Emerging Technologies Conference 2008   Faculty of Arts, Social Sciences & Humanities

6-2008

An evaluation of nursers' workplace clinical skills development facilitated by the use of an intranet based learning resource

R. Sprod
University of Wollongong

Follow this and additional works at: https://ro.uow.edu.au/etc08

An evaluation of nursers' workplace clinical skills development facilitated by the use of an intranet based learning resource

Abstract

This evaluation investigated the affordances of an intranet-based, learning tool which is being developed for paediatric nurses. The tool has been designed to be used in the work place to complement and support traditional approaches to teaching and learning. The focus of the evaluation is how nurses use five learning objects within this resource: two short films and three interactive animations, to learn a specific nursing skill: tracheostomy suction. Four nurses participated in the study, two with no experience and two with experience in tracheostomy care. The findings of this pilot evaluation demonstrate that the use of media rich learning resources by nurses in clinical settings can contribute learning new skills, particularly when these newly learned concepts and knowledge were reinforced with actual supervised clinical practice. The use of technology facilitated learning resources was enthusiastically embraced, boosted confidence and prompted discussions with the clinical teacher.

Publication Details

An evaluation of nurses' workplace clinical skill development facilitated by the use of an intranet based learning resources

Richard Sprod
Women's and Children's Hospital Adelaide and University of Wollongong

Abstract:

This evaluation investigated the affordances of an intranet-based, learning tool which is being developed for paediatric nurses. The tool has been designed to be used in the work place to complement and support traditional approaches to teaching and learning. The focus of the evaluation is how nurses use five learning objects within this resource: two short films and three interactive animations, to learn a specific nursing skill: tracheostomy suction. Four nurses participated in the study, two with no experience and two with experience in tracheostomy care. The findings of this pilot evaluation demonstrate that the use of media rich learning resources by nurses in clinical settings can contribute learning new skills, particularly when these newly learned concepts and knowledge were reinforced with actual supervised clinical practice. The use of technology facilitated learning resources was enthusiastically embraced, boosted confidence and prompted discussions with the clinical teacher.

Introduction

All health professionals are expected to be life-long learners who value personal and professional development. Health professionals employed by the Women's and Children's Hospital (WCH) are required to become 'experts' in the care of women and children. This is obviously vital for improving and maintaining the safety and quality of medical care. Gherardi, Nicolini, and Odella (1998) state: 'knowledge is not what resides in a person's head or in books or in data banks. To know is to be capable of participating with the requisite competence in the complex web of relationships among people' (p. 273).

The WCH can be seen as a rich learning community. New skills and knowledge are learnt in the work place through various formal, informal and social contexts. For example, nurses might attend formal short seminars, read protocol manuals and discuss concepts informally with other nurses. This learning could be seen as 'situated learning' within 'authentic' contexts as the skills and knowledge are applied directly to patient care on a daily basis.

Collins (1988) defines situated learning as: 'the notion of learning knowledge and skills in contexts that reflect the way the knowledge will be useful in real life' (p.2 cited in Herrington and Oliver, 2000). Herrington and Oliver go on to state that a critical aspect of situated learning is the learner observing the 'community of practice'. (p. 24). In this context nurses are participating in authentic, situated learning community.

A key issue examined in this paper are the affordances technology-facilitated learning might provide within this context. Many researchers have shown that network-based technologies are already widely used by health professionals. For example, Brosnan and Burgess (2003) report that '76 per cent of professionals surveyed claimed to engage in internet-enabled activities to support their professional learning' (p. 24). Anecdotally, the use of the internet by nurses within the WCH would appear to be less than this estimate.

A recent study by Morris-Docker, Tod, Harrison, Wolstenholme & Black (2004) of nurses using the internet in the clinical wards of an English hospital reports: 'Open access to the internet in the workplace emerged as a useful but unrefined tool for encouraging the retrieval of information for practice' (p. 157). They also go on to state that nurses need training and support to enhance their skills in the use of this technology.

