**Change Management in Emergency Department: Implementation of Mobile**

**Communication Device at the IWK Health Centre Halifax – Streamlining Emergency Care**

**Using Technology Project**

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## **Acknowledgment**

This report has been written by me and has not received any previous academic credit at this or any other institution.

## **Executive Summary**

This report is required for the completion of the Masters in Health Informatics Degree program at Dalhousie University. It discusses an internship undertaken at the Izzak Walton Killam Health Centre (IWK) in Halifax. The Streamlining of Emergency Care Using Technology (SECT) project under the Nova Scotia Department of Health and Wellness involves plans to improve emergency care using technology. These include the implementation of Tablet PCs in the emergency departments of hospitals in the province. This report deals with the change management process that was undertaken at the IWK Health Center's emergency department under part of the SECT project that deals with implementing Tablet PCs. As part of the change management process, the internship was directed towards physician exposure and training to use Tablet PCs in an emergency care setting. It also sought to understand the challenges emergency physicians faced using the device, and provide solutions for those challenges. The main objective of this project was to develop a solution to answer the information needs of emergency physicians who would use it to access patient health information anytime, anywhere within the department. Apple® iPads® were initially selected; however, they did not meet physician expectation. As a result, tablets based on the Android® operating system (Samsung Galaxy Note 10.1®) were subsequently tested and successfully deployed for use. Change management forms part of an implementation strategy and is a very crucial component of healthcare IT project management. The success of informatics projects within a healthcare setting depends on how effectively the change management process is undertaken by the organization. Healthcare organizations are still not very cognizant of this fact. Increased investments on change management initiatives by healthcare organizations would go a long way in successful implementation and adoption of new technologies.

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**1. Introduction**

The idea of using mobile technologies, such as Tablet PC in emergency care, has been around for quite a while. In recent years, efforts have been made to incorporate mobile devices in emergency departments for enabling faster access to patient information. Increasing number of hospitals are deploying mobile communication devices such as Tablet PCs for meeting information needs. The Streamlining of Emergency Care Using Technology (SECT) project is currently being undertaken under the leadership of the Nova Scotia Department of Health and Wellness and is funded by Canada Health Infoway. This project involves the deployment of Tablet PCs in the emergency departments of IWK Health Centre, the Queen Elizabeth II Health Sciences Centre, and Cobequid Community Health Centre. The present report focuses on the activities related to deployment at the IWK Health Centre.

Change management is defined by the Canada Health Infoway's Pan Canadian Change Management Network (2013) as: *"A strategic and systematic approach that supports people and their organizations in the successful transition and adoption of electronic health solutions. The outcomes of effective change management activities include solution adoption by users and the realization of benefits"* (p. 3). Change management is an integral part of project management. Change management activities facilitate transitioning to newer technologies leading to successful adoption and use. The task of implementing newer technologies in healthcare requires a strong organizational commitment, leadership, adequate resources (both capital as well as human), sound project management methodology, skilled team, and the utilization of suitable change management practices (p. 8). It has been noted that poor management of change can lead to negative consequences such as decreased productivity, increased resistance (passive, overt, mild, serious), low levels of employee engagement, increased absenteeism, cancellation of projects,

slow or non-adoption of new methods and procedures, and little or negative return on investment (p. 9). This report focuses on change management practices that were followed for the SECT project undertaken at the IWK Health Centre. The procedures used for change management were based on the framework for managing ehealth change developed by Canada Health Infoway's Pan Canadian Change Management Network. These include the best practices for dealing with implementation challenges associated with implementing information and communications technologies.

