

Information Gathering Techniques

A full guide with explanations and examples — built on the 5W1H framework

Course: Systems Analysis and Design (Analisis Desain Sistem Informasi)

Topic: Week 2 — Gathering information from an organization

Based on: Kendall & Kendall; Dennis, Wixom & Roth; Satzinger, Jackson & Burd (full list at the end)

Learning Objectives

This module explains how a system analyst collects the facts needed to build an information system. It gives the ideas behind each technique, not just the names, and shows small examples so you can see each one in action.

After you finish this module, you should be able to:

- Explain what information gathering is and where it fits in the SDLC.
- Use the 5W1H questions to guide your study of a system.
- Describe three interactive and three unobtrusive techniques.
- Give the main strength and weakness of each technique.
- Choose and combine techniques for a real task.

1. Introduction

Every information system is built to support real work done by real people. Before an analyst can design screens, databases, or reports, the analyst must first understand that work. This understanding does not appear by itself. The analyst has to go out and collect it. We call this activity information gathering. Another common name for it is requirements elicitation.

Information gathering happens early in the System Development Life Cycle (SDLC), during the analysis phase. The facts collected here become the requirements. Requirements describe what the system must do. Every later step — the process models (DFD), the object models (UML), the database, and finally the program code — is built on top of these requirements. So the whole project stands on the facts gathered at the start.

Because everything rests on the requirements, a mistake made here is costly. A need that is missed in the second week may not be noticed until testing, months later. By then, fixing it means changing models, code, and documents all at once. It has long been known in software engineering that an error found late costs far more to fix than the same error found early. This is the simple reason analysts spend real care on gathering information well.

Key idea: There is a short phrase that captures all of this — garbage in, garbage out. If the facts going in are wrong, the system coming out will be wrong, no matter how good the design or the code.

Example — the cost of a missed fact

An analyst builds an order system for a small shop. Nobody mentions that some customers pay in two parts. The system is finished before the gap is found.

Now the database, the screens, and the reports must all change to store partial payments. A single missed question in week two becomes days of rework near the deadline.

2. The 5W1H Framework

When an analyst first studies a process, it is easy to feel lost. There is a lot to learn, and it is hard to know where to begin. A simple tool helps: the 5W1H questions. These are six plain questions — Who, What, Where, When, Why, and How. The analyst asks them about each process, form, or rule. Each answer adds a piece to the picture. Each question that has no answer yet shows a gap that still needs work.

Who — Who uses the system? Who does the work? Who provides or receives the information?

What — What data, tasks, and functions are involved? What does the system need to do?

Where — Where does the work happen? Which units, places, or systems take part?

When — When does each event occur? How often? Are there deadlines or busy times?

Why — Why is the system needed? What problem does it solve? What is the business goal?

How — How is the work actually performed, step by step? What are the rules?

The power of 5W1H is that it works with every technique in this module. Whether you are interviewing a manager or reading a form, these six questions keep your study complete.

Example — 5W1H for a library loan

Who: students and librarians.

What: book loans and returns.

Where: the front desk, and the online catalogue.

When: during opening hours; each loan lasts 14 days.

Why: to track books and reduce loss.

How: the student shows a card, the librarian scans the book, the system saves the due date.

3. Two Families of Techniques

Over the years, analysts have created many ways to gather information. Almost all of them fit into two families: interactive methods and unobtrusive methods.

Interactive methods: The analyst works directly with people. The analyst asks, and people answer. Interviews, JAD workshops, and questionnaires belong here. Their strength is that people can explain their needs, their problems, and the exceptions that simple rules never cover.

Unobtrusive methods: The word unobtrusive means without disturbing. Here the analyst studies evidence quietly and does not take people's time. Sampling, document investigation, and the analysis of hard data belong here. Their strength is that they show facts, not just opinions.

Neither family is enough on its own. People may forget details, or describe work as it should be done rather than as it is really done. Documents may be out of date. For this reason, good analysts use both families and compare the results. This cross-checking is called triangulation, and we return to it near the end of the module.

4. Interactive Methods

4.1 Interview

The interview is the most common way to gather information. It is a planned conversation, usually between one analyst and one person. The analyst asks questions and listens carefully. The goal is to understand that person's part of the work in depth, including the small details and the special cases.

Two kinds of questions: Interviews use open and closed questions. An open question invites a long, free answer, such as “How do you handle a late payment?” Open questions are good for ideas and for problems you did not expect. A closed question asks for a short, exact answer, such as “How many orders do you process each day?” Closed questions are good for facts and numbers. A strong interview mixes both.

Structured or unstructured: In a structured interview, the analyst prepares a fixed list of questions and follows it in order. This makes different interviews easy to compare. In an unstructured interview, the analyst has a topic but lets the conversation flow, which can uncover surprises. Many analysts use a middle path: a prepared list, with room to follow interesting answers.

How to run it:

1. Choose the right person and set a clear goal for the interview.
2. Prepare your questions, mixing open and closed types.
3. During the talk, build rapport, listen more than you speak, and take notes.
4. Afterwards, write a summary and confirm it with the person.

