Web-based teaching in nursing: lessons from the literature

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Summary
Many in nurse education have partially adopted the Internet as a pedagogical approach. This has highlighted serious contentious issues for educators. These include, pedagogical vs. technological approaches to teaching, face-to-face vs. online communication and classroom vs. online teaching. This paper attempts to reassure educators about this new Internet-based pedagogy, by applying traditional educational theories and discussions on curriculum to web-based teaching. In particular, cognitive learning theories such as constructivism and the process model of curriculum development are discussed. These provide a solid theoretical framework from which to expand the Internet-based pedagogical approach among those whose interest is the promotion of learning. The paper concludes with the implications of web-based teaching for the personal and professional development of nurse educators.

KEYWORDS
Web-based teaching; Educational theories; Role of the online teacher

Introduction
This literature review presents a theoretical insight into a relatively new educational approach, which many educators are adopting or preparing to adopt. The educational approach is Internet-based teaching. Though the literature referred to is from distance education and higher education, the implications for web-based courses for qualified nurses is considered. This reflects a personal interest in the provision of flexible educational experiences for nurses who may have difficulties accessing classroom-based courses for many reasons, including their working hours. The main catalyst for this review was the experience of being an online learner at Masters level with the Open University. It was exciting and motivating being part of a group of learners who were based in England, America, Greece, France, Scotland and Ireland. Instructional designers, aircraft engineers, software developers, primary and secondary school teachers, foreign language teachers, and university lecturers in education and nursing were ‘classmates’. Communicating online early in the morning and then going to work, became the norm for two years of study. The most influential experience within the Masters course was learning from instructors/teachers whose strategies for online teaching differed significantly.

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Terminology

What this paper is not concerned with is education delivered via computers, which lacks contact or interaction between the tutor and the learner. There are many obvious examples, such as CDROMs distributed with course textbooks. These are designed for individual use, though many people like to work through the exercises in the classroom environment. Internet-based learning is also called e-learning, online learning, and web-based learning. It is generally considered to be where the learner uses the Internet to access course materials, learning activities, library resources, tutors and other learners. In any discussion of pedagogy, concepts of learning and teaching are closely linked. Research in one area informs practice in the other and vice versa. The emphasis is on Internet-based teaching which may be described using terms such as online teaching, networked teaching, e-moderating, e-tutoring and web-based teaching.

Research, carried out by educators involved in web-based teaching for nurses, is mostly based in Canada, Australia and America. The focus on teaching rather than learning, immediately limited the amount of literature that was available as teaching is not investigated and researched to the same degree as learning. The research on Internet-based teaching was quite diverse and generally in the form of case studies, descriptive research and evaluation research. Some examples from nurse education literature included the comparison of online teaching to face-to-face teaching (Crawven, 1999), the use of benchmarks for best practice (Billings et al., 2001), preferences for Distance Education delivery methods (Cragg et al., 1999), peer review of teaching (Cobb et al., 2001) and evaluation of distance education delivery methods (Andrusyszyn et al., 1999). Delivery of distance education was one of the only clear themes that was evident in the literature on Internet-based teaching for nurses.

Contentious issues

When distance and higher education literature were included in this review, issues for debate began to emerge. These were: technology vs. pedagogy; classroom teaching vs. online teaching; face-to-face vs. online communication. Authors tended to take quite opposing views in their research and discussions of these contentious issues. The debate on each of these issues needs to be outlined before considering theoretical frameworks. This will provide an insight into the factors that affect the teacher’s role online.

Technology vs. pedagogy

The first major divide that was evident was that between technology and pedagogy. Anderson et al. (2001) made a presumption that tutors already had technological skills and focused on a more pedagogical analysis of the tutor’s online presence. On the other hand, Barker (2002) focused on skills that a tutor needs to teach online. However his emphasis was solely on technical and communication skills, specifically; word processing, chat rooms, web page authoring, using e-mail and use of computer conferencing tools to set up discussion threads and monitor messages. Though difficult to generalize, these case studies provide some insight into the divide between technology and pedagogy. One survey of university teachers’ use of web-based technology found that the most significant barrier to use of web-based technology was time needed to learn how to use the technology (Pajo and Wallace, 2001). But, another study of attrition from a course on online teaching found that the lowest ranked reason for leaving by lecturers was the technology (the highest were personal issues and time) (Gold, 2001).

