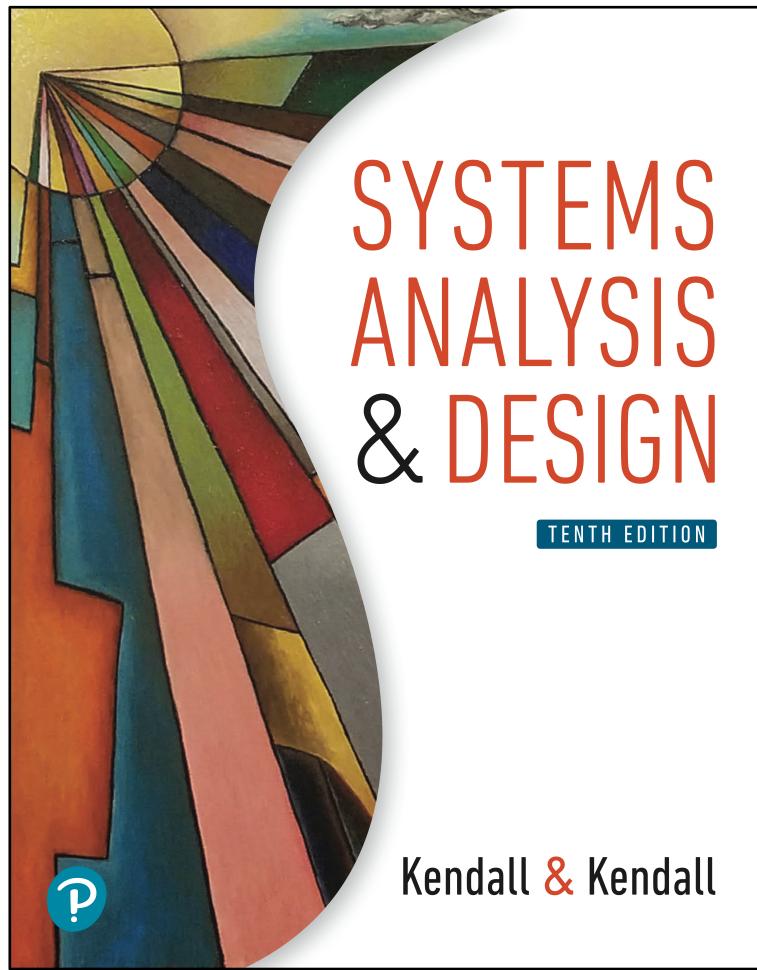


Systems Analysis & Design

Tenth Edition



Chapter 5

Information Gathering:
Unobtrusive Methods

Learning Objectives (1 of 2)

5.1 Recognize the value of unobtrusive methods for information gathering

5.2 Understand the concept of sampling for human information requirements analysis

5.3 Construct useful samples of people, documents, and events for determining human information requirements

Learning Objectives (2 of 2)

- 5.4** Interpret managers' and customers' messages, interviews, and communications using text analytics
- 5.5** Create an analyst's playscript to observe decision-maker activities
- 5.6** Apply the STROBE technique to observe and interpret the decision maker's environment

Unobtrusive Methods

- Less disruptive
- Text analytics to analyze qualitative data
- Insufficient when used alone
- Multiple methods approach
- Used in conjunction with interactive methods

Major Topics

- Sampling
- Quantitative document analysis
- Qualitative document analysis
- Text analytics
- Observation
- STROBE
- Applying STROBE

Sampling (1 of 2)

- A process of systematically selecting representative elements of a population
- Involves two key decisions:
 - What to examine
 - Which people to consider

Need for Sampling (1 of 2)

The reasons systems analysts do sampling are to

- Contain costs
- Speed up data gathering
- Improve effectiveness
- Data gathering bias can be reduced by sampling

Need for Sampling (2 of 2)

- Too costly to
 - Examine every scrap of paper
 - Talk with everyone
 - Read every Web page from the organization

Sampling (2 of 2)

- Sampling helps accelerate the process by gathering selected data rather than all data for the entire population
- The systems analyst is spared the burden of analyzing data from the entire population

