

SENG 321

REQUIREMENTS ENGINEERING

DR. NAVNEET KAUR POPLI

DEPT. OF ELECTRICAL AND COMPUTER
ENGINEERING



REQUIREMENTS ELICITATION TECHNIQUES



Elicitation activities

- **Prepare for Elicitation:** The purpose here is to understand the elicitation activity **scope**, select the right **techniques**, and **plan** for appropriate resources.
- **Conduct Elicitation:** The purpose here is to explore and identify information related to change.
- **Confirm Elicitation Results:** In this step, the information gathered in the elicitation session is checked for **accuracy**.



Preparation-collecting docs

- Preparation starts with business analysts collecting the documentation they need and analyzing the current system (if one exists). Documentation usually includes (but is not limited to):
- **Description of the organization:** business rules, structure, legal and regulatory requirements
- **Details of the project:** solution analysis results, reports, or requirements prepared by other business analysts, technical and end user documentation of the existing system, manuals, instructions, tutorials for users and employees
- **Marketing materials:** market research, competitor analysis, materials used to promote the solution.



Requirements Elicitation Techniques:

- 1) Stakeholder Analysis
- 2) Brainstorming
- 3) Document Analysis/Review
- 4) Observation/ Job Shadowing
- 5) Interviews
- 6) Focus Groups
- 7) Joint Application Development (JAD)/ Requirement Workshops
- 8) Reverse Engineering
- 9) Survey/Questionnaire
- 10) Prototyping



Requirement Elicitation Techniques

Stakeholder Analysis

Brainstorming

Document Analysis

Job Shadowing

Interviews

Focus Groups

JAD

Reverse Engineering

Surveys/Questionnaire

Prototyping



University
of Victoria

Requirement Elicitation Techniques

Stakeholder Analysis

Brainstorming

Document Analysis

Job Shadowing

Interviews

Focus Groups

JAD

Reverse Engineering

Surveys/Questionnaire

Prototyping



University
of Victoria

1. Stakeholder Analysis

- During this analysis, a BA **defines** all stakeholders affected by the project and decides which of them should be **involved in elicitation in what capacity**.
- This stage is necessary to speed up the elicitation process, engage **only relevant stakeholders** in the discussion, and **keep everyone** affected by future changes **informed**.