**2. Streamlining Emergency Care Using Technology (SECT) Project**

The SECT project is an initiative of the Nova Scotia Department of Health and Wellness, for streamlining emergency care using technology in the emergency departments of hospitals in the Province. The mobile devices project which falls under SECT is funded by Canada Health Infoway. The project involves deployment of Tablet PCs for accessing patient information during the course of emergency care. The main advantages to using Tablet PCs include:

1. Access to patient data at bedside

2. Better care delivery and patient safety

3. Better control over patient care with improved efficiency in patient tracking at every stage of the care delivery process

4. Less footsteps leading to more time for patient care

The mobile devices deployed at the IWK Health Centre would allow the emergency physician to view patient medical records through the Meditech EDIS® (Emergency Department Information System) and X-rays using the PACS® (Picture Archiving and Communication System) application at the patient's bedside. This would enable the physician to make decisions more quickly as it would allow them to access patient data at the bedside rather than disengaging

themselves from the patient and returning to a central location to access patient information. This may act as a barrier for providing timely care—especially in emergency situations. Moreover, because there are so many users trying to access the desktop, these devices solve the problem of congestion at the central location.

**3. Technology and Deployment Process**

Initially Apple® iPads® were selected for trials. The applications that were being used by the IWK emergency department for accessing patient information operated on the Windows 7® operating system and were found to be dependent on that operating platform. The iPads® worked on iOS® mobile operating system. To access the applications on the iPad® , VMware® interface application was installed so that the applications on the Windows 7® operating system could be accessed by logging into a virtual desktop using the VMware® app. The trial runs were conducted with a group of physicians (Champions of Change) and their feedbacks were elicited through a small group session (Appendix A). Overall, the physicians' response to the device was positive; however, they indicated certain drawbacks in the functioning of the device. The two main issues associated with the use of iPads® were:

1. There were four sign-ins: a generic sign-in, VMware® sign-in, Meditech EDIS® sign-in, and PACS® sign-in that were required in order to access patient information on the device, which made using the device a cumbersome activity.

2. iPads® come with built in automatic sign-out after fifteen minutes of inactivity. This resulted in the Windows 7® virtual desktop logging-off. As a result, the physicians had to login again to connect to the virtual desktop after every fifteen minutes of inactivity.

The majority of the physicians indicated that they would not be using the device in the current form until both of these issues are resolved. After analyzing these issues it was determined that the four sign-ins could be reduced to two (generic sign-in and VMware® sign-in) by activating the single sign-on application; however, the automatic sign-out after fifteen minutes could only be extended for another ten minutes, after which the device would automatically sign-out. However, this solution was not satisfactory to the physicians; as a result, it was decided to examine a different device for use. Based on the modified conditions and requirements from the physicians, a device that functioned on Android® operating system was selected for trial with Samsung Galaxy Note 10.1® as the initial prototype. The VMware® application was then installed in the Samsung® tablet and trialed with the same group of physicians. The new device was modified in such a way that the main issues that arose with the iPads® were addressed successfully. Firstly, a single sign-on was activated, which resulted in two sign-ins (generic sign-in and VMware® sign-in) required by the physicians to access the applications on the device (Appendix B). The Meditech EDIS® and PACS® sign-ins were configured using the single sign-on so that they could be accessed by simply clicking on the application window. Secondly, the device settings were modified in such a way that the Windows 7® virtual desktop remained switched-on for the entire shift (8 hours) and a generic screen lock was activated when the device remained inactive. Once the trial runs were completed with select physicians and had received a positive response, it was decided to introduce the device to the rest of the physicians. The physicians were then given training on how to use the device. This included how to access the applications and use the navigation tools. Finally, the device was deployed in the Emergency Department for regular use.