Sampling Effectiveness

- Sampling can help improve effectiveness if information that is more accurate can be obtained
- This is accomplished by talking to fewer employees but asking them questions that are more detailed
- If fewer people are interviewed, the systems analyst has more time to follow up on missing or incomplete data

Sampling Bias

- Data gathering bias can be reduced by sampling
- When the systems analyst asks for an opinion about a permanent feature of the installed information system, the executive interviewed may provide a biased evaluation because there is little possibility of changing it

Sampling Design

- To design a good sample, a systems analyst must follow four steps:
 - Determining the data to be collected or described
 - Determining the population to be sampled
 - Choosing the type of sample
 - Deciding on the sample size

Figure 5.1 Four Main Types of Samples the Analyst Has Available

	Not Based on Probability	Based on Probability
Sample elements are selected directly without restrictions	Convenience	Simple random
Sample elements are selected according to specific criteria	Purposive	Complex random (systematic, stratified, and cluster)

The systems analyst should use a complex random sample if possible.

Four Main Types of Samples

- Convenience
- Purposive
- Simple random
- Complex random

Convenience Samples

- Convenience samples are unrestricted, nonprobability samples
- This sample is the easiest to arrange
- The most unreliable

Purposive Sample

- A purposive sample is based on judgment
- Choose a group of individuals who appear knowledgeable and are interested in the new information system
- A nonprobability sample
- Only moderately reliable

Complex Random Samples

- The complex random samples that are most appropriate for a systems analyst are
 - Systematic sampling
 - Stratified sampling
 - Cluster sampling

The Sample Size Decision

- Determine the attribute
- Locate the database or reports in which the attribute can be found
- Examine the attribute
- Make the subjective decision regarding the acceptable interval estimate
- Choose the confidence level
- Calculate the standard error
- Determine the sample size

Figure 5.2 A Table of Area under a Normal Curve Can Be Used to Look up a Value Once the Systems Analyst Decides on the Confidence Level

Confidence Level	Confidence Coefficient (z value)
99%	2.58
98	2.33
97	2.17
96	2.05
95	1.96
90	1.65
80	1.28
50	0.67

First decide on the confidence level...

... then look up the z value.

Calculate the Standard Error of the Proportion

$$\sigma_p = \frac{i}{z}$$

i = interval estimate

z = confidence coefficient found in the confidence level
lookup table

Determine the Sample Size

$$n = \frac{p(1-p)}{\sigma_{\rho}^2} + 1$$

σ_{ρ} = standard error

ρ = the proportion of the population having the attribute

Example: A. Sembly Company

- Determine that you are looking for orders with mistakes
- Locate order forms from the past six months
- Examine order forms and conclude that $p = 5\%$
- Subjective decision of acceptable interval $i = \pm 0.02$
- Look up confidence coefficient z - value = 1.96
- Calculate $\sigma_p = \frac{i}{z} = \frac{0.02}{1.96} = 0.0102$
- Determine n; n = 458

Investigation

- The act of discovery and analysis of data
- Hard data
 - Quantitative
 - Qualitative

Analyzing Quantitative Documents

- Reports used for decision making
- Performance reports
- Records
- Data capture forms
- Ecommerce and other transactions

Reports Used for Decision Making

- Sales reports
- Production reports
- Summary reports

Figure 5.3 A Performance Report Showing Improvement

Week	Number of Batches Produced	Number of Batches Rejected	Percentage Rejected	Amount Away from 5% Goal
2/2	245	19	7.8	2.8
2/9	229	19	8.3	3.3
2/16	219	14	6.3	1.3
2/23	252	13	5.2	0.2
3/2	245	13	5.3	0.3
3/9	260	13	5.0	***
3/16	275	14	5.1	0.1
3/23	260	13	5.0	***
3/30	260	13	5.0	***
4/6	244	12	4.9	***
4/13	242	11	4.5	***
4/20	249	11	4.4	***
4/27	249	11	4.4	***

*** indicates met or exceeded the < 5% goal

Performance reports show goals ...

... and trends.

