Nurses Using Futuristic Technology in Today's Healthcare Setting

Debra M. WOLF^a, Amar KAPADIA^b, Jessie KINTZEL^c, and Bonnie B. ANTON^d

^a Slippery Rock University, Slippery Rock, PA, USA;
^b Vocollect, Pittsburgh, PA, USA;
^c Penn State University, PA, USA;
^d UPMC St. Margaret, Pittsburgh, PA, USA

Abstract. Human computer interaction (HCI) equates nurses using voice assisted technology within a clinical setting to document patient care real time, retrieve patient information from care plans, and complete routine tasks. This is a reality currently utilized by clinicians today in acute and long term care settings. Voice assisted documentation provides hands & eyes free accurate documentation while enabling effective communication and task management. The speech technology increases the accuracy of documentation, while interfacing directly into the electronic health record (EHR). Using technology consisting of a light weight headset and small fist size wireless computer, verbal responses to easy to follow cues are converted into a database systems allowing staff to obtain individualized care status reports on demand. To further assist staff in their daily process, this innovative technology allows staff to send and receive pages as needed. This paper will discuss how leading edge and award winning technology is being integrated within the united States. Collaborative efforts between clinicians and analyst will be discussed reflecting the interactive design and build functionality. Features such as the system's voice responses and directed cues will be shared and how easily data can be documented, viewed and retrieved. Outcome data will be presented on how the technology impacted organization's quality outcomes, financial reimbursement, and employee's level of satisfaction.

Keywords, voice assisted technology, point of care, computerized documentation

1. Introduction

Today within the United States (US), nurses and other healthcare clinicians are being introduced to various types of technology in an effort to meet the request of President Bush calling for the majority of Americans to have interoperable health records by 2014. As a result of multiple vendors producing numerous forms of functionality using multiple devices, various approaches of integration have been used within healthcare institutions. Nurses are being required to learn how to use computers; store multiple usernames and passwords, work between one or more computerized or paper documentation systems and remember where to find critical data within seconds.

The American Nurses Association (ANA) defines principles which guide nurses in their professional role that specifically address the need for documentation to be accurate, concise, clear, complete, timely and sequential, retrievable on a permanent basis and auditable. Critical to the success of nurses documenting as set forth by the ANA is the inclusion of nurses in the decision-making, design and evaluation of all documentation processes. (1) The ANA acknowledges nurses within the informatics arena as a specialty within the profession of nursing. The Nursing Informatics Scope and Standards of Practice, defines HCI as influencing people using software applications, computer technology while improving efficiency and effectiveness. [2] Patient documentation is seen as an essential component of a professional nurses' practice. [1] Voice assisted technology is an attempt to support nurses seeking this level of improvement. In 2008, the American Academy of Nursing Workforce

Commission concluded a study that identified technological solutions to improve workflow inefficiencies. [3] The study was funded by the Robert Wood Johnson Foundation with a twofold purpose of identifying technological solutions to improve workflow and secondly to energizes industry in creating various technologies to improve healthcare workflow. The study identified that the three most desired requests by nurses were a) voice activated technology, b) voice technology available at the bedside, and c) technology via wireless systems.

Voice assisted technology was first introduced within long term care (LTC) in 2003. The point of care devices allowed nursing assistants to document real time and retrieve patient data as needed without having to log into a computer or search for a paper The development of this innovative technology was originally supported charts. through research grants from the National Institute on Aging. The system was recognized as award winning technology receiving the Tibbetts award for excellence in small business innovation research and the Excellence in Applying High Tech to Healthcare award from the Commonwealth of Virginia. [4] Extreme measures have been taken by the vendor to ensure nurse clinicians have been intricately involved from concept, design, build, testing to integration. A Doctorate prepared nurse who specialized in informatics was employed as a consultant to assist in understanding the needs of acute care settings. A university school of nursing known for their center of excellence in simulation nursing labs was utilized to beta test the system. Input was obtained from multiple Nursing Faculty, professional nurses and student nurses to critique functionality leading to multiple areas of continued improvement.