**4. Job Description**

As a Health Informatics intern my primary job responsibilities included:

- Introducing the device to the physicians on an individual basis

- Providing support to physicians learning to use the device and the applications

- Conducting small group sessions to understand physician concerns and additional requirements

- Understanding the issues faced by individual physician while using the device

- Act as an interface between the physicians and the information technology team of HITS Nova Scotia to resolve glitches and configuration issues

- Meeting stakeholders and communicating the challenges and results of implementation at regular intervals

- Supporting other activities such as communications and events related to the mobile device project at the Centre for Therapeutic Technology

**5. The Health Informatics Perspective**

Change management is a necessary part of any ehealth project initiative. Several studies have shown that companies that invest in change management initiatives are found to be more successful in their project implementations (Petouhoff, Chandler, Montag-Schultz, 2010). The best practices associated with implementation of information and communications technologies for healthcare would include:

- Enrollment of strong champions for change within an organization

- Choosing a well-defined change management program aligned to organizational goals

- Implementation of change in staged manner

- Demonstrating the benefits to the end-user

- Offering sustained support to all new users of the technology and working to optimize their engagement

- Educating, and monitoring the data to provide support to clinical and organizational decision making process (Pan Canadian Change Management Network, 2013, p. 9)

The change management framework developed by the Pan Canadian Change Management Network of Canada Health Infoway is a useful guide for implementing change. According to this framework, there are six core change management elements that need to be incorporated for any projects relating to implementing information and communications technologies in healthcare environments. These elements are named as follows:

- Governance and leadership

- Stakeholder engagement

- Communication

- Work-flow analysis and integration

- Training and education

- Monitoring and evaluation (p. 13)

The outcomes of a successful change management process in ehealth projects would lead to better adoption and appreciation of clinical value, resulting in benefits realization that would ultimately result in overall transformational change in the process of healthcare delivery and impacting the healthcare outcomes for all Canadian patients. In the present project, governance and leadership was provided by the Nova Scotia Department for Health and Wellness, as the project forms the part of Streamlining of Emergency Care Using Technology, an initiative of the province.

The stakeholders involved were identified as:

- Nova Scotia Department of Health and wellness (project owner )

- Canada Health Infoway (financial sponsor)

- IWK Health Centre, Centre for Therapeutic Technology (representing physician)

- Health Information Technology Services Nova Scotia (representing IT)

Communication between the stakeholders occurred through periodic reporting, meetings, and updates through electronic mail. Work-flow analysis and integration was carried out at the implementation stage, and these activities were incorporated during the training phase. The training phase involved introducing the device to the physicians and helping them learn to use the applications and the navigation tools that are required to access patient health information. Initial monitoring was carried out by personally handing over the device to the physicians at the beginning of their shift, followed by examining if they were able to login correctly, and whether they were able to use the applications in the right modus. Later on, when the devices were deployed for regular use inside the Emergency Department, the monitoring was carried out by auditing the back end data from the logs of individual physicians.

## 6. Challenges Faced and Lessons Learnt

The initial failure of the iPads® to gain physician acceptance was a major challenge faced. However, this was mitigated by moving forward and quickly switching to the Android® operated device deployment. The migration from iOS® operating system to an Android® operating system was rather smooth as the application VMware® was interoperable in both the operating systems. The lessons learnt from this scenario were:

- Applications need to be platform independent in functionality, as this would allow them to be interoperable.

- An exhaustive study on tablet features is very much necessary in order to avoid this kind of scenarios in future.

- There needs to be a viable back-up option ready when implementing new technology in case of initial setback.

Solving technical glitches with the device during the course of deployment was also challenging as these were causing frustration among physicians regarding the dependability of the device. The lessons learnt were:

- Before rolling out technology, a fully integrated testing needs to be carried out to check whether the devices are operating without any glitches.

- The expectation is that the device should work without any issues starting from the initial deployment as this would increase confidence concerning the functional reliability of the device.

Supporting the physicians in learning to use the device was also challenging since emergency physicians have a very demanding job. Thus, one needs to be patient while introducing the device in a live work environment. Emergency physicians are hard pressed for time and will have very little time to spare on learning. Hence one has to be very precise and accurate in guiding the physician while explaining the navigational controls of the applications. Instances of dealing with disinterested physicians were also challenging. The lessons learnt were:

- We need to listen to their concerns while at the same time explaining the advantages of using this technology.

