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Preface

For D+T Thesis Students:
This collection of readings is about the research, writing, thinking, and prototyping processes needed for you to effectively engage in D+T thesis as sustained inquiry. Compiled by Parsons MFADT thesis faculty, this resource supports current thesis studio and writing curriculum goals. Experienced faculty have long searched for and discussed the benefit of having a required “core” text, but could not find one (or two or even three) texts with coverage that meets the types of needs students typically experience in our design and technology thesis program.

How does this resource meet learning needs? Selections introduce the most common and necessary topics and issues you will encounter recursively – over and again – throughout your iterative design process. Selections are brief and applied, with many practical suggestions. Selections bring together material that experienced thesis faculty here at Parsons have used and disseminated as handouts in their own instruction. Authors of these readings provide tried, proved, workable instruction - ideas and suggestions for students who need background knowledge for thesis.

Your faculty will assign chapters. To maximize your use and benefit of this resource, however, you should peruse its content: look over the scope and structure of the table of contents and read the part introductions. Once you have a glimpse of what’s in this book, you can refer to it as needed and/or as specific chapters may apply to your project and process. Many of the chapters apply to all aspects of the thesis design process. Research, for example, is an ongoing process, evolving as your own focus narrows or changes, for example. You are in charge of analyzing what you need to know and need to do to make progress in thesis. In the final analysis, this resource is a companion available to you at all times.
## I RESEARCH

### 1 Getting Started

1.1 From Topics to Questions (Wayne Booth)
1.2 From Questions to Problems (Wayne Booth)
1.3 Evaluating Sources (Ann Raimes)
1.4 Online Search Strategies (Ann Raimes)

### 2 Techniques

2.1 Interviews (Asa Berger)
2.2 Participant Observation: Video Game Players (Asa Berger)
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2.4 Experiments (Asa Berger)
2.5 From user to character – an investigation into user-descriptions in scenarios (Lene Nielsen)
2.6 Experience Prototyping (M. Buchenau/J. Suri)
2.7 What do Prototypes Prototype? (Houde/Hill)

### Highlights

Chapters 1.1 and 1.2 lead the way to your understanding of thesis. To engage in thesis process, you need to move from interests and topics to pivotal design questions aimed at seeking and finding solutions to a thesis design problem. If you are overwhelmed by freedom of choice or the breadth, depth, and eclectic nature of domains, Chapters 1.1 and 1.2 can help you a lot! All students need to read these chapters.

As you can see from the contents list above, design research includes study of multiple sources (including print and media) and design doing, such as building small studies or making prototypes. Design research can also include fieldwork, such as interviewing respondents. All students should read Chapter 2.6 as a basis for understanding the value of design experimentation. When and how you use these chapters will be a function of your background and the needs of your process and project, as well as specific assignments by your faculty.
1.1 From Topics to Questions

Booth, W. et al.  
The Craft of Research. Second Edition  

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In this chapter, we discuss how to use your interests to find a topic, narrow it to a manageable scope, and then generate questions that will focus your research. If you are an advanced student and already have a dozen topics that you would like to pursue, you might skip to Chapter 4. If, however, you are starting your first project, you will find this chapter useful.

3.1 Interests, Topics, Questions, and Problems

If you are free to pursue any research topic that interests you, that freedom may be frustrating—so many choices, so little time. Finding a topic, though, is only the first step, so do not assume that once you have a topic, you need only search for information and report what you find. Beyond a topic, you have to find a reason (other than completing your assignment) for devoting weeks or months to pursuing it and then for asking readers to spend time reading about it.

Researchers do more than just dig up information and report it. They use that information to answer a question that their topic inspired them to ask. At first, the question may intrigue the researcher alone: how good was Abe Lincoln at math? Why do cats rub their faces against us? Is there such a thing as innate perfect pitch? That’s how most significant research begins—with an intellectual itch that only one person feels the need to scratch. But at some point, a researcher has to decide whether the question and its answer might be significant, at first to the researcher alone, but eventually to others—to a teacher, to colleagues, to an entire community of researchers.

At that point, the researcher must view his task differently: he must aim not just at answering a question, but at posing and solving a problem that he thinks others should also recognize as worth solving. That word “problem,” though, has a meaning so special in the world of research that it is the topic of the whole next chapter. It raises issues that few beginning researchers are ready to resolve entirely, and that can vex even an advanced researcher. So do not
feel dismayed if at first you cannot find in your topic a problem that others might think worth solving. But you will never even approach that point unless you strive to find in your topic a question that at least you think worth asking.

In this chapter, we focus on the steps leading to the formulation of a research question. How do you transform an interest into a topic for research? How do you find questions that can guide your research? Then how do you decide whether those questions and answers are worth pursuing, at first just to you, but then to your readers? The process looks like this:

1. Find an interest in a broad subject area.
2. Narrow the interest to a plausible topic.
3. Question that topic from several points of view.
4. Define a rationale for your project.

In the next chapter we address the more vexing matter of turning your questions into a research problem.

3.2 From an Interest to a Topic

Experienced researchers have more than enough interests to pursue. An interest is just a general area of inquiry that we like to explore. The three of us have our current favorites: society and language, textual coherence and cognition, ethics and research. But while beginning researchers also have interests, they sometimes find it difficult to locate among them a topic appropriate for academic research. A topic is an interest specific enough to support research that one might plausibly report on in a book or article that helps others to advance their thinking and understanding; the linguistic signals of social change in Elizabethan England, the role of mental scenarios in the reader’s creation of coherence, the degree to which current research is motivated by under-the-counter payments.

If you are free to explore any topic within reason, we can offer only a cliché: start with what interests you most deeply. Nothing will contribute to the quality of your work more than your sense of its worth and your commitment to it. Start by listing four or five areas that you’d like to learn more about, then pick one with the best potential for yielding a topic that is specific and that might lead to good sources of data. If you are in an advanced course, you are likely to be limited to matters of interest to those in your field of study, but you can always find more by looking in a recent textbook, talking to another student, or consulting your teacher. You might even try to identify an interest that will provide a topic for work in another course, either now or in the future.

If you are still stuck, here is a way to search for topics that might pan out: If this is your first research project in a writing course, find in the reading room of your library a general bibliographical resource such as the Reader’s Guide to Periodical Literature or the Bibliographic Index (we will discuss these resources in more detail in Chapter 5 and in the Quick Tip after it). If you are an advanced student, locate a specialized index in your particular field, such as Philosopher’s Index, Psychological Index, Women’s Studies Abstracts. Now skim its headings until you find one that catches your interest. That heading will provide not only a possible topic, but also a list of sources on it.

If you are writing your first research paper in a particular field and have not yet settled on a topic, you might head over to the library to find out where its resources are particularly rich. If you pick your topic first and then after considerable searching discover that the sources are thin, you will have to start over. By identifying areas with promising resources, you learn the strengths and weaknesses of your library and can plan this and future projects more thoughtfully. (If you are really stuck, look at the Quick Tip at the end of this chapter for more suggestions.)

3.3 From a Broad Topic to a Narrow One

At this point, you risk picking a topic so broad that it could be a subheading in an encyclopedia article: “Space flight, history of”; “Shakespeare, Problem Plays”; “Natural kinds, doctrine of.” A topic is probably too broad if you can state it in fewer than four or five words. If you find yourself struggling with that kind of topic, narrow it:

- Free will and historical inevitability in Tolstoy’s War and Peace → The conflict of free will and historical inevitability in Tolstoy’s description of three battles in War and Peace
- The history of commercial aviation → The contribution of the military to the development of the DC-3 in the early years of commercial aviation
We narrowed these topics by adding modifying words and phrases. In particular, we added four nouns of a special kind: conflict, description, contribution, and development. Those nouns are special because they are each related to a verb: conflict, describe, contribute, and develop. At some point, you will have to move from a phrase that names a topic—"free will and historical inevitability in Tolstoy," "history of commercial aviation"—to a sentence that states a potential claim. If you narrow your topic by using nouns derived from verbs, you will be one step closer to a claim that could be challenging enough to interest your readers. Compare these:

Free will and historical inevitability in Tolstoy's *War and Peace*.

The *confront* of free will and historical inevitability in Tolstoy's *description* of three battles in *War and Peace*.

The history of commercial aviation.

The *contribution* of the military in the *development* of the DC-3 in the early years of commercial aviation.

These may not be particularly interesting claims yet. But since you will build your final project out of a series of claims, you should, from the beginning, take every opportunity to work toward the kinds of claims you will eventually need.

The advantage of a specific topic is that you more easily recognize gaps, inconsistencies, and puzzles that you can question. That will help you turn your topic into a research question. (If you follow our later suggestion to begin with an index or abstract, your topic will already be restricted by its headings.)

Caution: you narrow your topic too severely when you cannot easily find sources.

The history of commercial aviation

Military support for development of the DC-3 in the early years of U.S. commercial aviation

The decision to lengthen the wing tips on the DC-3 prototype as a result of the military desire to use the DC-3 as a cargo carrier

3.4 From a Narrowed Topic to Questions

Once the beginning researcher hits on a topic that feels both interesting and promising, perhaps something like "the political origins and development of legends about the Battle of the Alamo," she typically begins searching out sources and collecting information, in this case versions of the story in books and films, Mexican and American, nineteenth century and twentieth. She might then write a paper that summarizes the stories, points out differences and similarities, contrasts them with what modern historians think really happened, and concludes.

Thus there are interesting differences and similarities between . . .

In a first-year writing course, such a paper might earn a passing grade. It shows that the student can focus on a topic, find data on it, assemble those data, and present them coherently—no small achievement for a first research project. But for anyone who wants her research to matter, such an achievement would fall short of the mark.

While the writer may have learned something from the exercise of searching out and reporting on the Alamo stories, she offers only information. She asked no question that she or her readers might think worth asking, and so she can offer no answer significant enough to change how she or her readers should think about those stories or their development.

Once you have a topic to research, you should find in it questions to answer. Questions are crucial, because the starting point of good research is always what you do not know or understand but feel you must. Start by barraging your topic with question after question, first with the obvious standing questions of your field:

Do the legends about the Battle of the Alamo accurately reflect our best historical accounts? Do the historical accounts differ?

Ask the standard who, what, when, and where questions. Record your questions, but don’t stop for their answers.
You can organize your questions from these four perspectives:

1. What are the parts of your topic and what larger whole is it a part of?
2. What is its history and what larger history is it a part of?
3. What kinds of categories can you find in it, and to what larger categories of things does it belong?
4. What good is it? What can you use it for?

(Don’t worry about getting the right questions in the right categories; the categories serve only to stimulate the questions.)

3.4.1 Identify Its Parts and Wholes

- Question your topic in a way that analyzes it into its component parts and evaluates the working relationships among them:

  What are the parts of stories about the Battle of the Alamo? How do they relate to one another? Who were the participants in the stories? How do the participants relate to the place, the place to the battle, the battle to the participants, the participants to one another?

- Question your topic in a way that identifies it as a working component in a larger system:

  What were the politicians' roles in the story? What role does it have in Mexican history? What role does it have in our history? Who told the stories? Who listened? How does the nationality of the teller affect the story?

3.4.2 Trace Its History and Changes

- Question your topic in a way that treats it as a dynamic entity that changes through time, as something with its own history:

  How did the battle develop? How have the stories developed? How have different stories developed differently? How have audiences changed? How have the storytellers changed? How have motives to tell the story changed? Who first told the stories? Who told them later? Who were the earliest readers and listeners? Who later?

- Question your topic in a way that identifies it as an episode in a larger history:

3.4.3 Identify Its Categories and Characteristics

- Question your topic in a way that defines its range of variation, how instances of it are like and different from one another:

  What is the most typical story? How do other stories differ from it? Which one is most different? How do the written and oral stories differ from the movie versions? How are Mexican stories different from ours?

- Question your topic in a way that locates it in a larger category of things like it:

  What other stories in our history are like the story of the Battle of the Alamo? What other stories are very different? What other societies have the same kinds of stories?

3.4.4 Determine Its Value

- Question your topic in regard to the value of its uses:

  What good are the stories? What use has been made of them? Have they helped people? harmed them?

- Question your topic in regard to the relative value of its parts and features:

  Are some stories better than others? What version is the best one? The worst one? Which parts are most accurate? Which least?

3.4.5 Review and Rearrange Your Answers

When you run out of questions, group them in different ways. In the Alamo example some questions relate to the development of the stories: others address their quality as fact or fiction; others highlight differences between versions (nineteenth- and twentieth-century, Mexican and American, written and movie); other questions address political issues, and so on. Such lists can provide scores of research topics. If they are freewheeling enough, they can have the exhilarating effect of opening up worlds of research.

The next step requires more careful judgment. First, identify
questions that need more than a one- or two-word answer. Questions that begin with who, what, when, or where are important, but they ask only about matters of fact. Emphasize instead questions that begin with how and why. Then decide which questions stop you for a moment, challenge you, spark some special interest. At this point, of course, you can’t be sure of anything. Your answers may turn out to be less surprising than you hoped, but your task now is only to formulate a few questions whose answers might be both plausible and interesting.

When you’ve done all this, you have taken your first big step toward a project that goes beyond just collecting data. You have identified something that you don’t know but want to, and what you want to know drives the earliest stages of your research. You are ready to gather data, a process we’ll describe in Chapter 5. But even though you can now begin gathering data, the process of focusing your project is not yet complete.

3.5 From a Question to Its Significance

Even if you are an experienced researcher, you may not be able to take this next step until you are well into your project, perhaps even close to its end. And if you are a beginner researcher, you may feel this step is especially frustrating. Once you have a question, you have to ask and try to answer the further question, So what?

So what if I don’t know or understand how snow geese know where to go in the winter, why the Titanic was designed so badly, how fifteenth-century violin players tuned their instruments, why Texans tell one story about the Alamo, Mexicans another? So what?

This question vexes all researchers, beginners and experienced alike, because to answer it, you have to know how significant your research might be not just to yourself but to others. Instead of asking that question straight out, though, you can get closer to its answer if you move toward it in steps.

3.5.1 Step 1: Name Your Topic

In the earliest stages of a research project, when you have only a topic and maybe the first glimmerings of a few good questions, try to describe your work in a sentence something like this:

I am learning about/working on/studying ______.

Fill in the blank with a few noun phrases. Be sure to include one or two of those nouns that you can translate into a verb or adjective:

I am studying repair processes for cooling systems.

I am working on the motivation of President Roosevelt’s early speeches.

3.5.2 Step 2: Suggest a Question

As early as you can, try to describe your work more exactly by adding to that sentence an indirect question that specifies something about your topic that you do not know or fully understand, but want to:

I am studying X because I want to find out who/what/ when/ where/ whether/ why/ how ______.

You now have to fill in the new blank with a subject and a verb:

I am studying repair processes for cooling systems, because I am trying to find out how expert repairers analyze failures.

I am working on the motivation of Roosevelt’s early speeches, because I want to find out whether presidents since the ’30s have used those speeches to announce new policy.

When you can add that kind of because-I-want-to-find-out-how/ why clause, you have defined both your topic and your reason for pursuing it. If you are doing one of your first papers and you get this far, congratulate yourself, because you have defined your project in a way that goes beyond the random collection of information.

3.5.3 Step 3: Motivate the Question

There is, though, one more step. It’s a hard one, but if you can take it, you transform your project from one that interests you to one that makes a bid to interest others, a project with a rationale explaining why it is important to ask your question at all. To do that, you must add an element that explains why you are asking your question and what you intend to get out of its answer.

In Step 1, you add a second indirect question, this one introduced with in order to understand how, why, or whether.
1. I am studying repair processes for cooling systems,
2. because I want to find out how expert repairers analyze failures.
3. in order to understand how to design a computerized system that could diagnose and prevent failures.

1. I am working on the motivation of Roosevelt’s early speeches.
2. because I want to discover whether presidents since the 30s used those speeches to announce new policy.
3. in order to understand how generating public support for national policy has changed in the age of television.

Assembled, the three steps look like this:

1. Name your topic:
   I am studying ________.

2. Imply your question:
   because I want to find out who/how/why ________,

3. State the rationale for the question and the project:
   in order to understand how/why what ________.

Rarely can a researcher flesh out this pattern fully before she begins gathering information. In fact, most can’t complete it until they’re nearly finished. Too many, unfortunately, publish their results without having thought through these steps at all.

Even though at the beginning of your project you won’t be able to state these steps fully, it is a good idea to test your progress every so often by seeing how close you can come. Better: Have someone else—roommate, relative, or friend—force you to flesh out this progression. Your evolving description will help you keep track of where you are and keep you focused on where you may still have to go.

It may be that in your first try at research you will not find a question whose answer has much significance to anyone but yourself. But do that much and you will delight your teacher. As you move through your project, though, do what you can to fill out the pattern; try to find a reason for asking your question, a way to make its answer seem significant to you, maybe even to others.
Quick Tip: Finding Topics

If you are an advanced researcher, chances are that you will not have to look far for topics to research. You can focus on current research in your field, which you can find easily enough by browsing through recent articles and review essays and, if they are available, recent dissertations, especially the suggestions for future research in their conclusions. If you are less advanced, your teacher will still expect you to focus your topics on the field, though not on its most advanced state. Most teachers will either assign topics to choose from or at least indicate the kind of topics to consider.

But sometimes you will be left to find topics on your own, and if you are in a first-year writing class, you will have to find good topics without even a specific field to focus your efforts. If you have to find your own topic and have drawn a blank, try looking in these sources:

For Topics Focused on a Particular Field of Study

1. Browse through a textbook in a course one level advanced beyond yours or from a course that you know you will have to take at some time in the future. Don't overlook the study questions.

2. Attend a public lecture in your field and listen for something you disagree with, don't understand, want to know more about.

3. Browse through the topic headings in specialized bibliographies and abstracts.

4. Browse through the Encyclopedia of... in the field you are studying.

5. Ask your instructor about the most contested issue in her field.

6. If you have access to the internet, find a specialized "list" that interests you and "lurk" (read messages sent by others) until you find debated topics.

For General Topics

1. Think of some special interest you have—sailing, gymnastics, chess, volunteer work, modern dance—and investigate its origins or how it is practiced in another culture.

2. Investigate a specific aspect of a country you'd like to visit.

3. Wander through a museum of any kind—art, natural history, automobile—until you find yourself looking at something with great interest. What more do you want to know about it?

4. Wander through a large shopping mall or store, asking yourself, How do they make that? or I wonder who thought up that product?

5. Leaf through your Sunday newspaper, especially the features sections, until you find yourself stopping to read something. If you have access to the New York Times, look through its feature sections and the Sunday review of books.

6. Go to a large magazine rack and browse. Buy a magazine that looks technical and interesting. Look especially for trade magazines or those that cater to highly specialized interests.

7. Look through the kind of popular magazines you find in waiting rooms, such as the Reader's Digest, for an article that makes a significant claim about health, society, or personal relationships that is based on alleged "evidence." Find out whether it is true.

8. Tune into interview programs on TV or talk radio until you hear something you disagree with. Then ask yourself whether you could find enough information to refute it.

9. Recall the last time you heatedly discussed some important topic and were frustrated because you didn't have the facts you needed.

10. Think of one thing that you believe but most people don't. Then ask whether it's the kind of issue on which you can find enough evidence to convince someone else.

11. Think of some common beliefs that everyone takes for granted but might not be so, such as the claim the Eskimos have scores of words for snow or that one gender is naturally better at something than the other.

12. Skim topic headings in general bibliographies, such as the Readers' Guide to Periodical Literature.

13. Think of a popular controversy that research could help you clarify.

14. Get together with five or six friends and brainstorm about what you would all like to know more about.
RESEARCH
1 Getting Started

1.2 From Questions to Problems

Booth, W. et al.
The Craft of Research, Second Edition

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CHAPTER FOUR

From Questions to Problems

This chapter covers matters that beginning researchers may find difficult, perhaps even baffling. So those of you working on your first project might skip to Chapter 5. (Of course, we hope that you will rise to the challenge and read on.) For advanced students, though, what follows is essential.

In the last chapter, we described how to find in your interests a topic, how to find in that topic questions to research, and then how to signal the significance of your answer by describing its rationale:

1. **Topic**: I am studying _____.

2. **Question**: because I want to find out who/how/why _____.

3. **Rationale**: in order to understand how/why/what _____.

These steps define not only the development of your project, but your own growth as a researcher. When you move from step 1 to 2, you go beyond those who merely gather information, because you are directing your project not by aimless curiosity (by no means a useless impulse), but by your need to understand something better. When you move on to step 3, you surpass beginning researchers, because you are focusing your project on the significance, on the **usefulness** of understanding what you do not know. When those steps become a habit of thinking, you become a true researcher.

4.1 Problems, Problems, Problems

There is, though, a last step, one that is hard for even experienced researchers. You must convince your readers that the answer to your question is significant not just to you, but to **them** as well. You must transform your motive from discovering to showing; more importantly, from understanding to explaining and convincing.

This last step trips up even experienced researchers, because they often think that they have done their job simply by posing and answering a question that interests them. They are only partly right: their answer must also be the solution to a **research problem** that is significant to others, either because those others already think it is significant or, as is more likely, because they can be convinced to think so. What sets you apart as a researcher of the highest order is the ability to develop a question into a problem whose solution is significant to your research community. The trick is to communicate that significance. To understand how to do that, you have to understand more exactly what we mean by a research "problem."

4.1.1 Practical Problems and Research Problems

Most everyday research begins not with finding a topic but with confronting a problem that has typically found you, a problem that left unresolved means trouble. When faced with a practical problem whose solution is not immediately obvious, you usually ask yourself a question whose answer you hope will help you solve the problem. But to find that answer, you must pose and solve a problem of another kind, a research problem defined by what it is that you do not know or understand, but feel you must. The process looks like this:
Practical Problem: My brakes have started screeching.
Research Question: How can I get them fixed right away?
Research Problem: I need to find a nearby garage in the Yellow Pages.
Research Answer: The Car Shoppe, 1401 East 55th St.
Application to Practical Problem: Call to see when they can fix them.

It's a pattern common in every part of our lives:
• I want to impress a potential employer. How do I find a good restaurant? Look in a city guide. Woodlawn Tap. I take her there, and I hope she thinks I've got style.
• The National Rifle Association presses me to oppose gun control. Will I lose if I don't? Take a poll. My constituents support gun control. Now decide whether to reject the NRA's request.
• Costs are up at the Omaha plant. What has changed? Compare personnel before and after. More turnover now. If we improve training and morale, our workers stay with us. OK, let's see if we can afford to do it.

We don't write up solutions to most such problems, but we usually have to when we want to convince others that we have solved a problem important to them:

To CEO: Costs are up in Omaha, because your workers see no future in their jobs and after a few months quit. You have to train new ones, which is costly. To retain workers, upgrade their skills so they will want to stay.

Before anyone could solve the practical problem of rising costs, though, someone had to solve a research problem defined by not knowing why costs were rising.

4.1.2 Distinguishing Practical Problems and Research Problems

This distinction between practical, pragmatic problems and research problems may seem to be a fine one, but it is crucial:
• A practical problem originates in the world and exacts a cost in money, time, happiness, etc. You solve a practical problem by changing something out there in the world, by doing something. But before you can solve a practical problem, you may have to pose and solve a research problem.
• A research problem originates in your mind, out of incomplete knowledge or flawed understanding. You might pose a research problem because you have to solve a practical problem, but you

4.1.3 Distinguishing Problems and Topics

There is a second reason that beginning and even intermediate researchers struggle with this notion of "problem." Experienced researchers often talk about their research problem in a shorthand way that seems to describe it just as a topic: I'm working on adult measles, or on early Aztec pots, or on the mating calls of Wyoming elk.

As a result, many beginning researchers confuse having a topic to read up on with having a research problem to solve. Lacking the focus provided by the search for a solution to a well-defined research problem, they just keep gathering more and more data, not knowing when to stop. Then they struggle to find a principle for deciding what to include in their report and what not, and finally just throw in everything they have. Then they feel frustrated when a reader says, I don't see the point; this is just a data dump.

You risk wasting your reader's time if you cannot distinguish between a topic to read about and a research problem to solve. In the rest of this chapter, we explain what a problem is, both academic and nonacademic. We return to problems in Chapter 15 when we discuss how to state your research problem in the introduction of your paper.
4.2 The Common Structure of Problems

We have distinguished pragmatic problems and research problems, but they have the same essential structure. Both consist of two elements:

1) some particular situation or condition, and
2) its undesirable consequences, costs that you don’t want to pay.

4.2.1 Practical Problems

A flat tire is usually a practical problem, because it is (1) a condition out there in the world that (2) may exact from you a tangible cost—perhaps missing a dinner engagement. But suppose your dinner companion bullied you into accepting the date and you would rather be anywhere else. In that case, the flat tire does not have a cost, because now you judge missing that dinner date to be a positive benefit. In fact, the flat tire is now not part of a problem, but part of a solution.

So when you think you have found a problem, be sure that you can identify and describe a situation with these two parts:

- a condition that needs to be resolved
  - Condition: I missed the bus.
  - The hole in the ozone layer is growing.
- costs of that condition that you don’t want to bear
  - Cost: I may lose my job because I will be late for work.
  - Many will die from skin cancer.

You can often rephrase negative costs in positive form, as a benefit of resolving the condition:

- Benefit: If I can catch the bus, I save my job.
  - If we fix the ozone hole, we save many lives.

The greater the consequences of the condition—either the costs of leaving it unresolved or the benefits of resolving it—the more significant the problem.

For a practical, tangible problem, the condition can be literally anything, even a seeming stroke of luck, if it has a cost: You win the lottery. That might not seem like a problem, but what if you owed a loan shark $5,000,000 and your name gets in the paper? Winning the lottery could then cost you more than you won: someone finds you, takes your money, and breaks your leg.

4.2.2 Research Problems

A practical problem and a research problem have the same structure, but they differ in two important ways.

Conditions. While the condition part of a practical problem can be any state of affairs, the condition of a research problem is always defined by a rather narrow range of concepts. It is always some version of your not knowing or not understanding something that you think that you and your readers should know or understand better.

That’s why in Chapter 3 we emphasized the value of questions. Good questions are the first step to defining your research problem, because questions imply what you and your readers don’t know or understand but should: What role does genetics play in cancer? How do icebergs influence the weather? How did Latin epic influence Old English poetry? How much does the death penalty deter murder?

