Software Development Processes

1CWK100 Case Study Report

**Habiba Begum** (**21312966)**

# Introduction

Technology is becoming more popular due to its convenience and speed. Companies are moving from a paper-based system to a technology-based system because of the benefits that come with using technology. Some of the benefits are data being updated in real-time, storing data in multiple places online in the cloud and being able to create bespoke systems to best fit the company’s needs.

In this scenario, the CQC has found that the company’s paper-based system may become unreliable when the drug regimens need to be updated but the round sheet is unavailable. The IT team has been tasked to create a system that will allow pharmacists to adjust drug regimens for the residents, which will create an accurate round chart, that will be used by the care work supervisors on duty to dispense medication on rounds. In this report, I will be going through the stages of software development to recommend the steps the IT team should take to carry out the project.

# Software Development Methodology

The Agile and Lean methodology of Kanban would be most suitable for this project. This is because Agile allows for flexibility with the management of the project. Due to the team being in constant communication with the stakeholders, if a change in requirement occurs, the team should be able to incorporate this into the system. The IT team are not always in the office at the same time so an online Kanban board, for example Trello [1], would be the best option. Tasks are represented visually on a [kanban board](https://www.atlassian.com/software/jira/templates/kanban), allowing team members to see the state of every piece of work at any time [2], and helps prevent members from working on the wrong tasks. Another reason as to why Kanban is the most suitable is because the team have used it before, therefore they are more comfortable and knowledgeable with it. This removes the needs for training to use the methodology and helps with the fluidity of executing the project.

Due the team having 3 members, it is likely that some members will have multiple roles to complete for this project. For the front end of the system, the user interface, I have decided to have Myself and Kanato complete this. This is because Kanato has some programming knowledge and can also dedicate 4 days a week to completing the front end, so the front end will be completed within the 5 months given. The reason for having myself on front end is I have experience with various programming languages and know a lot about the existing rota system so I can use this to help create the user interface. For the database, I have chosen Myself and Murat. This is because Murat was able to create the booking system with my help, so he has knowledge about databases. For the final testing of the system, it will be Myself and Murat. This is because we both have knowledge of the system from creating it, however, Kanato will not be available for the last month, so he is not included.

# Project Timeline

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| Milestone | Completion Date |
| * Identify the requirements by interviewing the stakeholders. * Create an online Kanban board. * Prioritise the requirements and add to the Kanban board. | 1st month  (May 15th – June 15th) |
| * Design the architecture of the system using a flow chart. * Think about how to make the system secure so that it is only accessible by the internal network/VPN. * Design and create the database that will hold the residents, drug, dosage, and time. (Back end) * Design user interface. (Front end) * Have stakeholders review the user interface design. | 2nd month  (June 15th – July 15th) |
| * Create user interface. (Front end) * Test and fix any bugs in user interface. * Link database to the user interface. (Back end) | 3rd month  (July 15th – August 15th) |
| * Create a notification for the care workers to remind them of which residents still need their medication. (Every hour?) * Notify care workers and pharmacists when regimens have been changed. * Have stakeholders’ input for system. | 4th month  (August 15th – September 15th) |
| * Test and debug the system. * Review code written so that it is efficient. * Check system is reliable. * Check requirements are met. * Create user guide for novice users. | 5th month  (September 15th – October 15th) |
| * Final testing. * Final review from stakeholders. * Deploy system. * Train staff to use system. * Carry out ongoing maintenance. | 6th month  (October 15th – November 15th) |

Table 1 Table of Milestones & Deadlines

# Project Stakeholders & Requirements

The most important stakeholder is the residents. The system is handling their medication which is for their health, so it is important that the system is always accurate for their protection, and to ensure that they get the right medication. Due to there being lots of residents spread across the 3 setting, a suitable way to elicit requirements would be to do a survey. One of the potential requirements could be that they wish to be notified if a supervisor is on the way to give their medication.

Care work supervisors will be using the system daily to see the medication information of the residents. Due to them working closely with the future system, interviews should be carried out to ensure that their requirements are gathered. Some of the obvious requirements would be to have an easy user interface and notifications about residents who need to be given medication. Pharmacists will be inputting any updates on drug regimens to the system. Due to the pharmacists altering the regimen it’s important that their requirements be gathered via interviews. One of the requirements would be to be notified when a change is made to medication so it can be checked by the pharmacist.

The setting managers and assistant manager oversee their settings and staff. They are responsible for the staff and residents so they will want the system to be accurate for the protection of staff and residents. Their requirements can be gathered by survey. The Company’s CEO is funding the system so they will want the system to be cost efficient. Another stakeholder is the IT team as they are the ones creating the system so they will want it to work.

The CQC are interested in the system as they found a potential flaw in the original paper system and this electronic system is a solution to it. Their requirements can be elicited through document review. An obvious requirement would be that the system is secure so only authorised personnel can change the medication.

