

The Inpatient Nursing Leadership Perspective of Using Mobile Technology at the Bedside

Rose Giannini, MSN, RN-BC, NE-BC

Marquette University

Author Note

Rose Giannini, Marquette School of Nursing, 530 N. 16th Street, Milwaukee, WI 53233,

rose.giannini@marquette.edu

(219) 576-7775

Abstract

Background: Introducing technology to support patient care delivery in today's complex healthcare organizations can be innovative yet challenging. Managers are often not included when technology affects their units and less often is manager insight into the project taken into consideration. Studies that describe the C-Suite role and information technology are useful but not specific to the manager's perspective (Szydłowski & Smith, 2009; Petersen & Bertelsen, 2012).

Objective: The purpose of this project was to identify the factors related to the managers' perceptions about the use of mobile technology at the bedside. Mobile technology includes using smartphones for communication and documentation of patient care.

Methods: Inpatient nurse managers participated in focus groups; semi-structured interview questions were administered. Results were analyzed using NVivo12 (2019), within the context of the Socio-Technical Model (STM) by Sittig and Singh (2010).

Results: The majority of responses were related to two STM dimensions, 'workflow/communication,' and 'people.' Nurse managers overwhelmingly indicated they should be involved in technology-related projects that affect their units.

Conclusion: Nurse managers have a central role in supporting changes that occur with implementing technology and should be involved at the inception of the innovation (Alexander & Kroposki, 2001). The STM is a useful tool to organize social and technical factors associated with the implementation of mobile technology. Understanding these complex factors associated is necessary to address issues and promote strategies for the successful implementation of mobile technology.

Implications for Nursing: Manager understanding and support of technology projects is a necessary element for success. Project leaders should engage nurse managers by including them as project team members. Manager inclusion has far-reaching potential as they can serve as sounding boards and conduits to nursing staff, subsequently promoting engagement and adoption of the technology.

Keywords: socio-technical, health information technology, nurse managers, mobile technology, smartphones

The Inpatient Nursing Leadership Perspective of Using Mobile Technology at the Bedside

Healthcare organizations are complex systems. Introducing technology to support patient care delivery can be innovative yet challenging. Whether projects are in the planning, implementation, or evaluation stage at some point, issues will arise, and the need to address them may be imminent. Mobile technology can be a valuable tool, useful for many aspects of care for communication purposes and to document patient care. Nevertheless, nurse managers who are at the forefront of activities on their units are rarely included in planning for that technology; their insight into such projects is generally not taken into consideration. Little evidence exists that explores the nurse manager's perspective about implementing technology at the bedside. Most studies focused on the perception of technologies that are related to nursing and senior leadership perspective, not specifically the nurse manager perspective.

Managers bring a unique perspective to the conversation of implementing mobile technology. Quite possibly, their perspective is different from that of the staff nurses and patients. Understanding manager perceptions of mobile technology may be useful in determining a plan for successful implementation. Insight into manager perceptions of mobile technology coupled with the perceptions of nursing staff and the awareness of the impact of mobile technology on the patient experience may be useful in planning for successful implementation.

The overall purpose of this project was to determine nurse managers' perceptions of mobile technology in the inpatient setting.

Background

A research study at a healthcare organization in the Midwest explored staff and patient perspectives of mobile devices in acute care settings. The initial findings revealed a disparity

between the two groups in rating the importance of items. While concerns about confidentiality rated high for the patients, it rated as one of the lowest concerns for the nurses. Also, patients shared concerns about how the phone would distract nurses while providing care for them, yet the nurses rated such distraction as low, not a concern. Further discussion of these results uncovered that nurse managers were not involved in planning for technology implementation. One of the members of this Midwest research team listed concerns about patient satisfaction, policy, workflow, and communication. Also, the nurse manager indicated never being asked about his perspective related to mobile phone use. This discussion sparked an interest in manager perception of health information technology (HIT) projects.