Costs. The second difference is harder to grasp. It is that the consequences of a research problem might have nothing immediately to do with the world. The immediate cost or benefit of a research problem is always some further ignorance and misunderstanding that is more significant, more consequential than the ignorance or misunderstanding that defined the condition.

This idea of cost is easy to understand in a practical problem because its costs are usually palpable—pain and suffering, lost money, opportunity, happiness, reputation, and so on. The costs of a research problem, though, are that we do not know or understand something else. That’s why the problem of a visit from the loan shark seems easier to grasp than the problem of not understanding the influence of Latin on Old English poetry. The costs of the first are more palpable than those of the second. But not understanding the influence of Latin on Old English poetry has costs nonetheless. If we do not understand those influences, we will not understand something yet more significant—what an important but puzzling poem might mean, what Old English poets knew and didn’t know about other literatures, why Old English poetry is the way it is.
An advanced researcher must show that because she does not know or understand one thing, she cannot know or understand something else more important. She must answer the question, So what?

So what if I never understand the role of genetics in cancer, why cats rub their jaws against us, how bridges were built in ancient Greece? If I never find out, what greater cost do I pay in my larger knowledge or understanding?

In short, you have no research problem until you know the cost of your incomplete knowledge or flawed understanding, a cost that you define in terms of a yet greater ignorance or misunderstanding.

4.2.3 When a Research Problem Is Motivated by a Practical Problem

It is easier to identify costs and benefits of a research problem when it is motivated by a practical problem:

So what if we don't know why costs are up in Omaha? We go bankrupt.

So what if we do not understand the role of genetics in cancer? Until we do, we will not know whether we can identify the genes that predispose us to cancer, when it can be predicted, or even cured.

The cost of not knowing the role of genetics in cancer is that we do not understand its cause. Or putting this in the form of a benefit, perhaps only when we understand the genetics of cancer can we cure it. Now we instantly recognize the additional costs of our ignorance and the benefits if we remedy it, because a solution to the research problem points to a solution to the practical problem.

But how can stories about the Alamo or the aesthetics of Tibetan weaving be part of a significant research problem? We see a condition clearly enough: incomplete knowledge. But what costs do we bear if we go on knowing incompletely?

So what if we don't know about the evolution of medieval plumbing or the life cycle of a rare orchid in central New Guinea? What's the cost if we never find out? Or the benefit if we do? Well, let me think . . .

It is at this point that researchers invoke the idea of "pure research" as opposed to "applied research."

4.2.4 Distinguishing "Pure" and "Applied" Research

In much academic writing, we don't try to explain the cost of our ignorance by showing how our research will improve the world. Rather, we show how, by not knowing or understanding one thing, we and our readers cannot understand some larger and more important matter that we have an interest in understanding better. When the solution to a research problem has no apparent application to a practical problem, but only to the scholarly interests of a community of researchers, we call that research "pure" as opposed to "applied."

For example, none of your three authors knows how many stars are in the sky (or how much "dark matter"), and, candidly, we don't feel bad about not knowing. We wouldn't mind knowing, but we can't think of any cost if we never find out, or any benefit if we do. And so for us, not knowing is no problem.

But for astronomers, their not knowing that number is part of a "pure" research problem of great significance to them. Until they know that quantity, they can't calculate another that is much more important—the total mass of the universe. If they could calculate the mass of the universe, they might discover something more important still: whether it will keep expanding until it peter's out into oblivion, collapse back on itself to explode again into a new universe, or settle into an eternally steady state. Knowing the number of stars in the sky may not help solve any tangible problem in the
world, but for those astronomers (and maybe some theologians), that number represents a gap in their knowledge that exacts a great cost: it keeps them from understanding something more significant—the future of the universe. (Of course, if you have an interest in knowing whether the universe has a future, then perhaps you can see how not knowing how many stars are in the sky could be part of a problem for you as well.)

You can tell whether a research problem is pure or applied by looking at the last of the three steps in defining your project:

**Pure Research Problem:**
1. **Topic:** I am studying the density of light and other electromagnetic radiation in a small section of the universe.
2. **Question:** because I want to find out how many stars are in the sky.
3. **Rationale:** in order to understand whether the universe will expand forever or contract into a new Big Bang.

This is a research problem because its question (step 2) implies that we do not know something. This is a pure research problem because its rationale (step 3) implies not something that we will do, but something we do not know but should.

In an applied research problem, the question still implies something we want to know, but the rationale in step 3 implies something we want or need to do:

**Applied Research Problem:**
1. **Topic:** I am studying the difference between readings from the Hubble telescope in orbit above the atmosphere and readings for the same stars from the best earthbound telescopes.
2. **Question:** because I want to find out how much the atmosphere distorts measurements of light and other electromagnetic radiation.
3. **Rationale:** in order to measure more accurately the density of light and other electromagnetic radiation in a small section of the universe.

**4.2.5 Is Your Problem Pure or Applied?**

You distinguish between a pure and applied research problem by the consequences you name in the statement of its rationale (step 3). In pure research, the consequences are conceptual and the rationale defines what you want to know; in applied research, the consequences are tangible and the rationale defines what you want to do.

Perhaps one of the biggest reasons beginners have a hard time getting the hang of pure research is that its costs are entirely conceptual, and so it seems to them less like curing cancer and more like counting stars. Feeling that their findings aren’t good for much, they try to cobble the solution of a research problem onto the solution of a practical problem:

If we can understand how politicians used stories about the Alamo to shape opinion in the nineteenth century, we could protect ourselves from unscrupulous politicians and be better voters today.

1. **Topic:** I am studying the differences among various nineteenth-century versions of the story of the Alamo.
2. **Question:** because I want to find out how politicians used stories of great events to shape public opinion.
3. **Rationale:** in order to help people protect themselves from unscrupulous politicians and become better voters.

In some areas this is a respectable strategy, some would say a preferable one. But in our example, the writer is unlikely to convince many readers that his research on the Alamo stories can in fact improve democracy.

In order to formulate an effective applied research problem, you have to show that the rationale named in step 3 is plausibly connected to the question named in step 2. You can test this by working back from the rationale. Ask yourself this question:

(a) If my readers want to achieve the goal of [state your objective from Step 3],

(b) would they think that the way to do that would be to find out [state your question here from Step 2]? The more strongly your readers would answer "yes" to your question, the more effectively you have formulated the applied problem.

Try this test on the applied astronomy problem:

(a) If my readers want to measure more accurately the density of electromagnetic radiation in a section of the universe,
(b) would they think that the way to do that would be to find out how much the atmosphere distorts measurements of it?

Since astronomers have decades worth of data collected from high-powered telescopes on earth, their answer would seem to be yes; if they can discover how much the atmosphere distorts readings, they could adjust all of their data accordingly.

Now try the test on the Alamo problem:

(a) If my readers want to achieve the goal of helping people protect themselves from unscrupulous politicians and be better voters,
(b) would they think a good way to do that would be to find out how nineteenth-century politicians used stories of great events to shape public opinion?

In this case, readers would have a harder time seeing a connection between the goal and the research. A researcher who wanted to help voters protect themselves might think of other courses of action before he turned to nineteenth-century stories of the Alamo.

A reader might think that the following question defines a good research problem, but one that is pure rather than applied:

1. Topic: I am studying the differences among nineteenth-century versions of the story of the Alamo,
2. Question: because I want to find out how politicians used stories of great events to shape public opinion,
3. Rationale: in order to show how politicians use elements of popular culture to advance their political goals.

At the heart of most research in the humanities and much in the sciences and social sciences are questions whose answers have no direct application to daily life. In fact, in many traditional disciplines, researchers value pure research more than they value applied research—as the word “pure” suggests. They see the pursuit of knowledge “for its own sake” as reflecting humanity’s highest calling—to know more and understand better, not for the sake of money or power, but for the sake of the good that understanding itself can bring.

If you pose a question of pure research as though you could directly apply its answer to a practical problem, your readers may think you naïve. When you pose such a question and you want to discuss the tangible consequences of its answer, formulate your problem as the pure research problem that it really is and then add to that problem a further possible significance:

1. Topic: I am studying the differences among various nineteenth-century versions of the story of the Alamo,
2. Question: because I want to find out how politicians used stories of great events to shape public opinion,
3. Rationale: in order to understand how politicians use elements of popular culture to advance their political goals,
4. Significance: so that we will know more about protecting ourselves from unscrupulous politicians and become better citizens.

If your project is more pure than applied but you still believe that it has indirect tangible consequences, you should say so. But when you state your problem in your introduction (see Chapter 15), formulate it as a pure research problem whose rationale is based on conceptual consequences; save the possible tangible consequences for your conclusion (see Quick Tip, pp. 252–53).

4.3 Finding a Research Problem

What distinguishes great researchers from the rest of us is the brilliance, the knack, or just the good luck of stumbling upon a problem whose solution makes everyone see the world in a new way. Fortunately, the rest of us can usually recognize a good problem when we bump into it, or it into us. As paradoxical as it may seem, though, most of us begin a research project not entirely certain of what our problem is, and sometimes just clarifying the problem will be our major result. Some of the best research papers do no more than pose an important new problem in search of a solution. Indeed, finding a new problem or even clarifying an old one is often a surer way to fame and (sometimes) fortune than solving a problem already there. So do not be discouraged if you cannot formulate your problem fully at the outset of your research. Remember, though, that thinking about it early can save you wasted hours along the way and especially toward the end.

Here are some ways you can aim at a problem from the start.

4.3.1 Ask for Help

Do what experienced researchers do when they are not clear about the problem they think they are investigating: talk to people. Talk to your teachers, relatives, friends, neighbors—anyone who
might be interested in your topic and your question. Why would anyone need to answer your question? What would they do with an answer? What further questions might your answer raise?

If you are free to select your own topic, you might look for one that is part of a larger problem in your field. You will be unlikely to solve it, but if you can slice off a piece of it, your project will inherit some of its significance. (You will also be educating yourself about the problems of your field, no small dividend.) Ask your instructor what he is working on and ask to work on part of it.

A warning: If your teacher helps you define your problem before you begin your research and gives you leads on sources, do not let those suggestions define the limits of your effort. You must find other sources, bring something of your own to the definition of the problem. Nothing more dismays a teacher than a student who does exactly what was suggested, and nothing more.

4.3.2 Look for Problems as You Read

You can often find a research problem if you read critically. As you read a source, where do you feel contradictions, inconsistencies, incomplete explanations? Where do you wish a source had been more explicit, offered more information? If you are not satisfied with an explanation, if something seems odd, confused, or incomplete, tentatively assume that other readers would or should feel that way too. Experienced researchers have the confidence to assume that when they read a passage that they do not entirely understand, then something is wrong, not with them, but with what they are reading. In fact, when they cannot quite grasp something, they predictably assume that their source is wrong and that they may have found a new problem: an error, discrepancy, or inconsistency that they can correct.

Of course, you may be the one who is wrong, so if you make your disagreement the center of your project, re-read your source to be sure you understand it. The problem may have been resolved in a way that your source did not state. Research papers, published and unpublished, are full of useless refutations of a point never made in the first place.

Once you think you have found a real puzzle or error, try to do more than merely point it out. If a source says X and you think Y, you have a research problem only if you can show that readers who go on believing X will misunderstand something more important yet.

Finally, read the last few pages of your sources closely. It is there that many researchers suggest more questions that need answers, more problems in search of a solution. The author of the following paragraph had just finished explaining how the daily life of the nineteenth-century Russian peasant influenced his military performance.

And just as the soldier’s peacetime experience influenced his battlefield performance, so must the experience of the officer corps have influenced theirs. Indeed, a few commentators after the Russian-Japanese War blamed the Russian defeat on habits acquired by officers in the course of their economic chores. In any event, to appreciate the service habits of line officers in peace and war, we need a structural—if you will, an anthropological—analysis of the officer corps like that offered here for enlisted personnel [our emphasis].

4.3.3 Look for Problems in What You Write

There is another way that critical reading can help you discover and formulate a good research problem: you can read your own early drafts critically. When you draft, you almost always do your best thinking close to the end, in the last few pages. It is then that you begin to formulate your final claim, which can often be turned into the solution to a research problem that you have not yet completely formulated.

When you finish your first draft (we may seem to be getting ahead of ourselves here, but we warned you that doing research was not a neatly linear process), you should look closely at your last two or three pages.

1. Look first for the main point of your paper, the sentence or two that would stand as your most important claim.

2. Next look for signs that your point has resolved a puzzle, settled conflicting opinions, revealed something not previously known.

3. Now try to ask a complicated question that your main point would plausibly answer. That question should define the
condition of ignorance or misunderstanding that, lacking your answer, you and your readers will continue to suffer.

When you can do that, you have defined the condition of your research problem, what you do not know but want to. The next step is easy: Ask So what? The harder step is answering. But if you can find an answer, you have successfully reasoned backward from your solution to a full statement of the problem you have solved (we return to this process in Chapter 15).

4.3.4 Use a Standard Problem

Every problem is different, but most problems fall into just a few categories, many defined by a researcher disagreeing or contradicting some generally held view. When you reach a point where you think you may have the outlines of a problem, look at the Quick Tip on "contradictions" after Chapter 8. You may recognize in that list a kind of problem you can work toward.

4.4 The Problem of the Problem

Your teachers understand that you are not a professional, but they believe it important that you develop and practice the habits of mind of a serious researcher. They want to see you do more than just accumulate facts about a topic, then summarize and report them. They want you to formulate a problem that you (and perhaps even they) have a stake in seeing solved. You take your first step toward real research when you recognize a question that is significant to you, a question that you want to answer just for your own satisfaction, to satisfy your own desire to know more, to resolve a discrepancy, to settle a contradiction, regardless of whether anyone else cares. If you can do that much in your earliest research, if you can find some puzzle that you care about resolving, you have achieved something quite significant that will gratify your teachers.

Eventually, though, as you move on to advanced work, when you decide that you have reason to share your new knowledge and understanding with others, you will have to take this next step: You must try to understand what your readers consider interesting questions and problems, the costs they perceive resulting from a gap in their knowledge or flaw in their understanding. You take the biggest step of all when you not only know the kind of problem that your readers like to see solved, but can persuade them to entertain problems of a new kind. No one ever takes all three steps the first time out.

To work your way through all of this, you can use the three steps we discussed in the last chapter. We change the language from discover to show and understand to explain, but the second and third steps still implicitly define your problem:

1. Name your topic.
   I am writing about ________.

2. State your indirect question (and thereby define the condition of your problem):
   ... because I am trying to show you how/why ________

3. State how your answer will help your reader understand something more important yet (and thereby define the cost of not knowing the answer):
   ... in order to explain to you how/why ________

All this may seem disconnected from the real world, but it is not. Research problems in the world at large are structured exactly as they are in the academic world. In business and government, in law and medicine, no skill is more highly valued than the ability to recognize a problem important to a client, employer, or the public, and then to pose that problem in a way that convinces readers that the problem you have discovered is important to them and that you have found its solution. The work you are doing now is your best opportunity to prepare for the kind of work that you will have to do, at least if you hope to thrive in a world that depends not just on problem solving but on problem finding. To that end, no skill is more useful than the ability to recognize and articulate a problem clearly and concisely, an ability in some ways even more important than solving it. If you can do that in a class in medieval Chinese history, you can do it in a business or government office downtown.
1.3 Evaluating Sources

Raimes, A.
*Keys for Writers, Third Edition.*

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# Evaluating Sources

Finding sources is only half the battle. The other half is finding good, relevant sources. How can you tell which sources to use and which to reject? Use the following guidelines.

## 8a Read critically.

Reading what others write always provides ideas, but not just the ideas you absorb from the page or screen. If you read critically, you will generate ideas of your own as you read. Reading critically does not mean criticizing a writer’s views, though it may sometimes include that. Rather, it means reading with an open, questioning mind, examining the writer’s assumptions and biases, and scrutinizing the evidence the writer provides.

### KEY POINTS

#### Guidelines for Critical Reading

- **Ask questions about the credentials and reputation of the author and the place of publication.** What do you learn about the writer’s purpose and the audience whom the author is addressing? Make sure you subject any material you find on Web pages to especially careful scrutiny (8d).
- **Ask questions about the ideas you read.** An easy way to do this is to write your annotations in the margin. If you find yourself thinking “But…” as you read, go with that sense of doubt, and make a note of what troubles you.
- **Be on the lookout for assumptions that may be faulty.** If you are reading an article on home schooling and the writer favors home schooling because it avoids subjecting students to violence in schools, the unstated assumption is that all schools are violent places. For more on the logic of argument, see 4f.
- **Make sure the writer’s evidence is adequate and accurate.** For example, if the writer is making a generalization about all Chinese students based on a study of only three, you have cause to challenge the generalization as resting on inadequate evidence.

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## 8b Recognize a scholarly article

Learn to distinguish scholarship from nonscholarly articles. A scholarly article is not something you are likely to find in a magazine in a dentist’s office. A scholarly article does the following—the first point being the most important:

- refers to the work of other scholars (look for in-text citations and a bibliographical list of works cited, footnotes, or endnotes);
- names the author and usually describes the author’s credentials;
- includes notes, references, or a bibliography;
- deals with a serious issue in depth;
- appears in journals that do not include colorful advertisements or eye-catching pictures (a picture of two stunning models is an indication that you are not looking at a scholarly article).

When you read scholarly articles, scan any section headings, read the abstract and any section headed “Summary” or “Conclusions,” and skim for the author's main idea to find out whether the article addresses your topic. If you are working on a topic related to current events, you will probably need to consult newspapers, magazines, and online sources as well as in place of scholarly journals. See 8c for...
more on the various types of periodicals, and see the following Web site for more on distinguishing types of periodicals: <http://www.library.cornell.edu/okuref/research/skill20.html>.

8c Evaluate works originating in print.

Before you make detailed notes on a book or an article that began its life in print, be sure it will provide suitable information to help answer your research question.

Books Check the date of publication, notes about the author, table of contents, and index. Skim the preface, introduction, chapter headings, and summaries to give yourself an idea of the information in the book and the book's theoretical basis and perspective. Do not waste time making detailed notes on a book that deals tangentially with your topic or an out-of-date book (unless your purpose is to discuss and critique its perspective or examine a topic historically). Ask a librarian or your instructor for help in evaluating the appropriateness of sources you discover. If your topic concerns a serious academic issue, readers will expect you to consult books and not limit your references to popular magazines, newspapers, and Internet sources.

Periodical articles Take into account the type of periodical, any organization with which it is affiliated, and the intended audience. Differentiate among the following types of articles (listed in descending order of reliability, with the most reliable first):

- scholarly articles (see 8b);
- articles, often long, in periodicals for nonspecialist but serious, well-educated readers, such as New York Review of Books, Atlantic Monthly, Economist, Scientific American, and Nation;
- shorter articles, with sources not identified, in popular magazines for a general audience, such as Ebony, Time, Newsweek, Parents, Psychology Today, and Vogue;
- articles with dubious sources, written for sensational tabloid magazines, such as National Enquirer, Globe, and Star.

Newspaper articles The New York Times, Washington Post, and Los Angeles Times, for example, provide mostly reliable accounts of current events, daily editorial comments, and reviews of books, film, and

Evaluate Sources Originating on the Internet

art. Be aware that most newspapers have political leanings, so reports of and comments on the same event may differ.

8d Evaluate sources originating on the Internet.

What makes the Internet so fascinating is that it is wide open, free, and democratic. Anyone can “publish” anything, and thousands of millions can read it. For scholars looking for information and well-presented, informed opinion, however, the Internet can pose a challenge.

If you find an article in a CD-ROM or subscription database (InfoTrac or Lexis-Nexis, for example), you will know that the article has been published in print, so you can use the criteria for print works (8c) to evaluate it. If the article has been published in a reputable periodical, you can assume that it is a valid source for a research paper.

For works devised specifically for the Internet, use the strategies in the Key Points box to help you separate the information from the junk.

KEY POINTS

Questions to Evaluate a Print Source

1. What does the work cover? It should be long enough and detailed enough to provide adequate information.
2. How unbiased is the information? The author, publisher, or periodical should not be affiliated with an organization that has an ax to grind—unless, of course, your topic entails reading critically and making comparisons with other points of view.
3. How current are the views? Check the date of publication. The work should be up to date if you need a current perspective.
4. How reputable are the publisher and author? The work should be published by a reputable publisher in a source that is academically reliable, not one devoted to gossip, advertising, propaganda, or sensationalism. Check Books in Print or Literary Market Place for details on publishers. The author should be an authority on the subject. Find out what else the author has written (in Books in Print or at <http://www.amazon.com>) and what his or her qualifications are as an authority.
Presenter: 2

**KEY POINTS**

**Developing Your Junk Antennae**

1. *Scrutinize the domain name of the URL.* Informational Web pages tend to come from .gov and .edu addresses. Nonprofit organizations (.org) provide interesting mission statements. With .com ("dot com") sources, always assess whether the source is informational or is basically an advertisement or self-promotion.

2. *Check the home page.* Always take the link from a Web site to its home page, if you are not already there. The home page often provides more information about the author, the sponsor, the purpose, and the date of posting.

3. *Assess the originator of an .edu source.* Is the educational institution or a branch of it sponsoring the site? A tilde (~) followed by a name in the URL indicates an individual posting from an academic source. Try to ascertain whether the individual is a faculty member or a student. Increasingly, though, individuals are setting up Web sites under their own domain name (20d).

4. *Discover what you can about the author.* Look for a list of credentials, a home page, a résumé, or Web publications. Use the author's name as a search term to see what the author has published on the Internet or who has cited the author.

5. *Investigate the purposes of a Web page author or sponsor.* Objectivity and rationality are not necessarily features of all Web pages. You may come across propaganda, hate sites, individuals purporting to have psychic powers, religious enthusiasts, and extreme political groups. The sponsor of a site may want to persuade, convert, or sell. Go to the home page and to linked sites, and, in addition, note any postal or e-mail address or phone number you can use to get more information about the page and the sponsor. Even if the message is not pointedly biased and extreme, be aware that most authors write from some sense of conviction or purpose. Look for alternative points of view, too.

6. *Evaluate the quality of the writing.* A Web page filled with spelling and grammatical errors should not inspire confidence. If the language has not been checked, the ideas probably haven't been given much time and thought, either. Don't use such a site as a source. Exceptions are discussion lists and Usenet postings. They are written and posted quickly, so even if they contain

*(Continued)*
7. **Follow the links.** See whether the links in a site take you to authoritative sources. If the links no longer work (you’ll get a 404 message: “Site Not Found”), the home page with the links has not been updated in a while—not a good sign.

8. **Check for dates, updates, ways to respond, and ease of navigation.** A recent date of posting or recent updating, information about the author, ways to reach the author by e-mail, regular mail, or phone, a clearly organized site, easy navigation, and up-to-date links to responsible sites are all indications that the site is well managed and current.

Useful information on evaluating sources is available at a Widener University (Chester, PA) site at <http://www2.widener.edu/Wolfgram-Memorial-Library/webevaluation/webeval.htm> and at a site called *Thinking Critically about World Wide Web Resources* at <http://www.library.ucla.edu/libraries/college/help/critical/index.htm>.
1.4 Online Search Strategies

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*Keys for Writers, Third Edition.*  

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Keyword searches

Use keywords to search for any material stored electronically—on the Web, in library catalogs, in CD-ROM databases, or in online subscription services. Keyword searching is especially effective for finding material in journal and newspaper articles in databases such as InfoTrac and Lexis-Nexis, because a computer can search not only titles but also abstracts (when available) or full articles.

Keywords are vital for your Web searches. Spend time thinking of the keywords that best describe what you are looking for. If a search yields thousands of hits, try requiring or prohibiting terms and making terms into phrases (see the Key Points box). If a search yields few hits, try different keywords or combinations of keywords, or try another search engine. In addition, try out variant spellings for names of people and places: Chaikovsky, Tchaikovsky, Tschaikovsky.

KEY POINTS

Doing a Keyword Search

1. Know the search engine's system. Always use the Search Tips or the Help link to find out how to conduct a search. Search engines vary. Some search for any or all of the words you type in, some need you to indicate whether the words make up a phrase, and some allow you to exclude words or search for alternatives.

2. Use Boolean terms to narrow or expand a search. Some searches operate on the Boolean principle, which means that you use the "operators" AND, OR, and NOT in combination with keywords to define what you want the search to include and exclude. Imagine that you want to find out if and how music can affect intelligence. A search for music AND intelligence would find sources in the database that include both the word music and the word intelligence (the overlap in the circles below).

(Continued)
Parentheses can aid in searches, too. A search for music AND (intelligence OR learning) would expand the search. You would find sources in the database that include the word music and also the word intelligence or the word learning.

In Boolean searches, AND and NOT narrow the search: chicken AND salmonella; dolphins NOT Miami. OR expands the search: angiogram OR angioplasty. Not all databases and search engines use this system. MetaCrawler, for instance, asks simply if you want to include any or all of the search terms or use all as a phrase.

3. **Use a wildcard character to truncate a term.** A wildcard allows you to use at the end of a phrase a character that indicates that more letters can be attached. Common wildcard characters are * and ?. The truncated search term addict* will produce references to addict, addicts, addiction, addictive, and so on.

4. **Group words into phrases.** Often, you can use double quotation marks—"Michael Jackson"—or parentheses—(Michael Jackson)—to surround a search term and group the words into a phrase. Michael Jackson entered as a term without such quotation marks or parentheses would produce references to other Michaels—Johnson and Jordan, for instance—and to other Jacksons—Stonewall Jackson, Jackson Pollock, and so on.

5. **Learn how to require or prohibit a term.** Many search engines allow you to use a symbol such as + (plus) before a term that must be included in the document indexed; a – (minus) symbol prohibits a term: +"Civil War"–Gettysburg. Some search engines use these symbols in place of the AND and NOT of Boolean searching.

6. **Take advantage of the “proximity” search feature if available.** Some search engines—AltaVista is one—let you indicate when you want your search terms to occur close to each other in the text. Check in the Help or Tips file to determine whether the engine you are using has this feature. Proximity is indicated in various ways in various search engines. NEAR or ADJ (adjacent) are common: "Virginia Woolf" NEAR "Bloomsbury group" would search for the two phrases near each other in the text.

Use the results to help tailor and refine your search. If your search produces only one useful source, look at the terms used in that one source and its subject headings, and search again, using those terms. Above all, be flexible. If your search results in no hits, try again with a different search term or terms. Once you find a promising reference to a source that is not available online in full text, check whether your library owns the book or journal. If your search yields a source available only on microfilm or microfiche, you might need a librarian’s help to learn how to use the reading machine and how to make copies.
2. Techniques

2.1 Interviews

Berger, A.
*Media and Communication Research Methods.*

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Chapter 7
Interviews

Interviews are one of the most widely used and most fundamental research techniques—and for a very good reason. They enable researchers to obtain information that they cannot gain by observation alone. That is why one sees so many studies by researchers involving interviews.