Despite the need for training and support, Leist and Green (2000) have identified education as being an important theme in quality health care, and are enthusiastic about the potential for technology to deliver 'learning' to the point of care, but they suggest that technology could be used more effectively to address physician learner needs. (p. 248) Morris-Docker et al. (2004) note that the 'assumption is that workplace access will circumvent barriers to use such as lack of time, skills and confidence' and also allow nurses to access evidence and learning in the short periods of time between care delivery. (p. 158). It is interesting to observe that Brosnan and Burgess (2003) state that there is 'little research that explores what forms of professional practice or knowledge can or should be supported using internet technologies or that identifies appropriate strategies for developing and supporting effective continuing professional development via the internet' (p. 24). Enthusiasm for new and emerging technologies *per se* can often overshadow the real issues of how that technology can be used to support learning and the development of knowledge.

Designing relevant learning resources

Many educationists argue that providing authentic and meaningful experiences is valuable for learning. Within this educational framework the WCH has developed, an authentic, media-rich network enabled, educational resource for nurses and midwives (Figure 1). The media rich approach has allowed designers to go beyond the traditional text and lecture format for teaching and learning, to one where interactive learning animations, film and sounds are delivered to the workplace.

Figure 1: Screen grab from media-rich, intranet-based resource which has been designed to support knowledge and skill development of nurses in the hospital wards

This was considered an important aspect of the design as it allowed complexities of the skill to be demonstrated, explored and rehearsed by the nurse prior to performing the skill with a patient. The rich media approach has enabled authentic and meaningful contexts. For example, expert demonstrations highlighting the difficulties and subtleties of performing the procedure on small children. The resource offers a variety of active learning objects and resources for each clinical skill and topic area.

Pedagogy and technology

One of the topics within the resource is caring for children with tracheostomies. Examples of clinical nursing skills for tracheostomy care include: changing tapes, changing tubes, stoma care and suctioning. The learning objects provided for tracheostomy care include short film demonstrations using real patients, repeat film demonstrations on models, photographs with commentary, interactive animations, web links, comments from patients about procedures, and key learning points. Each learning resource has been created by a clinical expert, in this case the tracheostomy nurse expert. The designers have taken great care to demonstrate evidence-based practice and use examples that reflect actual nursing practice in the hospital.

The resources are structured within an open, democratic learning environment where the user is free to use the modules in relatively unstructured ways that are meaningful to them. These resources are found within a highly visual interface and linked folder structure. Recognising that time is limited in the clinical areas, the resource has been designed to be used quickly. In most cases each learning object would take no longer than two minutes to 'complete'.

What are the affordances of this type of web-based learning resource? Nurses have access to the resources when and where they need them. Learning is available 'on demand' 24 hours a day, 7 days a week, on multiple computer terminals anywhere in the hospital. The technology delivers a variety of highly targeted interactive resources that are relevant to actual clinical nursing practice. Different learning styles are catered for and the resources offer multiple perspectives; for example, a procedure demonstrated on an infant is repeated with an older child and also demonstrated using a model.

The technology enables delivery of interactive elements such as animations, allowing the user to explore and develop deeper knowledge and understandings. It also enables learning to be delivered in consistent ways across the hospital and is easily up-dated.

This approach to learning in the WCH is new and differs from traditional approaches in many ways. How does this approach complement, or even change, traditional teaching approaches for nurses working in the clinical areas of the hospital? This question is examined in the context of the above affordances, the perceived value to learning, and ways in which it supports knowledge and skill development.

Theoretical framework for the evaluation

The function of this limited formative evaluation was to test the design solutions in practice:

- did the learning design approach actually help novice nurses acquire competence in the desired clinical skill?

- and was the design approach valued within the workplace by both novice nurse and clinical teachers?

The learning resource had progressed to a stage where it could be used on the ward as intended. Outcomes of this research would inform the next stage of the design process.

The instruments chosen for the evaluation were;

- a pre and post-learning self-knowledge and skills rating scale (Bondy 1983),

- a post-learning questionnaire,

- and a return clinical skill demonstration.