Requirement Elicitation Techniques

Stakeholder Analysis

Brainstorming

Early Elicitation
Technique

Document Analysis

Job Shadowing

Interviews

Focus Groups

JAD

Reverse Engineering

Surveys/Questionnaire

Prototyping



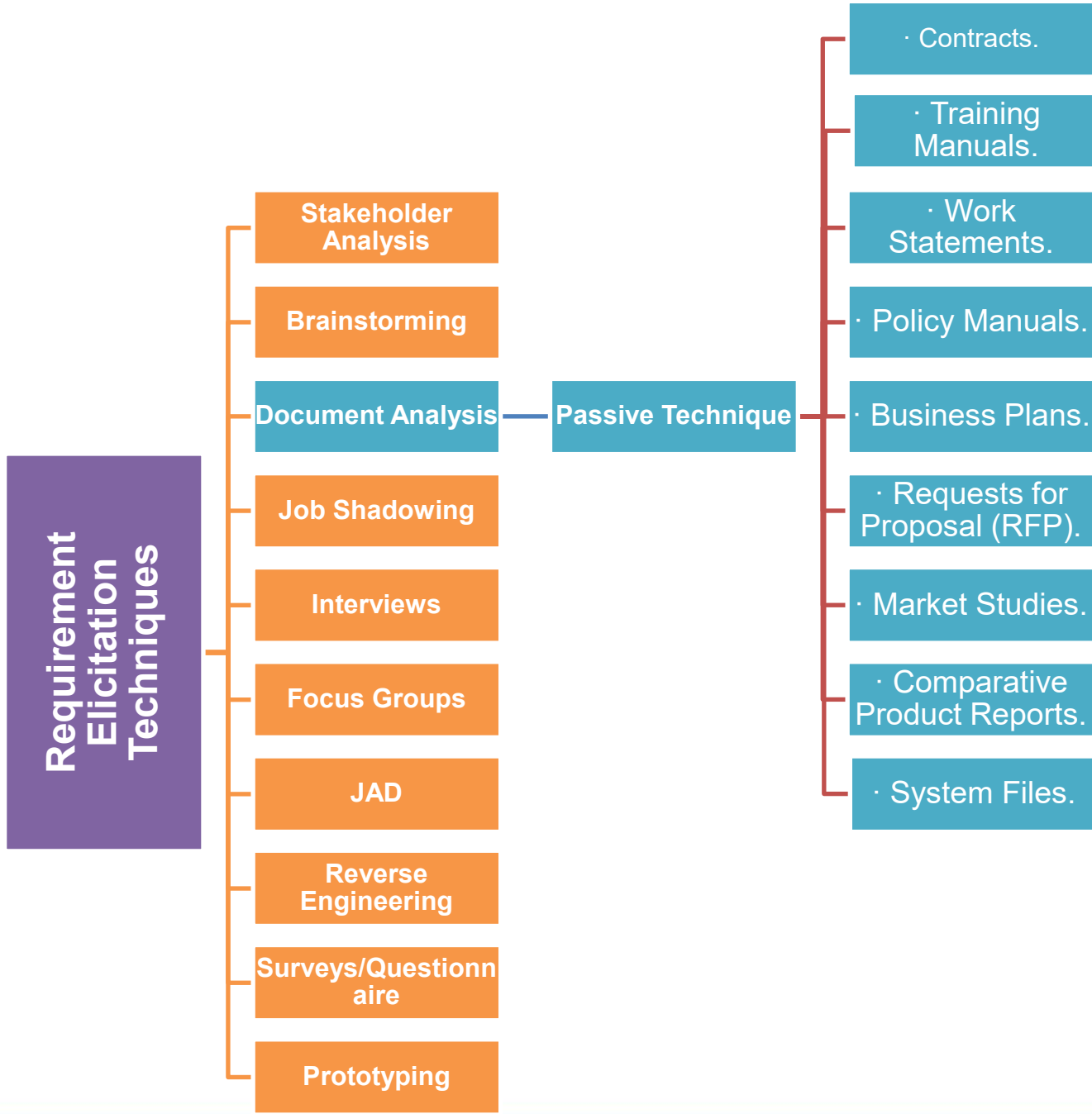
University
of Victoria

2. Brainstorming

- The purpose of **gathering your stakeholders** for brainstorming is “to produce numerous **new ideas**, and to derive from them themes for **further analysis** .”
- An analyst should try to secure a **representative from each participating stakeholder group** in the brainstorming session.
- It is normally an **early elicitation technique**.



University
of Victoria



3. Documentation Analysis

- Document analysis is usually performed to elicit information pertaining to an **existing process** or structure.
- This method is also useful when a **subject matter expert is no** longer with the organization or not available for elicitation.
- Though **published material**, the BA can gather adequate details about current attributes, rules, or behavior.
- It is a **passive** technique.



Documents to analyze

Some of the documents that the BA can analyze include:

- Contracts.
- Training Manuals.
- Work Statements.
- Policy Manuals.
- Business Plans.
- Requests for Proposal (RFP).
- Market Studies.
- Comparative Product Reports.
- System Files.