What Is an Interview?

Perhaps the simplest way to describe an interview is to say that it is a conversation between a researcher (someone who wishes to gain information about a subject) and an informant (someone who presumably has information of interest on the subject).

We most commonly think of interviews as involving jobs: and most of us have, at one time or another, been interviewed for a job by one or more members of a company we wanted to work for. The goal of these interviews is similar to the goal of interviews conducted by all researchers—to obtain information.

The term interview is related to the French term entrevue, which means “to see one another or meet.” This points out an important element of interviewing—usually there is a face-to-face relationship. But not always. Some interviews are conducted by telephone or other electronic means.

Four Kinds of Research Interviews

There are four kinds of interviews found in scholarly research.

Informal Interviws. There are few controls in these interviews: they just take place, are not organized or focused, and are generally used to
introduce researchers to those being studied. Informal interviews are, in essence, conversations that serve the purpose of helping the researcher gain the confidence of his or her informant. An informant is a person (often a member of some group being studied) who conveys information to a researcher. That is, informants are people who have (it is hoped) important knowledge and who are willing to tell interviewers what they know.

Unstructured Interviews. In these interviews, the researcher is focused and is trying to gain information, but he or she exercises relatively little control over the responses of the informant.

Semi-structured Interviews. Here, the interviewer usually has a written list of questions to ask the informant but tries, to the extent possible, to maintain the casual quality found in unstructured interviews. Focus groups, which are widely used in market research, are considered to be semi-structured interviews. Focus groups are free-form discussions by a group of people, led by a moderator, designed to obtain information about some topic.

Structured Interviews. In this kind of interview, the researcher uses an interview schedule—a specific set of instructions that guide those who ask respondents for answers to questions. For example, the instructions might tell what follow-up questions to ask if a question is answered in a certain way. Questionnaires that are self-administered are also classified as structured interviews. (Interviewing techniques are also an important element of survey research, a methodology discussed in Chapter 12.)

Why We Use Interviews

As I mentioned above, there are a number of ways of getting information about people: first, observing what they do; second, asking them about what they are doing; and third, analyzing texts and artifacts produced by people, which is done when we make content analyses (discussed in Chapter 11). Unless we have the chance to observe people for a long period of time, we cannot know much about their past activi-

ties, their history. But we can discover this information by asking them about it.

We also can find out about people's ideas, their thoughts, their opinions, their attitudes, and what motivates them by talking to them and asking the right questions. Let me suggest some basic differences between observation and interviewing in the chart below.

<table>
<thead>
<tr>
<th>Observation</th>
<th>Interviewing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Present</td>
<td>Past and Present</td>
</tr>
<tr>
<td>Actions</td>
<td>Attitudes</td>
</tr>
<tr>
<td>Context</td>
<td>Motivations</td>
</tr>
<tr>
<td>Seeing</td>
<td>Hearing and probing</td>
</tr>
</tbody>
</table>

In many cases, when possible, we use the two approaches together, but this is not always practical. Observation does give us a sense of context, which often helps explain what people do. But it doesn't help us get inside people to understand why they do things, what motivates them, and what anxieties they have.

One advantage of interviews is that one can generally record interviews and thus have a written record that can be analyzed in detail. In some cases, it is possible to use videotape when doing research and capture visual information, but videotaping is much more difficult to do.

In this chapter, I will focus on unstructured interviews. Interviews, as I suggested earlier, are widely used in research because they provide us with information that we cannot obtain any other way. You can observe a person (for example, if you are doing some participant observation research in a gymnasium or video game parlor or bar), but you can't know what the people you are observing think about what they are doing or what they know from just observing them.

In some respects, an interview (and remember, I will be talking about unstructured interviews when I use the term in this chapter) is like a psychoanalytic consultation. The interviewer is probing for information that the informant presumably has but may not be conscious or aware of or may not consider important.
How to Interview People

There's an art to interviewing people, and it takes time for researchers to become good interviewers. Let me offer a list of some important considerations to keep in mind when interviewing people.

**Guarantee anonymity.** Explain to your informants or respondents that what they tell you will be anonymous and that nobody (except you) will know who provided the information you obtained. Generally speaking, a distinction is made between informants (people you've gotten to know and who you will have a chance to interview a number of times) and respondents (people who will be interviewed only once).

**Make sure you're accurate.** You should tape-record your interviews to ensure that you'll have accurate information. If this is not possible, you'll have to jot down notes as you proceed with the interview. If it is not possible to take notes, write down what you remember immediately after the interview. Make certain you always record the following:

- The date of the interview
- Where it is taking place or took place
- Who you interviewed

Also, be sure that you have extra batteries (even if you can plug your tape recorder into a socket) and clean tapes and that your tape recorder is functioning properly. Some researchers take two tape recorders in case something happens to one of them. It is best to use high-quality 60-minute cassettes with screws in them (in case you have to take the cassettes apart); longer ones have very thin tape that often breaks or stretches.

**Avoid leading questions.** When you ask questions of your informants, don't offer leading questions, which more or less push your respondent toward an answer. For example, let's imagine you are interviewing a student about a class she's taking and she says her teacher is unfair. You can respond to this statement several ways:

- **Leading question:** "Is that because your teacher favors men over women?"
- **Asking for definitions:** "What do you mean by unfair?"

**Have your informants define terms.** If your informants use terms that you are unfamiliar with or that you think need some attention, ask them to define the terms, to tell you what they mean by the terms. Make them give their own definition of a term; don't ask them if your understanding of a term is correct.

**Stay focused.** Once your informants have started talking, make sure your questions don't get off the track; focus on getting more details about what your informants are saying. In conversations, there is often a tendency to wander about on all kinds of side issues. You must resist this and stay "on target."

**Make sure your questions are clear.** If you ask unclear questions, you'll get ambiguous and relatively useless answers. Your respondents may be trying to answer your questions as accurately as possible, but if they don't understand your questions or your questions are "fuzzy," informants won't be able to supply the information you are seeking.

**Ask for amplifications and examples.** When you are talking with your informants, keep in mind some ways of getting more details about the subject being discussed. One useful response to a statement by an informant is this:

1. And then what happened?

Some other responses and requests for amplifications are these:

2. Who was involved?
3. When did this happen?
4. Why did it happen?
5. Where did it happen?
6. What was the result?

You can also ask for examples of things informants talk about—anything to get more information and more details, as long as it related to the subject being investigated and does not lead you off on a tangent.'
Sometimes, instead of just asking a general question such as “where?” you can ask for more detail and say something like, “Could you tell me some places where?” to obtain more information from the informant. “Where?” suggests one place while “some places where” asks for more information.

Prepare some questions before the interviews. Even though you don't use a prepared list of questions in unstructured interviews, you should do some thinking about the topic you are dealing with and do what you can to stay focused on that topic and avoid going off on tangents.

Some researchers suggest that a research protocol be developed to guarantee uniformity and accuracy. A typical interview protocol contains material such as the following:

- A title or heading for the interview
- Instructions for the interviewer to follow
- A list of key questions to be asked
- Follow-up questions (or probes) once the key questions have been asked
- Comments and notes by the interviewer relative to the interview.

Be nonjudgmental. This is absolutely imperative. You should never suggest, by the questions you ask, the tone of your voice, your facial expression, or your body language, how you feel about the information you are given by your informant. If you show any signs of being judgmental, either positively or negatively, this will have a profound impact on your informant and will color the information you are given.

Use “Uh-huh” and other phatic communications. In some cases, just saying “uh-huh” or “I see” is sufficient to continue the interview. This phatic (literally phatic means just making noises) communication is a commonly recognized cue to the informant to keep talking. It is a form of acknowledgment that means, in effect, “I hear what you are saying... please continue.”

Take notes about other matters. Take notes, while conducting the interview, about matters that strike your attention; for example, was the informant nervous or relaxed, were there interruptions, were there distracting noises or music, and so on.

Be a good listener. Don’t interrupt your informants or complete their sentences. Make sure your mind doesn’t wander when you are listening.

The Structure of Conversations and Interviews

Conversations (extremely informal interviews) and unstructured interviews (conversations with a defined purpose) share a common structure. This structure is shown below:

Q & A Q & A Q & A Q & A Q & A Q & A Q & A Q & A

That is, typically a conversation involves questions and answers and turn taking between those talking. (The turn-taking is represented by the regular and boldface type in the example shown above.) Conversations seldom take the form of simple declarative statements by themselves. Frequently, questions are used as transitional devices to keep a conversation going. In an ordinary everyday conversation, the answers are usually considerably longer than the questions.

It might be useful to think of the kind of interrogations one finds in trials as a metaphor for interviewing, except that in interviewing, the
questions are not asked with a hostile intention. But the goal is the same—to gain detailed information, to obtain “the truth, the whole truth, and nothing but the truth.”

A Short Theatrical Piece on Interviews

Grand Inquisitor: Being a Grand Inquisitor is very hard! I seem to have lost my touch in recent years.

Arthur: What do you mean by “touch”?

Grand Inquisitor: I used to put people on the rack with a certain amount of flair. I yielded a wicked knout and was renowned for my skill in pouring hot lead down the throats of heretics.

Arthur: When did all this happen?

Grand Inquisitor: About a thousand years ago, give or take a few centuries.

Arthur: Why did the Inquisition occur?

Grand Inquisitor: We had so many heretics that we had to do something. The worst cases were the people who thought they were believers but were really unconscious heretics.

Arthur: Sounds vaguely Freudian. Fortunately, there’s no more Inquisition and no torturing to speak of nowadays.

Grand Inquisitor: Ha! Ever hear of adolescents? And adolescence? Or freshman composition?

One thing we learn from seeing films about trials and television programs of trials (think of the O.J. Simpson trial or President Clinton’s impeachment hearings) is that witnesses sometimes contradict themselves and sometimes lie and that different witnesses frequently offer different accounts of the same event. (The classic movie about different accounts of the same event is the Japanese masterpiece Rashomon.) But the fact remains, that in interviewing informants and respondents—as in trials—every word is potentially important.

The reason the O.J. Simpson trial was so fascinating to viewers was that it became a narrative—a story with dramatic qualities to it, which

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Property</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>An abstract</td>
<td>Summary of the narrative’s content</td>
</tr>
<tr>
<td>O</td>
<td>Orientation</td>
<td>Time, place, situation, those involved</td>
</tr>
<tr>
<td>CA</td>
<td>Complicating action</td>
<td>Sequence of events</td>
</tr>
<tr>
<td>E</td>
<td>Evaluation</td>
<td>Significance and meaning of the action</td>
</tr>
<tr>
<td>R</td>
<td>Resolution</td>
<td>How things turned out</td>
</tr>
<tr>
<td>C</td>
<td>Coda</td>
<td>Returns the discussion to the present</td>
</tr>
</tbody>
</table>

What Labov and Waletzky are suggesting is that when informants discuss things with interviewers, researchers can generally find the functions listed above in a given segment of conversation. Interviewers must be especially mindful of judgments, criticisms, and evaluations made by the informants, for they point to important attitudes and beliefs.

In principle, most every segment of the interview can be classified as having a particular function and can be labeled by one of the symbols. This helps researchers interpret what was said by informants because it shows what the function of a particular statement was.

Transcribing Tapes

The tapes you’ve made of your interviews have to be transcribed. Generally, this is done with a transcription machine, which costs a few hundred dollars or so. These machines enable you to use a foot pedal to operate the machine—to start it, move backward and forward, and even slow down the machine. It may be possible to use word recognition software to do transcriptions. You play the tape recorder into the
microphone of a computer and have the program transcribe the material. (It is also possible to bring a portable computer with the software program on it and have the interview directly recorded and transcribed by the program, but that is too risky, because there may be some important words that the word recognition program misses.) Some of these software programs claim 95% accuracy, and that may be enough to speed up the process of transcribing tapes.

Because it takes something like 7 or 8 hours to transcribe an hour’s tape, using the new software programs may save you an enormous amount of time—if you can get them to work. But even with these programs, you’ll have to go over the material and fix errors, so the process will consume a considerable amount of time whatever method you use.

Making Sense of the Information on Transcribed Interviews

When you have the interviews transcribed and have checked them for accuracy, the next step is to make sense of it as best you can. One thing you must do is look for information that will be useful to you. What “facts” did you learn? What information about people, practices, ideas, beliefs, and so on did you get? (And how reliable is it?)

Another thing is to classify and categorize the material in the transcripts. I have already suggested one way of classifying this material—using the functions in the Labov and Waletzky chart and determining whether a given passage functions as an abstract, an orientation, a sequence of action, an evaluation, or a resolution.

But there are other procedures to consider. For example, we should see how our informant categorizes things. How are old and young and good and bad defined by the informant? What kinds of groups are mentioned? How does the respondent categorize people—by age, by membership in a group, by gender, by occupation, by status?

I sometimes ask students in my classes to talk about their high schools (this is, in effect, a group interview), and generally, I get lists of different groups or subcultures found in their high schools: preppies, greasers, surfers, white punks on dope, jocks, cheerleaders, nerds, geeks, creeps, and so on. That is, when young people are asked about high schools, they often respond by categorizing their fellow students into various interest groupings. This offers an insight into how they think about their high school experiences.

Interviews

The purpose of looking for classifications and categories used by informants is to get a sense of how their minds work, how they make sense of the world. We assume that these usages are culturally conditioned, so finding out how informants think offers important clues about their culture or subculture or group. This process of determining categories and classification systems is done by coding.

Coding

When you have your transcriptions of the interviews you’ve conducted, you have to find ways of making sense of the material you have and this is done, as suggested above, by looking for patterns, classifications, themes, and categories in this material. There are no absolute rules about how coding is done; a great deal depends on the nature of the material being coded.

The list that follows is drawn from John W. Creswell’s (1994) Research Design: Qualitative and Quantitative Approaches. It is a general guide to the process of coding:

1. Read the material over as a whole and get an overview of it.
2. Pick one transcript and examine it carefully, looking for topics covered.
3. Do this for several transcripts and make a list of all the topics that were covered.
4. Make abbreviations for each topic and go through the transcripts, putting down the appropriate abbreviation beside each example of a given topic. If your topics list doesn’t cover all the material, see if you can think up new topics that will help you do the job.
5. Turn your topics into categories. Make sure that the categories cover all your transcripts and don’t duplicate one another.
6. Decide on a final set of abbreviations for your categories and alphabetize them. You now have an alphabetical list of codes in the transcripts.
7. Assemble all the material found under each category in one place and analyze it to see what you find.
8. See whether you can refine your coding and get fewer and more descriptive categories.

Creswell deals with the ideas of R. C. Bogdan and S. K. Biklen (1992, pp. 167-172) who suggest using abstract coding categories as
topics. They propose that researchers look for the following kinds of codes:

- Setting and context codes
- Perspectives held by subjects
- Subjects’ ways of thinking about people and objects
- Process codes
- Activity codes
- Strategy codes
- Relationship and social structure codes
- Preassigned coding schemes

There are also computer software programs that help researchers find ways of coding their transcripts and catch coding errors. Coding is an attempt by researchers to see if any common themes and topics inform the interview transcripts; these common themes will help researchers see what is important to informants and what is secondary.

A number of years ago, I did some research on humor. I was looking specifically for the techniques that humorists used in creating humor. I examined a wide range of materials, including joke books, folklore books, comic books, books on humor, humorous plays, humorous short stories, and comic novels.

From this research, I elicited 45 techniques that, I believe, are the building blocks of all humor and that are used, in various permutations and combinations, by all humorists. When I got my list, I started examining it and discovered that each of the techniques fit into one of four different and mutually exclusive categories—humor of logic, humor of identity, linguistic humor, and visual or action humor (see Table 7.1).

Any example of humor contains, my argument goes, one or more of these techniques. It took a considerable amount of thinking and speculation before I became aware of the categories “hidden” in the 45 techniques. My point, then, is that finding categories is not always an easy task.

**Problems With Interview Material**

One question about interviews that is debated is whether what interviewers are looking for is data, information, and factual matters, or

<table>
<thead>
<tr>
<th>Language</th>
<th>Logic</th>
<th>Identity</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Allusion</td>
<td>Absurdity</td>
<td>Before/after</td>
<td>Chase</td>
</tr>
<tr>
<td>Bombast</td>
<td>Accident</td>
<td>Burlesque</td>
<td>Slapstick</td>
</tr>
<tr>
<td>Definition</td>
<td>Analogy</td>
<td>Caricature</td>
<td>Speed</td>
</tr>
<tr>
<td>Exaggeration</td>
<td>Catalogue</td>
<td>Eccentricity</td>
<td></td>
</tr>
<tr>
<td>Facetiousness</td>
<td>Coincidence</td>
<td>Embarrassment</td>
<td></td>
</tr>
<tr>
<td>Insults</td>
<td>Comparison</td>
<td>Exposure</td>
<td></td>
</tr>
<tr>
<td>Infantilism</td>
<td>Disappointment</td>
<td>Grotesque</td>
<td>Impersonation</td>
</tr>
<tr>
<td>Irony</td>
<td>Ignorance</td>
<td>Imitation</td>
<td></td>
</tr>
<tr>
<td>Misunderstanding</td>
<td>Mistakes</td>
<td>Impersonation</td>
<td></td>
</tr>
<tr>
<td>Overblending</td>
<td>Repetition</td>
<td>Mimicry</td>
<td></td>
</tr>
<tr>
<td>Puns/wordplay</td>
<td>Reversal</td>
<td>Parody</td>
<td></td>
</tr>
<tr>
<td>Repartee</td>
<td>Rigidity</td>
<td>Scale</td>
<td></td>
</tr>
<tr>
<td>Ridicule</td>
<td>Theme &amp; variation</td>
<td>Stereotype</td>
<td></td>
</tr>
<tr>
<td>Sarcasm</td>
<td>Unmasking</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Satire</td>
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</table>

Whether it is the way informants speak and how they organize their information that is most important. That is, should researchers focus on what people are doing and have done or on the way they express themselves about what they’ve done and are doing? Which is most important and yields the most interesting information—what informants say or how they say it?

There is a link between the two matters, or maybe it is best to suggest that the two are connected (two sides of a coin) because the analysis of expression is also the analysis of thought and thinking. It is useful to keep in mind what E. W. Said (1978) wrote in Orientalism:

[The] real issue is whether indeed there can be a true representation of anything, or whether any and all representations, because they are representations, are embedded first in the language and then in the culture, institutions, and political ambiance of the representative. If the latter alternative is the correct one (as I believe it is), then we must be prepared to accept the fact that a representation is *ex ipso* implicated, embedded, interwoven with a great many other things besides the “truth,” which is itself a representation. (pp. 272-273)
Said’s point is that we must consider the extent to which a culture shapes the way people talk and give information (that is, give a “representation”), so we must always be cautious about accepting what people tell us as being the truth. Is the information respondents give “the truth” or “their truths?”

Just because a person agrees to be an informant and tell you something about some group or entity that the person has been involved with doesn’t mean that you’ll be getting “the truth, the whole truth, and nothing but the truth” from your informant. Let me suggest some of the problems that researchers face in dealing with informants and respondents (which apply to all other forms of research, such as questionnaires and surveys).

1. People don’t always tell the truth. People want to put their best foot forward, want to appear nobler and better than they actually are, and so they often lie or distort things. Sometimes they actually have convinced themselves that their accounts are not lies but are the truth.

2. People don’t always remember things accurately. Even if people want to tell the truth, sometimes their memory lets them down and without recognizing what they are doing, they fabricate the truth—that is, they make up things.

3. People don’t always have useful information. They may think they do and may feel important because they are being interviewed, but in reality, they have little to say of interest.

4. People sometimes tell you what they think you want to hear. In some cases, informants tailor their responses to questions in terms of their perceptions of what will best satisfy the interviewer. They do this because they like you and want to give you material that will be helpful, they are bored and want to get through the interview as soon as they can, or they want to impress you.

5. People use language in different ways. The problem is one of communicating and interpreting meaning. The intended meaning may not be the communicated or articulated meaning and, most important, the meaning received or gained by the interviewer may be different from the meaning intended by the interviewee. Thus, it is important to be an efficient and active listener who seeks clarifications and uses feedback techniques to ascertain that the meaning received is the meaning intended.

It is a good idea to ask several informants about the same thing to see whether there’s any consistency. You can also see, sometimes, whether there’s a difference between what people say and what people do. You want to get accounts from your informants and respondents that are true, reliable, and complete.

You must remember that your respondent’s point of view is not a reliable explanation of behavior. Some of the reasons for this are given above and are due to the way we represent ourselves to others and to the illusions we all have about ourselves. People tend to justify their actions to themselves and others, so you have to be careful about accepting anyone’s point of view as being accurate, correct, and unbiased.

The material you get in interviews can be understood in terms of the figure/ground metaphor. An informant’s interview should be seen as a figure against a ground of everything from the actual interview itself to some event in or aspect about the culture or subculture that the informant is providing information about. The background has an effect on the figure; context makes a great deal of difference.

Conclusions

Interviews are one of the most fundamental techniques researchers use to get information. But interviews are difficult to do and involve a great deal of work (recording them, transcribing them, coding them), and the information gained is always suspect. So one must proceed with caution when generalizing from interviews, but they are unique in allowing researchers to get inside the minds of people and to gain access to material of considerable importance. Like many high-risk activities, they are also high-gain ones.

Further Reading


RESEARCH:
2 Techniques

2.2 Participant Observation: Video Game Players

Berger, A.
*Media Research Techniques.*

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As for the term "participant observation," it is a misnomer. The scientist . . . must always be able to take the role of his subjects, to participate symbolically, if he is to interpret or impute meaning to the actions of others. "Participant observation," as the term is usually employed, simply means the researcher engages in the activities of the group under study. He attends church, participates in festivals, drinks with the boys, or whatever. . . .

But there are liabilities to any effort to maximize one's immersion in a system. Aside from the danger of losing one's identity as a scientist, the researcher may become the captive of the group he is studying. His observations may no longer represent his independent judgments or evaluations but may reflect the observer's definition of the situation. For there is more to observation than simply taking the role of the other: The scientist must remain free to make interpretative judgments. Although some studies of small groups warn against the distortions in the observer's perception that result from social pressures, few, if any, authors point to the misperceptions that result from social controls exerted by the group under investigation.

Gideon Sjoberg and Roger Nett,
A Methodology for Social Research (1968, p. 176)

Chapter 11
Participant Observation:
Video Game Players

Participant observation means just what it says. The researcher participates (to varying degrees) in some activity in order to observe and better understand those involved in the activity. Participant observation thus is a kind of fieldwork an investigator does to gain insight into some subculture or organization or activity of interest. For example, participant observation studies have been made of hospital emergency rooms, jails, drug addicts, and medical schools. The investigators' purposes in conducting these observations are to find out what goes on in the subcultures or organizations being studied and to gain some insight into their operations (especially hidden aspects not easily recognized) and how they function. As Brewer and Hunter (1989) note:

Fieldwork promises realistic theories that do justice to the complexity of actual social life. It is distinguished from other styles of research by the fact that the fieldworker personally enters natural social groups and studies them, as far as possible, in their full and natural state. . . . Most field research focuses on only one or a few groups, or upon a relatively small sample of individuals. This frees resources and also allows fieldworkers to develop not only an inside knowledge of the group but also the necessary rapport with subjects to conduct intensive multifaceted studies. However, this small scale also leads to questions about the representativeness of fieldwork's findings. . . . Participant observation obviously has its limitations, but it also is fascinating and sometimes leads to extremely interesting insights about members of the groups being observed. (pp. 45-46)
An Example of a Possible Participant Observation Study

Let's take gymnasiums, or health clubs, as an example. Suppose that the aim of the participant observer is to find out "what goes on" in the health club. Who belongs? Why do they belong? What are the rites and rituals involved? What do the people who join the health club believe? How do members use the health club? What functions does being a member of the health club serve (both manifest or intended and latent or unintended)?

The manifest functions of belonging to a health club are to get exercise and improve one's physical health, but there are also unrecognized (in many cases) latent functions, such as to find suitable sexual partners and to take care of narcissistic needs (looking at one's body or muscles in the mirrors).

Participant observers must make certain they maintain their objectivity and don't "go native"—that is, without being aware of what they are doing, adopt the beliefs and values of the group they are studying (this has been known to happen). They also have to avoid changing the natural dynamics of the group they are studying, so doing participant observation poses certain tactical problems for researchers. For example, one has to be unobtrusive (to the extent possible) yet also do things like taking notes, counting, and writing down important statements made by various individuals in the group being studied.

Following are some of the concerns that face the participant observer:

1. How do you obtain focus? That is, what is to be observed?
2. How do you record your observations without changing the natural dynamics of what you are observing?
3. How do you make sure your notes and records are accurate? (How do you make sure that you distinguish between descriptions of events that took place and your interpretations of those events?)
4. How do you relate to those being observed (and get desired information) and still maintain objectivity?
5. How much can you generalize from your observations? How do you need to qualify your generalizations?

In participant observation, the researcher spends time observing people who are in some ways different from him- or herself. It is a form of ethnography carried out in one's own society, rather than in some distant land. As James Spradley notes in The Ethnographic Interview (1979):

The essential core of this activity aims to understand another way of life from the native point of view. . . . Fieldwork . . . involves the disciplined study of what the world is like to people who have learned to see, hear, speak, think and act in ways that are different. Rather than studying people, ethnography means learning from people. (p. 3)

In the exercise described below, you will learn from people by observing them as they participate in an activity that involves an area of media usage not dealt with elsewhere in this book—playing video games.

Studying Video Game Players

In this exercise, you will observe a group of video game players. Participant observation generally involves the study of some group of which the researcher is not a part, but it is possible that some students doing this exercise are themselves serious video game players. If you are such a student, try to find some video game players who are somehow different from you (from a different socioeconomic or ethnic or racial group) to observe, to get as much distance as possible. (Some scholars consider it an advantage to investigate a group that one knows about, because this can mean the researcher has some inside information of interest. The problem, however, is maintaining objectivity.) Or you can investigate some alternative media-using group, such as the patrons of coffee shops that have Internet connections or people who attend Star Trek conventions.

