Burton, D. (2009) Telehealth in clinical supervision: a comparison of supervision formats. *Journal of Telemedicine and Telecare* **15** (7), 356–361.

Ritchie, J., Spencer, L. and O'Connor, W. 2003. Carrying out qualitative analysis. In *Qualitative Research Practice: A Guide for Social Science Students and Researchers*, (eds. J. Ritchie and J. Lewis), pp219–262. London: SAGE Publications.

Rodger, S., Webb, G., Devitt, L., Gilbert, J., Wrightson, P. and McMeeken, J. (2008) Clinical education and practice placements in the allied health professions: an international perspective. *Journal of Allied Health*, **37** (1), 53–62.

Russell, T.G., Buttrum, P., Wootton, R. and Jull, G.A. (2011) Internet-based outpatient telerehabilitation for patients following total knee arthroplasty. *Journal of Bone and Joint Surgery - American Volume* **93A** (2), 113–120.

PBLH, Vol 2, Issue 2 (July 2014) doi:10.11120/pblh.2014.00033

Sorlie, T., Gammon, D., Bergvik, S. and Sexton, H. (1999) Psychotherapy supervision face-to-face and by video conferencing: a comparative study. *British Journal of Psychotherapy* **15** (4), 452–462.

Theodoros, D.G., Hill, A.J. and Russell, T. (2013) Using telerehabilitation to deliver speech treatment to people with Parkinson's disease in the home. *Movement Disorders* **28**, S155–S156.

Thistlethwaite, J.E. (2013) Practice-based learning across and between the health professions: a conceptual exploration of definitions and diversity and their impact on interprofessional education. *International Journal of Practice-based Learning in Health and Social Care* **1** (1), 15–28.

Towle, A. (1998) Changes in health care and continuing medical education for the 21st century. *Bristish Medical Journal* **316** (7127), 301–4.

Wagner, S., Keane, S., Mcleod, B. and Bishop, M. (2008) *A Report: Clinical Supervision for Allied Health Professionals in Rural NSW*. NSW Institute of Rural Clinical Services and Teaching.

Williams, C. (2010) Understanding the essential elements of work-based learning and its relevance to everyday clinical practice. *Journal of Nursing Management* **18**, 624–632.

Wood, J.A.V., Miller, T.W. and Hargrove, D.S. (2005) Clinical supervision in rural settings: A telehealth model. *Professional Psychology, Research and Practice* **36**, 173–179.

PBLH, Vol 2, Issue 2 (July 2014)
doi:10.11120/pblh.2014.00033