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CURRICULUM & TEACHING STUDIES | RESEARCH ARTICLE

Situated learning: The feasibility of an experimental learning of information technology for academic nursing students

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Abstract: As part of the Bachelor's degree of nursing education, nursing students are exposed to the increasingly complex world of Information Technology. *Aim*: To evaluate the feasibility of a situated learning approach for Information Technology course by assessing students' perceptions at the end of the course. *Methods*: Course participants completed a pre and post-course survey describing their knowledge and perceptions of the course. *Results and discussion*: Results demonstrated increased knowledge and satisfaction with this new learning strategy, which was also apparent in their good final course grades. Students had considerably more knowledge after the course (comparing to pre course survey), with a positive correlation between students' perception of the usefulness of the course and their knowledge after completion of the course. Therefore, enhancing learning using a simulated learning curriculum may allow students to be more aware of the challenges that nurses face in actual practice, and may provide a more contextualized understanding of the issues relating to Information Technology.

Subjects: Classroom Practice; Education; Higher Education; Teaching & Learning

Keywords: situated learning; nursing students; information technology; curriculum change; computer competencies

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ABOUT THE AUTHORS

Ayala Gonen is a lecturer and serves as a Deputy Director of the Nursing Department at Ruppin Academic Center in Israel. Her main fields of interest are: **A.** Understanding the behavior of nursing students, nurses and educators, concerning using Information Technology for the benefit of the nursing profession. **B.** Researching personal and organizational behavior including cultural diversity. The topic of Gonen's PhD Dissertation was: "Registered Nurses' Attitudes Towards Working with Computers" (2003). Gonen had developed an advanced curriculum change for nursing students, focusing on Nursing Information Technology. Gonen believes that the user's technology acceptance has the potential to have the greatest influence on the successful implementation of Information Technology. For this reason, Ayala Gonen and Lilac Lev-Ari—a clinical psychologist, joined forces in studying ways of enhancing students use of Information Technology from different aspects concerning nursing and psychology.

PUBLIC INTEREST STATEMENT

In an effort to introduce students to the increasingly complex world of Information Technology (IT), the authors present a novel method of teaching in the classroom named situated learning, as a possible approach to teaching informatics in a specific academic nursing department in Israel. The central idea of this study is to demonstrate that situated learning, using real simulations, can be harnessed for the teaching of academic students in any department. This study has demonstrated the added value that allows students to be more aware of the challenges that graduates face in practice, and provide a better understanding of the issues relating to IT. The authors believe that this project is beneficial for education as traditional teaching is undergoing changes that will require educators to have computer literacy skills and participate in educational workshops. Further research is recommended regarding the learning outcomes with use of active learning strategies.

1. Introduction

From the time of Hippocrates, through the evolution of health care, the scope of knowledge required for health practitioners has become broader. These changes have been reflected in medical and nursing education, which has also become more focused on education toward the provision of safe, effective care based on individual patient needs and their specific situations. In order to meet these requirements, nursing education leaders are being challenged to transform nursing pedagogy, in a process that is affecting faculty as well as students (Allen, 2010). The student is no longer the passive recipient of information, but rather is actively engaged in the process of learning, thereby developing autonomy and empowerment. Active learning strategies can increase student learning and satisfaction (Boctor, 2013), and empower nursing students to engage in reflection, praxis, and effective dialog. As well as fostering a more active learning strategy, the nursing curriculum needs to be made more flexible, innovative, and meaningful (Bloomfield, Fordham-Clarke, Pegram, & Cunningham, 2010), thus providing graduates with the skills to adapt to complexities in health care.

Over the past decades, the field of nursing informatics has developed and become an important part of the nursing profession and education; both nursing students and staff are dealing with an informatics and technology revolution. However, in the new millennium, nursing education remains wedded to conventional teaching approaches that fail to engage with the individual and unwittingly silence the student's voice (Denny et al., 2008). Tailoring information technology to the needs and desires of the learner is an important strategy in contemporary education settings (Koch, Andrew, Salamonson, Everett, & Davidson, 2010).

Situated learning is one method of integrating current and future developments and wider applications of innovative clinical skills and education initiatives. The main aim of this study is to evaluate the feasibility of a situated learning approach for an Information Technology (IT) course by assessing students' perceptions of the course's effectiveness at the end of the course. Our hypotheses were:

(1) The situated learning approach will contribute to the students' IT knowledge.

(2) There will be positive correlations between the student's IT knowledge after the course and their subjective feeling of the course's contribution to them.

(3) There will be positive correlations between the students' perception that the course exercises were useful and their understanding that using these examples are necessary and important for the course.

Finally, we will try and better explain how situated learning may be harnessed for teaching IT in the nursing profession.