The team should begin by setting the goal of the system. This allows the team to understand what the foundation of the new system is. Following this, the team should collect the requirements from the stakeholders. This will help the team to shape the system to fit the stakeholders and helps to find hidden or obvious requirements. The team can document these requirements and meet with the stakeholders again to get further details on each requirement and get input from different stakeholders for different requirements. This will help the team better understand the requirements, so it is easier to prioritise these based on what the system must have, would have, and could have. Prioritising the requirements is important as the team should focus on the must have requirements as these are needed for the system to be functional. The team should meet with the stakeholders again about the prioritisation of the requirements so that the stakeholders can be kept informed of the team decisions and provide their opinions for discussion. The team can then upload the prioritised requirements onto their Kanban board so they can visually check off each requirement once it has been met.

# System Design & Architecture

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Description automatically generated

Figure Diagram of system (Created Using [3])

The system needs to produce a medicine round chart that includes the resident’s flat number, resident’s name, medicine name, dosage, any instruction notes, which will be retrieved from the database, and the time medication is given. The care work supervisors will need this to be produced daily so that they can see who needs to be given medication during their shift. The supervisors will also need to have the ability to input the time that medication is given, which will need to be saved to the database to prevent residents receiving medication multiple times.

The system is used to create a communication medium between the pharmacist and care work supervisors. This is because if any alterations are made to the resident’s medication, the pharmacist can inform the care work supervisor by updating the database. As the pharmacists won’t be working with the system regularly, it should have an easy-to-use interface to make it easier for the pharmacists to alter drug regimens. The pharmacists should be able to select the resident and the information for that resident should show, which is retrieved from the database. This makes it easier for the pharmacist to check that the correct resident is selected and what medication they are currently being given. If any alteration to the regimen is made, the database will need to be updated with the new information.

A login should be used to prevent unauthorised personnel from altering data that is not within their scope. For example, the care work supervisors should only be able to alter the time medication is given and pharmacists should only be able to alter the drug regimen.

The company wants the resident’s data to be held on-site, so a secure centralised database will need to be used. This should only be accessible by authorised users as it holds sensitive information about the residents. The company has thought about building another setting, which would mean increase in residents in the future. The database will need to be able to hold future residents’ data.

Due to the database holding vital information, the company needs to ensure that the data can be recovered in the case of a natural disaster, corruption, or data loss. One way to do this is by creating a backup of the database regularly and storing it securely in an online location, so it can be accessed at any time. The team will need to set up a system that will automatically upload an encrypted copy of the data within the database to OneDrive every night. This is to serve as an off-site backup but should only be accessible by the company. The OneDrive will need to have security to ensure only authorised users access the backups. Once the backup has been made, the medication time data will need to be reset so that it doesn’t confuse the care work supervisors by appearing on the chart the following day.

# Implementation & Testing

During the implementation process, the team needs to use a version control system. This allows the team to keep track of the changes that other members are making and ensures that everyone is working on the same version of the system. The version control best suited for this is GitLab, this is due to there being private repositories so only the team will be accessing the code. Security and compliance are built in, giving the visibility and control necessary to protect the integrity of the system [4]. Team members can make branches to work on their own code and once completed, they can merge it back into the main branch. The cost of using GitLab is lower than other private version controls which is better for the overall cost of the system.

Once the database has been linked to the user interface, test data should be inputted into the database, and the team should check that the information can be retrieved and outputted onto the user’s interface. Data should be altered and saved to the database and checked if the save was successful. Manual testing is a good fit because data will be manually altered by pharmacists. The team should test to check how many resident’s data the database can hold. A suitable testing for this is load/stress testing, this is because the company plans to expand so it will need to accommodate all the future residents, so the maximum residents the database can hold needs to be known. Once the system is completed, user acceptance testing should be carried out by pharmacists and care work supervisors to see if the system is easy to use and accepted by the stakeholders.

# Deployment & Maintenance

The system should be completed and ready to deploy before the last month. The IT team should set up the system within the setting managers office as this is where the pharmacists will be accessing the system within the setting site. The pharmacists along with the setting/assistant managers should be taught to use the system together. Supervisors should be taught how to use portable devices, that have the system set up, during their rounds. The IT team will send out a notification to tell users when the system is in use. A help station should be set up in the system where the user can get immediate responses from a member of IT.

The system should be checked regularly. Regular inspections will help the team to spot any issues early: this could be a security issue or incorrect data. To prevent a security breach, the system users should be prompted to change their passwords every month. Pharmacists will be asked to check the drug regimens every two weeks to ensure that all the drug regimens are correct. The IT team should meet with stakeholders, or provide a suggestion section in the system, so that they can find possible ways to make the system better. When system undergoes maintenance, the users should be notified, and training should be given for any changes to the system. Murat will be in charge for the maintenance of the database with some help from me. Kanato and I will oversee the maintenance of the user interface.

# Conclusion

Within this report, I have provided suggestions for the IT team to create a system for the Blossom View Retirement Homes. The team should use parallel running [5] when deploying the system, therefore if an error occurs the care supervisors can carry on using the paper system without it affecting the residents. It is important that the system is novice friendly for the users who have not used an electronic system before. It is crucial that the new system does not affect the residents negatively therefore security needs to be prioritised. Any alterations in data needs to be updated in real-time for all users due to the importance of the resident’s drug regimen being accurate. By implementing the suggestions that I have given, the IT team should be able to produce a secure, accurate, bespoke system for the company.

# References

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