Requirement Elicitation Techniques

Stakeholder Analysis

Brainstorming

Document Analysis

Job Shadowing

Active

Passive

Interviews

Focus Groups

JAD

Reverse Engineering

Surveys/Questionnaire

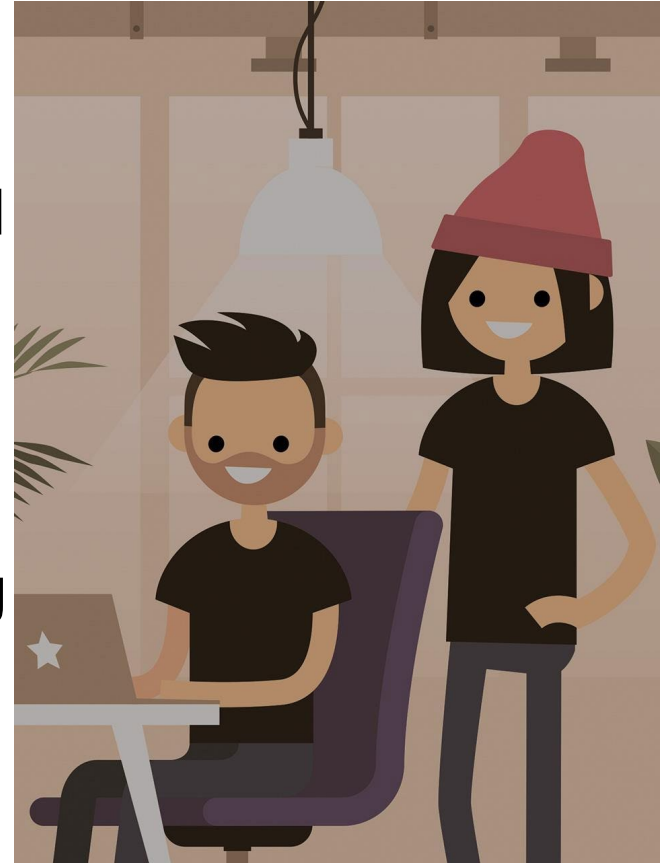
Prototyping



University
of Victoria

4. Observation (job shadowing)

- Observation or job shadowing involves an analyst **watching** their client performing their **daily tasks** and asking questions about what they are doing and why.
- Two basic types of observation are available to an analyst:
 - (1) **passive observation**, where the analyst merely watches someone working but does not interrupt or engage the worker in any way, and
 - (2) **active observation**, where an analyst asks questions throughout the process to be sure she understands and even attempts portions of the work.



Requirement Elicitation Techniques

Stakeholder Analysis

Brainstorming

Document Analysis

Job Shadowing

Interviews

Focus Groups

JAD

Reverse Engineering

Surveys/Questionnaire

Prototyping

Structured

Semi structured

Unstructured



University
of Victoria

5. Interviews

In an interview, Analyst **discusses the desired product** with different stakeholders and develops an understanding of their requirements. Generally, Interviews are divided in three groups.



5. Interviews

1. Closed/Structured Interviews:

In this interview the requirements, we must prepare some **predefined questions** and try to get the answers for these questions for the stakeholder. The **sequencing** of questions is standardized.

2. Open-ended/unstructured Interviews:

In this interview, we do not need to prepare any predefined questions, and the information from the stakeholders in **open discussions**. It is usually inefficient technique as it tends to go off track from the main goal and the analyst will have to redirect the interview in the right path.



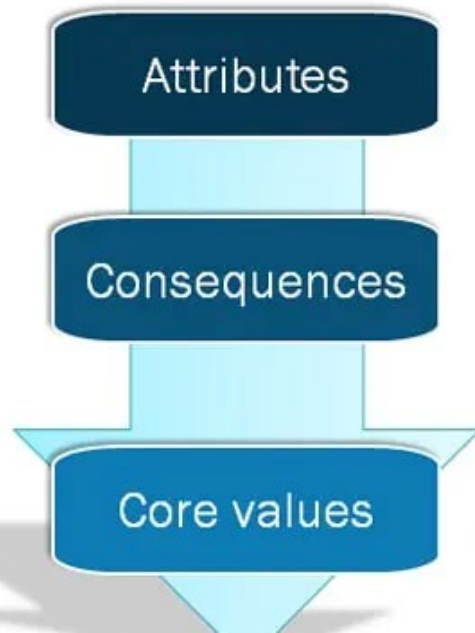
5. Interviews

3. Semi-structured interviews

<https://www.youtube.com/watch?v=G0zuEtvnIAY>

- It begins with **focused questions** and moves to **open-ended discussion**. The data of interest will have to be pre-determined. Laddering technique can be used where one question leads to another.

LADDERING TECHNIQUE



Example:

Q: 'Why did you buy this jumper?'

A: 'Because I like the color'

Q: 'What do you like about that color?'

A: 'It makes me feel relaxed'

Q: 'Why does it make you feel relaxed?'

A: 'It reminds me of the countryside, where I grew up'



University
of Victoria

Requirement Elicitation Techniques

Stakeholder Analysis

Brainstorming

Document Analysis

Job Shadowing

Interviews

Focus Groups

JAD

Reverse Engineering

Surveys/Questionnaire

Prototyping



University
of Victoria

6. Focus groups

- This technique is used, when we want to collect the needs from **specific sets of stakeholders**.
- Suppose you need to gather the needs of the **top executive and process owners both**.
- You can schedule separate meetings with the two. And gather the individual group's requirements.



