

Research Article

Integrating Digital Clinical Experience (DCE) into a Nursing Curriculum: Student Perceptions and Concerns

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Abstract

Assessing and addressing student concerns about technology are critical when integrating new technology into curriculum. This study explores nursing students' concerns on the use of a virtual patient in an RN-BSN online course. The conceptual framework of the study was based on the Concern Based Adoption Model (CBAM). This study used open-ended concern statements from 27 students who used a digital patient as part of their clinical curriculum. Overall, the study found students had Stage 3 (Management) concerns. In addition, the evidence suggests a marginal association between comfort level with technology and stages of concern ($p=0.0843$). The identification of students' concern toward virtual patient-enabled instruction will help facilitators such as instructional designers and faculty to tailor instructional materials and learning activities.

Keywords: Virtual Patient; Digital Clinical Experience (DCE); Shadow Health; Technology; CBAM; Nursing; RN-BSN; Technology; Integration; Stages of Concern; Change Integrating Digital Clinical Experience (DCE) into a Nursing Curriculum; Student Perceptions and Concerns

Introduction

Emerging technologies are changing the practice of nursing. In the 21st century nurses will need Information Technology (IT) skills and knowledge to achieve the goals of Healthy People 2020 [1]. To achieve the goals of Healthy People 2020, leading nursing associations and accreditation agencies in the United States (US) promote technology enabled instruction in nursing curriculum standards. In recent years, there has been an increasing interest in using virtual patients in nursing education. A considerable amount of literature has been published on virtual patients in the clinical education with an emphasis on learning process/pedagogy [2-7]. Studies have reported benefits of virtual patients including students satisfaction, improved learning and standardized clinical experience [8-10].

So far, there has been little discussion about effective adoption of virtual patients in nursing education. In any technology adoption process, personal connection of students' feelings, concerns, and perceptions about the technology is inevitable. Personal connection may either facilitate or disturb the technology integration process [11]. Assessing students concerns towards the virtual patient and addressing those concerns will enhance the adoption of technology. The overall goal of this study was to explore nursing students' concerns on the use of Digital Clinical Experience (DCE), as well as to identify challenges of implementing DCE in an RN-BSN online curriculum.

This study used the Concern Based Adoption Model (CBAM) to access the concerns of nursing students towards virtual patients. The primary research question of this study is - Which stage of concern is most prevalent among students in the use of digital patient? The findings of this study will help educators, administrators and designers of virtual patients to make informed decisions.

Overview of the Virtual

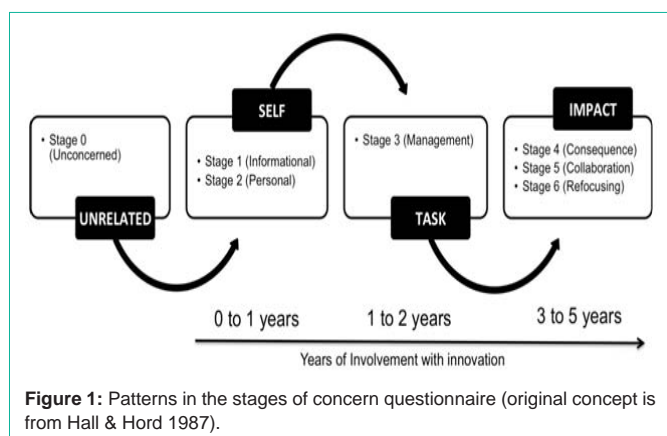
Patient Virtual patients have been identified as a cost-effective and powerful educational strategy with great potential to facilitate learning, support retention of knowledge and provide valid and reliable assessment and transfer of skill acquisition to live patients. Virtual patients have been utilized in medical and healthcare education for a number of years and have been successfully introduced more prevalently in nursing education in recent years [2,3,12-16]. Most virtual patient systems have common elements including capacity for history-taking, physical examination, review of imaging/laboratory diagnostics, and features for planning appropriate diagnosis and treatment [17,18] Regardless of variations in specific design, virtual patients are typically problem-focused, stimulating students to activate prior knowledge from long-term memory and making it accessible in the working memory to generate new knowledge and learning [19].

A clear advantage of virtual patient simulation is the ability to ensure a standardized simulation experience thereby increasing the objectivity of the assessment of student performance as every student can be presented with an identical scenario. This surpasses the use of standardized patients in this area as standardized patients, even when properly trained, may be subject to inserting their own bias or creating differences in the student experience through human error or oversight [19,20,21] Found that virtual patient simulations improved student long-term retention of knowledge when compared to traditional teaching strategies.

Another advantage of virtual patients is the accessibility via web-based platforms allowing asynchronous and more independent utilization by students. This makes virtual patient simulation ideal for distance learning situations. Although virtual patients are a relatively

Table 1: Stages of concern and descriptions.