The Bondy pre and post-learning self knowledge and skills rating scale tool (Bondy 1983) is used routinely by the clinical teachers to assess nurse's clinical skill competence in the wards at the WCH. The learner self-reports their level of knowledge and skill prior to and after engaging with the learning instance, in this case the on-line learning modules. The return clinical skill demonstration involves the learner demonstrating the skill to the teacher after engaging in the learning instance. From this demonstration the learner is rated by the teacher as being able to perform the skill with assistance, supervision or independently. The desired outcome is to have the nurse being able to perform the skill independently.

Method

Participants of the evaluation were two registered nurses (RNs) and two experienced registered nurses (ERNs). Although the two RNs were fully qualified nurses, they had no specific skill and knowledge related to the treatment of children with tracheostomies. The two ERNs were 'expert' paediatric nurses and have been trained using traditional methods to nurse children with tracheostomies.

Nursing children with tracheostomies involves a range of specialised skills and knowledge. One part of the daily care involves regular suctioning of the airway. All paediatric nurses are expected to learn this skill. Suctioning was the focus of this evaluation.

Each nurse is evaluated individually by the hospital's tracheostomy expert: the clinical nurse consultant (CNC). The CNC is responsible for all tracheostomy teaching in the hospital. The evaluation took place in the ward, during normal working hours using the ward computer terminals; hence, a realistic, authentic use of the resources and the learning environment.

The CNC completed a reflective questionnaire and was interviewed after the evaluation. Table 1 lists the instruments used.

Table 1: Evaluation instruments

Instruments	RNs	ERNs	CNC
Pre-test knowledge & skill self rating scale	X	X	
Post-test knowledge & skill self rating scale	X	X	
Return skill demonstration	X		
Post-learning questionnaire	X	X	
Reflective questionnaire			X
Informal interview			X

Prior to using the learning resources the nurses completed the pre-test knowledge and skill self rating scale. This rating scale asked them to rate their current knowledge of specific suctioning sub-skills as either: 'excellent', 'average', 'fair', or 'needs improving'. Table 2 lists the specific knowledge and skill areas that examined.

Table 2: Self-knowledge rating scale questions for suctioning 'sub-skills'

Rate your knowledge of nursing children and infants with tracheostomies.
Rate your knowledge of tracheostomy suction
Rate your knowledge of the suction pressure settings required for tracheostomy suction.
Rate your knowledge of the correct equipment required for suction.
Rate your knowledge of suctioning technique
Rate your knowledge of documentation on the suction chart and case notes
Rate your confidence in performing tracheostomy suction on a patient

The participants then accessed the website and explored the five '*Suctioning'* learning objects (Figure 2). These are:

- 'Suctioning' film (duration 1 min 50 sec)
- 'Suction pressure' film (duration 46 seconds)
- 'Suction interactive' animation (run time 4 minutes)
- 'Catheter size interactive' animation (run time 1 min 30 seconds)
- 'Pressure interactive' animation (1 min 15 seconds)

Figure 2: The blue arrow highlights the five learning objects seen within the folder structure of the e-learning web-site
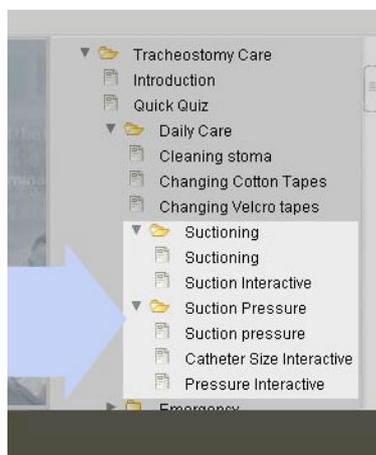
On completion of using the learning objects the participants were asked to return demonstrate their suctioning skills on a patient. This was observed by the CNC and recorded using a rating scale. After completing the skills demonstration the participants were asked to complete the 'skill self rating scale' and to fill in the post learning questionnaire.

At the completion of the evaluation the CNC gave her impressions of the learning process through an informal interview and a reflective questionnaire.

Findings and issues arising from the evaluation

Data from this evaluation consisted of written responses from participants and notes taken during an interview with the CNC. Responses to the rating scales, questionnaires and interviews were compiled in tables for each question asked and for each participant. Comments were recorded in these tables and emerging themes noted.