2. Background—situated learning

Situated Learning is a specific form of learning in which the learning environment is "situated" in a particular context. Situated learning is applicable to multiple forums including adult education, problem-based learning, and experiential learning, and provides an opportunity to "learn through doing" (Drummond, 2010).

The Situated Learning Theory emerged in the late 1980s and early 1990s, introduced by Lave and Wenger (1991), who described a specific view of learning and new concepts such as legitimate peripheral participation and situated learning, which opened new perspectives on teaching. Situated learning enables learning to be acquired within the framework of practice, which allows understanding of the context as well as the theories being taught.

Situated learning can be incorporated into various professions such as nursing (situated in practice); management education (instructional design project for clients); medicine (continuing

professional development situated in the workplace); and information technology (active participation of students in a real-world or near-real-world contexts for the purpose of learning).

Noting that current nursing practice is so technologically rich De Gagne (2011) suggests that nursing educators integrate the latest technology to provide more effective and efficient education. The nursing profession, which aims to meet anticipated health care needs for the future, requires nurses who can respond to changes in health care technology. Furthermore, learning by simulation (situated learning) is suggested as something that can also improve the development of competency (Fetter, 2009).

2.1. The benefits of situated learning

The critical characteristics of situation learning include providing genuine context that reflects the way knowledge will be used in real-life, as well as offering authentic experiences and access to encounters with experts. Multiple roles and perspectives are provided, as well as support for collaborative construction of knowledge, providing coaching at critical times, and promotion of reflection to enable abstractions to be formed. Drummond (2010) indicates that the benefits of situated learning programs include promoting profound learning, perceived value for learners, increased student engagement, and positive student evaluations. In a study conducted by Gulikers, Kester, Kirschner, and Bastiaens (2008), situated learning was found to increase learning and professionalism among social science students. Nguyen (2006) also facilitated a blended situated learning program for pharmacology students, and demonstrated that in comparison to the control group, the students attained better professional experience.

2.2. Barriers to situated learning

Situated learning is hard to implement in the classroom and necessitates more work for the students and the teachers (Drummond, 2010). One of the main barriers impeding integration of situated learning in the context of nursing education is nursing faculty educators, who may lack appropriate skills to teach nursing using IT. Consequently, working with students through situated learning may present a challenge for staff. Dixon and Newlon (2010) suggest that professionals and even nursing faculty may not have a clear understanding of informatics. In their situated learning model, Woolley and Jarvis (2007) referred to staff development and training, and recommend that each staff member should undergo a basic level of training to cope with technological reform and new teaching models.

2.3. Curriculum change

The nursing profession in Israel is poised at a significant point due to economic and technologic forces that are driving profound changes to ensure the provision of low-cost quality care (Gonen, Sharon, Offir, & Lev-Ari, 2014). With the ever-increasing presence of IT in health care fields, the nursing profession needs to integrate IT not only into the profession, but also into the nursing curriculum. This idea has been expressed by McNeil et al. (2005), who discussed the major implications for nurse faculty, staff developers, and program administrators that are planning continuing education opportunities. They recommend designing a nursing curriculum that prepares future nurses for use of electronic health records and 21st-century professional practice.

In an approach described by Hendricks et al. (2012) to create tomorrow's leaders and innovators, they suggest that a curriculum change which makes the curriculum more flexible, innovative, and meaningful could provide a solution for the critical need to improve safety and quality of patient care in today's complex health care system.

3. Integration of situated learning into the nursing curriculum

Before integrating the teaching mode of situated learning into the curriculum, three main issues were considered: required informatics competency, baseline knowledge, and training for nursing educators.

3.1. Informatics competencies

Employers in health care organizations have long recognized the need for nurses to enter the workforce with a set of informatics competencies (Demiris & Zierler, 2010). The challenge has been to explore innovative tools for promoting informatics competencies within the current nursing education system. According to Chang, Poynton, Gassert, and Staggers (2011), IT competencies are recognized as an important capability for nurses, and IT has a global value in the nursing profession. Warren, Dondlinger, McLeod, and Bigenho (2012) claim that students that have a better appreciation of the technology skills gained during the course will be better able to apply these skills in practice. Consequently, the exercises and simulations designed for the students were developed based on examples that came from practice, and included taking a patient's medical history, case studies, lists of medications, and instruction for patient discharge.

3.2. In conclusion

Situated learning increases learning and professionalism among students and can be incorporated into various professions such as nursing. A curriculum change including situated learning, should be made for the benefit of the students, to make the learning more interesting, and more effective. Three main issues were considered for the course development: Required informatics competency, students baseline knowledge, and training the nurses' educators. After considering these issues, a new and unique course was developed for basic competencies of IT, and was taught to a group of 70 first-year nursing students for 13 weeks (1 semester), using a situated learning approach.

4. Methods

A baseline knowledge survey was conducted, following the development of the course and staff training.

