INFO 201
Developing Information Systems 1
Lecture 5: Requirements Elicitation

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BUSINESS SCHOOL

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Learning objectives

- Describe the kinds of information needed to develop system requirements.
- Determine system requirements through various methods (review of documentation, interviews, questionnaires, ...).
- Discuss the need to validate system requirements to ensure accuracy and completeness, and the use of a structured walk-through.

Recall: Systems analysis activities

([Satzinger et al., 2016, pp. 40–42], Lecture 4)

Gather detailed information: interviews, questionnaires, documents, observing business processes, researching vendors, comments & suggestions (focus of this lecture)

Define system requirements: functional & non-functional (Lecture 4)

Prioritise requirements: essential vs. important vs. “nice to have”

Develop user interface dialogs: flow of interaction between user and system

Evaluate requirements with users: user involvement, feedback, & adapt to changes

Review recommendations with management

What is requirements elicitation?

[Satzinger et al., 2016, p. 50]

- The process of an analyst gathering information on what a system should do, from as many sources as possible.
- All methods are effective but some are more efficient than others.
- Can combine different methods for more comprehensive fact-finding.

SOURCE: Pexels (Tima Miroshnichenko)

Characteristics of good analysts

Impertinence	question everything, assume nothing
Impartiality	find the best solution to the business problem
Relax constraints	assume anything is possible but eliminate the infeasible
Attention to detail	be precise, comprehensive, and consistent
Re-framing	be creative and “think outside the box”

More ways to classify stakeholders

([Satzinger et al., 2016, pp. 47–48], also see Lecture 4)

Internal people *within* the organisation, e.g., employees, volunteers, ...

External people *outside* the organisation, e.g., suppliers or shipping companies.

Operational people who regularly *interact with the system*, e.g., accountants, factory supervisors, customers, ...

Executive people who don't directly interact, but *use the information* or *have a financial interest*, e.g., senior managers, board of directors, regulatory authorities, ...

Information gathering: Themes

[Satzinger et al., 2016, pp. 50–51]

Theme	Questions to users
What are the business operations and processes?	What do you do?
How should those operations be performed?	How do you do it? What steps do you follow? How could they be done differently?
What information is needed to perform those operations?	What information do you use? What inputs do you use? What outputs do you produce?

But what's the focus of the questions?

Information gathering: Existing systems

[Satzinger et al., 2016, pp. 50–51]

- Beware of paying too much attention to an existing system:
  - can waste time and effort and only reimplement the same procedures (also see business process re-engineering, Lecture 7)

  BUT: also need to identify deficiencies of existing system to be addressed in new system
- Need for balanced review of current business functions with discovery of new system requirements.
- New perspectives on solving the problem are valued.

Information gathering: Models

[Satzinger et al., 2016, p. 58]

A primary output of the requirements phase
is a large collection of abstract models.

Why so many?

- We learn more about the problem domain by modelling it from different perspectives.
- Abstraction can reduce complexity. (if not taken to extremes)
- We need to document all the details:
  - so that we remember everything
  - to support future maintenance/enhancement
- Useful for communicating with both stakeholders and other developers. (broad range of technical experience)

Fact-finding methods

[Satzinger et al., 2016, pp. 51–58]