Here are some of the things you should include in the notes you make while observing the group you have chosen:

1. Indicate where the video game parlor you are studying is located and take note of the significance of the location relative to those who play games in the video game parlor.
2. Record how much time you spend observing. Include how many times you go to the video game parlor and how long you spend there each time.

3. Record the number of male and female video game players and any other demographic information you can: age, ethnicity, race, estimated socioeconomic class, grade in school, style of dress, and so on.

4. Record, as best you can, how much time each person spends playing games, in general, and how long each player plays each game.

5. Describe the style of dress of the various players.

6. Record any ritualistic or highly structured or patterned behavior in the players. Are there cliques? Are certain players “opinion leaders” and others basically submissive? What do the players take for granted?

Get to know some players who will talk with you (“informants”), to help you understand how the group functions and how its members think. You may want to ask questions such as the following:

- What is your favorite game?
- Why do you like it? What's special about it?
- If this wasn't always your favorite game, what was your favorite before you switched?
- Why do you like video games?
- How much time do you spend playing video games here?
- How many times do you go to video game parlors in a typical week?
- Why do you come to this video game parlor rather than go to other ones?
- How much money do you spend in a typical week playing video games? Where do you get the money to play?
- Do you think there’s a difference between the games boys play and the games girls play? If so, what is it?
- Is there a difference between the ways boys and girls play? If so, what is it?

While doing your research, be sure to write down any statements that players make that you think might be significant and might help people understand the mind-set of video game players.

See whether you can find any hidden or latent functions (functions that video game players do not recognize) to video game playing. Also, get some information on the development of the video game industry over the years (especially information about how large it is, how much

money is spent on video games outside the home, and similar material) and relate your findings to these economic data.

Writing a Report on Your Participant Observation

1. Begin with an introduction that gives your reader information about the video game parlor you chose, its location, the games it has, brief descriptions of the games, and other general information. If you consulted any articles or books about video game players, indicate what you found.

2. Tell the reader what interesting data you found about the demographic aspects of the video game players. You should make a chart to display your data, so your reader can see easily what you've found.

3. Give your views, based on your observations, on any latent or unintended and unrecognized functions of video game playing for the players involved. The manifest functions of video game playing are amusement and entertainment, but the latent functions may involve all kinds of things that the players do not recognize. Use quotations from the video players when suitable.

4. Discuss any problems you had in doing your participant observation and any difficulties you had in generalizing from your rather limited exercise in this kind of research.

5. Discuss the benefits of participant observation and what you learned from the experience.

6. If you have studied video game players from different ethnic, racial, gender, and socioeconomic classes, describe the differences (if any) you have observed among the various players and discuss what these differences suggest.
RESEARCH

2 Techniques

2.3 Surveys

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Chapter 12
Surveys

Surveying is a research method that we use to get information about certain groups of people who are representative of some larger group of people of interest to us. For example, manufacturers of products want to know how people feel about their products (and those of their competitors) and use surveys to find out. We use surveys to determine the following:

- What do people know?
- What do people think?
- What do people own?
- What do people do?
- What have people done?
- What are people planning to do?
- What are people’s attitudes?
- What are people’s tastes?
- What are people’s prejudices?
- What are people’s beliefs?
- What are people’s values?

Politicians frequently use surveys to find out what issues are of importance to people and, during election periods, who they intend to vote for. Most surveying is done by interviewers, but one particular kind of survey—the questionnaire—does not use interviewers but is sent through the mail or distributed in publications (or through other means, such as on the Internet). Both terms—surveys and questionnaires—are often used loosely.
Defining Surveys

In their book *Field Projects for Sociology Students* Jacqueline P. Wiseman and Marcia S. Aron (1970) offer an excellent definition of surveys:

Survey research is a method for collecting and analyzing social data via highly structured and often very detailed interviews or questionnaires in order to obtain information from large numbers of respondents presumed to be representative of a specific population. (p. 37)

This description calls our attention to four key points about surveying:

1. It is done to collect and analyze social, economic, psychological, technical, cultural, and other types of data.
2. It is based on interviewing people (respondents) and asking them for information.
3. It is done with representative samples of a population being studied.
4. It is assumed that information obtained from the sample is valid for the general population.

Kinds of Surveys: Descriptive and Analytic

There are two basic kinds of surveys: descriptive surveys and analytic (or explanatory) surveys. I will deal with each kind of survey briefly. The descriptive survey, as the name suggests, describes the population being studied. These surveys seek to obtain information about demographic factors such as age, gender, marital status, occupation, race or ethnicity, income, and religion and to relate this information to opinions, beliefs, values, and behaviors of some group of people. For example, broadcasters use surveys to find out how popular their programs are, and manufacturers use surveys to determine who uses their products. The focus of descriptive surveys is on present-day behavior.

The second kind of survey, the analytical survey, seeks to find out why people behave the way they do. Researchers often use data from descriptive surveys to develop hypotheses and use analytical surveys to test their hypotheses about what causes certain kinds of behavior. Analytical surveys attempt to determine whether there are causal rela-

tionships between certain kinds of behavior and various social and demographic characteristics of people.

As you might imagine, it's much easier to obtain descriptions of people's behavior than it is to find out why people behave the way they do. There are so many different variables behind people's choices that it is hard to know why people act the way they do. People are affected by so many different factors that it's difficult to determine what, if anything, is of primary importance. You have to consider biological, psychological, social, economic, and political factors (among other things) in dealing with human behavior, and it is difficult to determine how each or any of these factors is involved in human behavior.

Methods of Data Collection

Conventionally, surveys collect data through two methods:

1. Interviews (individual or group interviews: in-person or telephone interviews)
2. Self-administered questionnaires—supervised administration (one-to-one or group administrations) or unsupervised administration, when the questionnaire is mailed (or e-mailed) to people or freely distributed via magazines, the Internet, and so on.

Survey interviews are quite different from depth interviews, described earlier in the book. Survey interviews have lists of questions that people are asked to answer and are not structured so that interviewers can explore subjects that come up, by chance, as in less structured depth interviews. Survey interviews are shorter than depth interviews and more structured so information can be obtained to make valid generalizations about the population being studied.

Questionnaires are conventionally understood to be lists of questions given or sent to people who are asked to answer the questions and return the questionnaires to the senders. That is, they are self-administered surveys. Questionnaires should always be accompanied by cover letters explaining the purpose of the questionnaire and pointing out how it is in the interest of the respondent to answer the questionnaire. They should also be attractively designed and easy to fill out and return. It's a good idea to provide a stamped, self-addressed enve-
lope to respondents. The easier you make things for your respondents, the better chance you have of getting the questionnaire returned.

The advantages and disadvantages of these two methods of surveying are noted briefly in the chart below.

### Personal Interviews

<table>
<thead>
<tr>
<th>Advantages</th>
<th>Disadvantages</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interviewer can explain questions in detail</td>
<td>Can be intrusive (too personal)</td>
</tr>
<tr>
<td>Interviewer can use a variety of data collection methods</td>
<td>Time-consuming and expensive</td>
</tr>
<tr>
<td>Interviewer can spend a lot of time with respondents</td>
<td>Hard to find people in sample at times</td>
</tr>
<tr>
<td>You know who is answering questions</td>
<td>People are reluctant to answer some questions</td>
</tr>
<tr>
<td>A higher likelihood of achieving a desired response rate</td>
<td>Needs well-trained interviewers</td>
</tr>
<tr>
<td>Not intimidating</td>
<td>Interviewer and respondent may have a language barrier</td>
</tr>
</tbody>
</table>

### Self-Administered Questionnaires

<table>
<thead>
<tr>
<th>Advantages</th>
<th>Disadvantages</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inexpensive</td>
<td>People may misinterpret questions</td>
</tr>
<tr>
<td>No interviewer bias to worry about</td>
<td>Low response rates the norm</td>
</tr>
<tr>
<td>You can ask about very personal matters</td>
<td>You don’t know who actually filled out the questionnaire</td>
</tr>
<tr>
<td>You can ask complex, detailed questions</td>
<td>Sampling errors frequent</td>
</tr>
</tbody>
</table>

You can see from this chart that there are advantages and disadvantages to each of the three ways of collecting information. The choice you make should be based on what you want to find out, how much time you have, and how much money you have.

### Surveys

#### Advantages of Survey Research

There are a number of advantages to conducting surveys, which explains why they are so widely used. They are also widely reported on in newspapers and magazines, in part because people are interested in what the surveys reveal ... even though individuals are often reluctant to participate in them.

- Surveys are inexpensive.
- Surveys can obtain current information.
- Surveys enable you to obtain a great deal of information at one time.
- Surveys provide quantitative or numeric data.
- Surveys are very common, and some of the information you seek may have already been discovered in a survey.

Surveys are, relatively speaking, inexpensive, especially when you consider the amount of information surveys are able to obtain. And the information you obtain is very current. Surveys enable researchers (who work for manufacturers, marketers, political parties) to find out, for example, what products people own, what products they intend to purchase, what issues are important to them in elections, who they might vote for in elections, and all kinds of other information of interest to the people making the survey.

What is particularly important is that surveys obtain information that can be quantified and analyzed statistically and thus can reach a higher degree of precision about the group being studied; that other forms of research cannot duplicate. These data can summarized in such a way that readers are able to see, rather quickly, what the data reveal about the population being studied.

I use the phrase “population being studied” because many surveys are interested only in one segment of the population—for example, people planning to buy cars, voters in a given state, housewives, or audiences of television shows. Survey information is so important in the television industry that programs live or die based on their popularity—which is determined by data about viewers obtained from surveys.

One thing you should keep in mind is that so many surveys are conducted that the information you are interested in obtaining may
RESEARCH
2 Techniques

2.4 Experiments

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Chapter 13
Experiments

Although we tend to think of the term experiment in connection with scientific work or with the research of social scientists, most of us in our daily lives frequently do what might be described as unscientific experimentation.

Everyday Experimentation

Suppose, for example, that you have a bad cold. You might try one remedy, and if it doesn’t work, try another; and if that isn’t effective, you try something else—until you’ve found something that will help you (with symptomatic relief, if nothing else).

What is important here is that you try one thing at a time. If you take aspirin and a cold remedy and have some hot chicken soup and your cold gets better, you don’t know whether it was the aspirin or the cold remedy or the chicken soup or some combination of the three that was the important factor in helping you feel better. So the principle is, try one thing (or variable) at a time and see what happens. We do the same thing when we try different foods or kinds of dishwashing detergent. We give these things a try, and if we like the results, we keep purchasing them. If the “trial” (read “experiment”) is unsuccessful, we try something else.

Experimentation, like the other methodologies discussed in this book, can be very complicated, and it is impossible to deal with all the different kinds of experiments and aspects of experimentation in detail in this book. But I can offer a generalized overview of the nature of experimentation that will give you insights into what is involved in the process of experimentation.
A Short Theatrical Piece on Experiments

Grand Inquisitor: *Tell me about your next experiment.*

Arthur: I want to find out whether a person on a cruise ship who eats $X$ amount eight times a day gains more weight than a person who eats $2X$ amount four times a day. You can eat eight meals a day on cruise ships.

Grand Inquisitor: *So?*

Arthur: I am applying for a $500,000 grant to cover the expenses I will incur in this research.

Grand Inquisitor: *Will I be involved in this experiment?*

Arthur: Yes. You have your choice. You can either be the person who eats $X$ amount eight times a day or $2X$ amount four times a day.

Grand Inquisitor: *I’ll choose the eight times a day regime. We developed big appetites in the Middle Ages. But why can’t we just eat in restaurants? Why do we have to take cruises?*

Arthur: The ocean is an important variable in this experiment. And I like cruises. But you make a good point. After the experiment on cruise ships, I’ll replicate it at three-star restaurants in France.

Defining Experiments

For our purposes, we will understand an experiment to be a procedure or kind of test that

1. demonstrates that something is true,
2. examines the validity of a hypothesis or theory, or
3. attempts to discover new information.

In the first case, we try to show that what is held to be true about something is actually true. This might involve, for example, replicating an experiment to see whether the findings in the first experiment are correct. In the second case, we test a hypothesis or theory to determine whether it is valid. We might think that there is a relationship between heavy television viewing and violent behavior in young people (having, of course, operationally defined heavy and violent). In the third case, we want to discover something we did not already know. We might try to find out how MTV affects the attitudes of male viewers of a particular age range about certain subjects, such as how to relate to women or what’s stylish and so on.

The Structure of an Experiment

Let me offer an overview of the steps taken when conducting experiments—or what might be described as the “structure” of a typical experiment.

1. Your experiment will involve two groups of people: the experimental group (also known as the treatment group, intervention group, or stimulus group) and the control group. Something will be done to the experimental group, but it will not be done to the control group.

2. Individuals must be randomly assigned to either the experimental group or the control group. How to do this is discussed in Chapter 12, on surveys and questionnaires, and involves the use of tables of random numbers (see Table 12.1).

3. A pretest is done. You measure the groups in terms of a dependent variable. There are two kinds of variables—*independent* and *dependent.* (Independent variables are ones that are varied by researchers, whereas dependent variables are ones presumed to be affected by independent variables.)

4. You perform the experiment and introduce one independent variable to the experimental group. Nothing is done with the control group.

5. You conduct a posttest to see if there’s a significant difference between the experimental group and the control group relative to the variable introduced.

An example of an experiment might be to take 100 sophomore males and divide them randomly into two groups of 50 students. You then test the students on something specific, such as their attitudes toward women. Then you show the experimental group a certain amount of violent MTV videos but don’t have the control group see anything. Then, after showing the experimental group the MTV videos, you test the two groups again to see whether the exposure of the experimental group...
to the MTV videos has led to any changes in that group’s attitudes toward women. (Note: This example describes one of several possible experimental designs—the classical pretest and posttest design. There are, of course, other designs or ways of structuring experiments.)

The logic of experiments is quite simple. We have two groups that are basically alike, and we expose one of the groups to X and don’t expose the other group to X; then we see what affect X might have had on the group exposed to it. We can tell what the effect was by comparing the group exposed to X with the other group that wasn’t exposed to X. It is assumed that the two groups are very similar to one another initially—a condition created through random assignment of subjects to groups (experimental or control). The underlying principle is that if the posttest shows differences between the two groups, the researcher would be able to conclude that the experimental treatment had an effect, because the treatment was the only variable distinguishing between the two groups.

In the hypothetical experiment described above, we are, in effect, comparing the experimental group before and after the exposure to the MTV videos and contrasting them with the control group. This experiment is diagrammed in the chart below.

<table>
<thead>
<tr>
<th>Control Group</th>
<th>Experimental Group</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. 50 male sophomores</td>
<td>50 male sophomores</td>
</tr>
<tr>
<td>2. Randomly selected</td>
<td>Randomly selected</td>
</tr>
<tr>
<td>3. Pretested</td>
<td>Pretested</td>
</tr>
<tr>
<td>4. Not exposed to MTV</td>
<td>Exposed to MTV</td>
</tr>
<tr>
<td>5. Posttested</td>
<td>Posttested</td>
</tr>
</tbody>
</table>

The two groups are treated the same until Step 4, when the independent variable (in this case exposure to a certain amount of MTV) to see whether it had an effect on the experimental group.

This offers us a sense of the logic of experiments. We must be careful to introduce only one independent variable; if we introduce two or more variables, we cannot know which, if any, of the variables affected the experimental group. The technical term for introducing more than one independent variable is confound. Confounds prevent researchers from determining what caused what in experiments.

Experiments

Advantages of Experiments

Experiments, if carried out carefully and correctly, provide very strong evidence that a given independent variable (such as the exposure of the experimental group to mediated violence in the form of MTV videos) actually has any effect that might have been discovered. Also, experiments give strong evidence that this effect that was discovered was not the result of some unrecognized phenomenon.

We can, then, discover all kinds of new knowledge by conducting experiments. And the fact that experiments can be replicated makes it possible for other researchers to conduct the same experiment to confirm the validity of the experiment.

Disadvantages of Experiments

Probably the biggest problem with experiments is that they are artificial, conducted—generally speaking—in laboratories or in “non-natural” situations. When people know that they are involved in an experiment, this information often affects their behavior.

There is also reason to believe that the design of experiments tends to overemphasize cause-and-effect relationships between matters being studied. It may be, for example, that many other factors are involved in the attitudes that male college sophomores have toward women.

In addition, there are often ethical problems involved in scientific experimentation. We see this in the case of medicines, in which the experimental group is given some new drug and the control group is denied the drug. Is it ethical to deny people a drug that may affect their health—or even save their lives in some cases? Of course, dealing with the media doesn’t involve life-and-death matters, but it is possible that certain experiments might disturb people psychologically. For example, many of the people who were involved in the Milgram experiment (discussed later in this chapter) suffered from psychological problems caused by their participation in it and needed extensive counseling and therapy.

That is why universities all have research boards that review potential experiments to make sure that the people being experimented on are not disturbed or harmed in any way.
A Checklist on Experimental Design

This checklist is adapted from the list found in John W. Creswell’s (1994) *Research Design: Qualitative and Quantitative Approaches* (p. 127). He describes this list as offering “key decisions” that experimental researchers have to make when designing their research. I have made some adaptations because I’ve not covered certain topics and kinds of experiments he deals with.

1. Who are the subjects (what population are they from) in your experiment?
2. How were the subjects selected? Was it randomly done?
3. Will the subjects be randomly assigned into groups?
4. How many subjects will be in the experimental group and the control group?
5. What is the dependent variable in the study? How will it be measured? How many times will it be measured?
6. What instrument(s) will be used to measure the outcome in the experiment? Why was it chosen? Is it reliable?
7. What are the steps you’ll be taking in this experiment?
   A. A random assignment of your subjects?
   B. Collection of demographic information
   C. Administration of a pretest
   D. The experiment itself (introduction of independent variable, also known as treatment or factor)
   E. Administration of a posttest
8. What threats are there to the internal and external validity of your experiment? How have you dealt with them?
9. Are you going to do a pilot test of your experiment?
10. What statistics will be used to analyze your data?

This list offers a useful guide for those planning and conducting experiments, in that it provides an overview of the process of experimentation. Of course, there is a big difference between knowing the “theory” of experimentation and implementing that theory—that is, actually conducting an experiment.

Experiments

What’s an Experiment and What Isn’t?

In experiments involving human beings, it’s difficult, in some cases, to determine what is an experiment and what isn’t. In this respect, let us consider some research that Stanley Milgram, a social psychologist, conducted. Strictly speaking, one could argue that Milgram’s research was not an experiment because he didn’t have a control group. But is it that simple?

Milgram (1965) described his study as follows:

Two persons arrive at a campus laboratory to take part in a study of memory and learning. (One of them is a confederate of the experimenter.) Each subject is paid $4.50 upon arrival and is told that payment is not affected in any way by performance. The experimenter provides an introductory talk on memory and learning processes and then informs the subjects that in the experiment one of them will serve as teacher and the other as learner. A rigged drawing is held so that the naive subject is always assigned the role of teacher and the accomplice becomes the learner. The learner is taken to an adjacent room and is strapped into an electric chair.

The naive subject is told that it is his task to teach the learner a list of paired associates, to test him on the list, and to administer punishment whenever the learner errs in the test. Punishment takes the form of electric shock, delivered to the learner by means of a shock generator controlled by the naive subject. The teacher is instructed to increase the intensity of the electric shock one step on the generator for each error. The generator contains 30 voltage levels ranging from 15 to 450 volts, and verbal designations ranging from “Slight Shock” to “Danger: Severe Shock.” The learner, according to plan, provides many wrong answers, so that before long the naive subject must give him the strongest shock of the generator. Increases in shock levels are met by increasingly insistent demands from the learner that the experiment be stopped because of growing discomfort to him. However, the experimenter instructs the teacher to continue with the procedure and disregard the learner’s protests. (p. 128)

After the research, Milgram gave lectures on his controversial research, in which he displayed photographs of the naive subjects in his research. These photographs showed the incredible amount of strain on their faces, as many of them proceeded (so they thought) to shock the person strapped in the electric chair. He was investigating obedience and wanted to find out the degree to which people would be obedient in a difficult situation.
Milgram, who was a personal friend of mine, told me that he had asked many deans of schools of social and behavioral science how far they thought naive subjects would go up the electronic console, and most of the deans said they doubted that people would go beyond the third level. To Milgram's surprise, a considerable number of people went all the way to the most severe shock level on their shock-generating consoles.

This research, sometimes known as the "Eichmann" experiment, because it suggested that under the right conditions, people will do almost anything, was very controversial—as might be expected. It led to the decision to have all research involving human beings examined by university panels dedicated to preventing abuses in experimentation.

Let me suggest that there are other ways of looking at experimentation that would suggest that Milgram did, in fact, conduct an experiment. I know he certainly thought he did.

Here is a slightly different definition of experimentation, from James A. Schellenberg (1974) in An Introduction to Social Psychology:

Experimentation—the observation of phenomena under controlled conditions. In laboratory experiments the investigator himself creates the setting for his observations, where in field experiments he manipulates only some of the variables in an established social setting. A third category of natural experiments is sometimes used to refer to cases where the investigator actually controls nothing, but where events happen to occur in a way similar to that which an investigator might wish to create through controlled conditions. (p. 348)

Schellenberg's list of kinds of experiments suggests that Milgram's research was a laboratory experiment but one that did not have a control group. The control group, in a sense, was the population not involved in the experiment.

Conclusions

We can see that defining experiments is difficult (because there are a number of different kinds) and conducting them is even more difficult (because people are so complicated and hard to figure out). Nevertheless, there have been and will be in the future a large number of experiments dealing with the media and related matters conducted by researchers from a variety of different fields such as psychology, sociology, and communication. This research, reported in a variety of journals, is the subject of great interest to commercial media organizations, the government, and the scholarly community.

This chapter provides an overview of experimentation that enables readers to analyze the methods used in experiments and to determine how well the experiments are carried out. It also provides a means for students to devise their own experiments. These experiments will be simpler than the ones carried out by well-funded researchers, but nothing prevents students with imagination and initiative from doing some experimentation on their own.

Further Reading

2.5. From user to character – an investigation
Into user-descriptions in scenarios

Nielsen, Lene.
"From user to character – an investigation
Into user-descriptions in scenarios."
DIS2002 London [ACM Proceedings],

Reprinted for educational use.
From user to character – an investigation into user-descriptions in scenarios

INT. RESTAURANT – MORNING (PRESENT DAY)

LOUISE is a waitress in a coffee shop. She is in her early-thirties, but too old to be doing this. She is very pretty and meticulously groomed, even at the end of her shift. She is slamming dirty coffee cups from the counter into a bus tray underneath the counter. It is making a lot of RACKET, which she is oblivious to. There is COUNTRY MUZAK in the b.g., which she hums along with.

INT. TELMA’S KITCHEN – MORNING

Thelma is a housewife. It’s morning and she is slamming coffee cups from the breakfast table into the kitchen sink, which is full of dirty breakfast dishes and some stuff left from last night’s dinner which had to “soak”.

She is still in her nightgown. The TV is ON in the b.g. From the kitchen, we can see an incomplete wallpapering project going on in the dining room, an obvious “do-it-yourself” attempt by Thelma. (Khoury 1990)

When I first read the script of Thelma and Louise I was drawn into the story. I immediately imagined the characters as real persons and I was so interested in what happened to them that I continued reading until the end. As I read I tried to figure out in my imagination why Thelma and Louise acted as they did and what did motivate them, a long time before the script gave me any clues. This script is what, in movie terms, is called a good read.

THE BALANCE BETWEEN USE AND USER

When I later came to work with and study scenarios, I was surprised to find that the scenarios never presented the users as vivid characters. At best they were stereotypes and made me laugh, at worst they only existed as a name.

It raised some question from both a writer’s and a reader’s point of view:

- How can you predict the goals and actions of a user, when you don’t know anything about the user as a person?
- Why use descriptions of users that the reader can’t engage in?
What does it take to write a good description of a user?

To me it seems important to know and be conscious of the user as a character in the written scenarios. Without this it will be impossible to be involved with the user especially when the user's experiences are far from your own [8, p. 11] and the lack of involvement will make it difficult for the writer to predict and the reader to imagine the user's actions.

In this paper I look at two different scenarios written by John M Carroll and Alan Cooper – authors of articles and books about the scenario-based design methods. I try to deduce from their writings and from the examples they give of scenarios, how they depict the process of describing the users in the scenarios.

Alan Cooper has a focus on the description of the user (Personas, in his term), while Carroll does not describe the depiction of users as such. The user-descriptions are embedded in the scenarios though and I will look into these.

Secondly I look at film scriptwriting and let the inspiration from this field suggest ways in which character descriptions can improve scenarios.

Finally I look into the impact this has on the research phase that goes before the description of the user.

It is not my aim to provide a complete method, but I will look at the process of film scriptwriting and focus on some of the methods and tools.

It is my aim in this paper to provide a brief overview of:

- The author's attitude towards the model-user.
- A definition of what constitutes a character.
- An attempt to look into what it takes to write and describe "a good character".

A SCENARIO

A scenario is a written story that describes the future use of a system or a web site from a specific, and often fictitious, user's point-of-view. The scenario is created around a protagonist, a setting and a goal. The structure of the scenario follows the basic structure of all stories whether oral, written or visual. As Carroll [3] points out, it includes the traditional elements of a story: setting, agents or actors, goals or objectives and sub-goals. It has a plot thus including sequences of actions and events.

The scenario contains written descriptions of processes that are to be implemented, not on paper, but in an entirely different medium – on a screen in an interactive system.

Scenarios are used for a variety of purposes: to evaluate system functionality, to design attributes and features and to test theory [Campbell in 12]. The scenario can be used at many levels in the design process, where it is common to use them in the beginning of the design process to illustrate user needs, goals and actions. Some designers use scenarios during the whole design process and return to them again and again. Others use them only as an offset for the creative process, never to return to them again.

The author can vary; some let their users write [2], others make user-observations, interpret the data and write the scenarios on that basis. Others again let the customers/clients write the scenarios (amongst these are the web agency Mus&Mønd).

For Cooper the scenarios are differentiated by the users' goals while Carroll has a list of 7 methods to create scenarios [4] that can be divided into three areas: reflections about actors (users), about goals and about the organisation.

LOOKING FOR THE USER

Cooper

In the literature I have looked into about scenario-based design methods, the only one who writes specifically about the character is Alan Cooper, who incorporates descriptions of users – Personas – in his design method – Goal-Directed [6, p.179].

Cooper defines scenarios as "a concise description of a persona using a software-based product to achieve a goal."