Billings et al. (2001) considered the technology/pedagogy divide in their discussion of best practices in web-based nursing courses. These authors warned against letting technology override pedagogical goals and emphasized that even the most futuristic and exciting technology does not automatically improve the learning process. They argued that technology trends should be a learning vision pull rather that a technology push. Fetherston (2001) clarified this technology/pedagogy debate in proposing that pedagogical challenges are not unique to the web-based learning environment and have been discussed in higher education for a long time.

Classroom teaching vs. online teaching

The second major divide evident in the literature concerns classroom teaching and online teaching. There are strong arguments, which propose that new skills are needed for online teaching, but these are opposed by those who argue that our current face-to-face teaching practices can be transposed to the online environment. The issue of adapting face-to-face teaching skills to the online environment is possibly the most divisive in the literature. Online and traditional teaching skills have been researched in depth without yielding a consensus. This can be illustrated by outlining some of the
research. Gold (2001) strongly insisted that teachers would simply transfer traditional practices to the online environment if they have no experience of online learning. He looked at the effect of exposure to an online course on teachers' views of online learning. Bennett and Marsh (2002, p. 14) in their case study which described the design and implementation of an online teaching course, go as far as saying that applying traditional education skills online, cancels out the potential and innovation of the online learning environment. It is interesting to note that these researchers are involved in setting up courses to help teachers to teach online, which may have implications for the focus of their discussions. On the other hand, Whittington and Murphy (2000) reported that the University of Ulster decided to mirror conventional and web-based courses. The web-based courses were designed with similar objectives and assessments to the conventional courses. This is unlike many other suggestions in the literature.

Hopper and Harmon (2000) also supported the transfer of classroom teaching skills to the online environment. They were very clear in the result of their analysis of exemplary Internet-based courses, that not only is the role of the tutor vital but many face-to-face teachers already have the skills to allow them to teach online. Hopper and Harmon's multiple case study analysed four Internet-based courses, which were selected, based on educational criteria. Their findings are supported by Burge and O'Rourke (1998, p. 194) who suggest that if a classroom teacher is effective and highly interactive, these skills will easily transfer to the online teaching environment. Burge and O'Rourke's (1998, p. 194) analysis was based on reports of experiences of online teaching from five teachers from the same university. Again the sample is small but the agreement among these writers on the adaptability of classroom teaching skills to online teaching at least demonstrates an area for further research.

Anderson et al. (2001, p. 10) were "not convinced that the function of teaching changes between conventional face-to-face education and online education" which seems realistic because of the tendency for many courses to use a combination of face-to-face and online presentation. Anderson et al. provide an insight into the differences between classroom and online teaching. They comment that teachers come to conventional higher education with well-defined roles and expectations. However in web-based courses, both learners and educators are unable to rely on predefined roles and behavioural expectations. If teachers are working in both environments, Downing (2001, p. 234) noted, "the challenge is to build on existing practice rather than to replace it". Instead of continuously emphasising the differences between classroom and online teaching, this seems to provide a more coherent view, especially if many of courses being developed, combine face-to-face and online teaching. Higgison and Harris (2002, p. 23) have written an e-book, based on e-workshops they facilitated with educational experts and practitioners around the world. The chapter on the online tutor is an excellent resource. They emphasise the differences between classroom and online teaching but are the only writers in the field who attempt to identify the specific differences from a pedagogical perspective. These differences relate primarily to the communication and interactions between tutors and learners using computer-mediated-communication. This leads directly to the third major dichotomy in the literature.

**Face-to-face vs. online communication**

This is the difference between face-to-face communication and online communication. In the online environment there is a lack of non-verbal cues and a lack of cultural markers in the interactions, which are based on 'spoken text in written form'. The emphasis on these differences is supported by research on face-to-face communication and asynchronous communication (Winiecki, 1999). Winiecki elaborates on the differences between the serialized, turn-taking behaviours where only one person speaks at a time and "asynchronous many-to-many text messages". Messages in discussion boards typically do not occur in a serialized turn-taking manner and each message can introduce or address several topics at once with more than one speaker at a time. This can lead to negative effects on learning and the social atmosphere, because of misunderstandings and discussions that are difficult to follow (Winiecki, 1999). A personal experience involved designing a simple multimedia package to teach the topic of Blood groups and Rhesus compatibility to student nurses. This was presented to the online group. One colleague, after reading about Rhesus incompatibility between mothers and babies, posted a message, stating that people with Rhesus positive blood should adopt. After two days and five messages it turned out it was a joke. Though it didn't affect the social atmosphere, it certainly caused misunderstandings because there was no non-verbal communication accompanying the message to imply that it should not be taken seriously.