Literature Review

The literature did not yield studies related to mobile technology and nurse manager perception. HIT projects often focus on the C-suite role, the chief information officer, and the HIT department role (Szydłowski & Smith, 2008; Petersen & Bertelsen, 2012). The nurses' use of smartphones for the delivery of care is mainly focused on single-use applications, impact on workflow, and intention to use (Bautista, Rosenthal, Lin, and Theng, 2018; Whitlow, Drake, Tussmann, Hoke & Barth, 2014). As teams are implementing new HIT, the impact on workflow and job roles should be explored and addressed (Bergey, Goldsack, & Robinson, 2019). Often, there is a need to develop guidelines and policies regarding the use of mobile technology for patient care (Klements & Evjemo, 2014; Farrell, 2016). Each of these studies provides useful information organizations can adapt to their setting by way of redesigning workflow, developing policy about the use of mobile technology, and in some cases redesigning applications based on user input. Though these studies may be useful singularly, they do not provide guidance or

incorporate the multitude of aspects to be considered at the manager or broader, organization level perspective.

In today's environment of constant change, managers must continually adapt and prepare for the next wave of transformation (O'Grady, 2003). We need leaders who can work in complex environments, leaders who are prepared to deal with the constant change and understand the implications in light of changes in operating conditions (Weberg, 2010). Adding mobile technology to the current workflow of the nurse adds a layer of complexity to the delivery of patient care. Middle managers must have a role in innovation implementation to assure the effectiveness of the innovation (Birken, Shoou-Yih & Weiner, 2012). Therefore, managers should be involved in planning for technology on their units, as they can serve as the voice for their team in regards to the unit operations such as workflow and unit functions. Manager involvement does have the potential to impact the success of the HIT solution.

Socio-Technical Framework

Given the value of using a framework to organize findings and relevant examples of its use in evaluating HIT, the Socio-Technical Model (STM) developed by Sittig and Singh (2010) was used as the framework for organizing interview responses. The STM model has been used by other authors to address the challenges associated with implementing HIT and is useful in understanding not only the technical issues related to technology but the social implications. The model is particularly helpful when applied to complex healthcare organizations to help explain the multidimensional factors associated with implementing HIT (Figure 1). As a multidimensional model, it supports the analysis of problems associated with technology and can be useful in determining solutions.

Or, Dohan and Tan (2014) and Martinez, Hogan, Balbale, Lones, Goldstein, Woo & Smith, (2017) incorporated the use of the STM in the evaluation of their respective HIT projects. Each example supports the value of using the STM in viewing issues in a broader fashion, considering all potential factors that may impact the success of a project. Their findings provided administration a view of the entire picture, including insights into factors associated with the technology use and usefulness.

Using a model that reveals the social and technical components of the HIT and its inherent issues present in complex healthcare system and can lead to an in-depth understanding of the issue. Also, the socio-technical model approach to evaluating technology magnifies the key issues inherent in implementation. Too often, feedback about technology is generalized, such as “it doesn’t work,” “I can’t use this,” rather than specific to what is the issue behind the statements. Digging deeper into the feedback about the HIT supports a more thorough review of the issues and problems can serve as the foundation for seeking solutions.

The Project

The PICOT question developed for this project was, “In the inpatient setting, how does incorporating leadership perception of mobile technology in planning phase of a project impact the successful implementation of the technology?” The aims of the project are:

1. Explore factors associated with nurse manager perception, level of satisfaction and attitudes towards use of mobile technology at the bedside through the use of focus group interviews.
2. Examine the socio-technical factors associated with the managers’ perceptions of using mobile technology at the bedside.

3. Compare and contrast the manager's perception with the patient and nurse perceptions of the value of mobile technology.

Methods

The setting for this project was inpatient units of a large multihospital organization in the Midwest. Seventeen nurse managers from three of the hospitals were invited by email to participate in focus group discussions; participation was voluntary. Nursing directors and house supervisors were excluded. The Chief Nursing Officer at each hospital provided written support for this project. The project was reviewed by the organization's Research Subject Protection Program and was determined not to constitute Human Subject Research. Approval from the university's Institutional Review Board (IRB) was obtained.

A structured interview guide (Figure 2) was used to conduct focus group sessions. The focus of the sessions was nurse managers' perceptions about mobile technology use at the bedside with additional questions about their involvement in HIT projects. Interview questions were administered during each of the preplanned sessions. Participants were informed of the confidentiality of their responses and that they could opt-out of the discussion at any time.

