**Title:**
Mobile Technology Integration in Baccalaureate Nursing Education to Promote Technological
Competency and Reduce Medication Errors

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**References:**
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**Abstract Summary:**
The purpose of this presentation is to educate nursing faculty to effectively integrate technology into their teaching through mobile technology use thereby promoting technological competency, to provide students with classroom and clinical experiences, to increase evidence-based practice and decrease medication errors by making relevant information available at the point-of-care.

**Learning Activity:**

| LEARNING OBJECTIVES | EXPANDED CONTENT OUTLINE |
| --- | --- |
| "The learner will be able to understand why technological competency is important in today's technologically sophisticated, consumer-centric health care environment and a priority in nursing education". | This content will be provided during the presentation on how technological competency is important to prepare the next generation of nurses to practice in a technology-rich and complex health care environment. |
| "The learner will be able to understand how mobile technology (PDAs) have been shown to increase evidence-based practice and decrease medication errors by making relevant information available at the point-of-care". | This content will be provided during the presentation on how mobile technology (PDAs) have the ability to make evidence-based information available to nurses when and where they need it and also have the potential to reduce medication errors by providing a portable and convenient reference |

| | source for healthcare providers. The rate at which new medication information is being produced, the IOM acknowledges that it is almost impossible for healthcare providers to have current knowledge of every medication they encounter and therefore recommends a point-of-care reference source such as a PDA for all healthcare providers. |
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**Abstract Text:**

**Purpose:** The purpose of this presentation is to educate nursing faculty to effectively integrate technology into their teaching through mobile technology use thereby promoting technological competency, to provide students with classroom and clinical experiences, to increase evidence-based practice and decrease medication errors by making relevant information available at the point-of-care

**Introduction:** The practice environment for nurses has changed radically due to the advances in information technology and massive expansion of knowledge in health care. Promoting technological competency is a priority in nursing which can be done by integrating the use of mobile technology in the clinical setting and course work to better prepare graduate nurses for the current and future health care environment. Patient safety is an important priority for nursing. Medication errors are a major cause of harm to patients and reducing medication errors is a major concern in today's technologically sophisticated healthcare environment. Nurses are the main professionals involved in administering medications and administration is the part of the medication process with the least safeguards in place.

Mobile technology, especially personal digital assistants (PDAs) used by nursing students can provide access to information at the point of care to safely calculate medication dosages to reduce medication errors thereby promoting technological competency.

**Background/Significance:** The American Association of Colleges of Nursing (2005), the National League for Nursing (2008), and the Institute of Medicine (2003), some of the major forces in professional health care and nursing education advocate the incorporation of technology in nursing education (George et al., 2010). Technological competency is the skilled demonstration of intentional and authentic activities by nurses who practice in environments requiring technological expertise. It supports current high-tech nursing practice by validating the dependency on nursing on technologies in the management of health care (Locsin, 2005). Nurses are the bridge between the patient and technology. The nursing curriculum and teaching strategies need to teach with and about technology to better inform health care interventions that improve health care outcomes especially medication error reduction (NLN, 2015). IOM estimates that medication errors result in at least one death every day in the United States and have stressed patient safety as a priority. They also conclude that it is not acceptable for patients to be harmed by the health care system that is supposed to offer healing and comfort-a system that promises, "First, do no harm." (IOM, 1999). The National Coordinating Council for Medication Error Reporting and Prevention (NCCMERP) believes there is no acceptable incidence rate for medication errors and the goal of every health care organization should be to continually improve systems to prevent harm to patients due to medication errors (NCCMERP, 2008). The IOM drew attention to the need for technology solutions that can make a difference in the ability of nurses to ensure safe, high-quality patient care emphasizing the area of medication administration (McKesson, 2004). The American Association of College of Nursing (AACN) recognized that technological advances are increasing opportunities to improve the quality of, and access to, nursing education (AACN, 2002).