Technique	Good for	Kind of data	Plus	Minus
Questionnaires	Answering specific questions	Quantitative and qualitative data	Can reach many people with low resource	The design is crucial. Response rate may be low. Responses may not be what you want
Interviews	Exploring issues	Some quantitative but mostly qualitative data	Interviewer can guide interviewee. Encourages contact between developers and users	Time consuming. Artificial environment may intimidate interviewee
Focus groups and workshops	Collecting multiple viewpoints	Some quantitative but mostly qualitative data	Highlights areas of consensus and conflict. Encourages contact between developers and users	Possibility of dominant characters
Naturalistic observation	Understanding context of user activity	Qualitative	Observing actual work gives insight that other techniques cannot give	Very time consuming. Huge amounts of data
Studying documentation	Learning about procedures, regulations, and standards	Quantitative	No time commitment from users required	Day-to-day work will differ from documented procedures

Source: Preece, Rogers, and Sharp "Interaction Design: Beyond human-computer interaction", p214

Requirement Elicitation Techniques

Stakeholder Analysis

Brainstorming

Document Analysis

Job Shadowing

Interviews

Focus Groups

JAD

Reverse Engineering

Surveys/Questionnaire

Prototyping



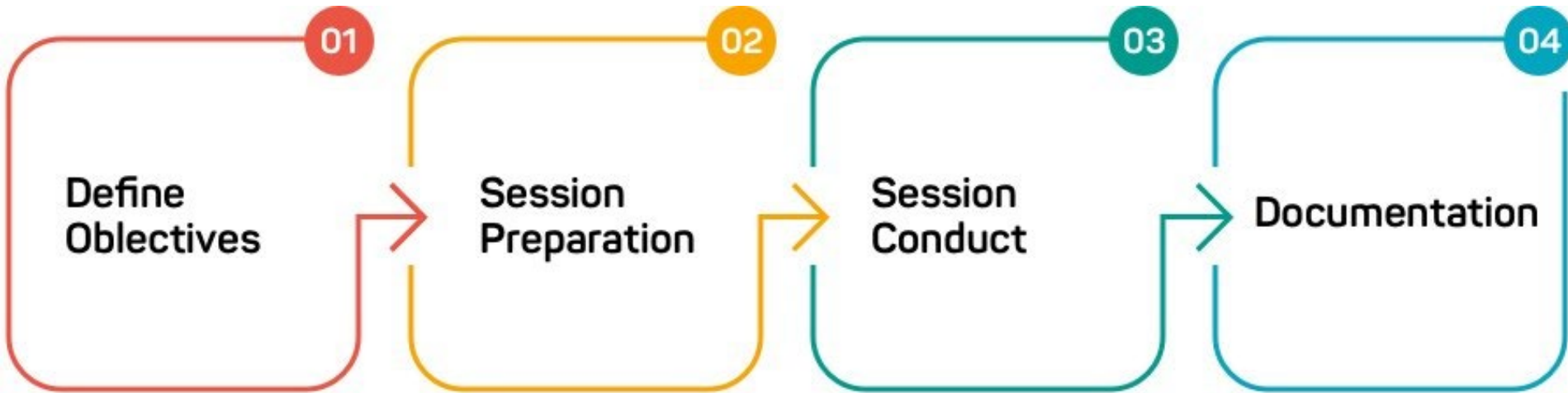
University
of Victoria

7. Joint Application Development (JAD)

- Joint Application Development (JAD) involves **all the available stakeholders** investigating through **general discussion** both the **problems** to be solved, and the **available solutions** to those problems.
- With **all parties represented**, **decisions** can be made **rapidly**, and **issues resolved quickly**.
- JAD centers around **discussion workshops(JAD sessions)** lasting a certain number of **days** under the direction of a **facilitator**.
- A major difference between JAD and brainstorming is that typically the **main goals** of the system have **already been established** before the stakeholders participate.
- Also, JAD sessions are typically **well structured** with **defined steps, actions, and roles for participants**.
- The focus of this type of meeting tends to often be on **the needs and desires of the business and users rather than technical issues**.