Stages of Concern	Description
Stage 0 (Unconcerned)	In this stage, the respondent's concern about innovation is minimal. "The individual indicates little concern about or involvement with the innovation" (George et al., 2006, p. 8). An example of an expression by a might be "I am concerned about some other innovation." (George et al., 2006, p. 8).
Stage 1 (Informational)	In this stage, the individual is acquiring information and interested in learning more about innovation. "The individual does not seem to be worried about him or herself in relation to the innovation. An example of an expression might be "I would like to know more about it." (George et al., 2006, p. 8).
Stage 2 (Personal)	In this stage, the individual shows concerns about the impact of innovation on his/her self. An example of an expression might be "How will using it affect me?" (George et al., 2006, p. 8).
Stage 3 (Management)	In this stage, the individual concerns include doing tasks. An example of an expression might be "I seem to be spending all of my time getting materials ready." (George et al., 2006, p. 8).
Stage 4 (Consequence)	In this stage, the individual concerns will be the impact of innovation on students. An example of an expression might be "How is my use affecting my students?" (George et al., 2006, p. 8).
Stage 5 (Collaboration)	At this stage the individual starts to think of collaborating with others in the use of innovation. "The individual focuses on coordinating and cooperating with others regarding use of the innovation" (George et al., 2006, p. 8). An example of an expression might be "I am concerned about relating what I am doing with what my coworkers are doing." (George et al., 2006, p. 8).
Stage 6 (Refocusing)	In this stage of concern, the individuals start to change the innovation for more benefits. An example of an expression might be "I have some ideas about something that works even better." (George et al., 2006, p. 8).



new teaching technology in nursing, their comparatively lower cost as opposed to high fidelity simulators or standardized patients as well as multiple studies suggesting no significant difference between learning outcomes and learner satisfaction as compared to more traditional simulation methods makes them appealing to nurse educators [7,8,22].

Theoretical Framework

Rogers (2003) defines adoption as "the mental process through which an individual passes from first hearing about an innovation to final adoption" (p.20). However, the five-stage model (Awareness, Interest, Evaluation, Trial, and Adoption) of the "Diffusion of Innovation" emphasizes decision-making rather than concern. The conceptual framework of the study was based on the Concern Based Adoption Model (CBAM). CBAM explains and predicts behaviors of end-users in a change process within innovation. The CBAM was started in 1970 at the University of Texas Research and Development Center for Teacher Education. The pattern of concerns was based on Fuller's (1969) developmental theory of teachers' concerns.

In any change process, personal connection is inevitable. This personal connection involves feelings and perceptions about the change, which can help or disturb the change process. For example, when a person is excited about a new technology he/she will try to implement it. According to Hall and Hord (2011), the sorted and classified feelings and perceptions are called concerns, which evolve into Stages of Concern (SoC). The descriptions of seven stages of

concern are shown in Table 1. The concerns fall into three major patterns: self task and impact (Figure 1 for pattern of SoC).

Concerns represent a formal construct in the context of this study. These are defined as composite sets of feelings, thoughts and preoccupations that an individual shows towards an innovation. The major assumption of the CBAM model is that, there is developmental progression of stages of concern in users involved with an innovation, ranging from informational to refocusing [11].

Method

This study used a descriptive research design with a sample of (n=27) online RN-BSN students. Fisher's exact test was used to identify the association between demographic characteristics and the students' stages of concern. The setting of the study was a large public university in the Midwestern United States. The university's Institutional Review Board (IRB) approved this study. The data were collected using discussion board posting and electronic survey questions.

Instruments

A questionnaire was constructed with 23 questions to collect background data regarding students' previous use of virtual patients and with an open-ended question. One way to understand the perceptions and concerns of persons who engaged in using virtual patient is to ask an open-ended statement of concern question- "When you think about DCE, what are you concerned about?" As part of the discussion board, the students were asked to discuss thoughts/feelings about the use of the DCE in their Health Assessment course as it pertained to their health assessment skill development/growth.

Students' responses to discussion board questions and open ended survey questions were analyzed using A Manual for Assessing Open-Ended Statements of Concern about an Innovation [23] and the constant comparative method [24] was used for the data analysis. This study analyzed the concern statements of nursing students (n=27) toward the used of DCE. The inter-rater agreement was determined by Cohen's kappa statistic [25], the Kappa was .93.

Results

The majority of the participants fell in the 36-45-year-old range. In the present study, 3% of respondents were male and 97% were females. The data indicated 52% of the students were very comfortable

Table 2: General Characteristics of the Respondents.

	Frequency	Percentage
Gender		
Male	1	3%
Female	26	97%
Age Group		
25 or less	2	7%
26-35	6	22%
36-45	14	52%
46-55	5	19%
56-65	0	0%
66 or above	0	0%
Years of experience as RN		
1 or less	6	22%
2 - 5	5	19%
6 - 10	6	22%
11 - 15	3	11%
16- 20	3	11%
21 or above	4	15%
Comfort level with technology		
Not very comfortable	1	4%
Somewhat comfortable	3	11%
Comfortable	14	52%
Very comfortable	9	33%
Prior experience in Digital Patient		
Yes	5	18%
No	22	82%

Table 3: Categorization of students' statements of concern.

Category	No of statements coded	Percentage
Un concerned	1	4%
Personal	6	22%
Management	16	59%
Consequence	3	11%
Refocusing	1	4%

with technology; however 82% students had no prior experience with digital patients. The demographic characteristics of the respondents are shown in Table 2.