Interviews were conducted in February 2020. All of the 17 managers who were invited chose to participate. Sessions were recorded, transcribed, and analyzed using NVivo12 software. A second review of the transcriptions was completed by another member of the project team. Responses to the interview questions were organized into common themes, using the eight dimensions of the Socio-Technical Model (Sittig, & Singh, 2010).

Results

Table 1 depicts the demographic information about the nurse managers from the three sites where the focus group interviews took place. The nurse manager participants were

predominantly Caucasian women aged 30-59 years, 64% with five or less years of nurse manager experience. 18% of the participants have less than one year of experience in the nurse manager role.

Definitions of each STM dimension guided the organization of the findings (Table 2). In reviewing these initial results, it is important to remember that the eight-dimensional model (Figure 1) by Sittig and Singh (2010) “account for key factors that influence the success of health information technology interventions and a major assumption of the model is that the eight dimensions cannot be viewed as a series of independent, sequential steps (p. 3).”

Several themes about nurse managers’ perspectives were identified during the analysis. Of the eight dimensions (Figure 1), feedback from interview samples revealed that most of the initial interview comments primarily fit into two dimensions, 1) ‘workflow and communication’, and 2) ‘people’. ‘Workflow and communication’ refer to the tasks and collaboration necessary to ensure that patients receive the care they need.

Examples that exemplify the workflow and communication dimension of mobile technology at the bedside include the following excerpts. One manager said,

I think when they (nursing assistants) are at the bedside, emptying a catheter bag or giving them (the patient) a glass of water...they can document their I’s and O’s, not to wait to end of the shift. So, you’re doing it (documenting) in real-time and not having to back chart everything.

Another manager made comments about how the use of mobile technology impacts communicating with patients.

I think (when we are) communicating with patients, "What is this? What are you doing? What is the purpose? What are the things in there?" "I explain I'm using my mobile device for this." Then they have a better understanding.

One of the managers referenced the impact of using mobile technology for physician communication when she said:

Communication with physicians and response time, not even response time, but the read receipts are huge to know, okay you got my message...I don't have to stress, "Oh my gosh, does this doctor know? Did he get it?"

The 'people' dimension represents the humans, those who designed, developed the software, those who used it, including patients. It includes the ways the system helps users think and make them feel (Sittig and Singh, 2010, p. 5). The dimension of 'people' is exemplified in the following quotes by the participating managers.

We have a younger nursing assistant; she loves it she's charting her I's and O's...everything that she can she's doing it and she loves it. So, you have people who have aptitudes for a smart phone and who don't.

We're in the society of instantaneous communication and if it doesn't occur in 30 seconds, they're frustrated. And a lot of our nursing staff is from that generation. So, we're going to have that issue.

Several of the responses from the managers fit into the dimension 'internal organizational policies, procedures, and culture'. Most notably, the managers mentioned the need for scripting to be used when using the phone inpatient rooms. This was mentioned several times. Also voiced was the concern that patients may mistake the nurses use of phones for personal rather than for patient care. Phone etiquette was mentioned, specifically in light of assuring calls are not blindly transferred, but there is a brief discussion about who is on the line allowing for the option of not taking the call if it means interrupting patient care.

The dimension of 'hardware and software computing infrastructure' includes the hardware and software required to run or support the application(s). Responses related to this dimension were about slow connectivity, problems with Wi-Fi, phone size (too big or too small), and missing the functions they need.

In the dimension of the 'human-computer interface', both the hardware and software must provide functions that are needed by the end-user. The human-computer interaction must

model the current workflow, and if there is a discrepancy, either the design needs to change or the workflow changes. A lack of features or functions may represent an issue (Sittig and Singh, 2010).

One of the interviewee comments exemplifies the human-computer interface dimension, raised several times, about the cumbersome way to pick up a call and the numerous logins needed to make a call.

I think from a phone call feature I've seen; I haven't used it really...to see them try to answer the phone call seems extravagant compared to a wireless phone where you just pick it up and answering it. So, I think that's been a big barrier.

Less often were responses in the 'clinical content', 'external rules', 'regulations and pressures', and 'system measurement and monitoring' dimensions mentioned. A few noteworthy of mention were related to appreciating the ability to find phone numbers quickly, and the ability to see trending data to recognize changes in the patient's condition. There were some concerns for privacy and the over-reliance on technology in our lives.

