**Difference Maker Idea Plan**

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**Project Title:** Q Bell system

**Project Concept:** We want to build an improved call-bell system for healthcare facilities that decrease alarm fatigue and increase patient safety and satisfaction. We call it Q Bell system. ‘Q’ has the same pronunciation with word ‘Queue’, that is the idea well-ordered and harmony medical environment. In addition, ‘Q’ is also for ‘Quality’, which means build an easy to use and user-friendly system for every user.

**Section 1. Problem**

The current call bell system is completely out of date for the 21st century. With major advancements in technology, it’s time that hospitals update their call bell and monitor systems. Our system would not only improve patient safety and patient satisfaction, but also reduce alarm fatigue among hospital clinicians.

**Section 2. Opportunity**

Alarm fatigue is easily one of the biggest problems in any hospital setting. In a study by Graham and Cvach (2012), false or clinically insignificant alarms range from 80-99%, which leads to a “cry wolf” effect thus desensitized clinicians to alarm fatigue. They also discovered that alarm fatigue resulted in 566 patient deaths from 2005-2008. To think that nurses just being overwhelmed and desensitized by alarms has lead to patient deaths is alarming. This problem still persists in hospital despite trainings on alarm parameters, changing tones for alarms, and implementation of other methods to decrease alarm fatigue.

In a survey among nurses at a variety of hospitals around the Massachusetts area, we discovered that 81% of nurses report alarm fatigue. We surveyed 68 nurses, who provided us with some quality feedback about alarm fatigue. Through this survey of nurses and aides, we found that 79% of clinicians do not like the current call bell system, and 88% think that the system could be improved. These surveys/interviews are evidence that a new call bell system would be beneficial to nurses and aides to provide the best possible patient care. In addition to wanting to improve the call bell system, 79% of nurses admit they have been distracted by call lights, leading to inefficient nursing assessments and interventions. Typically a med-surge nurse has 5 patients for every 1 nurse, while critical care nurses have 3 patients for every 1 nurse. Aides typically have 8 patients for every 1 aidee, however many times hospital staff are left short sometimes forcing an aide to take upwards of 25 plus patients. Additional patients with fewer nurses and aides leads to greater alarm fatigue. Simply the responses of these few nurses provides insight that the call bell system needs to be updated.

We have researched our competitors, finding a few companies with similar ideas. “Mocabell” is one company that is trying to bring this idea forward. Mocabell identifies that a patient has needs, and sends it to only that patient’s nurse. “CarePlus” is another company that we would be competing against. Their app has many of the same features as our app, however the app isn’t very user friendly. Furthermore, there are two other companies, “Extension Mobile” and “CommonPath” that uses an out-of-date push button, which is an ineffective system.

There is a great demand for updated call bell systems. With technology and wireless devices advancing great lengths in the past few years, hospitals are looking for ways to update their systems. Our app will help bring the system into the 21st century, be user friendly, and better connect clinicians and patients.

**Section 3. Solution**

Our idea focuses on decreasing alarm fatigue and increasing patient safety and satisfaction by modernizing the call bell system. Our proposal is to replace the single button push call bell system with a mobile application. The mobile application would allow patients to select from a list of requests which is then sent to the correct medical staff depending on the type of request. If the patient was connected to heart monitor, then the data could be sent to our application for analysis. If the patient’s heart rate is abnormal, then a notification would be sent to the medical staff taking care of the patient. If there is an emergency situation, then all medical staff on the patient’s floor would be alerted. The medical staff would carry a mobile device that receives notification of patient requests. The mobile application would prioritize these requests based on the significance and time since requested.

The push button system would be replaced with a Raspberry Pi which is a small computer about the size of a credit card. There would be a seven-inch touch screen attached to the Pi for interaction with the mobile application. The Pi would have Android operating system installed. Also, there would be sensor inputs to the Pi for heart rate monitoring which can be expanded upon in the future. The medical staff would use an iPod Touch to view the patient requests along with access to the system from any device with web connectivity to the organization’s network.

Through the mobile application, patients and nurses will have a more effective communication process. Nurses will know exactly what the patient is requesting; therefore, allowing the medical staff to be proactive to patient requests, decreasing response time. Moreover, nurses will be able to prioritize their work according to the request type and how emergent the request is. The system will guarantee patient requests will not be forgotten. Thus, it will decrease alarm fatigue situations, and patients will have a more satisfied experience. In addition, medical staff can quickly respond to emergencies which can increase patient safety. With this improved call bell system, healthcare facilities will receive higher reimbursement from insurance companies which will increase the facilities revenue.

As mentioned above, there are a few companies who are working on similar idea as ours. These competitors aim to launch a new call bell system in hospitals as well. In comparison, our solution uses a touchscreen and mobile application which is a highly extensible technology. Furthermore, an interactive touchscreen with mobile application can effectively improve the requesting process between patients and medical staff. There are more options for requests, and the medical staff will know what the patient is requesting before approaching the patient. On top of that, the application will be able to receive data from heart monitors and other sensors to detect emergency situations. Not only can our product improve the requesting process, it can also improve nurses work life by providing a more organized and manageable system. In addition, the Q Bell system will utilize universal symbols making it easier to comprehend for all patients.

Our idea is in the late stages of idea development and we will soon be start the prototyping. We have done market research to determine the pricing of the prototype. If we receive funding, we plan to work on it after we graduate to extend the call bell system. For example, we can include a documentation checklist in the nurses’ mobile application. During our research process, we found that many nurses have trouble keeping track of the documentation. Currently, nurses need to document all of their interactions with patients. Due to their high workload, it is very easy for them to forget to document actions or even forget the action itself. In addition, we can create a multi-language version of the application which can solve the foreign patient communication problem. We also plan to have a kid-friendly version that includes more emojis and fun sound effects. Lastly, the funding would be used to get FDA approval and market our product.

**Section 4. Resources**

After the idea challenge, most of us will be starting full-time job during the summer. Thus, it is very likely that we will have around 6 hours per week to commit to the project.

Our project requires FDA approval before launching. An estimated funding of $500,000 will be required to implement our project in the future. The funds will be mainly used towards the hardware development which will be around $150 per device. For the software development part, it will be around $100,000. Finally, around $600 will be used for business startup cost (LLC formation).

Reference:

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