Figure 5.4 A Manually Completed Payment Record

PROJ. NAME <u>OAK. FC</u> # <u>562</u>										KEY SIGNATURE _____							
RENT POTENTIAL					1175/0	81299	DEPOSIT POTENTIAL			PRORATE			<u>15⁰⁰</u> <u>121³²</u>				
Base Rent	Refrig- erator	Furni- ture	A/C	Util.	HMSR	T.V.	Maid	Total Rent	Secur- ity	Clean- ing	31175/0	81299	31700 Tax	Days	Daily Rate	Totals	
855	55							910			H/Sdep.	H/S rent		4	30.33 4.30	910 39	
									200	115					Deposits 31. ⁶³	340	
PAYMENT RECORD: Tot. 31175/0 + 81299 + Rent = <u>910</u>										TOTAL INITIAL PAYMENT REQUIRED: <u>1430.⁵²</u>							
Memo Only		Date Due	Date Paid	Receipt Number	Paid to Noon	Total Rent	Secur- ity	Clean- ing	31700 Tax	31175/0	81299 Dates	Other Desc.	Amt.	Amount Paid	Balance Due		
TV 10/3 MO!		8/28	8/28	106642	9/30	1031. ³²	202	115	44. ²⁰	25			414. ⁸²	15	1430. ⁵²	0'	
		10/1	10/3	107503	10/31	910									910	0'	
		11/1	11/1	10935	11/16	485. ²⁸									485. ²⁸	0'	
C1H/S9-16		11/17	11/8	11200	11/23	212. ³¹									212. ³¹	0'	
Bill 1 MO Prorated																	
H/S should be created toward refund deposit																	
Orig. Move-in Date <u>8-28</u>										d	same	Exp.	x #	1			
BLDG. # _____										NAME <u>Kendall</u>					1st		

Note: The form contains several handwritten annotations and arrows pointing to specific fields:

- An arrow points from a sticky note "Check for errors." to the project name field.
- An arrow points from a sticky note "Look for opportunities for improvement in design." to the key signature field.
- An arrow points from a sticky note "Observe the number and type of transactions." to the payment record section.
- An arrow points from a sticky note "Watch for places the computer can simplify the work." to the move-in date section.

Records

- Records provide periodic updates of what is occurring in the business
- There are several ways to inspect a record:
 - Checking for errors in amounts and totals
 - Looking for opportunities for improving the recording form design
 - Observing the number and type of transactions
 - Watching for instances in which the computer can simplify the work (calculations and other data manipulation)

Data Capture Forms

- Collect examples of all the forms in use
- Note the type of form
- Document the intended distribution pattern
- Compare the intended distribution pattern with who actually receives the form

Figure 5.5 Questions to Ask about Official and Bootleg Forms That Are Already Filled out

Farmfresh
Reorder of Shorted Dairy Products

Date _____	Store Name _____	Store Number _____	
Item Requested	Cases	Item Requested	Cases
Milk (1/2 gals.)		Milk (quarts)	
Whole	_____	Whole	_____
2%	_____	2%	_____
1%	_____	1%	_____
Skim	_____	Skim	_____
Buttermilk	_____	Buttermilk	_____
Chocolate	_____	Chocolate	_____
Yogurt			
Plain	_____	Pineapple	_____
Vanilla	_____	Dutch Apple	_____
Peach	_____	Banana	_____
Blueberry	_____	Mixed Fruit	_____
Boysenberry	_____	Raspberry	_____
Strawberry	_____	Lemon	_____
Ice Cream			
Deluxe Pints	_____	Deluxe Quarts	_____
Deluxe 1/2 Gallons	_____	Premium Pints	_____
Skinny Minnies	_____	Premium Quarts	_____
Requested by (employee number) _____		Total Cases Ordered _____	
Reason for Shortage _____			
Driver Number _____		Route Number _____	
Store _____ Date _____		Driver _____ Cases needed _____	
Product shorted _____			
Dairy manager's initials _____			

Official form can overwhelm people by asking for too much information.

There may be no logical order to the form.

Is the total really needed?

"Bootleg" forms arise to simplify the problem.

Questions to Ask about Forms

- Is the form filled out in its entirety?
- Are there forms that are never used?
- Are all copies of forms circulated to the proper people or filed appropriately?
- Check on permissions and functioning form links.
- Can people who must access online forms do so?
- If there is a paper form that is offered as an alternative to a Web-based form, compare the completion rates for both.
- Are “unofficial” forms being used on a regular basis?