One final interview question addressed the manager's role in designing the mobile technology device and whether they ever worked with a nurse informaticist in any HIT projects. While managers felt their perspective was important, the majority indicated they would include a bedside nurse to represent the workflow. The managers' responses did not indicate an understanding of the value of their role in designing HIT solutions. In addition, when asked about working with an informatics nurse, they overwhelmingly indicated the informatics nurses at their organization are in place to provide education about the electronic health record.

The final aim of this project was to compare results from the larger research study (Ingram, 2019; Posie, 2019) to the findings from the nurse manager interviews. The findings are

provided in Table 3, and include what managers mentioned most often and how nurses and patients ranked the items in order of importance. Notably there are similarities between several of the findings. For example, the managers and patients both believe mobile technology will result in improved communication. Also, both managers and patients voiced concern about mobile technology causing more interruptions. Interesting differences are found surrounding the importance of infection control and mobile technology; the patients listed this concern of more importance, whereas the nurses rated infection control of lower importance; it was not listed as a major concern.

Discussion

Mobile technology can be a valuable tool, useful for many aspects of care, for communication purposes, and to document patient care. Nurse managers are often not included in HIT projects that affect their units, although they bring a wealth of experience and can provide insight into the implications related to unit functions and staff workflow. As indicated by these results, a majority of manager feedback is representative of the workflow and communication dimension. Similarly, workflow and communication have been the focus of several studies in preparing and evaluating the implications of HIT and results have focused on redesigning workflow, developing policy related to using mobile technology, and in some cases redesigning applications based on user input (Bergey, Goldsack & Robinson, 2019; Farrell, 2016; Klements & Evjemo, 2014).

Leadership can choose to use positive feedback, such as how mobile technology is convenient and can improve communication as factors to promote engagement and adoption of technology. Conversely, they can address problems and develop solutions to issues such as mobile technology causing interruptions, mentioned several times by the managers. For

example, nurse managers may choose to delay the connection of the mobile device to the call light system until such time processes are developed to assure the calls go to the right person based on the need and the nursing staff are able to respond to the call directly through the mobile device. Furthermore, managers can emphasize the usefulness of mobile technology in real-time documentation by demonstrating the impact on patient outcomes such as timely response to changes in patient status.

Connectivity issues in the “hardware and software infrastructure” dimension should be directed to the information technology department who can deal with Wi-Fi strength, thereby leaving the manager time to deal with other issues. Nurse managers may use these findings as a basis for making improvements in current mobile technology processes and in planning for their future use. For example, based on the feedback about the need for scripting, managers might spend time creating standard scripting to be used in certain patient care situations such as introducing the technology during patient admission or conversing with families about why a mobile phone is being used during care.

In addition, managers might address the need to ensure policies are in place to address things like privacy and how to assure mobile technology does not interrupt patient care. Involving managers at the project inception allows time to address concerns such as those cited by managers that will be beneficial to the success of the project. And on a larger scale, providing hospital leadership with the project findings and how to interpret them is an important initial step in garnering support for solutions.

Organizing feedback using a model such as the STM is beneficial because it is a way to separate the issues with the overall goal of addressing concerns. Project leaders and managers can use the STM as a tool to coordinate efforts for success. Taking the feedback and comparing

the insights of other end-users such as nurses and patients, is an opportunity to work together to find commonalities and focus on overall goals for technology use. Comparisons such as those in Table 3 depict the feedback clearly, indicating a disconnect between perspectives. This can be viewed as an opportunity about how to overcome the disparity. The real challenge for the nurse manager is in understanding this insight and leveling the playing field, specifically between the patient and nurse perceptions.

The role of the nurse manager in technology efforts cannot be underestimated, and their involvement has the potential to contribute to the success of future projects. Assuring the success of technology initiatives has far-reaching effects with the potential to impact patient care and nurse satisfaction. According to Birken, Shoou-Yih, Lee, and Weiner (2010, p. 1), “it is important for middle managers to have a role in innovation implementation to assure the effectiveness of the innovation.”

Limitations

The interviews took place at three hospitals in the same organizations. Conducting interviews with managers at other healthcare organizations may yield different results based on the characteristics of the participants, experience with similar technology projects, and organizational culture. In addition, although the interviews yielded four hours of content, it is representative of seventeen managers.