Cooper puts an emphasis on users' goals, whether it is company goals or personal goals. The Personas are hypothetical archetypes of actual users, defined and differentiated by their goals. They are described from a goal hierarchy, where personal goals have priority, to practical goals and practical goals that are affected by the company goals [6, p.124].

In order to differentiate the Personas, it is important to look at:

- User-skills
- Practical goals, that are individual goals: avoid meetings, handle clients' demands, record clients' order, create numerical model of the business
- Personal goals, where the most important is not to feel stupid, not make mistakes, get an adequate amount of work done, have fun [6, p.156]
- Corporate goals, that are the goals of the company
- False goals, that are system goals

For Cooper it is important to create believable Personas; this is done by creating specific details and being specific in the description.

Angela is a 31 year old PR consultant who is based in Los Angeles, but who has customers throughout the entire West Coast. Angela often has to travel during the week.

Angela's Goals:

- Always be on time for client meetings
- Travel without hassle
- Don't feel stupid

Angela's Scenario: Angela is on her way to Seattle and has a 30 minute layover in an unfamiliar airport. She really wants to grab a cup of coffee before she heads to her connecting flight.

After Angela disembarks, the airport map and service details are downloaded to her PDA via a wireless local network, using Bluetooth. Angela quickly finds her favorite coffee shop in the list, and sees it is only a few minutes walk away.

The Wayfinder shows Angela exactly how to find the coffee shop, with handy landmarks indicated on her map.

Angela follows the directions the Wayfinder gives her, and success-
fully finds the coffee shop. Soon she's enjoying a double-tall, fat-free Mocha Latte Grande, with sprinkles.

Now Angela needs to find her way to the gate. She uses the Wayfinder to look up the gate for her connecting flight, and then follows the directions it gives her.

Angela arrives at her gate with plenty of time to spare.

This description is an example of the Goal-Directed method. It is built on descriptions of users and scenarios. Angela is described from her personal and practical goals.

Looking at this description it becomes clear that she is described in a very limited way that only deals with her performance as a worker and has very limited goals that only concern her working life. There is no consideration for any other characterisation that goes beyond her working life. Angela is described in such an anonymous way that it never becomes clear why she acts as she does. She could be anyone or actually no one.

Cooper has a limited view on what constitutes humans, their differences and similarities. He especially mentions the fear of being stupid as a common human trait, but not everybody is afraid of feeling stupid. Looking at the other traits he mentions, there are other aspects of humans than to have fun. And a person is much more than his or her goals.

In the above example we don't get to know enough about Angela to be able to know if the scenario can solve the problems she meets and the questions she asks. She is what I later will describe as a flat character.

Carroll

John M Carroll has a long list of writings about using scenarios in system design. In his definition: "scenarios are stories — stories about people and their activities" [4, p. 46] and the user is described via organisational roles, goals, actions and interaction with the system.

In his seven methods to designing scenarios [4, p. 265] he works with both technology-driven and use-driven scenarios based on observations and discussions of use and of analysis of existing systems in use.

He emphasizes that scenarios should look at task context, activity, prior knowledge, reasoning and experience.

Harry is interested in bridge failures; as a child, he saw a small bridge collapse when its footings were undermined after a heavy rainfall. He opens the case study of the Tacoma Narrows Bridge and requests to see the film of its collapse. He is stunned to see the bridge first sway, then ripple, and ultimately lurch apart. He quickly replays the film, and then opens the associated course module on harmonic motion. He browses the material (without doing the exercises), saves the film clip in his workbook with a speech annotation, and then enters a natural language query to find pointers to other physical manifestations of harmonic motion. He moves on to a case study involving flutes and piccolos. [3, p. 3].

This scenario for an educational project focuses on actions. The scenario describes Harry and the tasks he performs. It gives a brief introduction to Harry as a person who is interested in bridge failures because he saw a bridge collapse when he was a child. This explains why Harry chooses to open a case study of a bridge, and it explains why he chooses to open up the case study of flutes and piccolos as both deals with vibrations.

There is no description of where the action takes place — where Harry is situated — and what motivates Harry's choices — who Harry is as a person. The motivation mentioned is that of the bridge collapsing. But does that lead to a fascination with vibrations too?

Harry is a person I feel difficult to engage with. From my point of view he seems a little weird, as though he gets a lot of pleasure out of watching bridges collapse. There might be some Harry's out there, but I hope there aren't many. And I have a feeling that Harry might not be a valid representative of the users. The scenario is what I later will describe as a plot-driven story.

The scenarios are as most stories characterized by causality — an action from the user creates a reaction from the system, starting a new action from the user. To understand what makes the user act in the first place, it becomes important to understand what motivates the user.

In the example with Harry there is a motivation for his first action — opening a case study of the Tacoma Bridge and seeing a video of the bridge collapse. His next action — he browses the material — has no motivation. It seems plausible that he could have done something entirely different. His third action is to save the video clip. Again there is no motivation why he acts as he does. A thorough description of Harry as a person could have helped the design team to understand what is behind Harry's actions and, as I will show later, understanding Harry can create design innovations.

LEARNING FROM FICTION

Both examples of user-descriptions lack insight into the user as a person and both examples derive from a story tradition that focuses more on action than on character development.

I will now look into what it takes to make a user-description that goes beyond the flat character and the plot-driven story, and describe what characterises these terms.

The characters in film have similarities to the users in scenarios. Both are based on predictions and predictions of something that is to be created in another medium. Both describe actions and, in contrast to novels, do not deal with inner thoughts of the protagonist. This accounts in both film and scenario for the user/character being the central element from which the scenario/story develops.

There is a close relationship between the process of scriptwriting for the fiction film and the writing of scenarios. They describe a story that includes processes, which will be implemented in a visual medium and they have focus on persons with specific goals.

In scriptwriting you have to establish a character on print, a character that the reader believes in and whose actions

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THE CHARACTER'S FUNCTION IN THE STORY

Stories can be divided into two types: the plot-centred story and the character-driven story [10]. My focus is on the character-driven story. Scenarios should have a strong central character with goals and desires that needs fulfilment during the story, thus resembling the character-driven story.

In theory concerned with fiction, it is easier to find descriptions of the plot-driven narratives than of the character-driven narratives. From Aristotle to the Structuralists there is a common notion that the character is nothing more than a function of the plot [5].

What differentiates the description of the characters in the two forms of narrative are the number of traits. In the plot-driven – or a-psychological – narrative the character has few traits and the traits function as a catalyst for the action. As Todorov [Forester in 5] finds out in his analysis of fiction; when a trait is mentioned the character immediately acts on the trait. This makes the character highly predictable and creates what is called flat characters.

Looking at Harry it becomes clear that Harry has few traits and when one trait is mentioned – his devotion for collapsing bridges – he immediately reacts to it. Harry as a character is not easy to understand, as the description does not draw on a shared cultural understanding and common knowledge. Not many are familiar with somebody who saw a bridge collapse as a child.

In the character-driven – or psychological – narrative, the character has a number of traits and what Horton calls a number of voices that interact with and against each other. This makes the character’s actions non-predictable and creates rounded characters. Though Lajos Egri [9] sees the character as a key element of the story, it is the premise that drives the character forth and in the end makes the story. Horton [10] exclusively focuses on the character as the key element to drive the story on. The character can be defined as “a paradigm of traits; “trait” in the sense of relatively stable or abiding personal quality” [5, p. 126].

Looking at Thelma and Louise there are no traits mentioned, but the descriptions draw on a shared cultural understanding of distressed housewives and waitresses – our prototype schemata. When creating stories – fabulas – we draw on three schemata: prototype schemata, template schemata and procedural schemata [1, p. 49]. In these two short scenes we get information about:

- Where the characters are situated (restaurant, kitchen)
- The characters' names, age and sex
- Their social status (not rich)
- Occupation (waitress, housewife)
- Marital status (single/married)
- Temper (self-control, lack of self-control)
- Character traits (active/passive)
- Life situation (frustration)

In the character-centred story the character is seen as a personage rather than somebody who is the product of the plot and just participating in the story development – instead the character creates the story development [10, p. 15].

The story develops because the character develops out of motivation and it is this that spins the plot. Lajos Egri [9, p. 34] uses dialectics as a way of looking at the character and character development. It is oppositions and conflicts that create actions; the dynamic of the character can be expressed through inner contradictions. To understand the character’s motivation for action it is necessary to have background information about the character. Actions can either stem from changes in the character’s environment or from the character’s own inner contradictions thereby creating a development in the character.

"It is in our nature to change. A character stands revealed through conflict; conflict begins with a decision; a decision is made because of the premises of your play. The character’s decision necessarily sets in motion another decision, from his adversary." [9, p. 60-61]

THE CHARACTER CONSTRUCTION

But it is important to distinguish between analysis of fictive narratives and the creation of fictive narratives. In my hunt for the character I have found two authors who have tried to investigate how to write char-
acters that can be labelled as rounded: Lajos Egri and Andrew Horton.

The writing of Lajos Egri has had a huge impact on Danish film and TV drama, as he was one of the cornerstones for the TV-SUM (TV as a means for Entertainment) approach by Ingolf Gabold. His "Art of Dramatic Writing" [9] is still one of the most quoted within film scriptwriting. His dialectic approach to the scriptwriting and the reading process gives him an emphasis on both the surroundings and the psyche in the development of the character. A description of a human being must consider the physiological aspect as well as sociology and psychology, each influencing the character's behaviour. Looking at the person's physiology, sociology and psychology provides an understanding of the motivations that lie behind his actions.

"If we understand that these three dimensions can provide the reason for every phase of human conduct, it will be easy for us to write about any character and trace his motivation to its source [9, p. 35]."

- Physiology includes: sex, age, height and weight, colour of hair/eyes/skin, posture, appearance, defects and heredity.
- Sociology includes: class, occupation, education, home life, religion, race/nationality, place in community, political affiliations and amusements/hobbies.
- Psychology includes: sex life, ambitions, frustrations, temperament, and attitude towards life, complexes, extravert/intro-ambivert, abilities and IQ.

The dimensions include both present and past, both self and relations to others. Considering these dimensions can help and facilitate the creation of rounded characters.

Andrew Horton uses Bakhtin's concept of the carnival [10, p. 27-40] as a term that can explain the character and he describes the character as a cacophony of voices. Horton's description of the polyphonic character is made up of the sum of the character's consciousness and self-consciousness. Horton's concept of the carnivalesque has several implications for a theory about the character:

- Character as process (state of becoming)
- Character as polyphony (multiple voices interacting in different times)
- Character as social discourse that belongs to and interacts with a culture and its many voices

In Horton's view it is the cultural signs that are the input to an understanding of the character and to the creation of the character. He makes a distinction between the individual traits of the character and the unique. Even though we are all individuals, we are not completely unique. We have a common language created by the time and the cultures we are part of. This makes no two persons identical because we all participate in different social groups. And it is the multitude of experiences that creates the character.

Horton has, like Egri, an emphasis on society, location and era which influence the individual that is to be created.

"Knowing the place and time makes knowing the character much easier [10, p. 38]."

The character includes both personal (inner) and inter-personal (social, public, professional) elements. All characters have inner needs and goals as well as interpersonal desires and professional ambitions that help characterize them and impose their own requirements, restrictions and privileges. When character, circumstance and chance cross there is a possibility for many voices to speak.

THE ROUNDED USER
Looking for the rounded character will involve looking for:

- Multiple traits
- Psychology, physiology and sociology
- Inner needs and goals, interpersonal desires, professional ambitions.

When Horton mentions that the character should be so engaging that the reader takes an interest, this will - in the scenario writing process - be as important for the team doing the writing. When the writer engages in a user and the traits and goals of the user, the prediction of the writing will become much more grounded. Doing so will require a thorough insight into the users and into what distinguish different groups of users from each other. The findings reported in [7] are a good example of what happens when characters becomes stereotypes. The authors realised that of the three extreme characters they created, only one worked as an offspring for design. This character had traits that it seems the authors were familiar with and had multiple traits. Instead of being a polyandrous twenty-year-old woman, she might as well have been, in my point of view, an ordinary businesswoman who had to juggle with a lot of clients, who must not be known to each other.

Thereby it also has an impact on the research done into user-behaviour and user-characteristics. It will not be enough to look only at goals, tasks and settings, but also the mentality and the traits that the users share should be noticed. These should be explicitly used in the writing of the scenarios and have an impact on the way the users behave with the site/system and the needs they have.

The characteristics of the character-driven or psychological narrative are:

- The character is seen as a personage
- The character development creates the story development
- The character has a number of voices that interact with and against each other
- The character's actions are non-predictable
- The characters are rounded.

CONCLUSION
In the descriptions I have read of how to create scenarios there is no emphasis on how the user should be described and what to consider in this process.

The character-descriptions I focus on in this paper have a tendency to be described as stereotypes rather than descriptions of believable characters, thus influencing the value of the scenarios as predictions of the future use of a web site or a system.

"Stereotypes differ from clichés in that the former reduce an entire class (e.g. fat people, depressed women, or post office workers), and let the reader assume the rest. In contrast, a cliché is a hackneyed phrase. A stereotype is not identical to the real thing. Stereotypes seem to work best
when characters are not created to be deep, but only to be a mental picture* [8, p. 13]. As the stereotypes will function as a mental picture they will never enable an understanding of the user.

To describe the user as a rounded character brings a focus on the user into the design process. It helps the design team to engage with the user with empathy, thereby remembering the user all the way through and remembering that the design is for a user. But it differs from the fiction film script in that the description must be based on knowledge of actual users, on how they perceive the world, how they act and where they act. It is based on facts and is not fiction.

The approach has an impact on the way research into users is performed. It becomes important to pay attention to:

- The users’ surroundings
- The character traits that characterise the users
- The goals and tasks that characterise the users

With this approach a whole new insight could be created of Harry:

Harry is a 35-year-old engineer. He is interested in bridge failures, as he has to understand the way nature can work on bridges, but he is also interested in a lot of other phenomena and is easily drawn away from what he is currently investigating.

Harry is in his office when he opens the case study of the Tacoma Narrows Bridge and requests to see the film of its collapse. He quickly searches the film clip to where it lurches apart. He opens the associated course module on harmonic motion. He browses the material, but it is not able to catch his attention and he doesn’t do the exercises. His attention is caught by other physical manifestations of harmonic motion. He moves on to a case study involving flutes and piccolos, but he soon finds it boring.

The phone rings and Harry answers it.

If this Harry is a typical user (in my experience this is not farfetched), the scenario shows that something has to be done to keep Harry’s attention and make him do the exercises.

REFERENCES
2.6 Experience Prototyping


Reprinted for educational use.
Experience Prototyping

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ABSTRACT
In this paper, we describe "Experience Prototyping" as a form of prototyping that enables design team members, users and clients to gain first-hand appreciation of existing or future conditions through active engagement with prototypes. We use examples from commercial design projects to illustrate the value of such prototypes in three critical design activities: understanding existing experiences, exploring design ideas and in communicating design concepts.

Keywords
Prototyping, experience, design, methods

INTRODUCTION
Increasingly, as designers of interactive systems (spaces, processes and products for people), we find ourselves stretching the limits of prototyping tools to explore and communicate what it will be like to interact with the things we design.

"Prototypes" are representations of a design made before final artifacts exist. They are created to inform both design process and design decisions. They range from sketches and different kind of models at various levels — "looks like," "behaves like," "works like" — to explore and communicate propositions about the design and its context.

As such, prototyping is a key activity within the design of interactive systems. Several groups of designers and researchers, perhaps most notably at Apple Computer, Xerox Parc, and Interval Research, have been active both in pushing the boundaries of prototyping beyond the range of traditional methods [1, 2] and in developing understanding of the value of different forms of prototype. For example, Houde and Hill [7], discuss various functions for prototypes as being essentially about the "role" an artifact will play, its "look and feel" and how it will be implemented. Other work has explored issues such as different levels of fidelity [17], prototypes for different audiences [5, 16] and models for use in the context of participatory design [4, 12]. Further, prototyping as a design practice is now promoted within the business community as a key element in innovation [10,13]. Building from this foundation, designers at IDEO are working to expand internal prototyping practices to embody the concept of "Experience Prototyping" as an integrated part of the design process. In this paper we will discuss what we mean by Experience Prototyping, why we think it is important and then look at its application within three key design activities—understanding, exploring and communicating—through examples from design projects.

What Is "Experience Prototyping"?
First, let's think for a moment about what we mean by "experience." Experience is a very dynamic, complex and subjective phenomenon. It depends upon the perception of multiple sensory qualities of a design, interpreted through filters relating to contextual factors. For example, what is the experience of a run down a mountain on a snowboard? It depends upon the weight and material qualities of the board, the bindings and your boots, the snow conditions, the weather, the terrain, the temperature of air in your hair, your skill level, your current state of mind, the mood and expression of your companions. The experience of even simple artifacts does not exist in a vacuum but, rather, in dynamic relationship with other people, places and objects. Additionally, the quality of people’s experience changes over time as it is influenced by variations in these multiple contextual factors.

With respect to prototyping, our understanding of "experience" is close to what Houde and Hill call the "look and feel" of a product or system, that is "the concrete sensory experience of using an artifact — what the user looks at, feels and hears while using it." But experience goes beyond the "concrete sensory." Inevitably we find ourselves asking questions about the "role" which Houde and Hill define as "the functions that an artifact serves in a user’s life — the way in which it is useful to them." And even more than this, when we consider experience we must be aware of the important influences of contextual factors, such as social circumstances, time pressures, environmental conditions, etc.

By the term "Experience Prototype" we mean to emphasize the experiential aspect of whatever representations are needed to successfully (re)live or convey an experience with a product, space or system. So, for an operational
definition we can say an Experience Prototype is any kind of representation, in any medium, that is designed to understand, explore or communicate what it might be like to engage with the product, space or system we are designing. Obviously this can include design prototyping techniques such as storyboards [15], scenarios [14], sketches [17], video, or step through Macromedia Director™ simulations, all of which certainly add value by communicating elements that make up an experience. But they do this to a mainly passive audience. For the sake of this paper we wish to focus on the methods and techniques which support active participation to provide a relevant subjective experience.

In discovery, there is a continuum that extends from being told about something, seeing for yourself, to doing it yourself. Quoting the Chinese philosopher Lao Tse: "What I hear I forget. What I see, I remember. What I do, I understand!" When we use the term "Experience Prototyping" we are talking about methods that allow designers, clients or users to "experience it themselves" rather than witnessing a demonstration or someone else's experience. One of the basic tenets of the concept is that experience is, by its nature, subjective and that the best way to understand the experiential qualities of an interaction is to experience it subjectively.

Experience Prototyping is less a set of techniques, than it is an attitude, allowing the designer to think of the design problem in terms of designing an integrated experience, rather than one or more specific artifacts.

Why is Experience Important? Why Now?

More and more we find ourselves designing complex and dynamic interactions with converging hardware and software, spaces and services — products such as mobile digital communication devices, or systems of connected interactions such as those which occur on a train journey or an Internet shopping spree. The resulting hybrid artifacts require new expressions of their original qualities, such as "sensitive product behaviors" based on true hard/soft integration. This unknown terrain demands new design approaches, specific considerations and, ultimately, the design of integrated and holistic experiences set in context, rather than of individual artifacts or components. For example, it demands that the designer think about the experience of light rather than think directly about the design of the physical lamps themselves. To meet this demand, the designer needs to focus on "exploring by doing" and actively experiencing the sometimes subtle differences between various design solutions.

Multiple disciplines are needed to solve the design problems of today — e.g. interaction design, industrial design, designers of environments, human factors specialists, mechanical and electrical engineers. Each discipline brings a unique understanding of the issues at hand and an individual approach to solving them [8]. To work effectively as a design team it is important to develop a common vision of what the team is trying to bring into being. Therefore, it is a powerful asset to have tools and techniques which create a shared experience, providing a foundation for a common point of view.

Information becomes more vivid and engaging when it resonates with personal experience. If designers and clients can have informative personal experiences, it is easier for them to grasp the issues and feel greater empathy with both the people who will be affected by their decisions, and the experiences users may face.

The tools we use to design, such as prototypes, influence the way we think. Solutions, and probably even imagination, are inspired and limited by the prototyping tools we have at our disposal. We have observed ourselves thinking in new ways about what is possible when new materials or design tools become available — such as computer based drafting (changing the development process to become more iterative), virtual 3D modeling (influencing the formal design towards more organic shapes), and new materials — such as Teflon™ or electro-luminescent fabrics (offering new product functions and opportunities for product design). Experience Prototyping allows us to engage with new problems in new ways.

EXPERIENCE PROTOTYPING IN PRACTICE

We have identified three different kinds of activities within the design and development process where Experience Prototyping is valuable:

- Understanding existing user experiences and context
- Exploring and evaluating design ideas
- Communicating ideas to an audience

In this section we will explore how Experience Prototyping contributes to the activity and give some examples from design practice.

Understanding Existing User Experiences

Experience Prototyping here is applied to demonstrate context and to identify issues and design opportunities. One way to explore this is through direct experience of systems — the prototyping goal is to achieve a high fidelity simulation of an existing experience which can’t be experienced directly because it is unsafe, unavailable, too expensive, etc.

The questions to ask in this stage are: What are the contextual, physical, temporal, sensory, social and cognitive factors we must consider as we embark on design? What is the essence of the existing user experience? What are essential factors that our design should preserve?

The following three project examples will further explain and illustrate how Experience Prototyping can unveil the necessary insights to answer such questions.

The Patient Experience

This example builds upon people’s own imaginations and the use of proxy devices to recreate the essential elements of a personal experience that would not otherwise be available.
The project was to design product and service related elements for an Internet enabled cardiac telemetry system. The system would involve both face-to-face and remote doctor-patient interactions as well as automated supervision for patients with chest-implanted automatic defibrillators. Before embarking upon design solutions for the future system, the team wanted to know what system characteristics would be needed to ensure as positive an experience for patients as possible. What is it like to be a defibrillating pacemaker patient? What is it like not knowing when and where defibrillating shock will occur? How does that affect people’s everyday life? The design team set up circumstances to produce a similar experience for themselves to that currently endured by patients with such implants. As a real first-hand patient experience was obviously not feasible, one of the team set up circumstances to produce a similar experience. The aim was to provoke insights into important functional and emotional issues and inspire thoughts about how to deal with them.

The designer distributed pagers to all other team members. The pager signal was to represent a defibrillating shock that would be of sufficient impact to knock a person off their feet. Participants were paged at random times during a weekend and asked to capture their immediate circumstances for each occasion — where they were, with whom, what they were doing and what they thought and felt knowing that this represented a shock? After this exercise, team discussion about personal experiences ranged from anxiety around everyday activities like holding an infant son or working with power tools, to social issues about how to communicate to onlookers what was happening and how to get proper medical help.

Figure 1: The patient’s experience kit.

When participants were paged this indicated that they had received a defibrillating shock; they recorded their surroundings with the camera, and noted their impressions.

The participants, including engineers, bio-technologists, and representatives from marketing and product planning on the client side, quickly translated their own experiences into patients’ needs. For example they appreciated the importance of warning information to help patients anticipate and prepare for a shock. They also saw the need to provide information to indicate the patient’s condition to bystanders, and a broader base of remote support for this next generation of products and services.

Clearly, the form of prototype devised by this designer was based upon some initial assumptions about the fact that surprise, social and contextual factors would be important elements of the experience. This type of insight, sometimes informed by research of a more conventional kind, is necessary to guide the design of a specific Experience Prototype so that it can simulate important aspects of the real user experience, unveiling the previously not-fully-appreciated design issues.

The ROV Pilot Experience

This example too, used a proxy device to provide the team with specific insight into an experience that was not readily available to them.

The project involved the design of a pilot’s interface for an underwater remotely operated vehicle (ROV) and its cameras. It was important that designers grasp and deal with some of the cognitive confusion that would arise for the operator. There would be problems for operators steering a tethered vehicle with six degrees of freedom, as well as multiple cameras — which can be positioned independently from the ROV itself — while trying to find a target in a vast undifferentiated space with limited visibility.

In the initial project phase, the design team created a task analysis, based on interviews with pilots and literature research which was useful to them, but did not communicate the realities of ROV operation very effectively. For the first experience prototyping exercise one of the designers used a rolled-up sheet of paper to limit her peripheral view while searching for a target — a Post-it note in her work space.

To get to the more problematic cognitive and functional issues, the team developed a game in which one player, A, stood in a room which was empty except for multiple chairs (portraying underwater obstacles), and one of them held a chocolate bar, the target. Player A held a video camera connected by a long cable to a remote TV screen where the live picture was viewed by player B. Player B gave verbal instructions to player A to move right/left, forward/back, and up/down and gave separate verbal commands to direct the camera.

After a few yards of cables wrapped round A’s legs and the chairs as well as B’s frustration at making mistakes — "Aarrgh! I meant camera right not move right," the design team and the client had personal insight about many important issues. For example, it was obvious that a critical need was clear feedback to support a mental picture of the vehicle’s path through space, feedback about the tether
condition, and the need for a clear distinction between controls for the vehicle and for the camera.

As a follow-up, the team asked a participating retired ROV pilot about the validity of the simulated experience which, to his surprise, portrayed a quite accurate picture. He provided additional information, mainly about contextual factors (e.g. different levels of experience, underwater conditions, support tools like maps) which might change or influence the portrayed experience. The ability to share this Experience Prototype provided verification and enrichment of the simulated experience with a real life event. This further enhanced the participants' understanding of the pilot's problems, and created a shared reference point between all members of the design team as the work moved forward.

Role Playing a Train Journey Experience
It can be very informative, as well as fun, for designers to explore what experiences would be like for a particular person in a particular context through dramatic improvisation. This might be with or without props representing designed artifacts. In this example, an investigation into passenger needs for a new rail service, a group of designers used acting techniques such as role playing, bodystorming and improvisation to gain deeper insights. These methods are inspired by work at Interval Research [1,2] where the terms "informance" (for informative performance) and "bodystorming" (for physically situated brainstorming) were invented to describe these contextually rich explorations.

Improvisation seems to be most useful when acted out in a sequence of focussed scenes to ensure that appropriate activities and contextual situations are covered. In this train journey example, the design team explored different types of travelers, their needs, and various unexpected situations during specific stages of a train journey (e.g. entering the station, ticketing, waiting, riding the train, connecting to other means of transportation). Each scene was introduced with a card containing the scene's rules, explaining the goal, and the roles of players and audience. A professional actor familiar with improvisational theatre techniques acted as the supervising moderator. He gave one player instructions such as "Buy a return ticket for yourself and a child", while another designer played the role of a ticketing machine. Other instructions involved different conditions: "Now do it with gloves on." "It's dark and windy." "The machine only takes coins, no notes." "The ticket machine is very helpful and friendly."