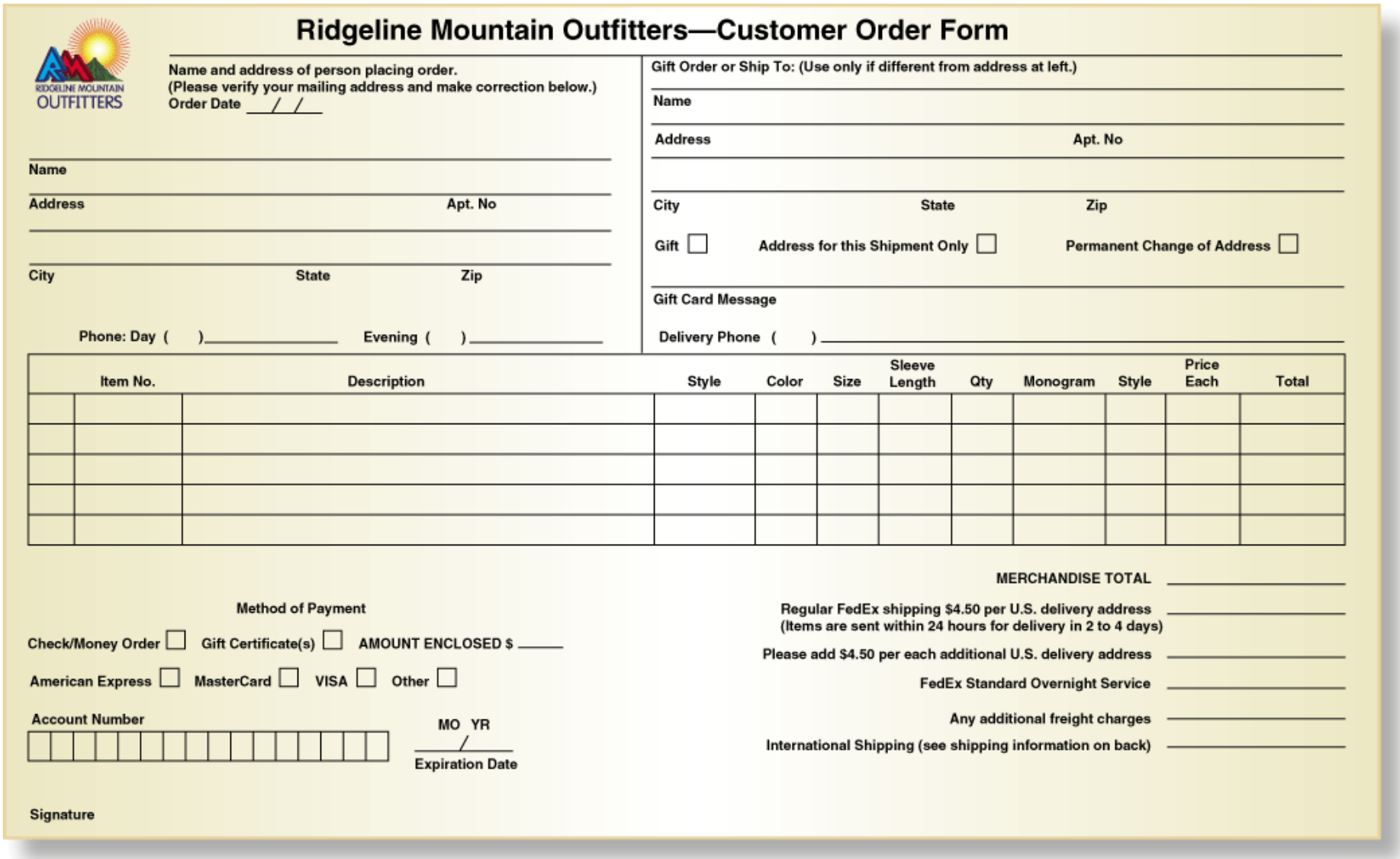
1. Review existing reports, forms, and procedure descriptions.
2. Interviews and discussions with users.
3. Observe and document business processes.
4. Build prototypes.
5. Questionnaires.
6. Research vendor solutions.

1. Review existing materials

- From external sources, e.g., industry professional organisations or trade publications.
- Internal "forms": (paper or digital)
  - includes forms, invoices, reports, ...
  - composed of one or more entities (i.e., not entities themselves)
  - calculated fields are not always stored (e.g., "total amount", GST)
- Internal business documents and procedure descriptions:
  - identify business rules, discrepancies, exceptions, redundancies
  - watch out for outdated material
  - obtain preliminary understanding of processes
  - use as guidelines or visual cues to guide interviews

Example of an existing order form

[Satzinger et al., 2016, p. 56]



Ridgeline Mountain Outfitters—Customer Order Form

RIDGELINE MOUNTAIN OUTFITTERS

Name and address of person placing order.
(Please verify your mailing address and make correction below.)
Order Date ___/___/___

Name

Address Apt. No

City State Zip

Phone: Day ( ) Evening ( )

Gift Order or Ship To: (Use only if different from address at left.)