Strength: It gives rich, deep detail, and you can ask a follow-up question at once.

Weakness: It takes time, and it does not scale to hundreds of people. Answers can also carry personal bias.

Example — one interview question leads to another

Analyst: “What happens when an order arrives after 5 p.m.?”

Clerk: “We hold it for the next day, unless it is marked urgent.”

The word “unless” reveals a hidden rule. The analyst now asks how “urgent” orders are marked and handled — a detail no form would have shown.

4.2 Joint Application Development (JAD)

Sometimes many people share one process, and interviewing them one by one takes too long. Their answers may also disagree. Joint Application Development, or JAD, was created to solve this. JAD brings the key people into one room for a focused workshop. Together they discuss the process and agree on the requirements in a much shorter time.

The roles: A JAD session has clear roles. A facilitator leads the session and keeps it neutral and on track. A scribe records every decision. Users and managers bring knowledge of the work. Analysts listen and shape the results. A sponsor, usually a senior manager, supports the effort and helps make final decisions.

When and why: JAD is useful when a decision needs many voices and must be made quickly. Because everyone is present, disagreements are settled on the spot, instead of through weeks of separate meetings and messages.

How to run it:

1. Pick a neutral facilitator and a scribe.
2. Invite the right mix of users, managers, and analysts.
3. Follow a clear agenda with simple ground rules.
4. Write down every decision, and confirm it before the session ends.

Strength: It saves elapsed time and builds shared agreement among stakeholders.

Weakness: It needs a skilled facilitator, and it is hard to free everyone at the same time.

Example — a JAD session

For a new library loan system, the analyst gathers two librarians, one IT staff member, and a student representative for a half-day workshop.

In three hours they agree on the top five features and settle a dispute about late fees — work that would have taken several rounds of separate interviews.

4.3 Questionnaire

When an analyst needs input from many people, or from people spread across many places, interviews and workshops are too slow. A questionnaire solves this. It is a fixed set of written questions sent to many respondents. Because everyone answers the same questions, the results are easy to compare and to count.

Designing the questions: Most questions should be closed, so answers are quick and easy to total. A common tool is a rating scale, for example “Rate this service from 1 (poor) to 5 (excellent).” A few open questions can be added at the end to catch ideas you did not think of. Keep the form short, use plain words, and always test it with a few people before sending it out.

How to run it:

1. Decide exactly what you want to learn.
2. Write clear questions, mostly closed, with simple scales.
3. Pilot-test the form with a few users and fix any confusing items.
4. Send it out, collect the replies, and analyse the results.

Strength: It is cheap and fast, reaches many people, and gives numbers you can count.

Weakness: You cannot ask follow-up questions, and many people never reply, which can bias the results.

Example — two questionnaire items

- 1) I can find the book I want in the online catalogue easily. (1 = strongly disagree ... 5 = strongly agree)
- 2) What one feature would you most like the new library system to have? (open answer)

5. Unobtrusive Methods

5.1 Sampling

An organization can hold thousands of records — invoices, forms, orders, log entries. The analyst cannot read them all. Sampling lets the analyst study a small part and still learn about the whole. The one rule that matters is this: the sample must fairly represent the whole. A biased sample leads to a wrong conclusion.

Common ways to sample: In random sampling, every item has an equal chance of being picked. In systematic sampling, the analyst takes every *n*th item, such as every tenth invoice. In stratified sampling, the analyst first splits the data into groups — for example, small, medium, and large orders — and then samples each group, so no group is missed.

How much to take: A larger sample gives more confidence but costs more time. The analyst balances the two, taking enough records to trust the result without checking everything.

Strength: It makes a huge amount of data manageable, while staying representative.

Weakness: If the sample is not representative, the whole conclusion can be wrong.

Example — sampling invoices

A shop has 12,000 invoices from last year. Instead of reading them all, the analyst checks every 100th invoice, giving a sample of 120.

From this sample the analyst estimates how often discounts are given and how many invoices contain errors.

5.2 Document Investigation

Every organization runs on documents — forms, reports, manuals, procedures, and organization charts. These documents are a rich and quiet source of facts. By reading them, the analyst learns how the current system is meant to work, what data it uses, and what rules it follows, all without taking anyone's time.

What to collect and why: Forms show the data fields the system captures. Reports show the outputs people rely on. Manuals and procedures show the rules the work must follow. Organization charts show who is responsible for what. Together they map the current system.

An important idea: Documents describe the official process. Real work sometimes differs from what is written. When the analyst finds a gap between the document and real practice, that gap is itself a valuable finding, and a good question to raise in an interview.

Strength: It is objective and factual, and it can be done quietly at any time.

Weakness: Documents can be out of date, incomplete, or simply not followed in practice.

Example — reading a form

The current loan form has fields for student name, ID, book title, and due date, but no field for a phone number.

This single fact tells the analyst that the library cannot currently send loan reminders — a likely requirement for the new system.

5.3 Statistical Analysis of Hard Data

Organizations also keep numbers: how many orders arrive each day, how long a task takes, how often a certain error appears. These numbers are called hard data. Studying them turns vague statements into measured facts. A user may say, “We are very busy in the morning.” The hard data can show exactly how busy, and at which hours.