- Successful implementation of technology would ultimately involve complete adoption by the end user.

Apart from these, some of the other minor challenges faced required assuaging physician concerns about patients getting upset when they believed physicians were spending most of their time accessing the device rather than communicating directly with them.

## 7. Road Ahead

The future plans for the device deployed would include the following activities:

- Using the video conferencing capability (Polycom® Application) that has been installed in the device as a means for IWK physicians to communicate with physicians in different locations to ascertain the need for transferring patients to IWK Health Centre for specialized care.

- Addition of e-access and patient consultation forms to the virtual desktop environment wherein the physicians would be able to record the data on electronic forms.

- Rolling out benefits evaluation for the physicians in order to determine the efficacy of the technology used.

## 8. Conclusion

To conclude, the SECT project at the IWK Health Centre involved the implementation of Tablet PCs in the Emergency Department. The aim was to work within the existing limitations of the health information environment at the IWK Health Centre to develop a minimum viable solution in order to access patient health information at the patient's bedside. The project successfully achieved this objective despite having initial disappointments with the iPads®. The Android® tablet (Samsung Galaxy Note 10.1®) was an appropriate alternative that received a positive reception from the physician community. However, the response from the end-user (i.e., the Emergency physician) in terms of adopting this technology has so far been mixed. The need and usefulness of bedside information in an emergency care scenario is questionable as

many physicians indicate that they do not make decisions at the bedside, and as result, they are not able to find a meaningful use for this piece of technology. This highlights the need for more involvement of the physician community to map out their requirements regarding technology. The role of the Health Informaticians in technology implementation projects is crucial as they form the critical link between the physicians and the information technology team. Health Informaticians act as knowledge translators and play a very important role in the process of change management

This project highlights that change management is an essential component of ehealth project management. Healthcare organizations should thus allocate fixed resources for change management initiatives. The change management team plays a very crucial role in technology implementation and it is essential that the role played by health informaticians in this team be recognized.

## 9. Recommendations

Based on the current status of the project, the following recommendations would be beneficial in improving the adoption of the device:

- Installing a physician order entry application in the device would enable the physicians to place orders for medications and diagnostic procedures.

- Installing applications (apps) that would enable the physicians to use the device for clinical referencing.

- Development of apps for PACS® (Diagnostic Imaging) and Meditech Hospital Information System® that are currently being accessed on the Windows 7® virtual desktop environment.

# References

Pan Canadian Change Management Network. (2013). *A framework and toolkit for managing ehealth change: people and process.* Canada Health Infoway. Retrieved from https://wwww.infoway-inforoute.ca/index.php/resources/video-gallery/doc_download/88-a-framewok-and-tookit-for-managing-ehealth-change/

Petouhoff N., Chandler T., Montag-Schultz B. (2010). *The business impact of change management* .Graziadio School of Business and Management, Pepperdine University. Retrieved from: http://gbr.pepperdine.edu/2010/08/the-business-impact-of-change-management/

## APPENDIX A

**Survey Questionnaire – Small Group Session**

1. In our piloting of these devices, the following issues have been identified.  How troublesome are these problems for you?

   - Too many passwords required to reach the information I want to view
     - ○ Fatal ... I won't use this device because of this problem
     - ○ Very troublesome ... I will only use this device if absolutely necessary
     - ○ Irritating ... I would try to use the device on an ongoing basis despite this problem
     - ○ Minimally troublesome ... I would continue to use the device if this were the only problem
     - ○ Not a problem at all

   - Device automatic sign-out too soon
     - ○ Fatal ... I won't use this device because of this problem
     - ○ Very troublesome ... I will only use this device if absolutely necessary
     - ○ Irritating ... I would try to use the device on an ongoing basis despite this problem
     - ○ Minimally troublesome ... I would continue to use the device if this were the only problem
     - ○ Not a problem at all

   - Have you identified any other problems?  If so, please list them below:

   - Comments?

