Requirement Gathering and Functional Requirement Specifications for Physiotherapy specific EHR

Submitted by:
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PG/11/048
The Organization- Fresco Informatics

- Fresco Informatics delivers the next generation of clinical care information systems solutions built upon best-of-breed and best-in-class healthcare software.
- The Fresco Informatics solution creates a foundation for heterogeneous communication amongst healthcare providers throughout the hospital as well as all caregivers within the Hospital Network.
- Fresco EHR and MPI product suites empower and enable physician practices to provide effective and integrated care delivery.
About the Project

- The project was concerning the development of a Physiotherapy specific EHR.

- My role involved:
  - Finding the requirements through the process of requirement gathering from prospective clients
  - Preparation of functional requirement document for the development of consultation module
Project Objectives

• It will help a Physiotherapy clinic to have a whole range of data in comprehensive form.
• A good Functional Requirement Document clearly states the objective of the project and defines its scope, to clarify what the project does and does not cover.

Rationale

• To enhance health care delivery quality
• To facilitate clinical data exchange and retrieval
• Maintain confidentiality of the patient records
• Enhance the patient satisfaction
Software development lifecycle (SDLC)

- The software development life cycle, or development process, is a structure imposed on the development of a software product.

- Each software development project has to go through the following stages:

1. Requirement gathering
2. Writing functional specifications
3. Creating architecture and design documents
4. Implementation and coding
5. Testing and quality assurance
6. Software release
7. Documentation
8. Support and new features
Requirement Gathering

- Requirement gathering is usually the first part of any software product.
- This stage starts while we are thinking about developing software.
- This phase, involves meeting customers or prospective customers, analyzing market requirements and features that are in demand.

Types of Requirement Gathering

- Shadowing
- Interviewing
- Focus group
- Survey
- User instruction
- Prototyping
Writing Functional Specifications

After understanding the requirements of the prospective users and stakeholders, the functional requirements are interpreted and written so that it can be conveyed to and understood by the technical team.
Software Development Model used at Fresco Informatics

Agile software development method - SCRUM
The programming language used at Fresco Informatics is **JAVA**.

Java applications are typically compiled to byte code (class file) that can run on any **Java Virtual Machine (JVM)** regardless of computer architecture.

The Graphic User Interface (GUI) being used at Fresco Informatics is **HTML5**.
Example of Java Code

```java
public class DocApp{
    public static void main(String args[]){
        System.out.println("Development of Doc Engage");
    }
}
```
METHODOLOGY AND TOOLS USED

• **Study Type:** Questionnaire based Study
• **Number of Respondents:** 50
• **Respondents included:** Working Physiotherapists
• **Method Used:** Survey and Interviewing individuals
• **Data Type:** Primary
• **Tools Used for Functional specifications:** MS Word and MS Visio
• **Tool Used for Evaluation of Responses:** SPSS 16.0
• Requirement gathering for the Physiotherapy Specific EHR involved conducting a survey among working physiotherapists and visit to a renowned Physiotherapy Hospital in Bangalore, Karnataka.
• Gap analysis of existing features of the assessment procedure being followed by physiotherapists was done to find out the features which should be included in the EHR.
• These features were listed down in some specific formats called the Functional Documents that can be understood by the technical team (Software Engineers) while developing the EHR.
FINDINGS

Average Numbers

- Number of patients coming to the clinic per day: 30
- Number of Physiotherapists at the clinic: 4
- Number of attendants and other staff at the clinic: 3

Time spent (in Minutes)

- Assessment: 20 minutes
- Treatment: 40 minutes

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Conducting Assessment

- Before start of treatment: 63%
- During course of treatment: 33%
- Both: 4%

Working with Computer & Internet

- Easy: 80%
- Modearte: 14%
- Difficult: 6%
Willing to adopt a computerized patient record system

- **YES**: 95%
- **NO**: 5%

Features they want in the system

- Patient Demographic details, History, Observations, Examinations, Treatment, Prognosis
- All except the prognosis part