What it is good for: Hard data helps the analyst size the system (how much it must handle), find peaks and bottlenecks (where work piles up), and justify decisions with evidence rather than opinion.

How to use it:

1. Find the useful data sources, such as logs and transaction records.
2. Compute totals, rates, and trends over time.
3. Look for peaks, quiet periods, and unusual values.
4. Turn each finding into a clear, measurable requirement.

Strength: It is evidence-based and shows the true scale and pattern of the work.

Weakness: Numbers show how much and how often, but not why — so they work best beside an interview.

Example — from a feeling to a number

Staff say returns are “slow at lunchtime.” The loan records show that 40% of daily returns happen between 12:00 and 13:00.

Now “slow at lunchtime” is a measured fact the new system must be designed to handle.

6. Combining Techniques (Triangulation)

No single technique gives the full truth. Each one has a blind spot. An interview captures opinions but not scale. Hard data shows scale but not reasons. A document shows the official rule but not whether people follow it. Because of this, careful analysts combine several techniques and compare what each one says.

When an interview, a document, and the data all point the same way, the analyst can be confident. When they disagree, the analyst has found something worth studying more closely. This cross-checking of sources is called triangulation, and it is a mark of professional analysis.

7. Choosing the Right Technique

No method is best for every situation. To choose well, think about four things: how many people hold the information, how spread out they are, how much depth you need, and how much time and money you have. Then match the method to the goal.

Technique	Family	Use it when...
Interview	Interactive	You need deep detail from one person
JAD	Interactive	Many people must agree quickly
Questionnaire	Interactive	You need input from many people
Sampling	Unobtrusive	The group is too large to check fully
Document Investigation	Unobtrusive	You want to learn the current system
Statistical Analysis	Unobtrusive	You want to measure volume and trends

Rule of thumb: *Start with unobtrusive methods to learn the basics of the current system quietly. Then use interviews and workshops to fill the gaps and confirm what you found.*

8. Putting It Together: A Short Case

Imagine the campus library wants a new loan system. Here is how an analyst might gather information, using several techniques in a sensible order.

1. Document investigation first. Read the current loan form and the late-fee rule sheet. Learn the data fields and the rules, quietly and quickly.
2. Statistical analysis. Study last year's loan records to find busy hours, average loan length, and how many books are returned late.
3. Interviews. Talk to two librarians about the daily problems and the special cases the records do not show.
4. Questionnaire. Ask 200 students what they find hard today and what features they want most.
5. JAD workshop. Bring librarians, an IT staff member, and a student representative together to agree on the top features.
6. Triangulate. Compare what students want with what the data and the staff say, and design the system around the points where they agree.

Notice the pattern: quiet fact-finding first, then people, then agreement. Each technique covers a weakness of the others, and together they give a full, trustworthy picture.

9. Summary

- Information gathering collects the facts that become a system's requirements.
- It happens early in the SDLC, and every later step depends on it.
- The 5W1H questions keep your study complete.
- Interactive methods (interview, JAD, questionnaire) ask people directly.
- Unobtrusive methods (sampling, document investigation, hard data) study evidence quietly.
- Each technique has a strength and a blind spot, so combine them and triangulate.
- Match the method to the goal, and start quiet before you ask people.

10. Review Questions and Exercises

Questions

1. What is information gathering, and why is it so important early in a project?
2. List the six questions in 5W1H and give an example of each for a canteen ordering system.
3. Explain the difference between interactive and unobtrusive methods.
4. When is a questionnaire a better choice than an interview? When is it worse?
5. Give one strength and one weakness of sampling.
6. What is triangulation, and why do analysts use it?

Exercises

1. Write three open questions and three closed questions you would ask the owner of a small print shop.
2. You have 5,000 order records to study but little time. Describe how you would sample them, and say which sampling method you would use and why.
3. For the campus library case, list two facts you would expect to learn from documents and two you could only learn from an interview.

Glossary

Requirements elicitation: another name for information gathering.

Requirement: a statement of something the system must do.

Open question: a question that invites a long, free answer.

Closed question: a question that asks for a short, exact answer.

Structured interview: an interview that follows a fixed list of questions.

Facilitator: the neutral person who leads a JAD workshop.

Scribe: the person who records decisions in a JAD workshop.

Rating scale: a fixed range, such as 1 to 5, used to answer a question.

Sample: a small part chosen to represent a whole group.

Hard data: numbers an organization keeps, such as volumes and durations.

Triangulation: cross-checking a fact using more than one technique or source.

References

This module is based on the standard treatment of information gathering in the following systems analysis and design textbooks:

- Dennis, A., Wixom, B. H., & Roth, R. M. Systems Analysis and Design, 5th edition. Wiley, 2012.
- Kendall, K. E., & Kendall, J. E. Systems Analysis and Design, 9th edition. Prentice-Hall, 2014.
- Satzinger, J. W., Jackson, R. B., & Burd, S. D. Systems Analysis and Design in a Changing World, 5th edition. Course Technology, 2010.