Taking breaks for discussion after each scene enabled the learning to be captured immediately following each improvisational scene. Such breaks are a time for group reflection and idea generation stimulated by actually participating in or witnessing the scene. The breaks provide an opportunity to go beyond appreciating the issues involved to generating initial design ideas. In bodystorming — brainstorming that occurs either during or between scenes in response to problems that are uncovered — many ideas are expressed verbally but some are expressed physically and come spontaneously through interaction with proposed design elements, or quickly improvised stand-ins. In our example, the improvisation of the ticket machine interaction might cause someone to provide a shelf for a purse or luggage, or a radical change of appearance such as indicating that the machine is out of order (e.g. turning away from the intending purchaser). The dynamic physical nature of the event stimulates an appropriate response in situ.

In a second piece of research for the same design task, the team took a train journey themselves. To facilitate the exploration of unusual situations and to open the designers' minds to other customer experiences, they found it helpful to devise and assign specific tasks to each other. They gave each other cards that read, for example: "Pretend that you can't speak English." "Be hungry, find something to eat." "Be friendly and chat to the train staff."

![Figure 2: Experiencing a train journey.](image)

The team combined objective passenger research with subjective discovery as they played out roles they assigned each other.

This exercise bridges the gap between real and prototyped experiences. It was a "real setting with real people," but the designers' feelings and behavior were mixed with performance and acting. The designers found that role-playing in the real setting gave them permission to observe. It also provided a useful additional lens through which to observe and live passengers' experiences in the context of their own train journeys.

However, the key idea in both these role-playing experiments, as with the simulations described in the first two examples, is to have the designers make discoveries themselves. These discoveries have a level of personal significance that makes them easy to understand and discuss among designers and users. The vividness of this owned experience creates subjective, lasting memories which influence and guide the designers' choices and decisions throughout all stages of the design and development process.
Exploring and Evaluating Design Ideas

The main purpose of Experience Prototyping in this activity is in facilitating the exploration of possible solutions and directing the design team towards a more informed development of the user experience and the tangible components which create it. At this point, the experience is already focused around specific artifacts, elements, or functions. Through Experience Prototypes of these artifacts and their interactive behavior we are able to evaluate a variety of ideas — by ourselves, with design colleagues, users or clients — and through successive iterations mold the user experience.

Controller for an immersive environment

In the early stages of developing a user experience, multiple design directions need to be efficiently prototyped and compared. Ad hoc use of analogous objects as props can quickly guide decisions about which kind of experience is most appropriate. In this example, of designing a control device with six-degrees of freedom for a video game, the team identified three radically different potential directions and looked for props to help them understand the kind of experience each would afford:

A tactile immersive experience — represented by a palm-sized pebble

A shared experience, where the control functions could be split between two hands or two players — represented by two different-sized joysticks mounted on suction pads

A full-body physical experience— represented by the surface of a customized skateboard.

Simply "playing" with these relatively crude props was a powerful method, enabling the designers to unveil the nuances and implications of each particular direction.

Experiencing an Airplane Interior

The same concepts apply in exploring ideas at a completely different scale, when designing a user experience set in a public and/or constrained environment. This example involves early exploration of ideas for the interior layout and components of an airplane. The design team together conducted a variety of bodystorming explorations within a full-scale foam-core environment simulating the inside of an airplane. Using props, such as chairs, readyly available in the studio, the team enacted various social situations and activities such as sitting and reading, sleeping, and talking to a travel companion, receiving and eating meals, to evaluate ergonomic and psychological comfort with different arrangements.

Again, many ideas for physical configurations could be tested in a time and money efficient manner. Additionally, the involvement of the whole design team created a common focus and a shared ownership of the design directions chosen for further development.

Figure 3: Control in an immersive video environment.

*Early in the project, the team played with a range of everyday objects to explore what different levels of physical involvement might feel like.*

Figure 4: Bodystorming layouts for an airplane interior.

*Ideas were generated and evaluated rapidly by the team as they directly experienced physical and social issues in this full-scale environment.*

TV Channel Changing Experience

Sometimes it is important to engage clients and other team members in radical design ideas before they are fully resolved. In this example, for an exploration of television remote controls, the designer wanted to explore the specific experience of switching channels, while ignoring other aspects of functionality or look and feel. He was especially interested in exploring the implications of a more intuitive and multi-sensory design solution. He created what he called "behavioral sketches" which were simple electronic circuits containing a few lines of code (Basic Stamps™), encased in off-the-shelf soap dishes. The two experience prototypes were controlled by a tilting gesture, switching channels up or down. The two prototypes differed however, in their feedback, one being visual — through moving light
bands, the other being tactile using vibrations. By tinkering with the simple software program, he was able to efficiently develop and test many subtle iterations of product behaviors and user experiences. The low resolution and fidelity of the prototypes proved to be vital for successfully sharing the insights of this conceptual approach with other designers and the client. They were expressive enough to convey a very sensual and compelling control experience, without constraining the imagination for further fine-tuning of the user experience, or the transfer to product applications beyond remote controls for televisions.

Children's picture communicator
Part of the process of design exploration involves checking out ideas with potential users. For example, in the EEC funded "Maypole" project's exploration of community communications [11] the goal was to create prototypes which would give children an experience as close as possible to that invoked by the intended design solution. Usually, user tests focus on fairly specific functional performance issues. Such tests also generally involve conditions that are not typical of the ultimate use situation, for example they frequently involve outsiders (e.g. as observers or "Wizards of Oz" when some functions need to be simulated by a person). This makes it difficult to answer questions about experience such as: How will people feel about the system we are designing? Will it change the way people behave or think about an activity? Is it compelling to them in their own context? A true Experience Prototype for users — providing a really relevant experience — seems to require a level of resolution and functionality such that it can be "let loose" into an everyday context and more fully integrated into people's lives.

For the Maypole project, Nokia built working sets of picture communicators that the design team was able to distribute to children who could take them away and play with them unsupervised for days at a time [6].

These prototypes required a power pack and transceiver unit that the children had to carry around in a backpack, yet the experience of being able to take pictures and send and receive them to and from friends proved so compelling that the users almost forget about that inconvenience.

As an observer of user evaluations, one knows very quickly if the designed experience is a good one. If it is, people get so involved in the experience that they forget about the limitations of the prototype (e.g. a tether to the computer running the software, or an extreme weight or size hindrance because of limiting prototyping components).

Communicating ideas
The role of Experience Prototyping here is to let a client, a design colleague or a user understand the subjective value of a design idea by directly experiencing it. This is usually done with the intention of persuading the audience — for example, that an idea is compelling or that a chosen design direction is incorrect.

Digital Camera Interaction Experience
In an early project on digital photography the goal was to help a client envision what digital photography might be and how to design both the camera and the user experience as a complete system (including picture storage, retrieval, manipulation, etc.). In the initial phases of the project the team used traditional communication techniques such as scenarios, still and dynamic visualizations, and interactive on-screen simulations. After going through a series of presentations, the design team realized that the client did not completely understand the intended user experience and camera behavior. The breakthrough came when the designers built a hardware and software integrated "look and feel" prototype based on the design specifications as they stood at that time. The prototype bore little resemblance to a desirable product in shape, form, size or weight. For example, there was a sizeable cable running from the camera to a desktop computer where all the processing occurred.

This Experience Prototype contained a small video camera attached to a small LCD panel, encased in a box. The size of the LCD panel was determined by the desired resolution, rather than by the desired physical size, in order to maintain the key aspects of the proposed user experience. The working prototype was accompanied by an appearance model to communicate the appropriate size and detailed formal aspects of the design solution.

Figure 5: Picture-communicating prototype.

Despite heavy backpacks containing batteries and drivers for the prototypes, the children were happy to integrate picture-sending and receiving into their daily activity.
The prototype used a desk-top computer's processing power to manipulate the dynamic qualities of the control system and screen behavior.

The prototype had a live video feed and captured still photos with audio annotations in real time, as response time was a critical component of the user experience. Since the processing was done by the desktop computer running regular software with a simple programming environment, it was easy to fine-tune the response time of the camera to enable the design team and the client to feel the impact on the user experience.

It was the clients' developers who asked for multiple copies of the prototype which were then used as a "living specification" throughout the clients' internal design process to maintain a perspective and verify new design concepts. The client reported that there were many pressures to change the resolution, or the speed of response, but that the prototype enabled them to see, feel and resist the negative impact of such changes.

This example perfectly demonstrates the importance of motivating and exciting a decision-making audience by providing them with a stimulating, hands-on experience. Knowing the audience and their expectations helps determine the resolution and fidelity of a prototype. Also care needs to be taken to explain its specific intent when an audience is not familiar with this particular form of prototyping. In this digital camera example, the design team built the Experience Prototype with enough flexibility for it to endure many iterations of refinement on the way towards the desired user experience. The designers were creating a prototyping platform where the hardware components were carefully chosen and built to last. The software environment was established in a modular architecture, so that simple code changes would not affect the artifact's behavior in other modes. The client however, was so impressed by the hands-on experience, that some of the design details which were compromised by time pressure, were ignored and the design phase was announced as completed directly following the presentation!

The Kiss Communicator
In this last example, "getting into the mood" became a significant set-up task for successfully communicating the proposed experience.

The "Kiss Communicator" was a concept prototype built to explore ways of using technology to communicate with another person in a subtle, sensual way. The intention was to keep the nature of the physical object as simple as possible, so the interaction was more about the experience of the message.

Designed to facilitate the exchange of emotional content between people separated by physical distance, the "Kiss Communicator" used wireless technology to transmit the digital equivalent of a personal gesture, such as a wave, wink or a kiss. Each Communicator connects only with a specific corresponding module, resulting in a secure and intimate one-on-one exchange. To let a partner know that you are thinking of her or him, you squeeze the Communicator gently. It responds with a slight glow to invite you to blow into it and create your "message" in the form of an animated light sequence as the device responds to your breath. The "message" shows while you blow and if you are happy with it, you simply relax your grip and it is sent to the corresponding Communicator. On the other end, the partner Kiss Communicator indicates that there is a message but waits until its owner squeezes it to play back the light sequence.

There are some important conditions necessary to really appreciate the experiencing of this prototype: an intimate relationship, two distant people, sending a gesture, etc. Now imagine sharing this concept with clients in their business suits in a conference room. To help set the scene for the experience in this formal context the designers now usually
preface the hands-on experience of the prototype with a short video sequence which shows a pair of the devices being used by a dreamy couple who are working apart. Using conventional devices like soft focus and a romantic soundtrack, the video creates, at least temporarily, an atmosphere that is more appropriate. This situation exemplifies how traditional and more passive communication techniques (like video) and Experience Prototypes can work hand-in-hand, with the goal of sharing a new user experience with an audience.

Figure 8: The Kiss Communicator.
*This pair of prototypes let people have the hands-on experience of creating, sending and receiving subtle sensual messages. Video helped to create an appropriate context.*

CONCLUSIONS AND NEXT STEPS
Our current analysis and examples have shown how experience prototyping has contributed to real design projects in three key ways:

By helping to develop understanding about the essence or essential factors of an existing experience: Experience Prototyping simulates important aspects of the whole or parts of the relationships between people, places and objects as they unfold over time.

In exploration and evaluation of ideas: Experience Prototyping can provide inspiration, confirmation or rejection of ideas based upon the quality of experience they engender. It produces answers and feedback to designers' questions about proposed solutions in terms of "what would it feel like if...?"

In communication of issues and ideas: by enabling others to engage directly in a proposed new experience it provides common ground for establishing a shared point of view.

Experience Prototyping is not a new phenomenon within the design community; designers have always been ready to adopt and adapt technology and processes of many kinds to create early representations of their ideas and understandings. But the concept of Experience Prototyping specifically, we believe, deserves a conscious focus. It should become an established and well-supported tradition within design practice. This belief is founded upon observation of our own practices that shows that we can be more sensitive, can design better experiences for people, and can be more convincing about the value of our design decisions, by intentionally adopting such an approach.

From this perspective, it is obvious that Experience Prototyping is not about the creation of a formalized toolkit or set of techniques, but is about developing an attitude and language to solve design problems.

Establishing an Attitude
Traditional prototyping techniques and tools are embedded in traditionally distinct design disciplines. Experience Prototyping, as a tool in designing complex systems, asks for a blending of the multiple design disciplines and beyond. One great advantage of Experience Prototyping is that it requires hybrid and overlapping skill-sets such that it is not exclusive to any single design discipline. As such, it offers an opportunity for all types of designers to supplement their traditional discipline skills in an effective and broadening way.

Initially at least, it seems important to promote a low-fidelity mindset for Experience Prototyping. High-fidelity prototypes certainly have their place but our examples show that, especially in the understanding, exploring and evaluating design phases, there is great value in low-tech methods and improvisation with basic materials — rolled paper, pagers etc. Low-tech solutions seem to promote the attitude that it is the design question that is important, not the tools and techniques that can be brought to bear. Based on what we have learned so far, we plan to further develop a range of skills among our designers including tools and techniques such as Basic Stamps™, PIC chips (supported by traditional tools such as Macromedia Director™ and simple electronics to integrate hardware and software), improvisational theater and role-playing, basic video/audio recording and editing as well as the more traditional physical modeling such as foam models and foam core environments.

Different activities need different kinds of spaces and resources. We are currently in the process of supplementing our traditional model shop and electrical engineering lab with a large flexible space — a "theater" — to function as a stage for spontaneous role playing, as a place to build "scenes" and full-scale environments, and provide audio/video recording, editing, and projection facilities, as well as blue screening capabilities. In addition to the functional value these spaces and facilities have in supporting Experience Prototyping, they also provide important value in physically representing the attitude they intend to promote. They are a daily reminder to push their specific design projects and their specific disciplines to a limit, and to sustain and evolve the language of Experience Prototyping.
What We Don't Know

As we move into a more conscious frame of mind about Experience Prototyping, we are aware of much we do not yet understand about how to best utilize the principles for the most innovative and successful results.

What is the appropriate representation for different audiences? Experience Prototypes might be designed primarily for ourselves, other members of the design team, users, and internal or external clients. The audience influences both the type of prototype we create and the degree of context and explanation we provide to frame the experience for them. For users it may be difficult to provide an early, low-fidelity improvisation prototype of sufficiently robust nature that they can have an experience in a naturalistic context without supervision. Higher levels of fidelity have their problems, too. As in our example of the prototyping platform for the digital camera, clients may become unshakably attached to early ideas when they experience a single convincing manifestation of many different possibilities and perceive it as the final solution. Clearly it is important for designers to share their understanding of the intent behind an Experience Prototype, but perhaps there are also lessons to learn about communicating these intentions more effectively by carefully choosing the prototype or prototyping technique.

A second question concerns the relationship between active and passive prototyping methods. Intentionally, this paper focuses upon prototypes that create an active/first-hand rather than passive/vicarious way of appreciating experience. Hence we discuss the value of role-playing and improvisational theater, rather than of watching someone else's experience. Is there any danger that active involvement, especially when an audience is present, tends to direct energy away from understanding the experience to acting as if you were having the experience? Perhaps sometimes there is at least additional learning to be gained by observation and reflection of someone else having an experience as opposed to being fully immersed in it yourself and then transferring or generalizing your own personal and subjective experience without cross-checking with real users. The example of the ROV operator's feedback following the prototyping experience, the use of supporting materials for the digital camera experience prototype (the designers provided an appearance model as a "looks like" reference) and the video scenarios explaining context for the Kiss Communicator, shows that there is a balance to be found in effectively combining active and passive ways of realizing experience.

Indeed, it is essential to think of Experience Prototyping as complementary to other design methods. First, no matter how good Experience Prototyping is at promoting empathy, (e.g. as in the patient experience) we cannot actually be other people. There will always be a place for other design and research methods to help us understand other people's points of view. Second, as in all forms of prototyping, we inevitably make choices about what elements of the ultimate experience to represent and what to omit. This means recognizing that a single prototype is never enough. Multiple prototypes, and other methods such as contextual observation, user testing and participatory design all bring important perspectives to complete the picture.

Additionally, these other methods help us in identifying the relevant factors of an experience that we plan to represent. For example, in a specific prototype, just what mix of emphasis do we want to give to specific aspects of the experience, such as sensory, physical/spatial, cognitive, social and temporal/dynamic qualities? To create an appropriate prototype we need to determine, for example, whether we are interested primarily in the sensory and temporal/dynamic aspects of an experience (such as in the TV remote), the physical/spatial and social aspects (as in the airplane), or the cognitive and temporal/dynamic aspects (ROV; digital camera). And, since we are developing only partially integrated prototypes, "setting the stage" for the experience becomes crucial. We need to be explicit about what needs to be ignored (e.g., because it "does not look like" or "would not be tethered") and about what context surrounds the user experience ("a high pressure emergency situation" or "a very intimate and private moment").

Finally, we come back to the point that people's experiences with products and systems are a complex integration of personal and circumstantial factors. People will have experiences with the things we design, whether we intend them or not, and in ways that we cannot hope entirely to predict. Nevertheless, understanding, exploring and communicating the experiential aspects of design ideas are central activities in design. Experience Prototyping, while it creates only approximate and partial simulations of the real experiences others will have, brings a subjective richness to bear on design problems. It is an approach that, we believe, will benefit from more conscious attention and deliberate experimentation.

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TV channel changing experience: Duncan Kerr

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Control experience for a video environment: Graham Pullin, Tracy Currer, Frances Samalionis and Paul South

Experiencing an airplane interior: Colin Burns, Martin Bontoft and IDEO Europe

Children's picture communicator: Alexander Grunsteidl, Thomas Stegmann, Alison Black and Nokia Research Center

Digital camera interaction: Matt Hunter and Duncan Kerr

Kiss communicator: Duncan Kerr, Heather Martin and Mat Hunter

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RESEARCH
2 Techniques

2.7 What do Prototypes Prototype?

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Reprinted for educational use.
What do Prototypes Prototype?

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1. INTRODUCTION

Prototypes are widely recognized to be a core means of exploring and expressing designs for interactive computer artifacts. It is common practice to build prototypes in order to represent different states of an evolving design, and to explore options. However, since interactive systems are complex, it may be difficult or impossible to create prototypes of a whole design in the formative stages of a project. Choosing the right kind of more focused prototype to build is an art in itself, and communicating its limited purposes to its various audiences is a critical aspect of its use.

The ways that we talk, and even think about prototypes, can get in the way of their effective use. Current terminology for describing prototypes centers on attributes of prototypes themselves, such as what tool was used to create them, and how refined-looking or behaving they are. Such terms can be distracting. Tools can be used in many different ways, and detail is not a sure indicator of completeness.

We propose a change in the language used to talk about prototypes, to focus more attention on fundamental questions about the interactive system being designed: What role will the artifact play in a user’s life? How should it look and feel? How should it be implemented? The goal of this chapter is to establish a model that describes any prototype in terms of the artifact being designed, rather than the prototype’s incidental attributes. By focusing on the purpose of the prototype—that is, on what it prototypes—we can make better decisions about the kinds of prototypes to build. With a clear purpose for each prototype, we can better use prototypes to think and communicate about design.

In the first section we describe some current difficulties in communicating about prototypes: the complexity of interactive systems; issues of multidisciplinary teamwork; and the audiences of prototypes. Next, we introduce the model and illustrate it with some initial examples of prototypes from real projects. In the following section we present several more examples to illustrate some further issues. We conclude the chapter with a summary of the main implications of the model for prototyping practice.

2. THE PROBLEM WITH PROTOTYPES

Interactive computer systems are complex. Any artifact can have a rich variety of software, hardware, auditory, visual, and interactive features. For example, a personal digital assistant such as the Apple Newton has an operating system, a hard case with various ports, a graphical user interface and audio feedback. Users experience the combined effect of such interrelated features; and the task of designing—and prototyping—the user experience is therefore complex. Every aspect of the system must be designed (or inherited from a previous system), and many features need to be evaluated in combination with others.

Prototypes provide the means for examining design problems and evaluating solutions. Selecting the focus of a prototype is the art of identifying the most important open design questions. If the artifact is to provide new functionality for users—and thus play a new role in their lives—the most important questions may concern exactly what that role should be and what features are needed to support it. If the role is well understood, but the goal...
of the artifact is to present its functionality in a novel way, then prototyping must focus on how the artifact will look and feel. If the artifact’s functionality is to be based on a new technique, questions of how to implement the design may be the focus of prototyping efforts.

Once a prototype has been created, there are several distinct audiences that designers discuss prototypes with. They are: the intended users of the artifact being designed; their design teams; and the supporting organizations that they work within (Erickson, 1995). Designers evaluate their options with their own team by critiquing prototypes of alternate design directions. They show prototypes to users to get feedback on evolving designs. They show prototypes to their supporting organizations (such as project managers, business clients, or professors) to indicate progress and direction.

It is difficult for designers to communicate clearly about prototypes to such a broad audience. It is challenging to build prototypes which produce feedback from users on the most important design questions. Even communication among designers requires effort due to differing perspectives in a multidisciplinary design team. Limited understanding of design practice on the part of supporting organizations makes it hard for designers to explain their prototypes to them. Finally, prototypes are not self-explanatory: looks can be deceiving. Clarifying what aspects of a prototype correspond to the eventual artifact—and what don’t—is a key part of successful prototyping.

2.1 What is a prototype?

Designing interactive systems demands collaboration between designers of many different disciplines (Kim, 1990). For example, a project might require the skills of a programmer, an interaction designer, an industrial designer, and a project manager. Even the term "prototype" is likely to be ambiguous on such a team. Everyone has a different expectation of what a prototype is. Industrial designers call a molded foam model a prototype. Interaction designers refer to a simulation of on-screen appearance and behavior as a prototype. Programmers call a test program a prototype. A user studies expert may call a storyboard, which shows a scenario of something being used, a prototype.

The organization supporting a design project may have an overly narrow expectation of what a prototype is. Shrage (1996) has shown that organizations develop their own "prototyping cultures" which may cause them to consider only certain kinds of prototypes to be valid. In some organizations, only prototypes which act as proof that an artifact can be produced are respected. In others, only highly detailed representations of look and feel are well understood.

Is a brick a prototype? The answer depends on how it is used. If it is used to represent the weight and scale of some future artifact, then it certainly is: it prototypes the weight and scale of the artifact. This example shows that prototypes are not necessarily self-explanatory. What is significant is not what media or tools were used to create them, but how they are used by a designer to explore or demonstrate some aspect of the future artifact.

2.2 Current terminology

Current ways of talking about prototypes tend to focus on attributes of the prototype itself, such as which tool was used to create it (as in “C”, “Director™”, and “paper” prototypes); and on how finished-looking or -behaving a prototype is (as in “high-fidelity” and “low-fidelity” prototypes). Such characterizations can be misleading because the capabilities and possible uses of tools are often misunderstood and the significance of the level of finish is often unclear, particularly to non-designers.

Tools can be used in many different ways. Sometimes tools which have high-level scripting languages (like HyperCard™), rather than full programming languages (like C), are thought to be unsuitable for producing user-testable prototypes. However, Ehn and Kyng (1991) have shown that even prototypes made of cardboard are very useful for user testing. In the authors' experience, no one tool supports iterative design work in all of the important areas of investigation. To design well, designers must be willing to use different tools for different prototyping tasks; and to team up with other people with complementary skills.
Finished-looking (or -behaving) prototypes are often thought to indicate that the design they represent is near completion. Although this may sometimes be the case, a finished-looking prototype might be made early in the design process (e.g., a 3D concept model for use in market research), and a rough one might be made later on (e.g., to emphasize overall structure rather than visual details in a user test). Two related terms are used in this context: "resolution" and "fidelity". We interpret resolution to mean "amount of detail", and fidelity to mean "closeness to the eventual design". It is important to recognize that the degree of visual and behavioral refinement of a prototype does not necessarily correspond to the solidity of the design, or to a particular stage in the process.

3. A MODEL OF WHAT PROTOTYPES PROTOTYPE

3.1 Definitions
Before proceeding, we define some important terms. We define artifact as the interactive system being designed. An artifact may be a commercially released product or any end-result of a design activity such as a concept system developed for research purposes. We define prototype as any representation of a design idea, regardless of medium. This includes a preexisting object when used to answer a design question. We define designer as anyone who creates a prototype in order to design, regardless of job title.

3.2 The model
The model shown in Figure 1 represents a three-dimensional space which corresponds to important aspects of the design of an interactive artifact. We define the dimensions of the model as role, look and feel, and implementation. Each dimension corresponds to a class of questions which are salient to the design of any interactive system. "Role" refers to questions about the function that an artifact serves in a user's life—the way in which it is useful to them. "Look and feel" denotes questions about the concrete sensory experience of using an artifact—what the user looks at, feels and hears while using it. "Implementation" refers to questions about the techniques and components through which an artifact performs its function—the "nuts and bolts" of how it actually works. The triangle is drawn askew to emphasize that no one dimension is inherently more important than any other.

Goal of the model
Given a design problem (of any scope or size), designers can use the model to separate design issues into three classes of questions which frequently demand different approaches to prototyping. Implementation usually requires a working system to be built; look and feel requires the concrete user experience to be simulated or actually created; role requires the context of the artifact's use to be established. Being explicit about what design questions must be answered is therefore an essential aid to deciding what kind of prototype to build. The model helps visualize the focus of exploration.

Markers
A prototype may explore questions or design options in one, two or all three dimensions of the model. In this chapter, several prototypes from real design projects are presented as examples. Their relationship to the model is represented by a marker on the triangle. This is a simple way to put the purpose of any prototype in context for the designer and their audiences. It gives a global sense of what the prototype is intended to explore; and equally important, what it does not explore.

It may be noted that the triangle is a relative and subjective representation. A location toward one corner of the triangle implies simply that in the designer's own judgment, more attention is given to the class of questions represented by that corner than to the other two.
3.3 Three prototypes of one system

The model is best explained further through an example from a real project. The three prototypes shown in Examples 1-3 were created during the early stages of development of a 3D space-planning application (Houde, 1992).

The goal of the project was to design an example of a 3D application which would be accessible to a broad range of nontechnical users. As such it was designed to work on a personal computer with an ordinary mouse. Many prototypes were created by different members of the multi-disciplinary design team during the project.