Analyzing Qualitative Documents (1 of 2)

- Key or guiding metaphors
- Insiders vs. outsiders mentality
- What is considered good vs. evil
- Graphics, logos, and icons in common areas or web pages
- A sense of humor

Analyzing Qualitative Documents (2 of 2)

- Email messages
- Memos
- Signs or posters on bulletin boards
- Corporate Web sites (note the interactivity of Web sites)
- Manuals
- Policy handbooks

Figure 5.6 Analysis of Memos Provides Insight into the Metaphors That Guide the Organization's Thinking

MEMO

To: All Night Call Desk Staff
From: S. Leep, Night Manager
Date: 2/15/2018
Re: Get Acquainted Party Tonight

It's a pleasure to welcome two new 11-7 Call Desk staff members, Twyla Tine and Al Knight. I'm sure they'll enjoy working here. Being together in the wee hours makes us feel like one big happy family. Remember for your breaks tonight that some of the crew has brought in food. Help yourself to the spread you find in the break room, and welcome to the clan, Twyla and Al.

Text Analytics (1 of 3)

- Software that can analyze unstructured qualitative data from any source including:
 - Transcripts of interviews
 - Written reports
 - Customers' communication collected through email, wikis, blogs, chat rooms, and other social networking sites

Text Analytics (2 of 3)

- Unstructured, qualitative, or “soft” data are generated through:
 - Blogs
 - Chat rooms
 - Questionnaires using open-ended questions
 - Online discussions conducted on the Web
 - Exchanges occurring on social media

Text Analytics Can Help

- Text analytics can realize valuable insights into
 - What customers are thinking about the organization, the values and actions of the company
 - Customer or vendor motivations for beginning, maintaining, improving, or discontinuing a relationship

Figure 5.7 Concept Map Showing Prominence and Relationships of Concepts

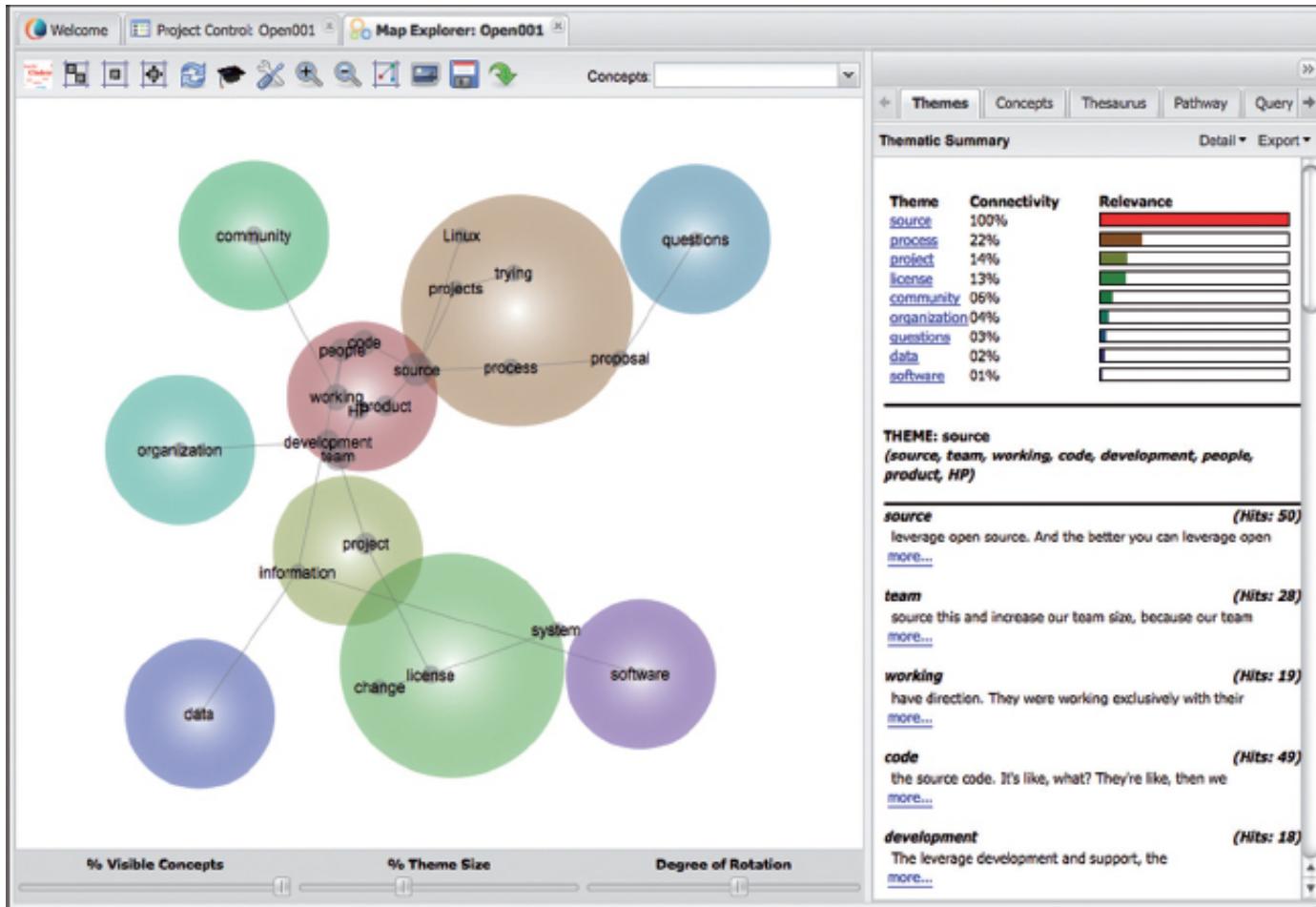
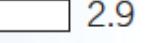
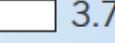


