EC3290 – Software Requirements Engineering

Topic 1 – Understanding, Eliciting, and Documenting Software Requirements

CLO 1

4 Hours

Requirements Inception

- The initial phase of gathering high-level requirements and understanding the problem domain.
- Understand business needs and goals
- Identify key stakeholders
- Define high-level system scope
- Outcome is a clear understanding of the problem to be solved.

Domain Understanding

- Learning about the industry, business processes, and challenges.
- Understanding domain-specific terminology.

- How to Achieve It?
  - Studying existing systems and documentation.
  - Interviewing domain experts.
  - Observing real-world business operations.

Product Vision

- A high-level statement that describes what the product will achieve.
- Key Elements of Product Vision:
  - Target Users
  - Business Value
  - Competitive Advantage

"An AI-powered chatbot to automate customer service and reduce response time by 50%."

Defining the Scope

- Defines what is included (and excluded) in the system.
- Helps avoid **scope creep**.
- Scope Statement Components:
  - System Features
  - Boundaries & Constraints
  - Assumptions

"The system will allow users to register, log in, and make purchases, but will not handle inventory management."

Requirements Elicitation

- The process of gathering requirements from stakeholders.

- **Challenges in Elicitation:**
  - Unclear business needs
  - Conflicting stakeholder interests
  - Difficulty in expressing requirements

Interview Technique

- An interview is a conversational method where stakeholders provide insights into their needs and expectations for the system.
- Types of Interviews:
  - Structured: Predefined questions for consistency.
  - Semi-Structured: Combination of standard questions with some flexibility.
  - Unstructured: Open-ended conversation for in-depth exploration.

Structured Interview

- In a structured interview, the interviewer follows a set of predefined questions. Every participant answers the same questions, making the process standardized.
- This format ensures consistency and makes it easier to compare responses. However, it may limit in-depth exploration since the questions are fixed.

Semi-Structured Interview:

- Semi-structured interviews use a combination of standard questions and allow some flexibility.
- The interviewer follows a basic framework of questions but can probe further or ask follow-up questions based on the respondent’s answers.
- This approach balances consistency with flexibility, allowing deeper insights while maintaining some structure.

Unstructured Interview:

- In unstructured interviews, the conversation is open-ended, with no strict questions or order. The interviewer may have a few topics in mind but lets the conversation flow naturally.
- This approach provides the most flexibility and is ideal for gaining detailed insights and exploring topics in depth.
- However, it’s harder to compare responses across participants since the conversation varies widely from one person to another.

Benefits of each:

- **Structured** is best for consistency and comparison.
- **Semi-structured** works well when a balance of structure and flexibility is needed.
- **Unstructured** is ideal for in-depth exploration but requires skilled interviewers to keep the conversation productive.

Preparing for an Interview

DEFINE INTERVIEW OBJECTIVES

IDENTIFY INTERVIEWEES

PREPARE QUESTIONS TO COVER KEY AREAS OF INQUIRY.

Conducting an Interview

BEGIN WITH AN INTRODUCTION

ASK QUESTIONS

ENCOURAGE DISCUSSION

RECORD RESPONSES FOR LATER ANALYSIS.

Benefits and Limitations

Benefits:

Gathers in-depth information, clarifies expectations.

Limitations:

Time-consuming, may introduce interviewer bias.

Questionnaire Technique

- A questionnaire is a structured form that stakeholders fill out to provide input on their needs and requirements.
- Types of Questionnaires:
  - Open-ended: Allows respondents to provide detailed feedback.
  - Close-ended: Limits answers to specific choices for easier analysis.
- Designing Effective Questionnaires:
  - Use clear, concise questions, include a mix of question types, and avoid leading questions.
- Distributing and Collecting Responses:
  - Send via email, post, or an online survey tool, or distribute in person to gather responses.

Examples

Open Ended Question	Close Ended Question
"What challenges do you face when using this system, and how do you think it could be improved?"	"How satisfied are you with the system's ease of use?" • Very Satisfied • Satisfied • Neutral • Dissatisfied • Very Dissatisfied

Benefits and Limitations

Benefits:

Efficient for large groups, anonymous feedback.

Limitations:

Limited depth, may lack clarity.

Observation Technique

- Observation involves watching users interact with the system or perform tasks to gain insights into their behaviors and challenges.
- Types of Observation:
  - Direct: Observer is present but does not interact.
  - Participant: Observer interacts with the subjects and environment.
- Steps for Effective Observation:
  - Plan objectives, define scope, and record observations systematically.

Direct Observation

- In direct observation, the observer watches the users but does not engage or interact with them.
- The goal is to see how users naturally interact with the system or perform tasks without influencing their behavior.
- This approach is helpful for identifying typical user behavior and any issues that might not be obvious in interviews or questionnaires.

Participants Observations

- In participant observation, the observer actively engages in the environment, working alongside the users and sometimes even performing the same tasks.
- This method allows the observer to gain a deeper, firsthand understanding of user challenges, needs, and the context in which tasks are performed.
- It’s useful for uncovering insights that might only come from experiencing the work environment directly.

Benefits and Limitations

Benefits:

Captures real user behavior, identifies hidden needs.

Limitations:

Observer bias, limited to observable actions.

Document Reading Technique

- Document reading involves reviewing existing documents (manuals, reports, and records) to understand system requirements.
- **Types of Documents Used:**
  - Manuals, technical specifications, historical records, policy documents.
- **Process of Document Analysis:**
  - Identify relevant documents, review contents, and note key information for requirements.

Benefits and Limitations

- Benefits:
  - Provides historical context, no stakeholder availability needed.
- Limitations:
  - May be outdated, lacks interactive clarification.

Requirements Documentation

- Acts as a reference for development and testing.
- Prevents miscommunication.
- Types of Requirement Documents:
  - Software Requirements Specification (SRS)
  - Use Case Descriptions
  - User Stories

Requirements Documentation

- Characteristics of Good Requirements:
  - Clear
  - Complete
  - Consistent
  - Feasible

"The system shall allow users to reset their passwords via email verification."

End of Chapter 2