The prototype shown in Example 1 was built to show how a user might select furniture from an online catalog and try it out in an approximation of their own room. It is an interactive slide show which the designer operated by clicking on key areas of the rough user interface. The idea that virtual space-planning would be a helpful task for nontechnical users came from user studies. The purpose of the prototype was to quickly convey the proposed role of the artifact to the design team and members of the supporting organization.

Since the purpose of the prototype was primarily to explore and visualize an example of the role of the future artifact, its marker appears very near the role corner of the model in Figure 2. It is placed a little toward the look and feel corner because it also explored user interface elements in a very initial form.

One of challenges of the project was to define an easy-to-use direct manipulation user interface for moving 3D objects with an ordinary 2D mouse cursor. User testing with a foam-core model showed that the most important manipulations of a space-planning task were sliding, lifting, and turning furniture objects. Example 2 shows a picture of a prototype which was made to test a user interface featuring this constrained set of manipulations. Clicking once on the chair object caused its bounding box to appear. This “handle box” offered hand-shaped controls for lifting and turning the box and chair (as if the chair was frozen inside the box). Clicking and dragging anywhere on the box allowed the unit to slide on a 3D floor. The prototype was built using Macromedia Director (a high level animation and scripting tool.) It was made to work only with the chair data shown: a set of images pre-drawn for many angles of rotation.
The purpose of Example 2 was to get feedback from users as quickly as possible as to whether the look and feel of the handle box user interface was promising. Users of the prototype were given tasks which encouraged them to move the chair around a virtual room. Some exploration of role was supported by the fact that the object manipulated was a chair, and space-planning tasks were given during the test. Although the prototype was interactive, the programming that made it so did not seriously explore how a final artifact with this interface might be implemented. It was only done in service of the look and feel test. Since the designer primarily explored the look and feel of the user interface, this prototype's marker is placed very near the look and feel corner of the model in Figure 2.

A technical challenge of the project was figuring out how to render 3D graphics quickly enough on equipment that end-users might have. At the time, it was not clear how much real time 3D interaction could be achieved on the Apple Macintosh™ IIfx computer—the fastest Macintosh then available. Example 3 shows a prototype which was built primarily to explore rendering capability and performance. This was a working prototype in which multiple 3D objects could be manipulated as in Example 2, and the view of the room could be changed to any perspective. Example 3 was made in a programming environment that best supported the display of true 3D perspectives during manipulation. It was used by the design team to determine what complexity of 3D scenes was reasonable to design for. The user interface elements shown on the left side of the screen were made by the programmer to give himself controls for demonstrating the system: they were not made to explore the look and feel of the future artifact. Thus the primary purpose of the prototype was to explore how the artifact might be implemented. The marker for this example is placed near the implementation corner (Figure 2).

One might assume that the role prototype (Example 1) was developed first, then the look and feel prototype (Example 2), and finally the implementation prototype (Example 3): that is, in order of increasing detail and production difficulty. In fact, these three prototypes were developed almost in parallel. They were built by different design teams during the early stages of the project. No single prototype could have represented the design of the future artifact at that time. The evolving design was too fuzzy—existing mainly as a shared concept in the minds of the designers. There were also too many open and interdependent questions in every design dimension: role, look and feel, implementation.

Making separate prototypes enabled specific design questions to be addressed with as much clarity as possible. The solutions found became inputs to an integrated design. Answers to the rendering capability questions addressed by Example 3 informed the design of the role that the artifact could play (guiding how many furniture objects of what complexity could be shown). It also provided guiding constraints for the direct manipulation user interface (determining how much detail the handle forms could have). Similarly, issues of role addressed by Example 1 informed the implementation problem by constraining it: only a constrained set of manipulations was needed for a space-planning application. It also simplified the direct manipulation user interface by limiting the necessary actions and therefore controls which needed to be provided.

It was more efficient to wait on the results of independent investigations in the key areas of role, look and feel and implementation than to try to build a monolithic prototype that integrated all features from the start. After sufficient investigation in separate prototypes, the prototype in Example 3 began...
Figure 3. Four principal categories of prototypes on the model.

to evolve into an integrated prototype which could be described by a position at the center of our model. A version of the user interface developed in Example 2 was implemented in the prototype in Example 3. Results of other prototypes were also integrated. This enabled a more complete user test of features and user interface to take place.

This set of three prototypes from the same project shows how a design problem can be simultaneously approached from multiple points of view. Design questions of role, look and feel, and implementation were explored concurrently by the team with the three separate prototypes. The purpose of the model is to make it easier to develop and subsequently communicate about this kind prototyping strategy.

4. FURTHER EXAMPLES

In this section we present twelve more examples of prototypes taken from real projects, and discuss them in terms of the model. Examples are divided into four categories which correspond to the four main regions of the model, as indicated in Figure 3. The first three categories correspond to prototypes with a strong bias toward one of the three corners: role, look and feel, and implementation prototypes, respectively. Integration prototypes occupy the middle of the model: they explore a balance of questions in all three dimensions.

4.1 Role prototypes

Role prototypes are those which are built primarily to investigate questions of what an artifact could do for a user. They describe the functional-

A portable notebook computer

The paper storyboard shown in Example 4 was an early prototype of a portable notebook computer for students which would accept both pen and finger input. The scenario shows a student making notes, annotating a paper, and marking pages for later review in a computer notebook. The designer presented the storyboard to her design team to focus discussion on the issues of what functionality the notebook should provide and how it might be controlled through pen and finger interaction. In terms of the model, this prototype primarily explored the role of the notebook by presenting a rough task scenario for it. A secondary consideration was a rough approximation of the user interface. Its marker, shown in Figure 4, is therefore positioned near the role corner of the model and a little toward look and feel.

Storyboards like this one are considered to be effective design tools by many designers because they help focus design discussion on the role of an artifact very early on. However, giving them status as prototypes is not common because the medium is paper and thus seems very far from the medium of
an interactive computer system. We consider this storyboard to be a prototype because it makes a concrete representation of a design idea and serves the purpose of asking and answering design questions. Of course, if the designer needed to evaluate a user’s reaction to seeing the notebook or to using the pen-and-finger interaction, it would be necessary to build a prototype which supported direct interaction. However, it might be wasteful to do so before considering design options in the faster, lighter-weight medium of pencil and paper.

**An operating system user interface**

Example 5 shows a screen view of a prototype that was used to explore the design of a new operating system. The prototype was an interactive story: it could only be executed through a single, ordered, sequence of interactions. Clicking with a cursor on the mailbox picture opened a mail window; then clicking on the voice tool brought up a picture of some sound tools; and so on. To demonstrate the prototype, the designer sat in front of a computer and play-acted the role of a user opening her mail, replying to it, and so forth. The prototype was used in design team discussions and also demonstrated to project managers to explain the current design direction. According to the model, this prototype primarily explored the role that certain features of the operating system could play in a user’s daily tasks. It was also used to outline very roughly how its features would be portrayed and how a user would interact with it. As in the previous example, the system’s implementation was not explored. Its marker is shown in Figure 4.

To make the prototype, user interface elements were hand-drawn and scanned in. Transitions between steps in the scenario were made interactive in Macromedia Director. This kind of portrayal of on-screen interface elements as rough and hand-drawn was used in order to focus design discussion on the overall features of a design rather than on specific details of look and feel or implementation (Wong, 1992). Ironically, while the design team understood the meaning of the hand-drawn graphics, other members of the organization became enamored with the sketchy style to the extent that they considered using it in the final artifact. This result was entirely at odds with the original reasons for making a rough-looking prototype. This example shows how the effectiveness of some kinds of prototypes may be limited to a specific kind of audience.

**The Knowledge Navigator**

Example 6 shows a scene from Apple Computer’s Knowledge Navigator™ video. The video tape tells a day-in-the-life story of a professor using a futuristic notebook computer (Dubberly and Mitch, 1987). An intelligent agent named “Phil” acts as his virtual personal assistant, finding information related to a lecture, reminding him of his mother’s birthday, and connecting him with other professors via video-link. The professor interacts with Phil by talking, and Phil apparently recognizes everything said as well as a human assistant would.

Based on the model, the Knowledge Navigator is identified primarily as a prototype which describes
the role that the notebook would play in such a user's life. The story is told in great detail, and it is clear that many decisions were made about what to emphasize in the role. The video also shows specific details of appearance, interaction, and performance. However, they were not intended by the designers to be prototypes of look and feel. They were merely placeholders for the actual design work which would be necessary to make the product really work. Thus its marker goes directly on the role corner (Figure 4).

Thanks to the video's special effects, the scenario of the professor interacting with the notebook and his assistant looks like a demonstration of a real product. Why did Apple make a highly produced prototype when the previous examples show that a rapid paper storyboard or a sketchy interactive prototype were sufficient for designing a role and telling a usage story? The answer lies in the kind of audience. The tape was shown publicly and to Apple employees as a vision of the future of computing. Thus the audience of the Knowledge Navigator was very broad—including almost anyone in the world. Each of the two previous role design prototypes was shown to an audience which was well informed about the design project. A rough hand-drawn prototype would not have made the idea seem real to the broad audience the video addressed: high resolution was necessary to help people concretely visualize the design. Again, while team members learn to interpret abstract kinds of prototypes accurately, less expert audiences cannot normally be expected to understand such approximate representations.

The Integrated Communicator

Example 7 shows an appearance model of an Integrated Communicator created for customer research into alternate presentations of new technology (ID Magazine 1995). It was one of three presentations of possible mechanical configurations and interaction designs, each built to the same high finish and accompanied by a video describing on-screen interactions. In the study, the value of each presentation was evaluated relative to the others, as perceived by study subjects during one-on-one interviews. The prototype was used to help subjects imagine such a product in the store and in their homes or offices, and thus to evaluate whether they would purchase such a product, how much they would expect it to cost, what features they would expect, etc.

The prototype primarily addresses the role of the product, by presenting carefully designed cues which imply a telephone-like role and look-and-feel. Figure 4 shows its marker near the role corner of the model. As with the Knowledge Navigator, the very high-resolution look and feel was a means of making the design as concrete as possible to a broad audience. In this case however it also enabled a basic interaction design strategy to be worked out and demonstrated. The prototype did not address implementation.
The key feature of this kind of prototype is that it is a concrete and direct representation, as visually finished as actual consumer products. These attributes encourage an uncoached person to directly relate the design to their own environment, and to the products they own or see in stores. High-quality appearance models are costly to build. There are two common reasons for investing in one: to get a visceral response by making the design seem "real" to any audience (design team, organization, and potential users); and to verify the intended look and feel of the artifact before committing to production tooling. An interesting side-effect of this prototype was that its directness made it a powerful prop for promoting the project within the organization.

4.2 Look and Feel prototypes

Look and feel prototypes are built primarily to explore and demonstrate options for the concrete experience of an artifact. They simulate what it would be like to look at and interact with, without necessarily investigating the role it would play in the user's life or how it would be made to work. Designers make such prototypes to visualize different look and feel possibilities for themselves and their design teams. They ask users to interact with them to see how the look and feel could be improved. They also use them to give members of their supporting organization a concrete sense of what the future artifact will be like.

A fashion design workspace

The prototype shown in Example 8 was developed to support research into collaboration tools for fashion designers (Hill et al., 1993; Scaife et al, 1994). A twenty-minute animation, it presented the concept design for a system for monitoring garment design work. It illustrated in considerable detail the translation of a proven paper-based procedure into a computer-based system with a visually rich, direct manipulation, user interface. The prototype's main purposes were to confirm to the design team that an engaging and effective look and feel could be designed for this application, and to convince managers of the possibilities of the project. It was presented to users purely for informal discussion.

This is an example of a look and feel prototype. The virtue of the prototype was that it enabled a novel user interface design to be developed without having first to implement complex underlying technologies. While the role was inherited from existing fashion design practice, the prototype also demonstrated new options offered by the new computer-based approach. Thus, Figure 5 shows its marker in the look and feel area of the model.

One issue with prototypes like this one is that inexperienced audiences tend to believe them to be more functional than they are just by virtue of being shown on a computer screen. When this prototype was shown, the designers found they needed to take great care to explain that the design was not implemented.

Figure 5. Relationship of the look and feel prototypes (Examples 8-10) to the model.
A learning toy

The “GloBall” project was a concept for a children’s toy: a ball that would interact with children who played with it. Two prototypes from the project are shown, disassembled, in Example 9. The design team wanted the ball to speak back to kids when they spoke to it, and to roll towards or away from them in reaction to their movements. The two prototypes were built to simulate these functions separately. The ball on the left had a walkie-talkie which was concealed in use. A hidden operator spoke into a linked walkie-talkie to simulate the ball’s speech while a young child played with it. Similarly, the ball on the right had a radio-controlled car which was concealed in use. A hidden operator remotely controlled the car, thus causing the ball to roll around in response to the child’s actions.

As indicated by the marker in Figure 5, both prototypes were used to explore the toy’s look and feel from a child’s viewpoint, and to a lesser extent to evaluate the role that the toy would play. Neither seriously addressed implementation. The designers of these very efficient prototypes wanted to know how a child would respond to a toy that appeared to speak and move of its own free will. They managed to convincingly simulate novel and difficult-to-implement technologies such as speech and automation, for minimal cost and using readily available components. By using a “man behind the curtain” (or “Wizard of Oz”) technique, the designers were able to present the prototypes directly to children and to directly evaluate their effect.

Example 9. Look and feel simulation prototypes for a child’s toy [E9 Bellman et al, 1993].


An architect’s computer

This example concerned the design of a portable computer for architects who need to gather a lot of information during visits to building sites. One of the first questions the designers explored was what form would be appropriate for their users. Without much ado they weighted the pizza box shown in Example 10 to the expected weight of the computer, and gave it to an architect to carry on a site visit. They watched how he carried the box, what else he carried with him, and what tasks he needed to do during the visit. They saw that the rectilinear form and weight were too awkward, given the other materials he carried with him, and this simple insight led them to consider of a softer form. As shown by its marker, this is an example of a rough look and feel prototype (Figure 5). Role was also explored in a minor way by seeing the context that the artifact would be used in.

The pizza box was a very efficient prototype. Spending virtually no time building it or considering options, the students got useful feedback on a basic design question—what physical form would be best for the user. From what they learned in their simple field test, they knew immediately that they should try to think beyond standard rectilinear notebook computer forms. They began to consider many different options including designing the computer to feel more like a soft shoulder bag.

4.3 Implementation Prototypes

Some prototypes are built primarily to answer technical questions about how a future artifact might actually be made to work. They are used to discover methods by which adequate specifications for
the final artifact can be achieved—without having to define its look and feel or the role it will play for a user. (Some specifications may be unstated, and may include externally imposed constraints, such as the need to reuse existing components or production machinery.) Designers make implementation prototypes as experiments for themselves and the design team, to demonstrate to their organization the technical feasibility of the artifact, and to get feedback from users on performance issues.

A digital movie editor

Some years ago it was not clear how much interactivity could be added to digital movies playing on personal computers. Example 11 shows a picture of a prototype that was built to investigate solutions to this technical challenge. It was an application, written in the C programming language to run on an Apple Macintosh computer. It offered a variety of movie data-processing functionality such as controlling various attributes of movie play. The main goal of the prototype was to allow marking of points in a movie to which scripts (which added interactivity) would be attached. As indicated by the marker in Figure 6, this was primarily a carefully planned implementation prototype. Many options were evaluated about the best way to implement its functions. The role that the functions would play was less well defined. The visible look and feel of the prototype was largely incidental: it was created by the designer almost purely to demonstrate the available functionality, and was not intended to be used by others.

This prototype received varying responses when demonstrated to a group of designers who were not members of the movie editor design team. When the audience understood that an implementation design was being demonstrated, discussion was focused productively. At other times it became focused on problems with the user interface, such as the multiple cascading menus, which were hard to control and visually confusing. In these cases, discussion was less productive: the incidental user interface got in the way of the intentional implementation.

The project leader shared some reflections after this somewhat frustrating experience. He said that part of his goal in pursuing a working prototype alone was to move the project through an organization that respected this kind of prototype more than “smoke and mirrors” prototypes—ones which only simulate functionality. He added that one problem might have been that the user interface was neither good enough nor bad enough to avoid misunderstandings. The edit list, which allowed points to be marked in movies, was a viable look and feel design; while the cascading menus were not. For the audience that the prototype was shown to, it might have been more effective to stress the fact that look and feel were not the focus of the prototype; and perhaps, time permitting, to have complemented this prototype with a separate look and feel prototype that explained their intentions in that dimension.

A fluid dynamics simulation system

Example 12 shows a small part of the C++ program listing for a system for simulating gas flows and combustion in car engines, part of an engineer-
\begin{verbatim}
IntList& IntList::operator=(const IntList& oldList)
{
    register long n = oldList.size;
    if (n != size) setSize(n);
    register int* newPtr = &values[n];
    register int* oldPtr = &oldList.values[n];
    while (n--) newPtr = ++oldPtr;
    return *this;
}
\end{verbatim}

Example 12. C++ program sample from a fluid dynamics simulation system [E12 Hill, 1993].

Implementation. A common mistake in software development is the tendency to demonstrate feasibility early in the development process. This can lead to problems if the initial feasibility demonstration is not followed by a complete and robust implementation. In the example given above, the initial demonstration of feasibility was achieved by showing that the new approach could be implemented using the existing FORTRAN language. However, the implementation was found to be slower than the existing FORTRAN implementation. The prototype was built primarily for the design team's own use, and eventually used to create a deployable system. The marker in Figure 6 indicates that this prototype primarily explored implementation.

Other kinds of implementation prototypes include demonstrations of new algorithms (e.g., a graphical rendering technique or a new search technology), and trial conversions of existing programs to run in new environments (e.g., converting a program written in the C language to the Java language).

Implementation prototypes can be hard to build, and since they actually work, it is common for them to find their way directly into the final system. Two problems arise from this dynamic: firstly, programs developed mainly to demonstrate feasibility may turn out in the long term to be difficult to maintain and develop; and secondly, their temporary user interfaces may never be properly redesigned before the final system is released. For these reasons it is often desirable to treat even implementation prototypes as disposable, and to migrate successful implementation designs to a new integrated prototype as the project progresses.

4.4 Integration prototypes

Integration prototypes are built to represent the complete user experience of an artifact. Such prototypes bring together the artifact's intended design in terms of role, look and feel, and implementation. Integrated prototypes help designers to balance and resolve constraints arising in different design dimensions; to verify that the design is complete and coherent; and to find synergy in the design of the integration itself. In some cases the integration design may become the unique innovation or feature of the final artifact. Since the user's experience of an artifact ultimately combines all three dimensions of the model, integration prototypes are most able to accurately simulate the final artifact. Since they may need to be as complex as the final artifact, they are the most difficult and time consuming kinds of prototypes to build. Designers make integration prototypes to understand the design as a whole, to show their organizations a close approximation to the final artifact, and to get feedback from users about the overall design.

The Sound Browser

The “SoundBrowser” prototype shown in Example 13 was built as part of a larger project which investigated uses of audio for personal computer users (Degen et al, 1992). The prototype was built in C

![Figure 7. Relationship of integration prototypes (Examples 13-15) to the model.](image-url)
to run on a Macintosh. It allowed a user to browse digital audio data recorded on a special personal tape recorder equipped with buttons for marking points in the audio. The picture shows the SoundBrowser's visual representation of the audio data, showing the markers below the sound display. A variety of functions were provided for reviewing sound, such as high-speed playback and playback of marked segments of audio.

This prototype earns a position right in the center of the model, as shown in Figure 7. All three dimensions of the model were explored and represented in the prototype. The role of the artifact was well thought-out, being driven initially by observations of what users currently do to mark and play back audio, and then by iteratively designed scenarios of how it might be done more efficiently if electronic marking and viewing functions were offered. The look and feel of the prototype went through many visual design iterations. The implementation was redesigned several times to meet the performance needs of the desired high-speed playback function.

When the SoundBrowser was near completion it was prepared for a user test. One of the features which the design team intended to evaluate was the visual representation of the sound in the main window. They wanted to show users several alternatives to understand their preferences. The programmer who built the SoundBrowser had developed most of the alternatives. In order to refine these and explore others, two other team members copied screen-shots from the tool into a pixel-painting application, where they experimented with modifications. This was a quick way to try out different visual options, in temporary isolation from other aspects of the artifact. It was far easier to do this in a visual design tool than by programming in C. When finished, the new options were programmed into the integrated prototype. This example shows the value of using different tools for different kinds of design exploration, and how even at the end of a project simple, low-fidelity prototypes might be built to solve specific problems.

The Pile Metaphor

The prototype shown in Example 14 was made as part of the development of the "pile" metaphor—a user interface element for casual organization of information (Mander et al, 1992, Rose et al, 1993). It represented the integration of designs developed in several other prototypes which independently explored the look and feel of piles, "content-aware" information retrieval, and the role that piles could play as a part of an operating system. In the pile metaphor, each electronic document was represented by a small icon or "proxy", several of which were stacked to form a pile. The contents of the pile could be quickly reviewed by moving the arrow cursor over it. While the cursor was over a particular document, the "viewing cone" to the right displayed a short text summary of the document.


This prototype was shown to designers, project managers, and software developers as a proof of concept of the novel technology. The implementation design in this prototype might have been achieved with virtually no user interface: just text input and output. However, since the prototype was to be shown to a broad audience, an integrated style of prototype was chosen, both to communicate the implementation point and to verify that the piles representation was practically feasible. It helped greatly that the artifact's role and look and feel could be directly inherited from previous prototypes. Figure 7 shows its marker on the model.
A garment history browser

The prototype in Example 15 was a working system which enabled users to enter and retrieve snippets of information about garment designs via a visually rich user interface (Hill et al, 1993; Scaife et al, 1994). The picture shows the query tool which was designed to engage fashion designers and provide memorable visual cues. The prototype was designed for testing in three corporations with a limited set of users’ actual data, and presented to users in interviews. It was briefly demonstrated, then users were asked to try queries and enter remarks about design issues they were currently aware of.

This prototype was the end-result of a progression from an initial focus on role (represented by verbal usage scenarios), followed by rough look and feel prototypes and an initial implementation. Along the way various ideas were explored, refined or rejected. The working tool, built in Allegiant SuperCard™, required two months' intensive work by two designers. In retrospect the designers had mixed feelings about it. It was highly motivating to users to be able to manipulate real user data through a novel user interface, and much was learned about the design. However, the designers also felt that they had to invest a large amount of time in making the prototype, yet had only been able to support a very narrow role compared to the breadth shown in the animation shown in Example 8. Many broader design questions remained unanswered.

1. 3D space-planning (role)
2. 3D space-planning (look and feel)
3. 3D space-planning (implementation)
4. Storyboard for portable notebook computer
5. Interactive story, operating system user interface
6. Vision video, notebook computer
7. Appearance model, integrated communicator
8. Animation, fashion design workspace
9. Look and feel simulation, child’s toy
10. Pizza-box, architect’s computer
11. Working prototype, digital movie editor
12. C++ program listing, fluid dynamics simulation
13. Integrated prototype, sound browser
14. Integrated prototype, pile metaphor
15. Integrated prototype, garment history browser

Figure 8. Relationship of all examples to the model.

5. SUMMARY

In this chapter, we have proposed a change in the language used by designers to think and talk about prototypes of interactive artifacts. Much current terminology centers on attributes of prototypes themselves: the tools used to create them, or how refined-looking or -behaving they are. Yet tools can be used in many different ways, and resolution can be misleading. We have proposed a shift in attention to focus on questions about the design of the artifact itself: What role will it play in a user's life? How should it look and feel? How should it be implemented? The model that we have introduced can be used by designers to divide any design problem into these three classes of questions, each of which may benefit from a different approach to prototyping.

We have described a variety of prototypes from real projects, and have shown how the model can be used to communicate about their purposes. Several practical suggestions for designers have been raised by the examples:
• Define “prototype” broadly. Efficient prototypes produce answers to their designers’ most important questions in the least amount of time. Sometimes very simple representations make highly effective prototypes: e.g., the pizza-box prototype of an architect’s computer [Example 10] and the storyboard notebook [Example 1]. We define a prototype as any representation of a design idea—regardless of medium; and designers as the people who create them—regardless of their job titles.

• Build multiple prototypes. Since interactive artifacts can be very complex, it may be impossible to create an integrated prototype in the formative stages of a project, as in the 3D space-planning example [Examples 1, 2, and 3]. Choosing the right focused prototypes to build is an art in itself. Be prepared to throw some prototypes away, and to use different tools for different kinds of prototypes.

• Know your audience. The necessary resolution and fidelity of a prototype may depend most on the nature of its audience. A rough role prototype such as the interactive storyboard [Example 4] may work well for a design team but not for members of the supporting organization. Broader audiences may require higher-resolution representations. Some organizations expect to see certain kinds of prototypes: implementation designs are often expected in engineering departments, while look-and-feel and role prototypes may rule in a visual design environment.

• Know your prototype; prepare your audience. Be clear about what design questions are being explored with a given prototype—and what are not. Communicating the specific purposes of a prototype to its audience is a critical aspect of its use. It is up to the designer to prepare an audience for viewing a prototype. Prototypes themselves do not necessarily communicate their purpose. It is especially important to clarify what is and what is not addressed by a prototype when presenting it to any audience beyond the immediate design team.

By focusing on the purpose of the prototype—that is, on what it prototypes—we can make better decisions about the kinds of prototypes to build. With a clear purpose for each prototype, we can better use prototypes to think and communicate about design.

6. ACKNOWLEDGMENTS
Special thanks are due to Thomas Erickson for guidance with this chapter, and to our many colleagues whose prototypes we have cited, for their comments on early drafts. We would also like to acknowledge S. Joy Mountford whose leadership of the Human Interface Group at Apple created an atmosphere in which creative prototyping could flourish. Finally, thanks to James Spohrer, Lori Leahy, Dan Russell, and Donald Norman at Apple Research Labs for supporting us in writing this chapter.

6.1 Prototype Credits
We credit here the principal designer and design team of each example prototype shown.


6.2 References


II WRITING

3 Process and Craft
3.1 Thinking About Processes in Writing  L. Fearn/N. Farnan
3.2 Thinking About Craft in Writing    L. Fearn/N. Farnan
3.4 Top Ten Sentence Problems & Parts of Speech Ann Raimes

4 Documentation
4.1 Avoiding Plagiarism and Documenting Sources Jane Aaron

Highlights
Writing process is a design process. As a design process, writing requires purpose and structure, is unique to its doer, and iterative. In Chapter 3.1, you will read highly-divergent reports from writers themselves about what they do. This chapter will help you connect “writing to know” to design thinking and doing. Chapter 3.2 explains that writing craft is not just grammar and mechanics, but rather “…the effective use of language to record ideas and images.” (Fearn/Farnan) Chapter 3.2 makes it clear that your ideas and the ‘messages’ you want to record and communicate drive the way you craft your writing.