JAD

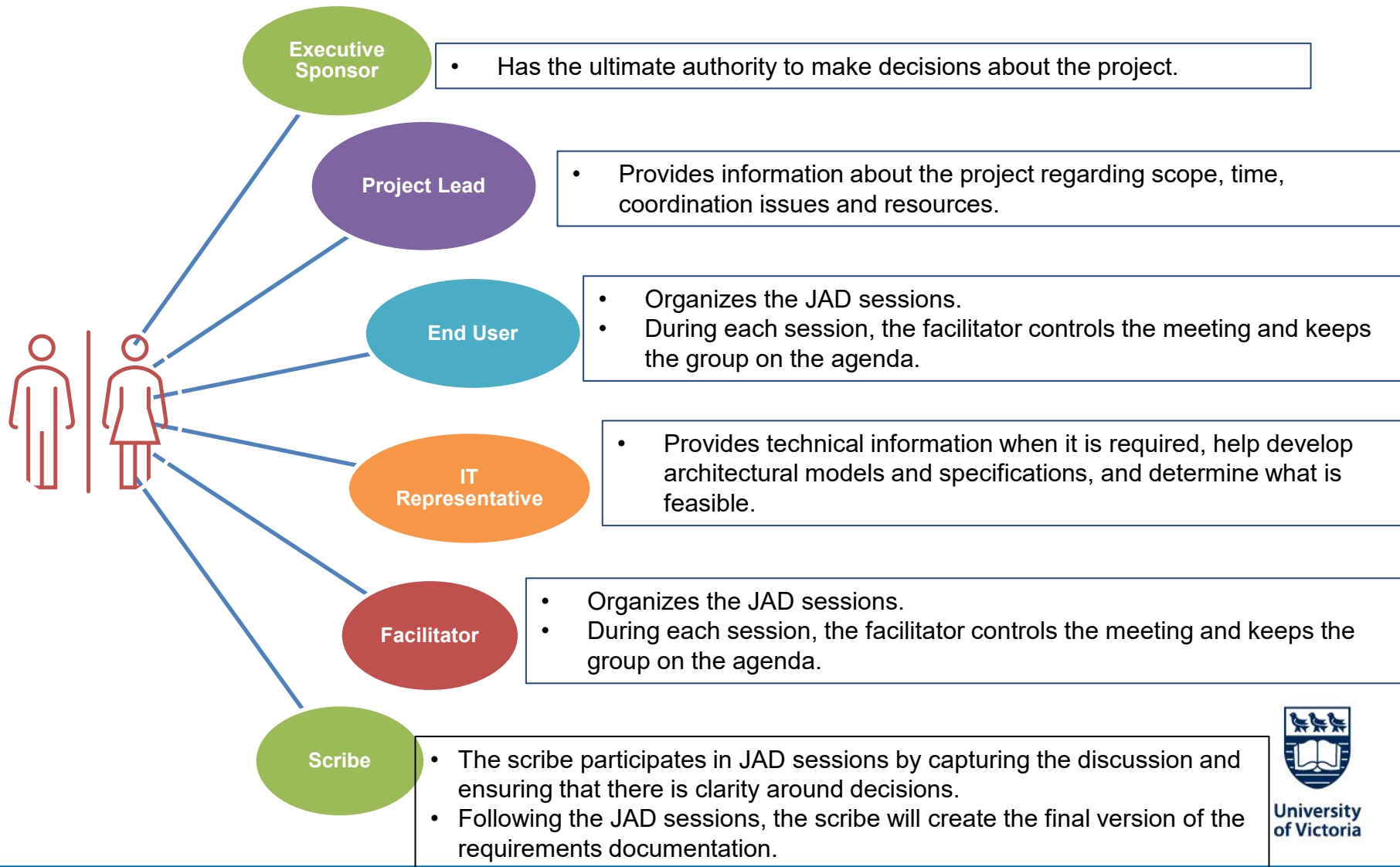


JAD Process

- JAD is a joint process, with all the concerned groups getting together for a **well-defined purpose**.
- It is a methodology for developing applications **jointly by the users and the IT professionals in a well-structured manner**.