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**RECOMMENDATIONS**

- Physiotherapist login

<table>
<thead>
<tr>
<th>Stake Holder</th>
<th>System Feature</th>
<th>Requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHYSIOTHERAPIST</td>
<td>FR1. Sign up Screen</td>
<td>1. The physiotherapist will sign up with the system in a One-time process adding his details about the clinic and his personal details.</td>
</tr>
<tr>
<td></td>
<td>FR2. Login screen</td>
<td>2. Personalized Password and ID to be provided based on RBAC (Role Based Access Control).</td>
</tr>
<tr>
<td></td>
<td>FR3. Password recovery system</td>
<td>3. In cases, if the user forgets his/her password, user can click on the FORGOT PASSWORD tab to retrieve his password on his mail and mobile number.</td>
</tr>
<tr>
<td>FRONT OFFICE STAFF</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Snapshot of Login Screen Design (User Interface Look)
### Snapshot of Appointment Screen Specification

<table>
<thead>
<tr>
<th>PHYSIOTHERAPIST/FRONT OFFICE STAFF</th>
<th>FR4. Appointment Screen</th>
<th>FR4.1 Add Appointment</th>
</tr>
</thead>
<tbody>
<tr>
<td>4. This screen shows the list of appointments in the calendar view and also allows adding, editing or cancellation of an appointment. This screen is also interfaced with the social community.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.1 The user can schedule or add an appointment for a patient, by clicking on available date &amp; time slot in the calendar. This will ask the patient name, contact number, the physiotherapist to be seen &amp; the Chief Complaint of the patient.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
# Appointments for the Day

<table>
<thead>
<tr>
<th>S. No</th>
<th>Patient ID</th>
<th>Patient Name</th>
<th>Time</th>
<th>Old / New case</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>PID 1</td>
<td>ABC</td>
<td>9:00 AM</td>
<td>NEW</td>
</tr>
<tr>
<td>2</td>
<td>PID 2</td>
<td>DEF</td>
<td>9:45 AM</td>
<td>OLD</td>
</tr>
<tr>
<td>3</td>
<td>PID 3</td>
<td>GHI</td>
<td>10:30 AM</td>
<td>NEW</td>
</tr>
<tr>
<td>4</td>
<td>PID 4</td>
<td>JKL</td>
<td>11:15 AM</td>
<td>NEW</td>
</tr>
<tr>
<td>5</td>
<td>PID 5</td>
<td>MNO</td>
<td>12:30 PM</td>
<td>OLD</td>
</tr>
<tr>
<td>6</td>
<td>PID 6</td>
<td>PQR</td>
<td>2:15 PM</td>
<td>OLD</td>
</tr>
<tr>
<td>7</td>
<td>PID 7</td>
<td>XYZ</td>
<td>3:30 PM</td>
<td>NEW</td>
</tr>
</tbody>
</table>
## Snapshots of the Consultation Module Specifications

| FR11.1 Consultation Progress Bar | 11.1 A progress bar on the left of the consultation screen will denote the completeness of the consultation. |
| FR11.2 Subjective Assessment | 11.2 This segment of the Consultation is displayed when the physiotherapist clicks on the **subjective tab** |
| FR11.4 Observation | 11.4 This segment of the Consultation is displayed when the physiotherapist clicks on the **Observation tab** (on the screen headers). |

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**Patient Consultation Module**
Snapshots of Consultation Screen Design (User Interface Look)
Snapshots of Consultation Screen Design (User Interface Look)

<table>
<thead>
<tr>
<th>Subjective</th>
<th>Pain Assessment</th>
<th>Observation</th>
<th>Measurements</th>
<th>Diagnosis</th>
<th>Treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measurements</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Special Tests</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BODY PART</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Upper Extremity</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Shoulder</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Elbow</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wrist &amp; Hand</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lower Extremity</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hip</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Knee</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Foot &amp; Ankle</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spine &amp; TMJ</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cervical</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lumbar</td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Thoracic</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TMJ</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Side to be Measured</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Right</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Left</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bilateral</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Measurements</th>
<th>BODY PART</th>
<th>ROM</th>
<th>MMT</th>
<th>END FEEL</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Right Shoulder</td>
<td>Active</td>
<td>Passive</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Flexion</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Extension</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>Abduction</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Adduction</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>External rotation</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Internal rotation</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
CONCLUSION

• There is no magical wand, no one answer, no perfect approach method or technique to requirements gathering.
• Developing a good requirements document is about giving your project the best chance of success.
• To do so, you must reduce the risk of common mistakes that arise from a lack of communication or understanding.
• Keep this in mind as you gather your requirements, and the documentation — and project as a whole — will have the best chance of success.
Recommendations for Requirement Gathering