For consideration, Whetten and Georgiou (2010) posit that “concepts, theories, and principles that underlie the socio-technical perspective and application to the healthcare domain are limited” (p. 223). Given this, there is clear support for future research to begin to understand similar concepts in light of the complexities of healthcare. And, more research in the area of nurse managers involved in technology innovations is needed.

Conclusion

This project is unique because it explores the nurse manager's perspective on the use of mobile technology in their units. Managers have a central role in supporting changes that occur with the introduction of new technology and should be included in HIT projects. Using a model such as the STM is helpful in determining key issues inherent in bringing mobile technology to the bedside. The opportunity to interview managers about their perspective of using mobile technology is instrumental in understanding the complexities of HIT solutions and their inherent role. In addition, comparing and contrasting the manager's perspective with those of the nurse and patient provides valuable insight for the manager and the larger organization. Finding commonalities of insight is an opportunity to work together as a team to bring mobile technology to the bedside. According to O'Grady (2003), "nursing needs strong and effective leaders who can model transformative engagement" (p. 64). Engaging managers in HIT projects is not only insightful but may promote the success of future projects.

References

- Alexander, J., & Kroposki, M. (2001). Using a management perspective to define and measure changes in nursing technology. *Journal of Advanced Nursing, 35*(5), 776-783.
- Bautista, J., Rosenthal, S., Lin, T., & Theng, Y. (2018). Psychometric evaluation of the Smartphone for Clinical Work Scale to measure nurses' use of smartphones for work purposes. *Journal of the American Medical Informatics Association: JAMIA, 25*(8), 1018-1025.
- Bergey, M. R., Goldsack, J. C., & Robinson, E. J. (2019). Invisible work and changing roles: Health information technology implementation and reorganization of work practices for the inpatient nursing team. *Social Science & Medicine, 235*.
- Birken, S. Shoou-Yih, & Weiner, B. (2012). Uncovering middle managers' role in healthcare innovation implementation. *Implementation Science, 7*(1), 28.
- Farrell, M. (2016). Use of iPhones by nurses in an acute care setting to improve communication and decision-making processes: qualitative analysis of nurses' perspective on iPhone use. *JMIR Mhealth Uhealth, 4*(2). e43.
- Ingram, D. (2019, September). *The Mobile Device Staff Experience Study*. Podium Presentation at the 7th Annual Advocate Aurora Nursing Science Conference. Wheeling, Illinois
- Klemets, J., & Evjemo, T. (2014). Technology-mediated awareness: Facilitating the handling of f(un)wanted interruptions in a hospital setting. *International Journal of Medical Informatics, 83*(9), 670-682.
- Martinez, R. N., Hogan, T. P., Balbale, S., Lones, K., Goldstein, B., Woo, C., & Smith, B. M. (2017). Socio-technical perspective on implementing clinical video telehealth for

- veterans with spinal cord injuries and disorders. *Telemedicine journal and e-health: the official journal of the American Telemedicine Association*, 23(7), 567.
- NVIVO (2019). Retrieved October 1, 2019 from <https://www.qsrinternational.com/nvivo/home>
- O'Grady, T. (2003). Of hubris and hope: transforming nursing for a new age. *Nursing Economics*, 21(2), p. 59-64.
- Or, C., Dohan, M., & Tan, J. (2014b). Understanding critical barriers to implementing a clinical information system in a nursing home through the lens of a socio-technical perspective. *Journal of Medical Systems*, 38(9), 1-10. doi:10.1007/s10916-014-0099-9
- Petersen, L. & Bertelsen, P. (2012). A culture and power perspective on the management of health information technology in hospitals. *Quality of Life through Quality of Information*, 871-875.
- Posie, J. (2019, May). *The Mobile Device Patient Experience Study*. Podium Presentation at the 21st Annual Southeastern Wisconsin Nursing Research Conference. Milwaukee, Wisconsin.
- Szydlowski, S., & Smith, C. (2009). Perspectives from nurse leaders and chief information officers on health information technology implementation. *Hospital Topics*, 87(1), 3-9.
- Sittig, D. F., & Singh, H. (2010). A new socio-technical model for studying health information technology in complex adaptive healthcare systems. *Quality & Safety in Health Care*, 19, i68-74. doi:10.1136/qshc.2010.042085
- Weberg, D. (2012). Complexity Leadership: A Healthcare Imperative. *Nursing Forum*, 47(4), 268-277.
- Whetton, S., & Georgiou, A. (2010). Conceptual challenges for advancing the socio-technical underpinnings of health informatics. *The Open Medical Informatics Journal*, 4(1), 221-

224.

