Virtual IV Model: A Self-Directed Learning System for Practical Nursing Students

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ABSTRACT

The use of technology in higher education has created an environment that reinforces the didactic and technical skills in the health careers field. Students in healthcare programs are expected to complete the program prepared to perform the basic skills of a new graduate. IV certification is an optional training component of the practical nursing program, which provides the graduate the ability to function effectively and efficiently in the medical arena. Nurse educators are forced to find ways to provide student nurses with clinical experiences outside of the hospital arena, due to the current limitations of available clinical sites. The introduction of technology in nursing provides the student the ability to participate in multiple self-directed learning systems which are provide hands-on skills. Using the Virtual IV Simulator will assist students to improve specific techniques that will move the student from a novice, to an expert practitioner. To capture the effectiveness of the use of the Virtual IV Simulator, the writer used the ISTE Classroom Observation Tool (ICOT) and observed the interaction and activities of students (8) in the Practical Nursing Program at Delgado Community College.

The Learning Environment and Activity

The process of educating the adult population in higher education requires that faculty have the ability to teach intergenerational, multicultural students that come with prior work experience, expectations, and ethics. Millennial students are technologically competent, and expect the teaching-learning environment to be interesting and interactive (Clifton & Mann, 2011). With the addition of technology, nurse educators are able to provide a learning environment that addresses multiple pedagogic models and with the use of technology the hands-on skills needed by the student nurse helps to ensure experience and confidence in the graduate nurse.

The activity observed to assess the effective and efficient use of technology in the nursing program was conducted in the skills laboratory of the Practical Nursing Center of Excellence.
This lab accommodates 8 students providing a work station for 8 intravenous manikin arms, with two Virtual IV Computerized Simulators that connect to a desktop computer and printer. Intravenous poles (IV) hold an infusion pump that has imitation blood in the infusion bag connected to infusion tubing. Students are encouraged to work individually on the IV arms, and it is suggested that students work individually or in pairs on the simulator. Students must log in using their personal access code and are then prompted to begin the process of preparing the site, assessing the appropriate vein, tape and label the site based on the case scenario provided by the computer. (See Attachment 1.A)

Using high-fidelity computer simulator machines affords students the ability to practice in a simulated clinical environment (Parsh, 2010). Nurses previously learned by practicing to start an IV on an IV manikin, but with the progress made with technology, student nurses can now simulate the entire process using a computer program that provides multiple scenarios using variables that will challenge the students ability and require critical thinking. With the high-fidelity computer simulators the student is allowed experience the palpitation of a pulse, witness an IV infiltration experience a collapsed or rolling vein, and cause bruising on the simulated patient. These lessons all provide a valuable learning experience of the actual situation with no risk to the patient. Each student is allowed the time to initiate an IV on the simulator and receive a computerized grade based on the accuracy of the stick and the efficient use of the technique used in starting, taping and maintaining the IV.

Use of the ICOT

The ICOT is a free online tool designed to be used in a K-12 environment, but the writer was able to make use of the tool in higher education, in the practical nursing program. Computer-assisted instructions (CAI) assist students with the acquisition of skills by providing a
drill-and-practice program that reinforces specific steps to complete a skill (Smaldino, Lowther, & Russell, 2008). Simulated clinical experiences are needed in the education of nursing students in higher education due to the shortage of hospital units needed to accommodate the multiple nursing programs throughout the nation (Parsh, 2010). Technologically savvy instructors are needed to facilitate the learning environment by supporting the activity of the self-directed program. Accomplishing the required score to successfully complete the simulation builds self confidence in this risk-free environment (Parsh, 2010), but appropriate planning is required. As clinical nurse experts are hired into the academic setting, it is imperative that these individual nurses are provided with tools to assist them in educating nursing students. The ICOT is just the tool to aid the novice nurse education in determining if the use of technology in the classroom is appropriate and helps the students to meet the intended objective for the classroom assignment.

The use of the ICOT enabled the writer to determine the effective and efficient use of the technology, as the tool assisted the writer to focus on student engagement. In using the Virtual IV Simulator to practice, each student must accomplish the simulated task of starting the intravenous infusion site within a specific time frame, using specific techniques, and as the student practices, the computer provides immediate feedback identifying errors with rationales to further assist the student in becoming successful with accessing an IV site. The writer completed the ICOT to evaluate the appropriate use of technology in the skills lab by focusing on the activities of the students in 15 minute increments. As the students continued to practice, the immediate feedback received in this simulated training help the student to make the necessary adjustments, as the instructor facilitated the learning environment. Within three to four attempts, students were achieving a 95% score which is an indication of success.
The use of the ICOT is designed to assist the teacher in assuring that the use of the technology is integrated into the curriculum and addresses the teacher standards. The National Education Technology (NETS) established standards that address teacher and student standards are; (a) appropriate technology used, (b) developmentally appropriate learning activity, (c) technology-enhanced instructional strategies, (d) technology supports learner-centered strategies, (e) technology applied to develop students' higher order skills, (f) class management facilitates engagement with technology, (g) teacher assesses student technology skills, (h) diverse learners enabled and empowered, and (i) equitable access to technology for all students. All students in the practical nursing program practice on the simulator, which provides a risk-free; learner-centered environment that uses appropriate technology to meet the learning objective. The instructor introduces the technology, and provides an explanation of the use of the technology through demonstration. Students are rotated from the traditional IV arm to the virtual simulator for practice, to assure that each student is afforded the ability to practice using the simulator model. Maintaining contact with students that need individualized attention can also be achieved using this technology, and the writer was able to assess the appropriate educational environment with the use of the ICOT tool. The writer recommends that the novice and/or experienced nurse educator, in search of an instrument that will assist in determining the effectiveness of the technology currently used in the classroom, adapt the ICOT as the tool to help in making that determination.

Conclusion

The use of the ICOT is designed for the K-12 academic environment, but can be adopted for use in higher education. Integrating technology into the curriculum for health care is appropriate as there continues to be a limited amount of clinical facilities available for the
training of nursing students. The ICOT is therefore the tool of choice to use in assuring the appropriate integration and use of technology in K - 12 and can be adopted for higher education. Nurse educators must address the frustration of lack of clinical space available for experience; therefore, the alternative is to provide this experience in the human patient simulator that increases the use of technology. The use of the ICOT will serve as a valuable asset to nurse educators, as they become familiar with academic tools and technology used design, implement and assess student-centered learning that helps to engage the multigenerational, multicultural, technologically competent college students in healthcare.
Attachment 1A

The Virtual IV Simulator provides step-by-step evaluation on the appropriate placement of the tourniquet, cleaning of the site, positioning and placement of the catheter, technique on how to access the vein, securing the catheter with appropriate disposal of sharps and contaminated supplies.

Traditional IV Arm use to assist students with assessing the appropriate location of the vein.

For information on the ICOT Classroom Observation Tool copy and paste the following link http://www.iste.org/icot/
References