Additionally, the Board of Governors of the National League for Nursing (NLN) in their position statement "Transforming Nursing Education" recommended nurse educators to effectively integrate technology into their teaching through the use of sustained, evidence-based practices, distance learning, simulation and

Personal Digital Assistants (PDAs) to provide students with clinical experiences in diverse settings and to improve care provided to patients (NLN, 2005). Technology solutions, especially PDA technology, can make a difference in the ability of nurses to provide safe patient care in the area of medication administration, especially medication calculations by having access to the latest healthcare information. Health care professionals require access to ever-expanding knowledge, and PDAs or other handheld computer devices can serve as valuable tools for education, information storage and retrieval, and clinical practice (George et al., 2010). Using PDA technology at the point of care; by a bedside, in the community, in the office, or in a patients home can reduce errors and promote patient safety. It provides a mobile platform whereby the nursing student or nurse can download various types of software and access information quickly that supports evidence-based nursing practice (Beard et al., 2011).

**Methodology / Data Analysis:** An evidence-based pilot study using Rosswurm and Larrabee's change model was conducted at a private School of Nursing in Northern NJ. The stages are similar to the nursing process and are as follows: assess, link, synthesize, design, implement and evaluate, and integrate and maintain (Rosswurm and Larrabee, 1999).

A convenience sample of twenty undergraduate junior nursing students enrolled in the medical-surgical nursing course was given a case study with an attached medication administration record. Students were instructed to use the PDA with nursing software to complete the questions and calculate drug dosages in the case study. The comparison group was the same twenty students who use the PDAs.

They were required to complete the same case study using textbooks and a calculator after 4 months. The two outcomes measured were accuracy and speed. Accuracy was determined from the 10 questions asked in the case study. Each correct answer received a score of l, and each incorrect score was scored as 0, with a maximum score of 10. The speed was the time each student took to complete the case study, the maximum time allotted was 15 minutes. The groups are similar, since it was the same group used for the PDA exercise and textbook exercise to complete the case study. The t-test, a non-parametric test was used. The mean accuracy, mean speed, the standard deviation (SD), the t value, the degrees of freedom (df) and the level of significance (p value) were calculated.

The mean accuracy for the PDA group was 9.90 and 9.65 for the textbook group, df was 38 and p = 0.06. The level of difference between the means for the two groups was not statistically significant.

However, the mean accuracy was higher by 0.25 in the PDA group compared to the textbook group. The mean speed was 7.25 minutes for the PDA group and 12.0 minutes for the text book group, df was 38 and p = 0.0001. The level of difference between the means for the two groups was statistically significant. This shows that the group that used the PDA worked at a faster speed than the group that used the textbooks. The standard deviation for the two groups revealed that the participants' responses were similar to the mean. Post evaluation survey indicated that the students found the PDAs easy to use and perceived their use as beneficial to their learning in the clinical area.

**Findings/Implications:** Based on the results of the study, the integration of PDA technology was built into the baccalaureate nursing program at the University making it a requirement from the first clinical course. This supported the mission of the University to be a leader in providing high quality technological and professional nursing education. After selection of the PDA and nursing software, financing, and IT support, students and clinical faculty were provided education and training on the PDA use thereby promoting technological competency. Students use the PDA in the clinical setting to access information that supports nursing practice thus reducing errors, improving care, and promoting patient safety by increasing accuracy and efficiency. Medication administration is a critical step, and the nursing student or nurse administering that medication must be able to perform this procedure safely.

Medication administration is also performed frequently, which increases the chances for error, since it involves calculations. When medication information is available in a PDA, it can be retrieved easily at the point of care, thereby reducing the incidence of medication errors. It is an important technologic

competency that will improve the quality of nursing practice and therefore should be included in the nursing curricula. These outcomes are in concert with IOM's goal to provide safe medication administration at the point of care.

**Discussion:** The use of mobile technology in the nursing curriculum would introduce students to the habit of using technology for safe practice thus promoting technological competency. The rapid influx of mobile technology into nursing practice also dictates that nurse educators train current and future nursing students to deliver new strategies of care. This also provides an opportunity for nurse researchers to indulge in evidence-based research to confirm the effectiveness of these strategies in providing optimum health care (Melynk, 2012). This technology will eventually help the practicing nurse to spend more time on patient care and have access to the most current information. Health care employers are also expecting graduate nurses to have the latest information technology skills. Providing nursing care in a highly technological, connected work environment is the future of nursing practice. Mobile devices like the PDA can open a door of lifetime learning, as students are capable of moving from one learning environment to another (Franklin, et al, 2007).