• To be successful at requirement gathering and to give your project an increased likelihood of success follows the given rules:
  ➢ Don’t assume you know what the customer wants, ASK
  ➢ Involve the user from the start
  ➢ Define and agree the scope of the project
  ➢ Ensure requirements are specific, realistic and measurable
  ➢ Gain clarity if there is any doubt
  ➢ Create a clear, concise and thorough requirements document
- Confirm your understanding of the requirements with the customer
- Avoid talking technology and solutions until the requirements are completely understood
- Get the requirements agreed with the stakeholders before the project starts
- Avoid duplication of requirements in a functional document
- Create a prototype if necessary to confirm or refine the customers’ requirements
Mistake one should avoid:

- Not prioritizing the User requirements, for example ‘must have’, ‘should have’, ‘could have’, and ‘would have’
- Not enough consultation with real users and practitioners.
- Lacking a clear understanding and making assumptions rather than asking
CASE STUDY

Feedback and Evaluation of a HMS (Hospital Management System) in a Physiotherapy Hospital in Bangalore

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Hospital Visited

HMS being used over there

RECOUP
Neuro Musculoskeletal Rehabilitation Centre

HealthObject

Display Panel to display appointments, doctors availability, facilities, disease awareness and patient education

Patient Portal for online access of EMR and appointments to patient

Lab's receive orders online and enter results online

Comprehensive clinical and administrative functionality for Clinics, Hospitals and other care settings

Pharmaceutical companies push content about drugs, vaccines to clinics and hospitals
METHODOLOGY

• Meetings with the users of this software at RECOUP Hospital were conducted to take their feedback on Health Object.

• The users whose responses were recorded and analysed were:
  - Doctors
  - Physiotherapists
  - Front Office Staff
  - System Administrators

• Separate discussions were conducted with all the users to record their feedback and experience of using Health Object.

• All of their views, opinions and responses were noted down and evaluated.
OBSERVATIONS

• All the users had an opinion that the software is **not user friendly** at all.

• **Technical Details**
  - **Technology being used:** Microsoft .Net 3.5
  - **Database being used:** SQL Server

• **Integration Issues**
  - The most major issue and drawback which they face while using the software is the integration issue of the software as it is not centralized.
  - A patient coming and registered at one of their centres cannot be viewed as a registered patient at other centres and hence the patient has to undergo the process of registration all over again.
  - The doctors and physiotherapists are not able to see the patient records and details who are visiting other centres as the system is not centralized.
• **Data Entry Issues**

- There is no specific template for recording patient assessment for the doctor and all the entry has to be made by the doctor through typing only.
- The mode of all the data entry is in free text form where a blank prescription note is displayed on the screen where he enters all the details by typing only.
- This was found to be a major reason for the doctors being irritated by the software and reporting it to be not at all user friendly.
• Backend Issues

- Doctors and physiotherapists reported of the software not working properly when they are entering details in it.
- Users of the software often report of problem in accessing and signing up in the system and that needs resetting the password again.
- The billing department also reports of discrepancies in the bill with wrong units being billed or a particular treatment being billed multiple times.
- Data entered into the system has been reported for errors and mismatch at multiple occasions.
It does not show the payments of the patient being made in advance on the landing page and the billing desk has to go into billing details to check for it.

At times the doctors and physiotherapists see that the date of birth, gender and area location of the patient has changed when they open the patient records to make further addition to the patient assessment note.

Sometimes the system does not save the data which the doctor has entered into the system and hence the doctor has to enter all the data again which was not saved.
RECOMMENDATIONS

• The following points are recommended for rectification in Health Object to make it function properly and suit RECOUP’s needs:
  
  ➢ Centralization of the system
  
  ➢ Specific templates for recording of patient assessment
  
  ➢ The backend of the software needs to be rectified
CONCLUSION

• For a properly functioning HMS it is very essential to make it user friendly which will ultimately help in increasing the adoption rate of EMR achieve our goal of integrating healthcare and information technology.

• Therefore proper steps need to be carried out to ensure that we present to the users a system which is user friendly and suited to their needs and requirements.
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Thank You