Consistency was observed between the two participant groups; the RNs and the ERNs, at every point of the evaluation. Both RNs reported little knowledge or skill associated with tracheostomy care or suctioning prior to their use of the learning objects. As expected, and in contrast, both ERNs reported high levels of skill and knowledge.

After using the learning objects, successful learning was reported by each RN for most of the suctioning sub-skills examined. Table 3 summarises RN 1's self reported learning and knowledge. In most cases, RN 1 moved from having no knowledge or skill to a fair to average level.

Table 3: RN 1 Self reported learning outcomes

Questions	Pre-learning	Post-learning
1: Tracheostomy care	Needs improving	Fair
2: Suction	Needs improving	Fair
3: Pressure settings	Needs improving	Average
4: Equipment required	Needs improving	Average
5: Technique	Needs improving	Fair
6: Documentation	Fair	Average
7: Confidence	Not confident	Confident with assistance

RN 2's recorded learning moved from 'needs improvement' in all areas to 'fair' in the suctioning sub-skill questions listed in Table 4.

Table 4: RN 2 Self reported learning outcomes

Questions	Pre-learning	Post learning
1: Tracheostomy care	Needs improving	Needs improving
2: Suction	Needs improving	Fair
3: Pressure settings	Needs improving	Fair
4: Equipment required	Needs improving	Fair
5: Technique	Needs improving	Fair
6: Documentation	Needs improving	Needs improving
7: Confidence	Not confident	Confident with assistance

Both RNs reported that after using the learning resources and demonstrating these skills they would be confident to perform the suctioning skill on patients with assistance. The two ERN's reported that the learning resources reaffirmed their tracheostomy suctioning skills and knowledge.

This pilot evaluation sought to observe learning within a very specific and limited nursing skill context: tracheostomy suctioning. It does not examine the other learning resources within the site. It does not examine resistance to this type of learning or usability issues with computer technology. It is expected that some nurses will have learning styles that would differ from the participants of this evaluation. There was a short time between learning and doing, although this is an intended authentic use of the resource. Learning in this context cannot therefore be attributed entirely to the inputs from the learning objects. The CNC and other nurses were present the whole time. Again this is authentic and intended. It is expected guidance and support will be given to nurses developing new skills. This evaluation did not seek to measure long term knowledge, skill development or competency.

The post-learning questionnaire examined the learning effectiveness of each object. Table 5 summarises the findings for all participants.

Table 5: Post learning questionnaire summary. (X = one vote from RNs and ERNs)

Question	1 Strongly disagree	2 disagree	3 neither agree or disagree	4 agree	5 strongly agree
Suction film was an effective learning tool for me				XX	XX
Pressure film was an effective learning tool for me				XX	XX
Suction animation was an effective learning tool for me			X	X	XX
Pressure animation was an effective learning tool for me				XX	XX
Catheter animation was an effective learning tool for me				X	XXX
e-learning resources enhanced my understandings				XX	XX
e-learning can complement traditional teaching in clinical areas				XX	XX

The RNs consistently recorded lower scores using this instrument than the ERNs, suggesting that they may have been less confident. Both RNs felt that they needed some further supervision to fully master all the sub-skills required to perform suctioning independently. In the follow-up interview the CNC commented that the nurses demonstrated different learning styles and approaches to the learning resource. All, however were very enthusiastic about the resource and

actively engaged with the learning objects. Comments from the participants such these were typical:

> *'Oh wow, this is really cool'*
>
> *'What a great resource. This is giving staff excellent support as they require it'*
>
> *'It is easily accessible on the ward'*
>
> *'It gives a clear step by step guide in a non-threatening way'*

Both RNs stated that the resource helped them learn the suctioning skill. Comments included:

> *'As I have not been trachy trained I found it very informative… it was interactive and not just reams of written information… it is more likely that I will remember it'*
>
> *'I really liked the fact that it was interactive and that I was then able to put this newly learned information into practice'*
>
> *'A good learning resource in conjunction with practical learning'*

The fact that evaluation also involved a return skill demonstration reinforced learning. Learning and doing within this 'point of care' context proved to be a valuable and important combination. After use of the learning resources, the CNC reported that approximately half of the assessable skills demonstrated by the RNs were at a level where they could be performed independently. The remainder could be performed with supervision and support until the skill was perfected.