The initial adaptation to the non-linear type of computer-mediated-communication, analysed by
Winiecki (1999), often causes difficulties for learners new to the online environment. Firstly, the adjustment to differences in speed and type of communication is a challenge. An in-depth discussion has often moved on to a different topic, while a response to the earlier discussion is still being composed. Secondly, deciding which part of a message to respond to is difficult initially, particularly if other online learners compose long messages. However, Ribbons (1998) was sure that as younger students become more familiar in communicating using text messages on mobile phones and using e-mail they will be more confident and comfortable with the technology.

Theoretical frameworks

The main focus of this paper is theoretical frameworks that underpin teaching over the Internet. There is evidence from the nursing research mentioned earlier and from renowned authors in the literature that research on online teaching reveals a lack of theoretical focus (De Castell et al., 2002; Thurmond, 2002; Phipps and Merisotis, 1999). Phipps and Merisotis (1999) commented that theoretical frameworks are rarely referred to in research on distance learning in higher education. De Castell et al. (2002) went even further and laid the blame for the lack of a theoretical focus on the educators.

"The consequences of educators’ (— and particularly educational theorists’ —) failures to seriously engage with educational questions about technology have had a devastating impact on both research and practice in the domain of educational technology” De Castell et al. (2002).

Thurmond (2002) proposed that theoretical frameworks are necessary to assess the quality of web-based courses. She noted two approaches to theories in her review of the literature (Thurmond, 2002). One pattern was an extensive discussion of a theoretical framework, without commenting how the theory was tested in research. The other pattern involved reporting on research conducted, without explaining the theoretical framework that was used. Of the theoretical discussions that exist in distance teaching, online teaching and nurse education literature, many seem to omit or neglect traditional theoretical frameworks and curriculum discussions.

Constructivism

There are many examples of traditional educational theory which can inform the development of Internet-based education. Constructivism seems to be accepted as a suitable theoretical framework for designing and delivering web-based courses. Gold (2001) wrote about constructivist instruction in online education and particularly outlined the shift from objectivist to constructivist theories of education. However, the roots of constructivism in the classic works of Piaget, Bruner and Vygotsky are rarely acknowledged. Constructivism, is a theory of learning, which in its purest form, assumes that the learner builds up their own meanings and understanding of a topic and that they discover the basic principles for themselves (Schunk, 2000). The teacher, rather than being the expert, becomes a facilitator of the learning. The teaching and learning experience is structured so that it supports and develops the process of learning. It focuses on the importance of student dialogue rather than delivery of lectures. Constructivism can be an appropriate theory to promote an understanding of the educational needs of registered nurses. The extent of their nursing experiences enables them to construct meanings from new knowledge that they are exposed to.

Hopper and Harmon (2000) expected to find constructivist teaching philosophies in their analysis of exemplary Internet courses but they found more evidence of positivism. It is interesting in relation to the earlier mention of the technology/pedagogy divide, that they reasoned this to be due to the nature of the learning management systems used in the courses. These systems seemed to be designed to facilitate traditional instructive pedagogies rather than encouraging constructivist learning and instruction. Two learning management systems that they identified were WebCT and Blackboard. However it must be acknowledged that they selected a very small sample of Internet courses from recommendations made by participants in online discussion fora.

Miller and Miller (1999), in their in-depth theoretical analysis, present cognitive processing and cognitive constructivist paradigms as well as relevant teaching and communication strategies for each in the web-based learning environment. They proposed a constructivist, collaborative, problem-solving, learner-centred approach where learners articulate, discuss, reflect and revise their thinking to ensure accuracy of knowledge construction. Downing (2001) also believed that constructivist learning should be the base for Internet-based teaching in health care to promote access to learning opportunities. However, he concentrated on relating characteristics of constructivism to functions of conferencing software, which really indicated his technological rather than pedagogical focus.
One specific aspect of constructivism is helpful in developing and designing web-based courses. ‘Scaffolding’ or structuring learning activities is one of the most appropriate and most useful applications of Bruner’s and Vygotsky’s theories (Weedon, 1997). However Vygotsky’s influence is also credited with adding the social element to constructivism. Debates on using theoretical frameworks as a basis for the design of learning environments are continuing in the educational literature.