JAD Roles



Requirement Elicitation Techniques

Stakeholder Analysis

Brainstorming

Document Analysis

Job Shadowing

Interviews

Focus Groups

JAD

Reverse Engineering

Surveys/Questionnaire

Prototyping



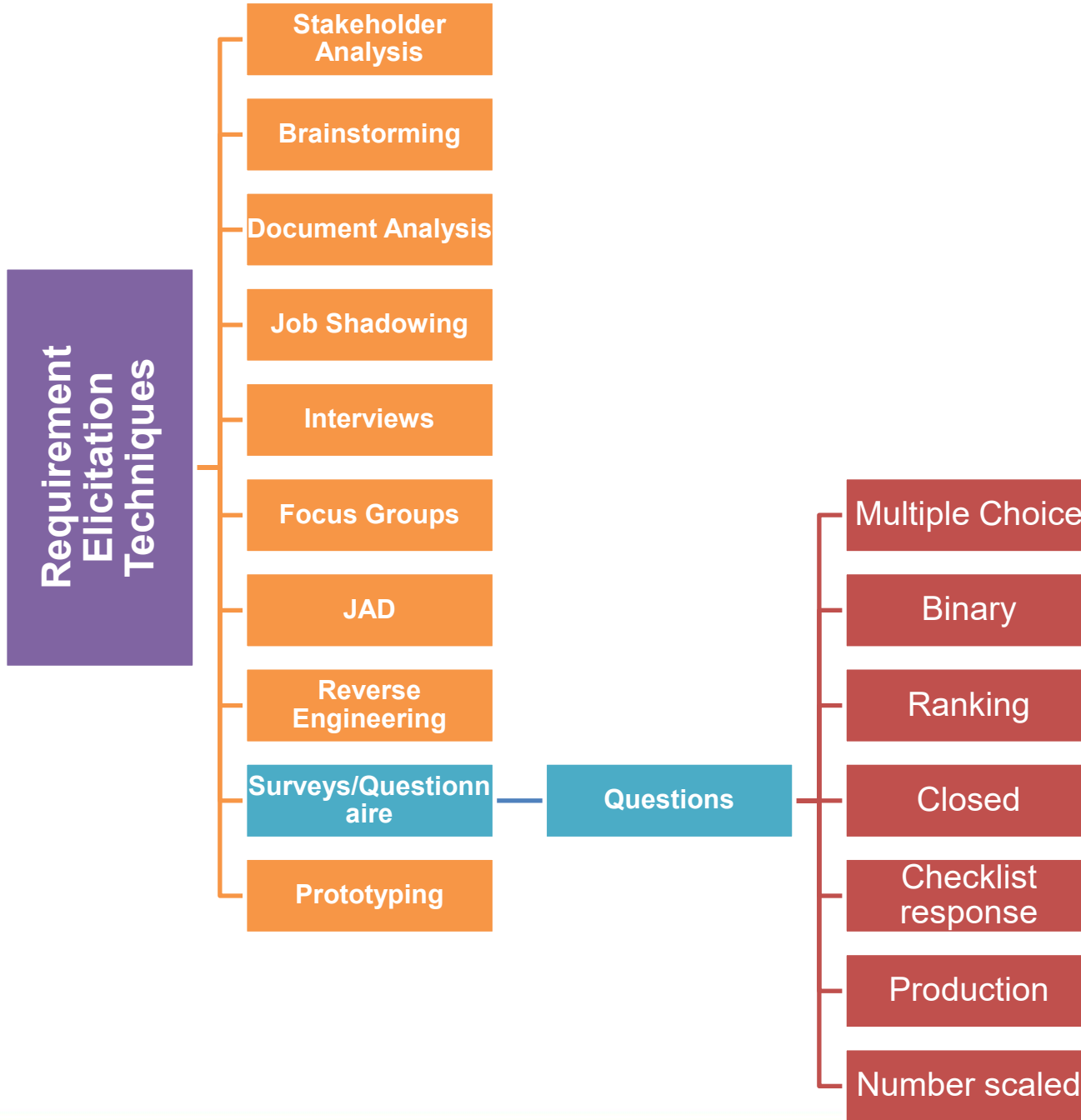
University
of Victoria

8. Reverse engineering

- Usually, reverse engineering is used to examine software or software **components** to figure out how they're processing **business rules**, where they're **sourcing data**, and how they make **decisions**. Basically, you want to understand **how the software is supporting the business**.
- The use of this elicitation technique is increasing across the field because of all the **legacy systems** (old computer systems) sitting around.
- These systems need to be updated or replaced.
- Applications built on the mainframe 30 years ago were never expected to last as long as they have, and technology has progressed so far that these systems have to be reverse engineered so people can figure out how they work.
- Reverse Engineering is also used when the software **documentation is out of date**



University
of Victoria



9. Questionnaires and Surveys

- This technique is best used when there are **more stakeholders** involved in a project.
- For example, if there are 200 stakeholders associated with the project, collecting information from each individual to assess their requirements will consume a lot of time.
- Hence, the project manager is requested to prepare a questionnaire and conduct surveys to collect their requirements list.