Name

Address Apt. No

City State Zip

Gift ☐ Address for this Shipment Only ☐ Permanent Change of Address ☐

Gift Card Message

Delivery Phone ( )

	Item No.	Description	Style	Color	Size	Sleeve Length	Qty	Monogram	Style	Price Each	Total

MERCHANDISE TOTAL

Regular FedEx shipping $4.50 per U.S. delivery address
(Items are sent within 24 hours for delivery in 2 to 4 days)

Please add $4.50 per each additional U.S. delivery address

FedEx Standard Overnight Service

Any additional freight charges

International Shipping (see shipping information on back)

Method of Payment

Check/Money Order ☐ Gift Certificate(s) ☐ AMOUNT ENCLOSED $ ____

American Express ☐ MasterCard ☐ VISA ☐ Other ☐

Account Number

MO YR
___/___
Expiration Date

Signature

SOURCE: Pexels (fauxels)

2. Interviews and discussions with users

- Effective way to understand business functions and rules..
- Meet with individuals or groups of users.
- Prepared questions vs. open-ended discussion. (both useful)
- May require multiple sessions to:
  - meet all users
  - understand all processing requirements

Example of a user interview checklist

[Satzinger et al., 2016, p. 52]

Before

- ❑ Establish the objective for the interview.
- ❑ Determine correct user(s) to be involved.
- ❑ Determine project team members to participate.
- ❑ Build a list of questions and issues to be discussed.
- ❑ Review related documents and materials.
- ❑ Set the time and location.
- ❑ Inform all participants of objective, time, and location.

During

- ❑ Arrive on time.
- ❑ Look for exception and error conditions.
- ❑ Probe for details.
- ❑ Take thorough notes.
- ❑ Identify and document unanswered items or open questions.

After

- ❑ Review notes for accuracy, completeness, and understanding.
- ❑ Transfer information to appropriate models and documents.
- ❑ Identify areas needing further documentation.
- ❑ Thank the participants.
- ❑ Follow up on open and unanswered questions.

Example of an interview agenda

[Satzinger et al., 2016, p. 53]

Discussion and Interview Agenda

Setting

Objective of Interview
Determine processing rules for sales commission rates

Date, Time, and Location
April 21, 2016, at 9:00 a.m. in William McDougal's office

User Participants (names and titles/positions)
William McDougal, vice president of marketing and sales, and several of his staff

Project Team Participants
Mary Ellen Green and Jim Williams

⋮

⋮

Interview/Discussion

1. *Who is eligible for sales commissions?*
2. *What is the basis for commissions? What rates are paid?*
3. *How is commission for returns handled?*
4. *Are there special incentives? Contests? Programs based on time?*
5. *Is there a variable scale for commissions? Are there quotas?*
6. *What are the exceptions?*

Follow-Up

Important decisions or answers to questions
See attached write-up on commission policies

Open items not resolved with assignments for solution
See items numbers 2 and 3 on open items list

Date and time of next meeting or follow-up session
April 28, 2016, at 9:00 a.m.

Pros and cons of interviews/discussions

Advantages

- Free and open answers.
- Interviewee(s) actively contribute.
- Can ask follow-up questions to gain more insight or clarify a question or answer.

Disadvantages

- Time consuming and resource intensive.
- Success highly dependent upon analyst's communication skills.
- Location or schedule of interviewee(s) can make interviewing impractical.