Figure 5.8 Ranked Concepts for Categories Overview

Category: community				Category: license			
Concept	Rel Freq (%)	Strength (%)	Prominence	Concept	Rel Freq (%)	Strength (%)	Prominence
development	2	5	  4.1	project	11	4	 8.6
information	2	5	  4.1	system	5	3	 7.1
source	4	4	  2.9	source	5	2	  3.7
system	< 1	< 1	 0.0	team	< 1	< 1	 0.0
project	< 1	< 1	 0.0	organization	< 1	< 1	 0.0
team	< 1	< 1	 0.0	development	< 1	< 1	 0.0
organization	< 1	< 1	 0.0	product	< 1	< 1	 0.0
product	< 1	< 1	 0.0	information	< 1	< 1	 0.0

Text Analytics (3 of 3)

- Text analytics provide insights for an organization's members who want to have a rapid and visual yet decidedly qualitative approach to analyzing text data
- An important element is to design the human activities surrounding the use of text analytics software

Observation

- Observation provides insight on what organizational members actually do
- See firsthand the relationships that exist between decision makers and other organizational members
- Can also reveal important clues regarding HCI concerns

Analyst's Playscript

- Involves observing the decision-makers behavior and recording their actions using a series of action verbs
- Examples:
 - Talking
 - Sampling
 - Corresponding
 - Deciding

Figure 5.9 A Sample Page from the Analyst's Playscript

Playscript Analysis	Company: Solid Steel Shelving	Scenario: Quality Assurance
	Analyst: L. Brackett	Date: 1/3/2018
Decision Maker (Actor)	Information-Related Activity (Script)	
Quality Assurance Manager	Asks shop floor supervisor for the day's production report	
Shop Floor Supervisor	Prints out daily computerized production report	
Discusses recurring problems in production runs with quality assurance (QA) manager		
Quality Assurance Manager	Reads production report	
Compares current report with other reports from the same week		
Inputs data from daily production run into QA model on computer		
Observes onscreen results of QA model		
Calls steel suppliers to discuss deviations from quality standards		
Shop Floor Supervisor	Attends meeting on new quality specifications with quality assurance manager and vice president of production	
Quality Assurance Manager	Drafts letter to inform suppliers on new quality specifications agreed on in meeting	
Sends draft to vice president via email		
Vice President of Production	Reads drafted letter	
Returns corrections and comments via email		
Quality Assurance Manager	Reads corrected letter on email	
Rewrites letter to reflect changes		