Whitlow, M., Drake, E., Tullmann, D., Hoke, G. & Barth, D. (2014). Bringing technology to the bedside. *CIN: Computers, Informatics, Nursing*, 32(7), p. 305-311.

Tables

Table 1

Nurse Manager Demographics

Characteristic	N	Percentage
Gender		
Female	15	88.2
Male	2	11.8
Age		
19-29	0	
30-39	7	41.2
40-49	7	41.2
50-59	3	17.6
60 and over	0	
Race		
White or Caucasian	14	82.4
Black or African American	1	5.8
Asian or Asian American	2	11.8
Ethnicity		
Hispanic	0	
Non-Hispanic	15	88.2
Prefer not to answer	2	11.8
Years of Experience (in current role)		
Less than 1	3	17.6
1-3 years	5	29.4
3-5 years	6	35.3
5-10 years	3	17.6
Over 10 years	0	0
Certified in any specialty		
Yes	11	64.7
No	6	35.3
Highest Level of Education		
Bachelor's degree	11	64.7
Master's degree	6	35.3

Table 2

Socio-Technical Framework Dimensions, Definitions and Common Themes

Socio-technical Dimension	Definitions (adapted from Sitting & Singh, 2010)	Common Themes
Workflow and Communication	Teams working together cohesively, collaboration that requires significant two-way communication.	Too many interruptions Infection control concerns Intrusive Helps RN:MD communication
People	The humans, involved in all aspects of design, development, implementation and use of HIT.	Worried about alarm fatigue Do not trust phone will work as expected Nurses do not like change Like and dislike secure chat
Internal Organizational Policies, Procedures, and Culture	All internal structures, policies and procedures and a key aspect of any HIT project is ensuring that the software is representative of those structures.	Need scripting and standards for use Concern for personal use How to handle in isolation rooms Privacy concerns
Human Computer Interface	The hardware and software that work together to enable the user to interact with the system.	Easier to document Need call waiting Call lights and alarms come to phone
Hardware/Software	Includes the hardware and software necessary to run the application. For the most part, end users are often not aware of the infrastructure that exists to keep systems running until there is a failure.	Size of phone is issue Connectivity issues Wi-Fi issues Not easy to answer a call
Clinical Content	Includes the data-information-knowledge continuum within the system whether structured or unstructured.	Couldn't find the necessary flowsheet Used to seeing trending data to notice changes in condition
External Rules, Regulations, and Pressures	Includes any external forces that facilitate or constrain the system development and use of the HIT in the clinical setting.	Concerns for HIPAA violations Feel the industry is pushing technology
System Measurement and Monitoring	The effects of the HIT should be measured and monitored regularly related to availability	We should limit what goes to the phone

	of features and functions, how the features and functions work together, the effectiveness of the system on delivery of care and any documentation of unintended consequences.	
--	--	--

Note: Nurse manager feedback from interviews is organized by STM dimension with those occurring most frequent to least frequent.

Table 3

Feedback from manager as compared to patient and nurse.

Manager	Patient	Nurse
Improved Communication	Useful tool	Improve communication
Functionality *	Better response time	Safe to use
More interruptions	More interruptions	Improve efficiency
Convenience	Privacy/confidentiality concerns	Improve quality of care
Quick access to information	Infection control concerns	Improve access to information
Real-time documentation	Need to explain use of phone	Easy to use
Secure chat **		Increase real-time charting
Infection control		Reduce interruptions
		Reduce call light response time

Source: Posie, J. (2019, May). *The Mobile Device Patient Experience Study*. Podium Presentation at the 21st Annual Southeastern Wisconsin Nursing Research Conference. Milwaukee, Wisconsin. Ingram, D. (2019, September). *The Mobile Device Staff Experience Study*. Podium Presentation at the 7th Annual Advocate Aurora Nursing Science Conference. Wheeling, Illinois,

Note: *Functionality refers to the ability to do a task or function.