4.1. Baseline knowledge survey

In order to understand what information the students had and what should be taught in the course, students were asked to self-report on their computer and internet-based knowledge prior to taking the course (45 of 70 students replied, response rate—64%). The students were asked to rate their computer knowledge using a 1–5 Likert-type scale, with 1 representing "poor knowledge" and 5 representing "very knowledgeable". They were asked to rate how well they felt they knew Word, Excel, Power Point, using Calendar, e-mail, and gathering information using the Internet.

Students reported that they were most knowledgeable with respect to searching for information and using e-mail. They reported being least knowledgeable with respect to use of a computer calendar and Excel. Searching the Web was not further defined, and consequently it was not possible to distinguish between using Google or Wikipedia and searching for appropriate scholastic material (see Table 1).

Students were then asked if they had participated in a computer course in the last 3 years. Only 5 participants reported in participating in such a course. Subjective reported knowledge in different computer-related domains was compared for students who had and had not participated in a computer course in the last 3 years. Students who had previously participated in a course felt that they

Table 1. Student's base line self-reported knowledge of computer and Internet-based technology

Technology	Mean	SD
Searching the Web for Information	4.33	1.09
E-mail	4.31	1.05
Word	3.73	.85
Power Point	3.57	1.17
Calendar	3.13	1.36
Excel	2.94	1.22

Table 2. *t*-Test for the difference in base line self-reported knowledge of computer and Internet-based technology between students who participated in a computer course over the past three years and those who did not

Technology	With course (n = 5)	Without course (n = 43)	$t_{(df)}$; p
	Mean (SD)	Mean (SD)	
Searching the Web for Information	3.80 (1.30)	4.40 (1.00)	$t_{(44)} = -1.22$
E-mail	4.00 (1.00)	4.28 (1.10)	$t_{(46)} = -.54$
Word	4.40 (.89)	3.65 (.72)	$t_{(46)} = 2.15^{*}$
Power Point	4.60 (.89)	3.41 (1.10)	$t_{(44)} = 2.32^{*}$
Calendar	3.80 (1.30)	3.02 (1.35)	$t_{(44)} = 1.22$
Excel	4.60 (.89)	2.71 (1.13)	$t_{(45)} = 3.58^{**}$

*$p < .05$.
**$p < .001$.

had better knowledge using Word, Excel, and PowerPoint, but not in use of a digital calendar, e-mail, or informatics (see Table 2).

4.2. Course development

The premise underlying the lesson plan was to take into consideration examples and exercises which were relevant to this kind of learning. Most of the course was taught using individual practice in a computer laboratory, and included multiple exercises, both in class, and as homework. The students were graded for each exercise and the average grade made up 10% of the course's final grade. The students' course tasks were designed around different subjects related to nursing and can be demonstrated with two examples. In one task, the students needed to build a database including patient's names, health maintenance organizations names, department of admission, length of hospital stay, etc. The students were then asked to produce reports according to different parameters, such as: Calculation of total admitted days per department and which drugs were given in the different departments. In a second task, the students were asked to choose a subject from their course syllabus and to prepare a presentation which combined the tools they had learned during the course. Later on, they needed to give this presentation in front of the class. The presentations were very professional, both in content and in the use of technological tools. On the last day of the course, during oral assessment, most of the students expressed great satisfaction from this learning method.

The educators aimed to teach the technological tools within the framework of an integrated system within the current nursing studies, and to create a significant and tangible linkage between the technological and practical aspects of the course. This linkage was later reflected in the great interest the students reported during the course, and the relevance to daily nursing activities. This kind of learning further motivated the students and they requested more learning using this approach to develop and enrich their technological knowledge.

4.3. Staff training

Consideration should be given to the fact that this kind of project must be carried out in collaboration with the team of nursing faculty educators. In order to increase the involvement and the motivation of the nursing team, a staff meeting was held, where the project was presented and the goals of the studying method were explained. Relevant examples from the course were presented and demonstrated. The team was invited to experience this kind of teaching and learning first-hand. It is important to note that the team's responses were extremely positive; they showed interest and readiness to learn and to integrate this method of teaching.

In order to assess the feasibility of integrating the method of situated learning, into an IT course, we used two methods of assessment: A. post-course survey was administered to the first-year

nursing students after completion of the course. B. the student grades were assessed at the end-of-course test.

The post-course survey was administered to the same 70 nursing students who filled the pre course survey (see Section 4.1) and it was done one month after the last day of the course. The questions related to three aspects of situated learning: satisfaction with the course in terms of understanding the material and their feelings about level of knowledge; perceptions about the usefulness of the exercises; and perceptions of the value of situated learning as a way of teaching, including the feeling that the exercises and examples were necessary and important for learning.

