

The State of the Science: Research Issues in Technology-Based Interventions

The use of technology is on the rise in nursing research, and it offers a broader array of options for both interventions and data collection. Nurse researchers from the University of Pittsburgh discussed the process of developing prototypes for technology-related research. In this process, scientists build an initial design, test the prototype, improve the design, and retest the prototype until they believe it to be testable in the target population. Three essential criteria are then evaluated: whether the prototype improves health outcomes, fits seamlessly into the life of the user, and enhances the quality of life of the user.

Nursebot. In collaboration with technology experts at Carnegie Mellon University, University of Michigan, and Stanford University, Judith Tabolt Matthews, PhD, MPH, RN, has used funding from both the National Science Foundation and the National Institute of Nursing Research to develop two prototypes intended to enable elders to safely remain in their homes longer than would otherwise be possible. Pearl, the prototype “nursebot”, interacts with the elder to facilitate navigation through activities of daily living. A second prototype, the intelligent mobility platform, is designed to provide safe and supportive guidance as elders move through their environment.

PDAs in monitoring care. In caring for one of the most difficult transplant populations- people with lung transplants- Annette DeVito Dabbs, PhD, RN, is developing an interactive system using a personal digital assistant (PDA) platform. The transplant recipient completes the self-care queries for the day, entering the data into the PDA. When the PDA is placed in its cradle, it both recharges and transmits the data to the researcher’s computer via the telephone line. Dabbs indicated that this technology, despite the frequency of monitoring, supports transplant patients’ goal of returning to as normal a life as possible and their desire to be good stewards of the donor lung.

Internet symptom management. Heidi S. Donovan, PhD, RN, is applying what traditionally has been a face-to-face interview process for the management of complex symptoms associated with cancer treatment to an interactive process using the Internet. The Written Representational Intervention to Ease Symptoms (WRITE Symptoms) provides a secure environment on the Internet to address the symptoms of most concern to the patient. Although the balance of the efficiency of this method with the richness of the information that can be obtained is not yet known, it appears that this interactive approach can be successfully used in the text-only environment of the Internet in a way that is convenient and appealing to the patient.

Communication devices. One of the most frightening aspects of being cared for in an ICU is the inability to communicate with a nurse when intubated for airway management. Mary Beth Happ, PhD, RN, is the principal investigator of the Study of Patient-Nurse Effectiveness with Assisted Communication Strategies (SPEACS). This study is testing the efficacy of communication devices to supplement natural speech in the ICU. Happ is in the process of comparing basic communication skills training of nurses with augmentative and alternative communication devices to determine the ease, quality, frequency, and success of use of high-technology devices.

Electronic diary monitors. A major concern with paper diaries that patients keep is the “parking lot” phenomenon, that is, the patient or research participant completes the diary just before handing it in. As a result, the information recorded becomes recall information, not real-time monitoring. This distinction is especially important for interventions directed toward enabling self-regulation, such as of a behavior or medication regimen, as would be the case with obesity and diabetes. Lora Burke, PhD, MPH, RN, has been collaborating with technology experts to investigate the concordance of diary-entry time as recorded by the individual and by a photosensor on the diary that is activated when it is opened. A major concern was finding relatively little agreement between the photosensor recordings of diary opening and the time of

entry recorded by the participant. Dr. Burke acknowledged that the paper diary methodology is quite burdensome. An alternative such as use of a PDA could provide immediate feedback to the diary-keeper, for example, the number of calories consumed. Such feedback is of great benefit, and participants find it useful beyond the period of a research study.

Dabbs stressed that nurses play a pivotal role in the development of technology for patient care. Nurses value autonomy and respect the individual. They are capable of generating and applying theory, developing scientific evidence of the efficacy of technology, and translating new knowledge to nursing practice. Nurses respect the contributions of the team and can facilitate patients' success in utilizing technology. All of these factors support the need for nursing involvement in the development and testing of high-technology devices for patient care. One cannot assume that technology will facilitate care; it must be tested rigorously.- *Gayle Page, DNSc, RN, FAAN, reporting.*