2. If no changes were made to the ipad configuration, how likely would it be that you continue to use it in the ED?

   Extremely unlikely     Unlikely          Uncertain     Likely     Very Likely

3. How likely would you be to use the new configuration of the Ipad, assuming the changes described (a longer, 25 minute time out period, and a more streamlined log in process)?

   Extremely unlikely     Unlikely          Uncertain     Likely     Very Likely
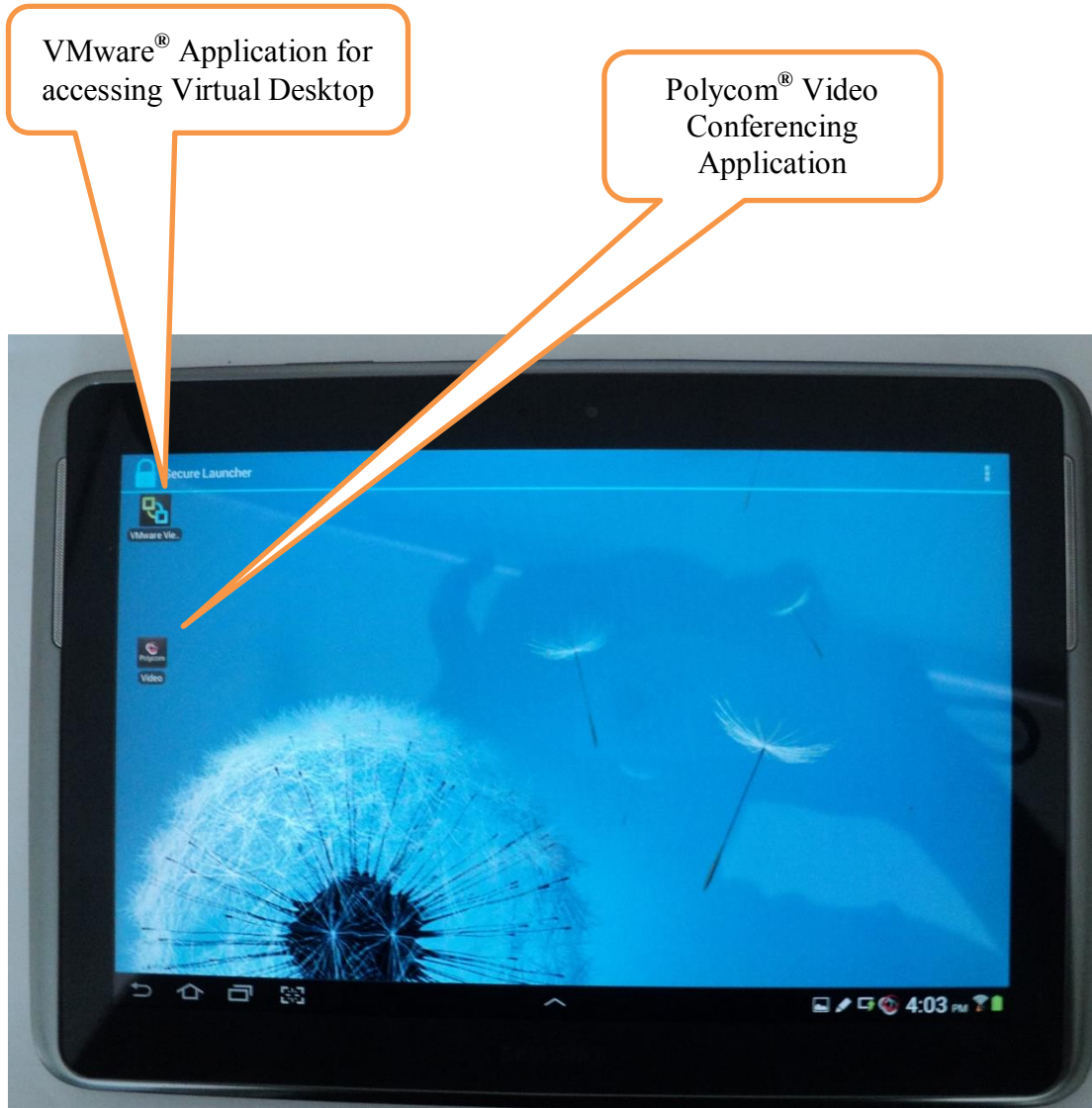
   - Comments?
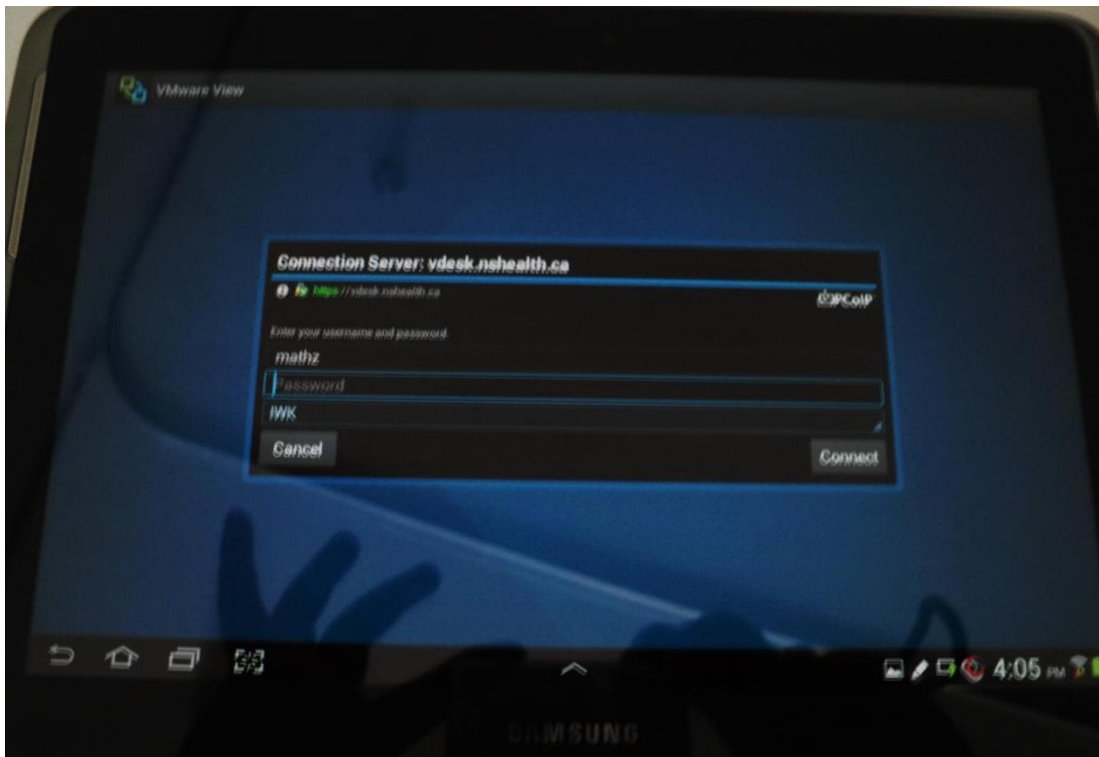
# APPENDIX B