** Secure chat refers to the ability to text to another healthcare provider while using Epic©software.

Figure 1. Socio Technical Model

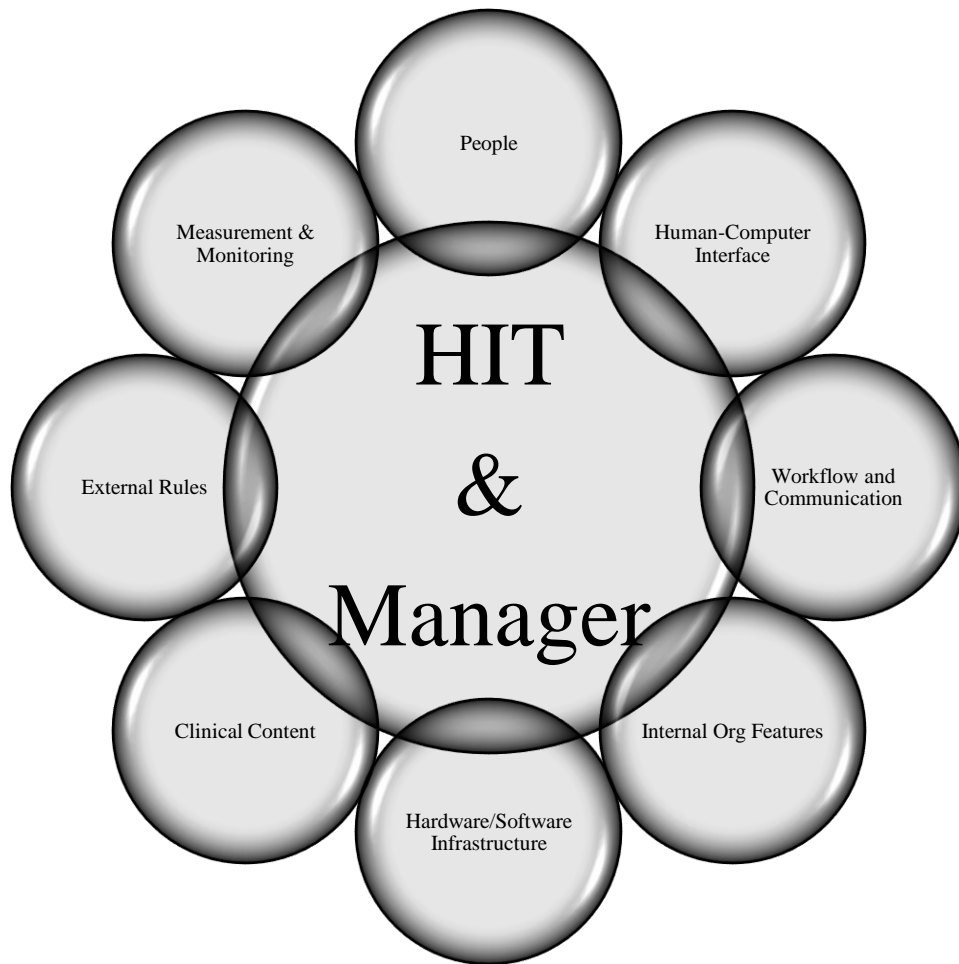


Figure 1. Pictorial representation adapted from Sittig and Singh (2010) Socio-technical Model. The model includes factors that influence the success of HIT projects. The eight dimensions are not sequential but influence each other, they are interrelated. The eight dimensions include social and technical components. At the center of and intersecting each of the dimensions is the mobile technology (HIT project) and the manager.

Figure 2. Structured Interview Guide

Focus Group: Mobile Technology and the Nurse Manager Perception

Introduction

Welcome: *Have participants sign in and give them an Information Sheet. Encourage them to get coffee/drink and snack and have a seat.*