In the reflective questionnaire the CNC spoke about the experience from a teaching point of view:

> *'Great positive response from the learners. In fact I felt they actually wanted to go and perform the task on the patient because they had that confidence to do so.'*
>
> *'It prevents staff from performing something 'cold' ensuring safety for the patient and staff member'*

The CNC also stated that support was still required when actually performing the skill, but using the learning resources meant that nurses did not have to watch the ENT demonstrating the skill. It also assisted the nurses to feel more comfortable in initiating the task.

In summary, the CNC believed that, when used in conjunction with conventional teaching, these technology facilitated learning resources offered many benefits, including improvements in learning quality and consistency, flexibility, high levels of interaction, deeper levels of understanding, improved safety for the patient and nurse, and efficiency in delivering learning in the place were it is needed, that is, the clinical areas of the hospital. Suggested improvements included better access to the resource by the provision of additional computer terminals in the ward, perhaps at the patient bedside.

Conclusions

The findings of this pilot evaluation demonstrate that the use of media rich learning resources by nurses in clinical settings does contribute learning new clinical skills, particularly when these newly learned concepts and knowledge were reinforced with actual supervised clinical practice. The use of the learning objects boosted the nurses'

confidence when approaching the patient and prompted discussions with the clinical teacher.

All participants - the teacher, senior nurses and 'novice' nurses - were very enthusiastic about teaching and learning in this way. They consistently reported liking the way the resources were interactive and media rich. They liked the quality of the learning objects: they appreciated the flexibility of being able to access the resources at any time, and that they were available on the computers in the wards.

Each learning object within this resource is based on best clinical practice. The educational designers have embraced authentic, active learning as the key feature of the resource, and there is an expectation that nurses will integrate their learning and teaching styles to take advantage of this new approach to learning and teaching.

The challenge for e-learning designers is to enable authentic, active learning solutions that are responsive to the educational needs. The challenge for the clinical educators to efficiently integrate these new approaches to teaching and learning for the benefit of the health professional, organisations and lastly, but most importantly, patients.

References

Bondy K. N., (1983) Criterion-referenced definitions for rating scales in clinical evaluation... clinical competence of nursing students. *Journal of Nursing Education*, Nov, 22(9), 376-82.

Brosnan, K., & Burgess, R. C., (2003). Web based continuing professional development - a learning architecture approach. *Journal of Workplace Learning, 15*(1), 24-33.

Gherardi, S., Nicolini, D. & Odella, F. (1998). Towards a social understanding of how people learn in organizations. *Management learning, 29*(3), 273-297.

Herrington, J., & Oliver, R. (2000) An instructional design framework for authentic learning environments. *Educational Technology Research and Development, 48*(3), 23-48.

Honebein, P. C., Duffy, T. M. & Fishman, B. J. (1993). Constructivism and the design of learning environments: Context and authentic activities for learning. In T. M. Duffy, J. Lowyck & D. H. Jonassen (Eds.), *Designing environments for constructive learning* (pp. 87-108). Berlin: Springer-Verlag.

Leist, J. C., & Green J. S., (2000). Congress 2000: A continuing medical education summit with implications for the future. *Journal of Continuing Education in the Health Professions*, 20(4),247-252

Morris-Docker, S. B., Tod, A., Harrison, J. M., Wolstenholme, D. & Black, R., (2004). Nurses' use of the internet in clinical ward settings, *Journal of Advanced Nursing, 48*(2), 157-166.

Reeves, T. C., & Hedberg, J. G., (2003). *Interactive learning systems evaluation.* Englewood Cliffs, N.J.: Educational Technology Publications.

Contact: rts26@uow.edu.au

Cite paper as: Sprod, R. (2008). An evaluation of nurses' workplace clinical skill development facilitated by the use of an intranet based learning resources. In I. Olney, G. Lefoe, J. Mantei, & J. Herrington (Eds.), *Proceedings of the Second Emerging Technologies Conference 2008* (pp. 182-190). Wollongong: University of Wollongong.