Most recently in 2008, this innovative technology expanded to support clinicians in acute care setting (beta testing). The voice assisted functionality is supporting Intravenous (IV) Nurses in documenting activities surrounding the care of intravenous insertions from peripheral to central lines. Also included in the documentation is dressing changes and removal of IVs. Multiple benchmark measures have been selected to assess the impact. Originally, this wireless voice assisted technology was introduced in 1987 as a technological solution to better manage inventories within warehouse settings. The technology was well received as a method of optimizing supply chain operations. Success was seen through favorable return on investments (ROI), improvements in productivity, accuracy, cost reduction and job satisfaction for employees and most importantly employee acceptance .[5] With 20 years of operation in over 35 countries this technology has assisted companies in managing data and supporting employees to be more productive and resourceful. Businesses using this technology have experienced performance gains as high as 30 % and accuracy improvements as high as 60 to 80 %. [6]

2. Objectives

This paper will assist individuals to: 1) identify voice assisted technology as a point of care device utilized by nursing personnel to improve patient outcomes, organizational key measures and increase nurse satisfaction, 2) interpret how voice assisted functionality supports nurses in documenting patient care, managing tasks, retrieving patient data and paging colleagues without leaving patient bedside, and 3) translate the need for continued opportunities to collaborate and integrate voice technology within all healthcare arenas.

3. Materials and Methods

Voice Assisted Care is achieved through use of a lightweight headset with small microphone and a small wearable computer that can send and receive data via a wireless network. A central software application and server broadcasts information and instructions as needed to the clinicians. The computerized waist unit is 55mm high x 100mm long x 32mm in depth and fits comfortably in ones palm. The computer may be worn in a uniform pocket or on a waist belt with ease of adjustment. The device allows healthcare professionals to hear sound prompts, instructions and document completely hands free. The overall aim of the voice assisted technology is to assist nursing personnel with documentation, communication, and task management. Key features this technology provides are: a) instant access to care needs, b) chart while multitasking, c) chart at point of care, d) instant communication of updates to care needs, e) nurse-call integration, f) eliminates overhead paging, and g) ability to stay with patient while seeking help.

Nurses are enabled to retrieve patient information hands & eyes free at the point of care by using a variety of voice prompts such as "Retrieve patient chart", or "Allergies", or "Diet". Following the administration of care or completion of certain tasks, nurses have the ability to document real time due to the mobility of the device. Through individualized training, selected spoken words are recognized by the computerized The speech recognition technology aims to increase accuracy in system. documentation through word template training, through use of a verification process that occurs with each documentation event through the use of "repeat" commands. This speech technology is believed to increase the efficiency and accuracy of documentation by nursing personnel. Through wireless systems verbal documentation is seamlessly converted to text and transmitted to the electronic medical record, to further increase efficiency for all. One case study reported that "For every 60 minutes of patient care, nurses spend 30-60 minutes on corresponding paperwork." [7] Voice assisted technology aims to reduce this time by enabling nurses to document real time at point of care allowing additional time that may be spent with patients.

Along with increasing efficiency in documentation, the technology aims to increase Using the device's paging feature, flawless efficiency in communication. communication is achieved. Calls for assistance can be made without leaving patient's bedside, and responses to page request can be addressed immediately upon receipt. Additional features allow pages to be sent and received without interrupting documentation. In addition, pages can be managed so one is not distracted during patient or professional interactions. Confidentiality of information, especially the patient's personalized data, is maintained by nurses wearing a small headset allowing only the clinician to hear communicated information or messages, supporting HIPAA regulations. At the end of a shift, detailed information may be recorded and accessed by nursing personnel supporting handoff communication. Voice assisted functionality also has the ability to reduce the cognitive workload of nurses by allowing them to prioritize all aspects of workflow related to patient care in one location. The task manager feature allows high priority pages to become the next task within the existing programmed list of tasks. Upon completion of the paged task, the system will seamlessly transition back to existing lists of tasks waiting to be completed. One Registered Nurse noted the ability to document and perform other tasks at the same time helps tremendously with time management. [8]Voice assisted technology may also assist in reducing infection rates by reducing the spread of bacteria. Nurses no longer have to use a computer keyboards, manipulate paper charts, or use a pen to document. All of which could be used by multiple individuals over a 24 hour period. Each clinician is administered their own private headset for continued use, while sharing a computerized waist unit. The waist unit consists of a hard cover that is easily cleaned with any hospital disinfectant agent.

In an effort to prepare nurses to document within an EHR, a wide variety of methods have been utilized to educate and prepare nurses. Clinicians must maneuver through multiple web based screens to enter & retrieve data. This manual process requires the clinician to memorize where various forms are located as while as which form contains the data needed at any given point in time. Upon initial use, voice assisted technology, requires 1 to 2 hours time in training the system to interpret one's voice by repeating words within the system which stores the clinicians voice templates for future use. Typed user name and password is not required, to enter system, simply stating one's name and password logs user into system.