3. Observe and document business processes

- Various approaches, e.g., office walk-through, “shadowing” users, performing actual tasks, ...
- Not necessary to observe all processes at same level of detail.
- May make users nervous—use common sense.
- Document using workflow diagrams. (see Lecture 7, also Lecture 14)

4. Build prototypes

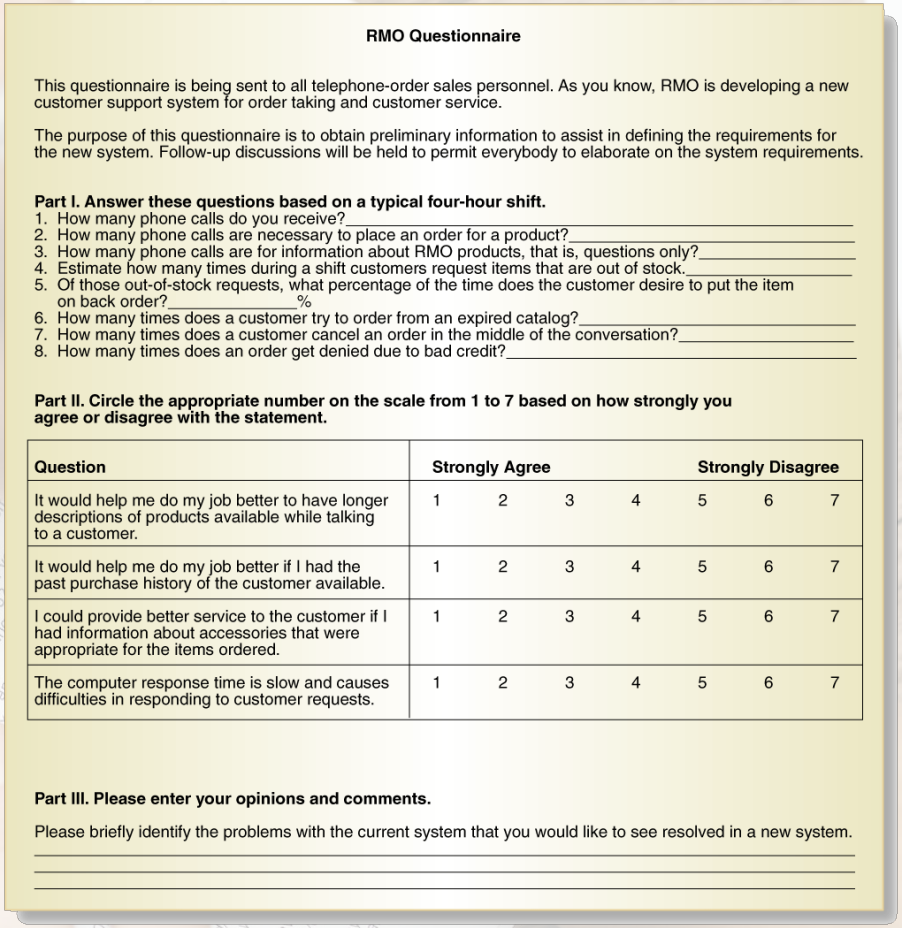
- Preliminary working model of a larger, more complex system:
  - to test and evolve concepts
  - to evaluate “look and feel”
- Focused on accomplishing a single objective.
- Built quickly using integrated development environment (IDE) and/or rapid application development (RAD) frameworks.

SOURCE: Pexels (RODNAE Productions)

5. Questionnaires

[Satzinger et al., 2016, pp. 54–55]

- Limited and specific information from a large number of stakeholders.
- Preliminary insight into business.
- Not well suited for gathering detailed information.
- *Closed-ended questions* have simple, direct answers. (e.g., "no" ☺)
- *Open-ended questions* encourage discussion and elaboration.



RMO Questionnaire

This questionnaire is being sent to all telephone-order sales personnel. As you know, RMO is developing a new customer support system for order taking and customer service.

The purpose of this questionnaire is to obtain preliminary information to assist in defining the requirements for the new system. Follow-up discussions will be held to permit everybody to elaborate on the system requirements.

Part I. Answer these questions based on a typical four-hour shift.