- **Introduce moderator and note taker:** *I am delighted to have you join me today.*
- **Explain the Purpose:** *The purpose of this project is to obtain feedback from nurse managers and nursing directors about their perspective of bringing mobile technology to the bedside. Your perspective will increase our understanding about the value that mobile technology has on patient care. In addition, we can use this insight in comparison to the patient and nurse feedback obtained in the research study. We will outline our findings in a report to be shared with you and hospital administration with the hope this leads to strategies to address any issues.*
- **Participant introductions:** *I would to make sure everyone knows each other, if not we can go around the room and you can introduce yourself.*
- **Explain the Ground Rules:** *There are a few ground rules that I want to go over for the group.*
 - *Please turn off your cell phones/pagers, so they don't interrupt our discussion.*
 - *We will be asking a series of open-ended questions. There are no right or wrong answers to our questions. We want to hear your thoughts, experiences, and ideas, both positive and negative.*
 - *We ask that you to speak one at a time (tape), listening to what others say, talking directly to each other and not just to us.*
 - *We are going to take some notes during the discussion and at the end we may ask some clarifying questions.*
 - *We will also audio record the discussion because what you say is very important to us and we do not want to miss anything. The recordings will not be shared with anyone outside of the project team.*
 - *When we publish our findings, we may select specific comments from the discussion to serve as examples of important points you have shared.*
 - *We've included our contact information **if you have any** questions about the project.*
 - *Do you have any questions about what we've covered before we begin?*

Introduction [content above]	<i>[5 minutes]</i>
Domain: Manager experience with mobile technology (smart phones). <i>Tell me your understanding of mobile technology and its application in healthcare</i>	<i>[10 minutes]</i>
Probes: <ul style="list-style-type: none"> • <i>I would like to hear about your own experience with mobile technology.</i> 	Notes:

<ul style="list-style-type: none"> • <i>Did others of you have similar experiences with nurses using mobile devices? Please tell us about your experiences.</i> • <i>Who had a different experience? Please tell us about it.</i> 	
<p>Domains: People impacted, staff nurse, patient experience what are the benefits of mobile technology on patient care. <i>I'd like to hear what you think about how mobile device use at the bedside might be valuable.</i> <i>What are some good reasons for nurses to use mobile device at the bedside?</i></p>	<p style="text-align: right;">[10 minutes]</p> <p>Notes:</p>
<p>Probes:</p> <ul style="list-style-type: none"> • <i>What are some other good reasons?</i> • <i>The experts say, that these mobile devices can improve staff and doctor communication and can improve the nurse's efficiency, what do you think about the value of that?</i> • <i>Nurses will be using this technology during their shift to document, medication passes; how do you envision this technology may impact their workflow?</i> 	
<p>Domains: Problems likely encountered with cell mobility during direct patient care. <i>Now let's talk about some of the problems with nurses using mobile device at the bedside.</i> <i>What are some of the problems with nurses using mobile device at the bedside?</i></p>	<p style="text-align: right;">[10 minutes]</p> <p>Notes:</p>
<p>Probes:</p> <ul style="list-style-type: none"> • <i>What are some other problems?</i> • <i>What do you think the trade-offs are between these problems and the value of nurses using mobile device at the bedside?</i> 	
<p>Strategies for successful communication and caregiver management of cell mobility during patient care. <i>I'd like to get your ideas about how mobile devices can be used at the bedside in a way that maximizes their value while minimizing the problems you've raised.</i></p>	<p style="text-align: right;">[10 minutes]</p> <p>Notes:</p>

<p><i>What are your thoughts about how to address the problems we've talked about?</i></p>	
<p>Probes:</p> <ul style="list-style-type: none"> • <i>What can we do differently?</i> • <i>What is the one thing we could do that would make the greatest impact?</i> 	
<p><i>So as managers, did you have any idea what you were getting into? Do you feel like you had the knowledge that you needed to have in order to make decisions about the mobile devices for your staff?</i></p> <ul style="list-style-type: none"> • Probes: do you see any role of the manager in designing the device? • Have you worked with a nursing informaticist with HIT projects? 	
<p><i>Is there anything about nurses using mobile devices at the bedside that we haven't yet talked about that it would be important for us to know?</i></p>	<p style="text-align: right;"><i>[5 minutes]</i></p> <p>Notes:</p>
<p>Wrap-up. <i>I want to thank you for your time. The information you've provided will be shared with you and administration with the goal of providing insight into areas for improvement. We have a \$10 Starbucks gift card for you. Hand out envelopes with a verbal thank you.</i></p>	

Figure 3: Structured Interview Guide includes an introduction, questions and probes and format to include note taking during focus groups.