**Screen Shots of Tablet Applications**
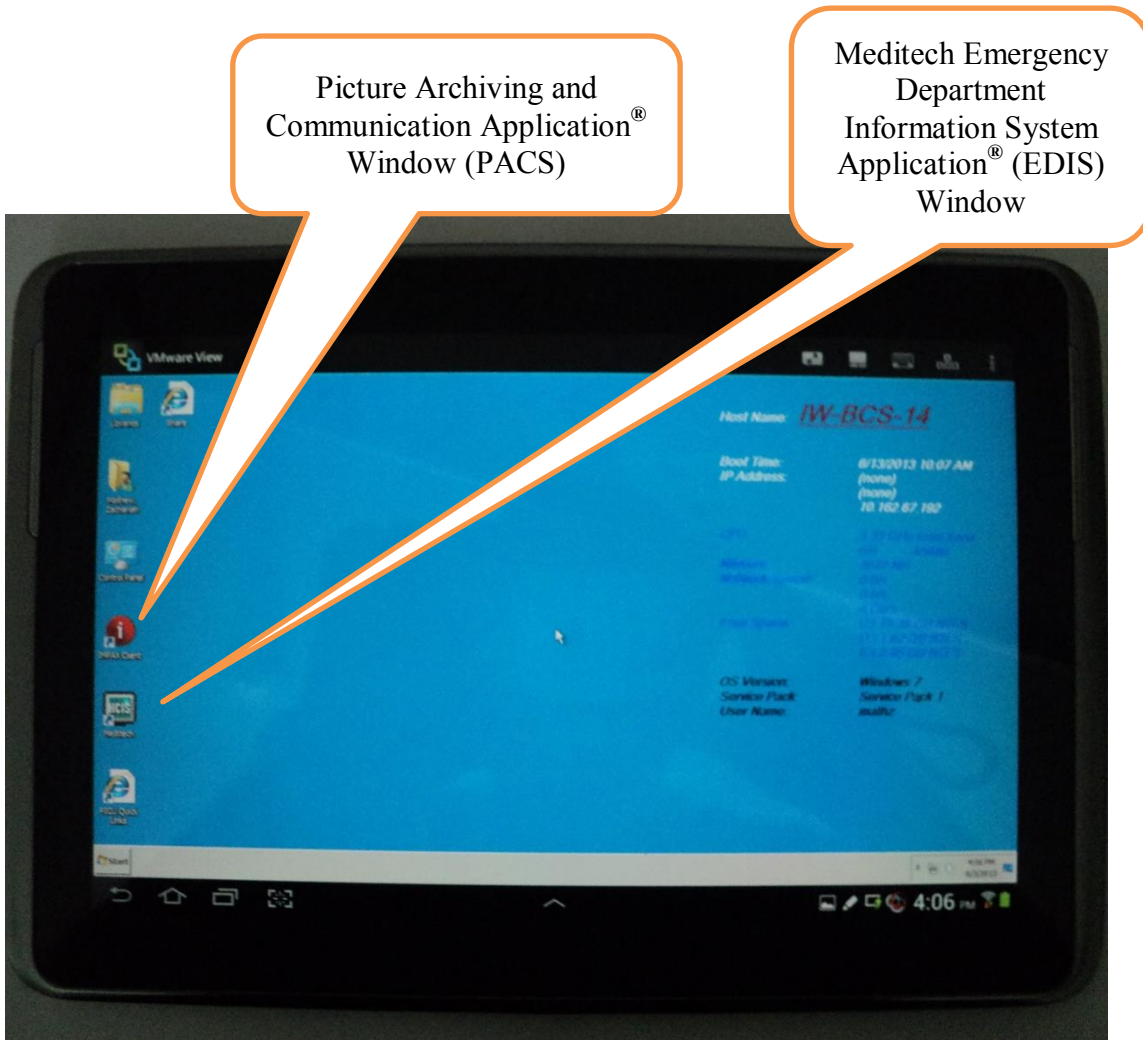


**Initial Generic Login Screen cum Screen Lock**

**(Samsung Galaxy Note 10.1®)**

VMware® Application for accessing Virtual Desktop

Polycom® Video Conferencing Application



**Second Screen showing the Applications**

**VMware® login Screen**

Picture Archiving and Communication Application® Window (PACS)

Meditech Emergency Department Information System Application® (EDIS) Window



**Window 7® Virtual Desktop**