1. How many phone calls do you receive?_____
2. How many phone calls are necessary to place an order for a product?_____
3. How many phone calls are for information about RMO products, that is, questions only?_____
4. Estimate how many times during a shift customers request items that are out of stock._____
5. Of those out-of-stock requests, what percentage of the time does the customer desire to put the item on back order?_____%
6. How many times does a customer try to order from an expired catalog?_____
7. How many times does a customer cancel an order in the middle of the conversation?_____
8. How many times does an order get denied due to bad credit?_____

Part II. Circle the appropriate number on the scale from 1 to 7 based on how strongly you agree or disagree with the statement.

Question	Strongly Agree						Strongly Disagree
It would help me do my job better to have longer descriptions of products available while talking to a customer.	1	2	3	4	5	6	7
It would help me do my job better if I had the past purchase history of the customer available.	1	2	3	4	5	6	7
I could provide better service to the customer if I had information about accessories that were appropriate for the items ordered.	1	2	3	4	5	6	7
The computer response time is slow and causes difficulties in responding to customer requests.	1	2	3	4	5	6	7

Part III. Please enter your opinions and comments.

Please briefly identify the problems with the current system that you would like to see resolved in a new system.

6. Research vendor solutions

(i.e., “off-the-shelf” systems)

- Takes advantage of existing knowledge and solutions.
- Can potentially avoid costly mistakes and save time and money.
- Advantages:
  - helps users generate new ideas about how best to perform their business functions
  - existing solutions could be excellent and state of the art
  - often cheaper and less risky to buy a solution than to build it
    (also see Lecture 24)

BUT: Risky to purchase a vendor solution before requirements are fully known:

- may find it only supports half the required functionality

$\Rightarrow$ best to wait until requirements thoroughly investigated

Outputs of requirements elicitation

- Information collected from:
  - interview transcripts
  - questionnaire responses
  - observation notes
  - meeting minutes
- Existing written information:
  - business mission and strategy statements
  - sample business forms
  - reports and computer displays
  - job descriptions
  - training manuals and procedure manuals
- Digital information:
  - VCS repository contents and reports of existing systems
  - system prototypes plus displays and reports from them
- Results of vendor solution research.

Validating requirements

- Ensure gathered information is correct.
- Structured walk-through:
  - effective way to implement quality control early in project
  - verify and validate system requirements
  - review of findings from investigation
  - review of models based on findings
- Project manager responsible for system quality.
- Schedule review soon after document creation.
- Review conducted by experienced analyst and stakeholders, presented by analyst.

Requirements validation is essential:
incorrect requirements ⇒ incorrect system!

Revisiting requirements in agile methodologies

- Requirements should be decoupled:
  - i.e., as independent as possible
  - identify *which* requirements to implement not *when* to implement them
- Every iteration includes a requirements collection and prioritisation activity:
  - important requirements are implemented next
  - less important requirements held to later iterations, or not implemented at all

Scrum: product backlog
UP: inception & elaboration phases
XP: user stories

SOURCE: Pexels (Yan Krukau)

Eliciting requirements is difficult

- Users:
  - unable to articulate requirements
  - ignorant of relevant technology (but may *think* they understand it!)
  - reluctant to discuss requirements
  - may contradict or disagree with others
- Language/terminology barriers between analyst and user.
- Often need multiple user sources to fully understand a requirement.
- Analyst lacks the skills to obtain requirements.
- Personality issues, e.g., analyst too assertive or abrasive.

Lecture summary

- Characteristics of a good analyst.
- Primary information gathering techniques:
  - review existing materials
  - interviews and discussions with users
  - observe and document business processes
  - build prototypes
  - questionnaires
  - research vendor solutions

Revision questions

1. What types of stakeholders should you include in fact finding?
2. List and briefly describe the six main information gathering techniques.
3. What are the benefits of doing vendor research during information gathering?
4. Describe the steps in preparing for, conducting, and following up an interview session.
5. How could prototypes be used to improve the quality of requirements?

References

Satzinger, J. W., Jackson, R. B., and Burd, S. D. (2016). *Systems Analysis and Design in a Changing World*. Cengage, 7th edition.