4. Results

Voice assisted technology has successfully guided the work environments in areas such as food distribution, grocery, retail and LTC settings. One company among the top twenty supermarkets in the U.S. experienced a reduction in errors > 80% and a return on investment in < 12 months. [9] The CEO of a retirement community stated he saw case mix index increase from 1.27 to 1.34 in 7 months. [10] Another LTC facility experienced a 95% reduction in generating reports, 83% reduction in searching for staff, 40 to 74% decrease in turnover, full elimination of all nursing assistance paper work, increase reimbursement from Medicare by \$96, 579 and increase from Medicaid by \$375,662 annually, and a ROI within 3 months of integration. [11]

5. Discussions

As consumers continue to expect more from clinicians and healthcare institutions; so should the institutions and clinicians expect more from companies that design innovative technology. Critical to the successful integration of new technology is the manner in which it was developed. Technology needs to be designed to address the needs and laborious processes clinicians face daily. The involvement of bedside clinicians is critical to the success and acceptance of the technology. Forcing clinicians to change processes as a result of poorly designed technology by a non clinical professional is not acceptable. Nurses as key providers of patient care, play a critical role in how the integration can be approached. As healthcare arenas continue to move forward with innovative methods of care, so does the manner in which innovative technology. Without the collaborative understanding of how one's process is intertwined with others; technological systems are prone to failure. Financial support, multidirectional communication, education and clinician involvement should be the corner stone to any technological integration's strategic plan.

6. Conclusions

Technology development and integration within all organizations has become one of the most leading-pronounced industries within our country. Today we have the capabilities of having precise diagnostic testing resulting in the identification of the microscope markers assisting with diagnosis of various diseases. In addition we have the ability to visualize current events across the world. Healthcare clinicians need companies to design solutions that support them in their role. Using Voice Assisted Documentation is a major step in supporting this futuristic need in today's healthcare setting. Continued collaboration is critical between healthcare institutions and vendors to work side by side testing and further developing the technology that will support all clinicians in providing safe quality patient care.

References

[1] American Nurses Association. Principles for Documentation. Silver Spring MD; 2005.

[2] American Nurses Association. Nursing Informatics Scope & Standards of Practice. Silver Spring MD; 2000.

[3] American Academy of Nursing. Technological Drill Down, TD2 Presentation slides from HIMSS [online]. 2008 [cited 2008 July 22]; [28 Screen] Available from: URL:

http://www.aannet.org/i4a/pages/index.cfm?pageid=3318.

[4] Vocollect. About Vocollect Healthcare Systems. [online]. 2008 [cited 2008 July 22]. Available from: URL:http://healthcare.vocollect.com/index.php/en/about.

[5] Bright Innovation. Medical Teams (Phase 2). Revision G6- January 17, 2008. Pittsburgh, PA

[6] Vocollect. Voice-Directed Work [online]. 2008 June [cited 2008 July 22]; Available from: URL:

http://vocollect.com/global/web.php/en/pr/vocollect_voice_applications_address_top_imperatives_for_supply_chain.

[7] Joint Commission. Healthcare at the crossroads. [cited 2008 July 24]; Available from: URL: http://jointcommission.org/NR/rdonlyres/5c138711-ED76-4d6F-909F-

B06E0309F36D/0/health care at the crossroads.pdf

[8] Radaker, J. UPMC Cranberry Place. [cited 2008 July 24]; Available from: URL;

http://healthcare.vocollect.com/index.php/en/successes/upmc_cranberry_place [9] Voice of Successes [Online]. 2008 [cited 2008 Aug 17]; Available from:

URL: <u>http://vocollect.com/en/successes/gianteagle.php</u>

[10] Vocollect Healthcare Systems' Voice Case Study with Continuing Care Retirement Community [Online]. 2008 [cited 2008 Aug 17]; Available from:

URL: http://healthcare.vocollect.com/index.php/en/successes/church_of_god_home

[11] Peck, R. L. Voice-Activated Documentation Comes Into Its Own. Long Term Living: for the Continuing Care Professional [serial online] 2008 January [cited 2008 July 22]; Available from: <u>http://www.ltlmagazine.com/ME2/dirmod.asp?sid=&nm=&type=Publishing&mod=Publications%3A%3AAr</u> <u>ticle&mid=8F3A7027421841978F18BE895F87F791&tier=4&id=6DD9A5D829744A29957100F9A38B7D2</u> 2

Email address for correspondence: 6wolfs@comcast.net