Fifty-five nursing students answered the post-course questionnaire (response rate, 78.5%). The students were aged 18–30 years (mean (M) = 21.17; SD = 2.69). Only 5 (10.4%) of the students had participated in a computer course in the previous 3 years. Sixty-seven (95.7%) of the students took the end-of-course test; the results were used to assess the effectiveness of the teaching method.

5. Results

Pearson correlations between student's self-reported general computer knowledge after the course, course's usefulness and necessity and evaluation of the usefulness of the simulations are reported in Table 3.

5.1. Computer knowledge after the course

The students were asked to assess their general computer knowledge after the course, using a 1–5 Likert-type scale. 98.2% of the students reported that they were "knowledgeable" or "very knowledgeable" after the course. 96.3% of the students reported that the course had contributed "much" or "very much" to their current knowledge; most of the students felt that their knowledge was greater after the course (mean = 3.35 on a 1–5 scale, SD = .52).

5.2. Students perception about the value of the course

There was a strong positive correlation between the feeling the course had contributed to their knowledge and the level of knowledge they felt they had after the course ($r = .49$, $p < .0001$; see Table 3); students who felt the course had contributed to their knowledge also felt that they had greater knowledge in the post-course questionnaire.

5.3. Students' evaluation about the simulations

Fifty students (90.2%) reported that they found the exercises useful. A positive correlation was found between the students' perception that the exercises were useful and their understanding that using these examples was necessary and important for the course ($r = .33$, $p < .05$; see Table 3).

5.4. Final course grades

The student's grades were relatively good, with a median of 81 and mean of 79.55 (SD = 11.70). Sixty-three students (94%) passed the final test successfully and only 4 (6%) of the students failed the course.

Table 3. Pearson correlations between student's evaluation of situated learning

	Usefulness	Necessity	Simulations
Knowledge	.49***	.17	.16
Usefulness		.33*	.16
Necessity			.09

Notes: Knowledge = student's self-reported general computer knowledge after the course; Usefulness = student's self-report of course's usefulness; Necessity = student's self-report of course's necessity; Simulations = student's self-report of usefulness of the simulations.

*$p < .05$.

***$p < .001$.

6. Discussion

The main findings of this study provide further evidence for situated learning as a beneficial approach, which can be applied to teaching Information Technology. *Firstly*, the student's grades in the course were relatively good, with a mean grade of 79.55 (SD = 11.70). The final grade was based on a test of the students' knowledge in accordance with the course syllabus, and used the same principles that guided other tests from previous years. The good grades demonstrated that the students understood the material presented in the course and the course's functionality and effectiveness.

Secondly, there was a positive correlation between the students' feeling that the exercises were useful and their perception of their level of knowledge (after the course). This demonstrates the benefits of situated learning as a method of teaching. *Finally*, there was a positive correlation between the students' feeling that the exercises were useful and the students' appreciation of their importance in the course ($r = .33$, $p < .05$). This also demonstrates the course value and the students' appreciation of its importance.

In accordance with published literature, student feedback on work-based assessments is generally positive, and they cite benefits in terms of applying principles from learning to the workplace and satisfaction from practical assignments (Drummond, 2010). Cope, Cuthbertson, and Stoddart (2000) conclude their research about situated learning for nurses in Scotland by stating that in light of the central importance of placement for training nurses, explicit use of mentoring techniques derived from situated learning and cognitive apprenticeship during nursing school is beneficial. In a study that developed an instructional design framework for authentic learning environments, Herrington and Oliver (2000) note that situated learning provides authentic activities and offers coaching for students at critical times. These results provide evidence for the value of situated learning as a pedagogic tool for nurse educators in general and for imparting knowledge relating to basic nursing computer competencies.

7. Research limitation and recommendations

This study has some limitations: First, there was no control group in this study as all students underwent the training described. Second, the research was conducted in a single nursing academic institution in Israel. These might impede the ability to generalize these findings. We, therefore, recommend that further comparative studies be assessed in other academic centers and in other countries. Third, baseline and post-course IT knowledge were assessed using a single question method. Thus, a summed scale for knowledge could not be formed. Future studies should try and gain a more complex view of student IT knowledge prior to and following the course. Lastly, we recommend examining the feasibility of situated learning, for other student populations, according to their field of study and encourage further research of the learning outcomes with use of active learning strategies.

8. Conclusion

Traditional academic education is undergoing change and will require educators and students to be prepared for that change, by having computer literacy skills and by participating in educational workshops. This study has demonstrated the added value of nursing students participating in a real-world context. "Enhancing learning, using a simulated learning curriculum, will allow students to be more aware of the challenges that nurses face in practice, and will provide a more contextualized understanding of the issues relating to nursing informatics and consequently an ability to provide better care." The authors believe that this project is beneficial for many departments of academic education, as well as the nursing profession.

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