Based on the Hall and Hord (2011) Stages of Concern (SoC) model, the statements were coded (Table 3). Twenty six of 27 concern statements were satisfactorily coded based on Hall and Hord (2011) one concern statements were not coded due to ambiguity. The results of the concern statements indicate that during DCE adoption process, students have concerns in one or more stages. Sixteen statements were coded Management, six statements were coded Personal and three statements were coded Consequence.

Figure 2 shows the bar chart of Stages of Concern and prior digital patient experience. With Fisher's exact test we conclude that there is

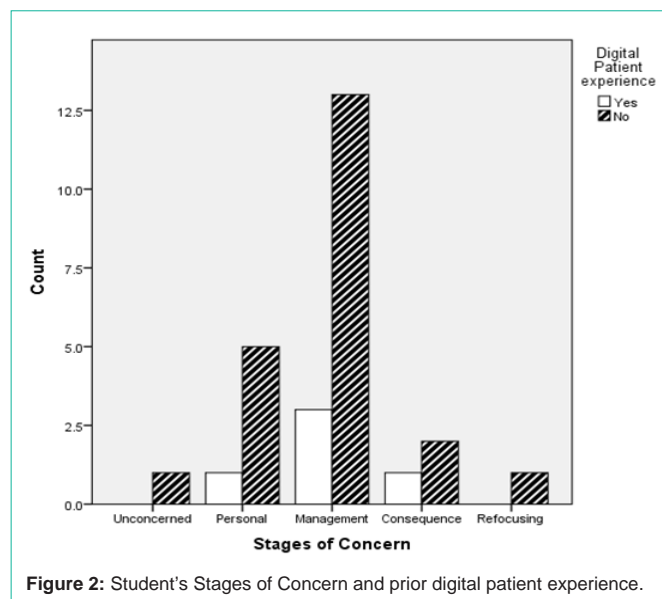


Figure 2: Student's Stages of Concern and prior digital patient experience.

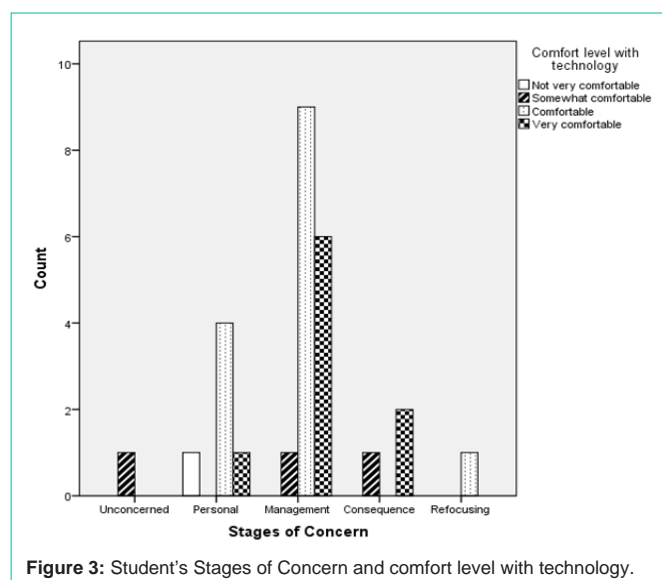


Figure 3: Student's Stages of Concern and comfort level with technology.

not enough evidence to suggest an association between prior digital patient experience and stages of concern ($p = 0.8647$).

Figure 3 shows the bar chart of Stages of Concern and comfort level with technology. With Fisher's exact test we conclude that there is marginal evidence to suggest an association between comfort level with technology and stages of concern ($p = 0.0843$).

Discussion

The main purpose of the study was to identify students' concerns with the DCE. The results suggest that in general, students have more management concerns with the DCE. The following text is an extract from a student concern statement that represents a management concern when using digital patient "It was frustrating trying to figure out how to ask a question that would be understand".

The CBAM model states that more task (management) concerns will typically be evident during the early stages and the impact

concerns occur when users deepen their understanding about the innovation and begin to think about effects of the innovation [11]. The findings of this study are consistent with CBAM model. The study confirms marginally significant association between comfort level with technology and stages of concern. Contrary to expectations, this study did not find any association between prior digital patient experience and stages of concern. It was not possible to investigate the significant relationships of gender, age and stages of concern further because the sample size was too small. However, more research on DCE needs to be undertaken before the association between DCE and Stages of Concern is clearly understood.

Majority of the students expressed positive experience with the DCE. Some students expressed concern of the lack of human interaction as evidenced in the following comments: “My concern with the digital clinical experience is the lack of human interaction. Nonverbal body language plays a big role in assessment.”

“Assessing a virtual patient is very difficult when you cannot truly see, touch, or feel things that would make assessing easier” Though lack of human interaction was a concern, for practicing nurses DCE was a good tool. The following text is an extract from a student “The DCE was an excellent tool for learning more in-depth assessment skills for a practicing nurse who had already related with human clients.”

Some of the concerns emerging from this finding relate specifically to improve the design and the implementation of the DCE. For example, the technical issues like freezing the system or the slowness to load DCE.

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