STROBE (1 of 2)

- **STRuctured OBservation of the Environment**—a technique for observing the decision-maker's physical environment

STROBE (2 of 2)

- Often it is possible to observe the particulars of the surroundings that will confirm or negate the organizational narrative
 - Also called stories or dialogue
 - Information that is found through interviews or questionnaires

STROBE Elements

- Office location
- Desk placement
- Stationary equipment
- Props
- External information sources
- Office lighting and color
- Clothing worn by decision makers

Figure 5.10 Seven Concrete Observable Elements of STROBE

Observable Element	Questions an Analyst Might Investigate
Office location	Who has the corner office? Are the key decision makers dispersed over separate floors?
Desk placement	Does the placement of the desk encourage communication? Does the placement demonstrate power?
Stationary equipment	Does the decision maker prefer to gather and store information personally? Is the storage area large or small?
Props	Is there evidence that the decision maker uses a PC, smartphone, or tablet computer in the office
External information sources	Does the decision maker get much information from external sources such as trade journals or the Web?
Office lighting and color	Is the lighting set up to do detailed work or more appropriate for casual communication? Are the colors warm and inviting?
Clothing worn by decision makers	Does the decision maker show authority by wearing conservative suits? Are employees required to wear uniforms?

Office Location

- Who has the corner office?
- Are the key decision makers dispersed over separate floors?

Desk Placement

- Does the placement of the desk encourage communication?
- Does the placement demonstrate power?

Stationary Office Equipment

- Does the decision maker prefer to gather and store information personally?
- Is the storage area large or small?

Props

- Is there evidence that the decision maker uses a PC, smart phone, or tablet computer in the office?

External Information Sources

- Does the decision maker get much information from external sources such as trade journals or the Web?

Office Lighting and Color

- Is the lighting set up to do detailed work or more appropriate for casual communication?
- Are the colors warm and inviting?

Clothing

- Does the decision maker show authority by wearing conservative suits?
- Are employees required to wear uniforms?

Figure 5.11 STROBE and Decision-Maker Characteristics

Characteristics of Decision Makers	Corresponding Elements Characteristics of Decision Makers in the Physical Environment
Gathers information informally	Warm, incandescent lighting and colors
Seeks extraorganization information	Trade journals present in office
Processes data personally	PCs, or tablet computers present in office
Stores information personally	Equipment/files present in office
Exercises power in decision making	Desk placed for power
Exhibits credibility in decision making	Wears authoritative clothing
Shares information with others	Office easily accessible

Applying STROBE

- The five symbols used to evaluate how observation of the elements of STROBE compared with interview results are:
 - A checkmark means the narrative is confirmed
 - An “X” means the narrative is reversed
 - An oval or eye-shaped symbol serves as a cue to look further
 - A square means observation modifies the narrative
 - A circle means narrative is supplemented by observation

Figure 5.12 An Anecdotal List with Symbols

Anecdotal List with Symbols for Applying STROBE			
Narrative Portrayed by Organization Members	Office Location and Equipment	Office Lighting, Color, and Graphics	Clothing of the Decision Maker
Information is readily flowing on all levels.	✗	●	●
Adams says, "I figure out the percentages myself."	✗	●	●
Vinnie says, "I like to read up on these things."	✓	●	●
Ed says, "The right hand doesn't always know what the left hand is doing."	❖	●	●
Adams says, "Our company doesn't change much."	●	✓	●
The operations staff works all night sometimes.	●	❖	●
Vinnie says, "We do things the way Mr. Adams wants to."	●	●	□
Julie says, "Stanley doesn't seem to care sometimes."	●	●	✓
	●	●	●
	●	●	●
	●	●	●
	●	●	●
	●	●	●

Key

- ✓ Confirm the narrative
- ✗ Negate or reverse the narrative
- ❖ Cue to look further
- Modify the narrative
- Supplement the narrative

Summary (1 of 2)

- Sampling
 - Designing a good sample
 - Types of samples
 - Sample size
- Hard data
 - Quantitative document analysis
 - Qualitative document analysis

Summary (2 of 2)

- Observation
- Text analytics
- STROBE
 - STROBE elements
 - Applying STROBE

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