Type of questions

- Multiple Choice
- Binary
- Ranking
- Closed
- Checklist response
- Production: This category of questions allows the respondent to provide personalized answers to questions. It can be used for gathering subjective responses to questions. An example here would be: If you could improve any aspect of our service, what would it be?
- Number scaled: always, mostly, sometimes, never



Cover letter for the Survey

Make sure you send a cover letter or notification letter out with the survey that clearly indicates:

- The purpose of the survey
- The sponsor
- How the results will be used
- Any incentives for participating in the survey
- Whether or not the responses will be confidential
- The deadline for submitting a response &
- The estimated time to complete the questionnaire



Sample questionnaire for childcare services



Thank you for taking the time to consider our questionnaire. If at anytime you do not wish to answer a question please leave blank and move on to the next question. Your opinion is very important to us.

1. Would you be interested in using an after school club, breakfast club, holiday club or day nursery?

☐
Immediately

☐
In 3-6 months

☐
In 6-12 months

☐
Not at all

2. How many children would you need places for?

3. On which days would you prefer the club/provision to run ?

☐

☐

☐

☐

☐

Monday

Tuesday

Wednesday

Thursday

Friday

4. Which opening times would you most prefer? e.g. 8am-6pm/9am-3pm

Your preferred opening times;

Additional day care for Pre school children, please state what your requirements would be.

Breakfast club

7.45am - 8.45pm ☐ 7.30am - 8.50am ☐ 8.00am - 8.50am ☐

After school club

3.00pm - 5.00pm ☐ 3.00pm - 5.30pm ☐ 3.00pm - 6.00pm ☐

Holiday club

8.00am - 5.00pm ☐ 8.30am - 5.30 pm ☐ 9.00am - 6.00 pm ☐

Others (please specify)

5. How much would you be prepared to pay for this service?

Child per hour/session

6. What activities would you want to see on offer?



University
of Victoria

Requirement Elicitation Techniques

Stakeholder Analysis

Brainstorming

Document Analysis

Job Shadowing

Interviews

Focus Groups

JAD

Reverse Engineering

Surveys/Questionnaire

Prototyping



University
of Victoria

10. Prototyping

- Prototyping is a newer technique used in requirement gathering.
- You create a prototype based on initial gathering results, like brainstorming or group interviews, to show a client an **early version of a workable solution**.
- The client can then give **more requirements or refine** existing ones to advance the project.
- This cycle of prototyping can last a few exchanges until the product meets the client's needs.



Scenario techniques for requirements elicitation

- The scenario techniques for requirements elicitation are based on the principle that users find it easier to transfer their expertise to the analyst through an **active 'story telling' session**, rather than through questionnaires and interviews.
- Together with prototyping techniques , scenario techniques present a promising solution to the difficult problem of communication and transfer of expertise that usually exist between the analyst and the user.



Users often have a difficult time expressing their needs. However, they are often very capable of explaining what they do and what their **problems** are. Their **activities and problems** can be documented using scenarios. There are three primary types of scenarios:

- **Problem Scenarios** – Describe problems encountered in performing their work.
- **Activity Scenarios** – Describe how users perform their daily work.
- **Interaction Scenarios** – Describe how users interact with the system.



Scenario 1- A University Library System

Consider a university library which has a computerised system for checking books in and out. A check-out scenario for a book is as follows. A student arrives at the assistance desk with a book to be checked out. The library assistant asks the student for his/her student card which contains the student's id. The assistant enters the id in the following screen

- The assistant checks the response to see if the borrower's privileges are restricted for any reason. If not, the book's id is entered on the screen.
- After the id is entered the book's title and the due date for the loan are displayed on the screen.
- The assistant enters a 'Y' at the 'OK' prompt and at that point the volume is on loan to the student.



University
of Victoria

Library assistant

- The scenario allows the elicitation of expertise from the user.
- The library assistant for example, will be in a position to **criticize** the above scenario for its lack of realism, much more easily than it would have been with the case of a formal requirements model.
- The library assistant could for example recall that
- **“When I am checking-out a book for a student, I always check if that student has any overdue books, in which case I remind the student about it, by showing the book titles and due-back dates.”**



Analyst

- The analyst understands such recalled experience as a **missing requirements** statement. More specifically, the analyst notes that
- **“Books which are overdue (defining overdue as the due date being after 'today') must be flagged as such and all overdue books for a student must be displayed on the screen in a checkout session.”**
- This methodology features the parallel development of requirements and a high-level design.