**Constructivism and online course development**

If constructivism is not well described in the literature on online teaching, and it is presented elsewhere as a theory of learning with little insight into its application to teaching, how can it guide the pedagogical development of web-based courses? The classic work of Stenhouse on curriculum design in the 1970s is one example of how a traditional treatise continues to be influential even in this age of rapid technological advances. His thoughts and opinions on teaching and support for the teacher as researcher are fascinating for their continuing relevance. Laurence Stenhouse proposed principles of a process-based curriculum as a reaction to his criticisms of the behavioural objectives model of curriculum. However he acknowledged that the process model is more appropriate in the areas of the curriculum which centre on knowledge and understanding, and the objectives model is more suitable in curricular areas, which emphasise information and skills (Stenhouse, 1975, p. 97). This has implications for different levels of online nurse learners.

A process oriented curriculum model is best described as creative course development which focuses on the learning of the student rather than prescribing content. The teacher facilitates the students learning and there is emphasis on learning activities. Though this model is particularly relevant to the online educational environment, there seems to be only one major reference to it in the literature on distance education. Nation and Walker (1993) have identified. A particular criticism in constructivist-based online education is that the focus on learner-centredness may seem to abandon the learner and give them too much responsibility while teachers continue to judge the success of their learning (Thorpe, 1995).

Constructivist-based teaching approaches and the process-based curriculum as a framework for web-based course design will not suit all courses and all lecturers. Rowntree (2002, p. 16) and Davison et al. (1999, p. 13), in their discussions on student learning styles, noted that teachers tend to design courses, teach and assess in a manner that suits their own learning style. Mantuga (2001) proposed that each online teacher uses a theoretical framework that suits their own style. She happened to focus on the constructivist approach, which suited her particular style. Mantuga (2001) makes a very sensible proposition, that electronic pedagogy needs to be discussed with, rather than in isolation from, course curriculum, pedagogical style of the instructor, and the characteristics and assumptions of student learners. It must also be acknowledged that online teaching will not suit all teachers and some teachers will find it easier to adapt to the online environment than others.

**Role of the online teacher**

To conclude, the role of the teacher in the online environment can be addressed. Anderson et al. (2001) provide a more recent discussion of the role of the online teacher, which others such as Mason (1998) and Harasim et al. (1996) have addressed in the past. For example Anderson et al. (2001) positively compare the roles of teachers in the ‘pioneer’ era in America with the roles of online teachers who are ‘pioneering’ in a new educational methodology. Three particular functions of teachers in both these contexts are discussed. The first function is the design and organization of learning activities. The second is the creation of a community of learners through student-to-student discourse. The third is the provision of direct instruction. Detailed research evidence is considered to support these online roles. Interestingly they relate the second function, ‘Facilitating Discourse’, to Piaget’s work. This indicates that higher forms of reasoning can be developed through discussion with others, though this is more an adaptation of Vygotsky’s theory. The third function or role of ‘Direct instruction’ is argued with critical reference to Vygotsky and construc-
tivism. They propose that it requires more than facilitation skills, as it is a broad role, which requires a skilled person with subject expertise and pedagogical expertise to scaffold or structure learning.

It is arguable that the quality of teaching in the online environment depends on the teachers’ facilitative role. However, thoughtful pedagogically sound design of learning activities, as suggested by the first function, have been found to be critical to the attainment of educational outcomes. Bonk and Reynolds (1997) in a chapter in Kahn (1997) helpfully proposed a variety of learning activities. These strategies and approaches can be used to enhance creative and critical thinking and encourage collaboration and cooperation in learners in the online environment. Stenhouse (1975) similarly provided criteria for worthwhile learning activities which are relevant in both the traditional and online educational environments.

Conclusion

Downing (2001) argued that emphasis must be placed on sound pedagogical design rather than the technology itself. He identified the challenges as building on existing practices rather than replacing them, and using the new technologies to best effect. The enormous commercial influence in the field of online teaching and learning means that large e-learning corporations tend to be the driving force in the development of this new educational methodology. But the technology should not transform teachers into technical trainers and technical support staff. Instead, it should help teachers to create teaching and learning environments, to mediate between knowledge and the student and to become open and critical professionals (Trench, 2001, p. 57).

References


Rowntree, D., 2002. Block 1 Overview Essay Knowing our Learners in ODL. The Open University, Milton Keynes.