Chapter 3.4 provides a quick glance at common grammar and mechanics writing problems, but cannot substitute either for a grammar handbook or special support (eg The Writing Center, tutors), should you need basic writing skills help.

Chapter 4.1 on “Avoiding Plagiarism and Documenting Sources” is a must read for all students.
3.1 Thinking About Processes in Writing

Fearn, L. and Farnan, N.
*Interactions: Teaching Writing and The Language Arts.*

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Thinking About Processes in Writing

BEFORE YOU READ

- What do writers do when they write? How do writers write?
- What are the differences between experienced and novice writers' writing processes?
- When do writers plan their writing?
- When do writers revise their writing?
- Write a description of your writing process(es).

Process in Balanced Writing Instruction

*Writing process* is about how writers approach and perform writing. To approach writing is to plan, to identify principal ideas, to build the big picture for the writing. To perform writing is to draft, rethink principal ideas, research, revise, and edit. Writing *process* covers the entire procedural world associated with writing.

*Process* is another word for *mental procedures*. The anchor question is: What do writers do when they write? The only source of information about what writers do when they write is, of course, writers themselves. So to know what's going on during writing, we ask writers.

If the writers agreed to a roundtable discussion, the transcription of the audio-tape might appear as shown below. The words are the writers' own, taken from interviews with them and from autobiographies. On the initial appearance of each writer in the roundtable, the genre specialization appears in parentheses. The interviews and commentaries from which the writers' words have been taken are contained in Asimov (1979, 1980), Cowley (1958), Lloyd (1987), Murray (1990), Plimpton (1989), and Steinbeck (1969). We ask that you play along for a few moments as the writers, assembled around a large table, respond to a teacher's questions about how they write.
Asimov and Doctorow just let the writing roll along to see what happens, and there are all kinds of variations in between. It's clear from what you say, though, that there is no secret—just hard work, and my young writers have to write, write some more, and keep writing. I can work with that in my classroom. I know that several of you said there are only thirty minutes you can spend here, so let me ask another question quickly. None of my students likes revision very much, but writers have to do it. Have you any suggestions?

Kathryn Lance (Fiction and Nonfiction): I used to hope that as I got better I would have to revise less, but the opposite seems to be happening: as I gain more experience I become more self-critical and spend even more time on rewriting and polishing.

Robert Cormier (Fiction): Listen, a brain surgeon has to get it right the first time, but a writer can always rewrite and fix and tinker and get the better word. You can always seek a better way of saying something.

William Styron (Fiction): I seem to have some neurotic need to perfect each paragraph—each sentence—as I go along.

Elizabeth Hardwick (Nonfiction): One of the things writing students don’t understand is that when they write their first draft, they have merely begun, and that they may be merely beginning even in the second or third draft.

John Updike (Fiction): Writing well involves two gifts—the art of adding and the art of taking away. Of the two, the first is more important, since without it the second could not exist.

Roald Dahl (Fiction): Good writing is essentially rewriting.

Joan Didion (Fiction): My writing is a process of rewriting, of going back and changing and filling in.

Thornton Wilder (Playwright): There are passages in every piece whose first writing is pretty much the last. But it's the joint and cement, between those spontaneous passages, that take a great deal of rewriting.

Teacher: That doesn't give me a teacher system either, but what you say will validate my young writers. They certainly experience revision as hard work. Maybe because Mr. Wilder spoke last, I remember what he said most clearly. That does help me a lot. I keep telling my students to just get it down, but some of them work hard at each sentence. Some of you do that too. I guess some of you write just as some of my young writers write. We keep coming back to the same theme. There doesn't seem to be one way. Finally, what would you tell my students if you had a chance to give them your best advice?

François Mauriac (Fiction): Every writer ought to invent his own technique.

Asimov: There is nothing marvelous or artistic about it. I just think and think and think until I have something.

Theo Lippman, Jr. (Journalism and Commentary): Teach them to write short. It forces you to rewrite, and there isn't any padding.

Wilder: There are totally different requirements for ordering mind and language. Reporting is poles apart from shaping concepts into imagined actions. It is proverbial that every newspaper reporter has a half-finished novel in his bureau drawer.
That being the case, the typical implementation of teacher-directed prewriting before young writers begin composing likely preempts young writers' attempts to activate and organize their own memories and connections relevant to the topic. If instruction does for young writers what young writers should be doing for themselves, the instruction can interfere with the development of young writers' ability to think for themselves as they write (Bereiter & Scardamalia, 1987). They merely copy their prewriting ideas into sentences.

One of the reasons that writing process is impossible to codify in any systematic or predictable manner is its very nature. Murray (1985) tells us that writers do not think up their meaning and then write it down. “The act of writing,” Murray says, “is the act of thought” (p. 3). Murray’s sense of writing processes adheres to what Bereiter and Scardamalia (1987) say about the attentional demands of writing. The complexity of writing is not due so much to the number of factors that demand writers’ attention (spelling, capitalization, sentence structure, focus, and so forth) as it is to the fact that all of the demands compete for attention at the same time.

The complexity of writing processes, and the futility of trying to teach as though there were a process, is highlighted by the relationship between process and circumstance (Murray, 1985). The pressure of time, for example, often changes the way a writer performs the act of writing. A young writer may write an autobiographical incident one way if there are two days before it is due and in another way if it is due in an hour. In addition, the process changes depending on who is likely to read the writing. Young writers write one way for peers and another for teachers.

The evidence seems to suggest more than one kind of composing or drafting process. There seems to be a difference between less and more mature writers, and the difference is not necessarily tied to chronological age. Moffett (1994) refers to the difference as writing to show versus writing to know. Writing to show is called knowledge telling in which young writers use linguistic capabilities shared by everyone (oral language ability, for example) to write ideas that reveal information alone. Knowledge redirects “oral language abilities into producing written text” (Bereiter & Scardamalia, 1987, p. 4). Less mature writers tend to tell what is in their minds and declare themselves finished when they run out of thoughts or ideas.

Writing to know is more like knowledge transforming, that is, constructing ideas and images through writing. Knowledge transforming is more a way of using writing for the construction of knowledge.

A knowledge-telling report on wheat farming in North Dakota, for example, would feature the information a young writer accumulated and organized about North Dakota wheat farming. The same topic in a knowledge transforming report could contain information similar to the former report, but it might move the writer to speculate about shortened growing seasons and why wheat, and not corn, is North Dakota’s main grain crop. When the knowledge is told in the first report, the report is finished. In the second report, the information promotes
curiosity or speculation, and the writer uses the information and the curiosity to construct knowledge not originally accumulated.

Consider the possibility that if teachers introduce every writing experience with a relatively systematic kind of prewriting and young writers begin to habituate the teacher's prewriting strategies, young writers may never move from telling writing to transforming writing that can occur only on the basis of the thinking that is activated because of the writing itself.

There seem to be differences between how novice and experienced writers use writing processes. One difference is in knowledge telling and knowledge transforming. Another is that novices are writer based, and experienced writers are more reader based (Flower, 1979). Writer-based text production is based on how knowledge is represented in the writer's mind, and reader-based text production is shaped more by what writers think readers need. More mature writers monitor their writing with an eye and an ear to how the meanings come across.

Flower and Hayes (1980) found that novice and expert writers can be distinguished from one another by their use of planning time and procedures. Although Bereiter and Scardamalia (1987) suggest that not all writing need be planned, it is clear that good writers know how to mobilize effective planning procedures.

Bereiter and Scardamalia (1987) describe writers' increasing ability to differentiate planning from text production. Planning here means action aimed at achieving a goal (Hayes-Roth & Hayes-Roth, 1979). At the earliest stages of writing development, writers' thought processes are so closely tied to their text production that it is impossible for an observer to notice separation between planning and composing. With experience, however, there appears a greater difference between thinking of what to write and the writing itself.

Hayes and Flower (1980) point out that planning by experts is a distinct mental activity that occurs mainly in the early portions of composing, an important point. Bereiter and Scardamalia (1987) found that novices tend to plan only once when they write, rather than think through the entire piece of writing. Experienced writers, on the other hand, often have a global sense of the direction and overall content of a writing task. They have a sense of purpose that they monitor throughout the writing. However (and this is important), both Emig (1971) and Gould (1980) found, as reflected in the roundtable, that even experienced writers routinely tend not to plan their work very extensively before they begin to write. As Hayes and Flower (1980) point out, experienced writers' planning often occurs even in the midst of the draft. Every piece of writing need not be planned in detail before drafting, but good writers do plan the big picture.

The discussion of what we know about writing processes so far has focused on the fluid nature of these processes and how novice and experienced writers' processes differ. Another focus of the research on writing processes is at the level of reflection and revision.

Flower (1979) suggests that one reason that young writers have difficulty revisiting or revising their own writing is that their writing is egocentric or writer based. It is
constructed from what the young writer knows or remembers. Given that what they write is a reflection of their view, they are most likely unable to take a reader's point of view of their own writing. They know what their text means, and they are unable to see how anyone could fail to understand. To revise is to “de-center,” as Piaget calls it—to see something from two perspectives at once.

Only if the writing is other-centered can the writer see the perspective of the writer and the reader at once, and that is what revision requires. Merely to reserve a day or a stage for revision has almost nothing to do with causing revision to occur. Frank (1992) found that fifth graders could think about the two audience groups (third graders and adults) at once when they revised an advertisement to fit them both. Kroll (1985) faced writers in grades 5, 7, 9, 11, and college with a linguistically complex story that they had to rewrite for third-grade readers. Kroll found that fifth graders revised on a word-for-word basis, replacing hard words with easier ones, while older writers essentially rewrote the piece, protecting its meaning and structure. Kroll's findings line up with those of Flower (1979), who found that the revisions of novice writers are mostly cosmetic improvements that do not represent interactions between the text and its intended meaning.

Given that writing processes are neither stage bound nor linear, it is likely that processes such as revision occur in the midst of the draft, probably affecting even the planning process. Writing process research on experienced writers is filled with evidence of reflective activity (revising) that includes goal changing, problem solving, and predicting what is to come (Flower & Hayes, 1980, 1981). That might seem to be explained with an assumption that writers reflect in a sort of internal or subaudible dialogue way about the writing, even as the writing occurs. However, there is nothing in the research literature, or even the self-reports of experienced writers, and certainly not in the early investigation by Emig (1971), to document the existence of any internal dialogue. Experienced writers ask themselves where they are and where they are going, but there is no evidence to document any ongoing internal, subaudible reflection by either novice or experienced writers.

**REVIEW AND REFLECTION**

1. Now that you have read the writers' roundtable, what can you say about writing and writing processes?
2. The research most responsible for moving the profession's attention toward how students write (writing processes) was conducted by Janet Emig. What did Emig find in her research?
3. How would you generally describe your writing processes? Write a self-report that is between a half-page and a page in length to share with one or more peers or colleagues.
5. Describe at least two ways that novice and experienced writers might use writing processes differently.
An Iterative Model of Interactive Writing Process

An iterative model for the interactive writing process accounts for interactions between writing process elements over and over again. The model shows repeated interactions—not recursive applications of process elements, but repeated application of the interactions between process elements. Figure 7.1 shows an iterative model for interactive writing process.

There are three interactions in the iterative model for interactive writing process (a, b, and c in the figure). The interaction labeled a is between prewriting and drafting. This interaction shows that the drafting itself has a planning function. Writers in the roundtable, to say nothing of what we all self-report about our own writing, routinely report something akin to E. L. Doctorow’s statement that when you drive, you can see only as far as the headlights on the car illuminate, but you can get to your destination that way. Writers, to stay with the metaphor, might plan only into the next sentence or paragraph, but they continue planning based on what they just wrote. Writers can write their draft that way.

The exploration of one idea reveals the next one. We have all had the experience of writing on one idea and having an idea that will occur several paragraphs later germinate in our mind. Clearly, even as we draft, we plan, and we thereby experience the interaction between two elements of writing process.

Notice, however, that the interaction is not recursive; we do not go back and forth between drafting and planning. The planning and drafting are occurring at the same time, not alternately. They are interactive, not recursive. The process is iterative because writers repeat the interaction.

![Diagram of Interactive Writing Processes]

FIGURE 7.1 Model of Interactive Writing Processes
At point $b$ in Figure 7.1, there is another interaction, this one between drafting and editing. William Styron said in the roundtable that he has a need to perfect each paragraph, even each sentence, as he goes. When you write, do you ever find yourself stopping in midsentence to select a different word from the one you just wrote, to change a comma to a semicolon, to start the sentence differently, to re-spell a word? That interaction between drafting and editing shows how experienced writers can pay attention to several things simultaneously, as in the example above, to idea development and flow and a simultaneous concern for surface correctness.

The ability to pay attention to idea development and flow, as well as surface correctness, demands that surface correctness is automatic, which means well practiced. If young writers have to attend deliberately to every punctuation mark, they will be unable to use a drafting and editing interaction fully.

If writers are able to draft, make surface corrections, and choose alternative words without compromising the flow of the draft, then the drafting and editing functions of writing process are working simultaneously and iteratively.

Writers not only make surface corrections in the midst of their concentration on the draft; they often make substantive adjustments in what they have written to fit what they intend to write. The interaction labeled $c$ in Figure 7.1 shows this drafting and revision interaction. That is what Roald Dahl was referring to in the roundtable when he said that good writing is essentially rewriting.

Although vast amounts of fundamental rewriting occur when a draft appears finished, or after what we might call the “first draft,” a surprising amount occurs in the midst of that first draft. It is routine for writers to rewrite a portion of a draft to accommodate a new thought that has arisen in the drafting and planning interaction. When that happens, there’s a drafting and revising interaction.

Think about your own writing experiences. Haven’t you found yourself in the midst of a writing project, formally planned or being planned as the draft rolls out of your mind, and suddenly you realize that there’s a terrific spur on the main idea you hadn’t thought of before? And what happened? If you decided to use it, you went back several paragraphs and made room for the new idea, rewriting one or more paragraphs so the new idea would move right into a place originally designed for a different idea. That was revision. It happened during the draft, and it didn’t compromise the draft. It shows the drafting and revision interaction, not a switch from drafting to revision, but both drafting and revision occurring at the same time, feeding on each other.

The iterative model of interactive writing process shows what writers of all ages talk about when they self-report their own writing processes. They rarely self-report anything that functions in stages, anything that is linear, or anything that alternates back and forth from one process function or element to another. Most characteristic, writers of all ages self-report that they have lots of things going on at the same time, and it’s hard to keep track of them all or to know when one begins and another ends.
Writing processes are difficult to explain because basic aspects of writing process don’t begin and end. Writing process is fluid. The draft occurs throughout. In fact, every portion of every piece of writing is a draft, as Emig (1971) suggested when she pointed out that writers deal with larger genre and smaller sentence segments of discourse in the same way. It’s only when writers stop working on a piece (good writers never think a piece is finished) that they have a final draft. Everything before that is a numbered draft: first, second, third draft, and so forth. It’s all drafting, and in the course of the drafting, writers are adjusting the plan, revising, and making surface corrections as the need becomes apparent. It’s all repetitiously interactive, from beginning to stop. Writers stop because a clear sense of an end, or being finished, is so very elusive.

**REVIEW AND REFLECTION**

1. How are recursive and iterative explanations of writing process different?
2. Reflect on your experience as a writer. Think about whether you ever revise in the midst of drafting. Recall when you found that the drafting itself revealed new or different plans.
3. How would you describe the process differences between knowledge telling and knowledge transforming?

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**INSTRUCTIONAL SCENARIO**

In the Classroom Using Power Writing to Highlight Iterative Writing Process

Recently a teacher in a fifth grade directed young writers to select one idea from the two she was about to write on the board and use that idea as the topic around which they would write as much as they could as well as they could—in one minute. There were the inevitable questions: “Do I have to write in sentences?” That’s how writing works best. “Does spelling count?” Spelling always counts, but don’t stop writing just because you can’t spell a word you want to use. Just write as well as you can. “How will we know it’s a minute?” I have a stopwatch. Good. Here we go. The teacher wrote on the board: *pony* and *mountain*. “Pick one. Go.”

Most of the children wrote for the entire minute. Two stopped along the way and said they were finished. The teacher didn’t tell them to continue. One little guy furiously wrote a list of words as they came to his mind. At one minute, the teacher told them all to stop and count their words. Someone asked if “the” counts; the teacher said it did. “Put the number at the top of your paper,” she told them. Pause. “Count them again,
WRITING
3 Process and Craft

3.2. Thinking About Craft in Writing

Fearn, L. and Farnan, N.
*Interactions: Teaching Writing and The Language Arts.*

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A Definition of Craft

Writing is about recording, whether for ourselves or for others. We write because we have something to say, something to remember, something we want others to know. The writing is a record of what we think and/or see. It appears in ideas and images. The record works because it is crafted effectively. By *craft* we mean the effective use of language to record ideas and images.

When *ideas* are written, they can be thought again by the writer, or they can be thought by readers for whom the ideas are new or variations on the familiar. When *images* are written, they can be seen or heard or felt again by the writer, or they can be experienced by readers for the first time or again as variations on what they experienced before.

Writing can be described in those ways. We write *ideas* and *images*, and we write to *record* and *communicate*. There are interactions between recording and communicating, of course. The recording can be for the writer alone, as in getting it down so I won’t forget or getting it down so I can reexperience it. Just as clearly, the recording can be for communicating. People write about their awe while driving across southern Utah. What they write is a record, but if they write well enough, their journal is more revealing of their awe than are the photographs they took along the way. While the writing is a record, it is also a communication. The quality of the communication is directly related to how effectively the writing is constructed. The construction is what we mean by *craft*.

There are also interactions between images and ideas. A chapter in a chemistry textbook about optical crystallography describes ideas associated with the wave normal and the biaxial indicatrix, but the text also seeks to create images of a plane perpendicular to a wave normal. And a fiction writer paints visual pictures (images) of characters and environments, all the time trying to make a point about a value system or explore a way to think about coming to know. Ideas and images interact in writing, as do recording and communicating.
It is important that the ideas and images work. Writing is supposed to do what the writer intends for it to do. If a writer intends to create an idea that is similar to the one in his mind, then the writing works if readers end up with the idea. If the writer's intent is to paint a picture similar to the one he sees and such an image appears in readers' minds, the writing works. The concept of when writing works, and how we know, is a key idea that we discuss further in Chapters 7 and 8.

Now go back to that shop for rent in Maine, or the place in Maine where one can shop for rent. There was an idea intended in the simple wording. We think the intended message was about a place for rent—a shop one could rent. However, the writing didn’t work very well. Readers first had to consider the other possible meaning (shop as verb, not noun) and make sense by assuming the higher-probability meaning. Readers didn’t get the idea from the reading; they got the idea by using their prior knowledge. When we’re teaching craft, we’re teaching for clarity and precision.

The Craft and the Grammar

A major part of balanced writing instruction is the act of constructing or crafting language. Craft isn’t so simplistic as what some call “grammar,” for the sign about rent doesn’t violate any grammatical construction. It just isn’t clear. Although craft includes the ability to use basic grammatical elements and structures, that ability is insufficient for writing well.

There is a reason that the evidence shows little, if any, relationship between teaching grammar and writing well (Hillocks, 1986), and the reason is deceptively simple. It’s obvious that people who write well handle sentences expertly, and in doing so they use nouns, verbs, and modification. That translates into what appears to be a reasonable, but flawed, generalization: to write well, young writers must know how to handle sentences and, therefore, nouns, verbs, and modifiers. Then there occurs another great leap sideways. Given that good writers handle sentences and their parts adroitly, it follows that we should teach sentence parts to young writers so they too will write well.

The reasoning fails entirely because although good writers can handle nouns, verbs, and modifiers adroitly, that isn’t why they write well. Furthermore, being armed with grammatical knowledge is almost completely unrelated to writing ability because no one who writes well (or ill, for that matter) uses that ability as any sort of template for sentence writing. Put another way, writers certainly use nouns, verbs, and the rest of what we associate with grammar, but they don’t use that ability as a guide when they write.

We’re not arguing against teaching subjects and predicates, or direct objects and pronouns. We’re simply urging teachers not to be surprised and frustrated when young writers don’t write appreciably better as a result of their learning to define and find sentence parts. They will write better because they know how to think in and write sentences, not because we teach them how to name and find what’s in sentences. Craft is thinking in and writing good sentences.
It’s related to bicycle riding, playing the piano, and chemistry. We don’t ride and play better, or “do” chemistry better, because we know how bicycles, music, and the Periodic Table are constructed, but some people who ride, play, and conduct experiments eventually learn how those three are constructed. Knowing the constructive properties isn’t why people ride, play, and do chemistry well. Knowing how a sentence is constructed isn’t why we write good ones either.

Craft is not merely knowing that a sentence contains a subject, a predicate, and something complete. The concept of the incomplete thought is too abstract for seven- or ten-year-old children. “Because I’m tired” is a thought but not a sentence. “Be careful, or you could get injured” is a thought expressed in a sentence. There are sentences, and there are nonsentences. Defining a sentence as a complete thought has no utility for young writers.

Craft is knowing how to think in and write sentences so they work. It isn’t understanding vague distinctions between whole and partial thoughts or knowing about adverbs. It’s adding texture to a verb so it reaches off the page and takes readers on a leisurely afternoon walk in the forest. Of course, good writers use a word such as meander and eliminate the need for the adverb. To craft the language means knowing that the right word is better than the nearly right word with a modifier.

The Craft and the Mechanics

Craft also isn’t so simplistic as what some call “mechanics.” The generic mechanics are certainly necessary in writing well, but craft is more than that. All sorts of people satisfy grade-level expectations on mechanics standards and do not write well because the mechanical conventions do not by themselves produce good writing.

Craft in Proper Perspective

Craft is the part of writing that makes it possible for readers with the requisite prior knowledge to interact effectively with writers. Reading experts have defined reading as a transaction between readers, a text, and a context (International Reading Association, 1988). If writers craft the language well, readers know the ideas and images the writers intended when they wrote the piece. Writers create what Rosenblatt (1978) called a blueprint for meaning, the text.

Everything we’ve suggested so far about craft is at the level of the single sentence: word selection, word order, and mechanical conventions. Craft is certainly about thinking and writing in sentences, but it is also about thinking and organizing in paragraphs.

Craft is about connections between and among sentences that themselves affect main idea. Craft is about transitions and organizational devices. It is about spelling and capital letters, of course, and word selection that creates the precise idea or image the writer has behind her eyes.
But craft is also about what our favorite writer does to write that paragraph we post on the refrigerator. We post the paragraph because everything in it seems to enhance the main idea, just as a gnarled tree in the distance enhances a beach scene in watercolor. The paragraph on the refrigerator door wouldn’t be quite so complete without its third sentence, and the beachescape wouldn’t be quite so complete without that gnarled tree. When we teach the craft, we teach young writers to understand how to make the connections that complete the word picture.

Craft is the foundation of writing effectively. It makes writing work. For example, as diverse young writers gain progressive control over the craft, they can begin to record and communicate the experiences and passions that they hold dear. Craft isn’t the only part of what writers do that makes writing work, but when writers do everything else right and fail to craft effectively, the writing doesn’t work. And if writers craft brilliantly but fail to do the other things that make writing work, the writing still fails.

**The Last Sign of Craft**

Craft is necessary in writing well, but it is not sufficient. As we explain what we mean by craft, we focus on that special bear they have in Wellesley, Massachusetts. We know about it because there, right along Route 95, was the warning sign:

**BOSTON BEAR LEFT**

It seems from the sign that the Boston Bear is ahead on the left. On the other hand, the Boston Bear may have left Wellesley. Maybe the Boston Bear left Boston, or all of New England. Where is the Boston Bear?

Of course, we all know the sign isn’t about a Boston Bear. We all know the sign warns drivers to bear left to get to Boston from Wellesley along Route 95. We all know that *bear* isn’t a noun in that sentence, although we’ve been drilled relentlessly that a noun is the name of a person, place, or thing, and *bear* is a thing. We just know *bear* is a verb in that sentence. And we know that *left* isn’t a verb, although it’s a variation on *leave*, which shows action and must be a verb. But in that sentence, we know *left* is an adverb. And we know that no matter that the sentence, as written, shows *Boston* to be an adjective that modifies *bear*, it’s a noun. We just know that. Right?

Maybe. It depends on what readers are thinking and doing at the time they’re reading the wording on the sign, and it depends as well on readers’ prior knowledge. In fact, the readers we’re referring to had become completely confused driving in Boston, such that they started for Wellesley from the Boston Common at 4:30 P.M. and by following the signs through Boston arrived back at the Common at 5:40 P.M. These were readers for whom ideas printed as road signs throughout Boston didn’t make any sense because they had no prior knowledge
relative to Boston. There were two to five lanes of traffic going in every direction all over Boston. When the drivers saw a sign, they had a nanosecond to make sense of it. When the sign’s wording suggested something about a bear, for a nanosecond they thought of a bear, and while they considered the humor in the sign, they lost focus and missed the turn.

To craft the language well is to eliminate the nanoseconds of misinformation, confusion, or distraction. It is to use the right words in the right positions for the right reasons. That is what we mean by craft.

**REVIEW AND REFLECTION**

1. How do you distinguish between craft and grammar?
2. How do you distinguish between craft and mechanics?
3. What is the relationship between how you viewed craft in writing before reading so far in this chapter and how you view craft now?
4. What do you think is the proper perspective for viewing the craft of writing?

**What Does Craft Include?**

We begin to answer this question by discussing the place of craft in learning to write well. Often it’s either stated or implied that spelling, punctuation, usage, and organizational structures are only small parts of the entire writing process and secondary to creating text. But how is it that a writer “creates” text if many of the features and the form of the creation are secondary? Asked another way, How does anyone create text if sentences, paragraphs, and mechanical control are not primary in the process? In fact, text itself is constructed of sentences and paragraphs that are all arranged to serve the message. The conventions are part of the message and are integral to the text on which communication rests.

One problem in writing instruction is that teaching the craft of written language has been approached as drill and practice divorced from context or meaning. Far from the narrow, drill-based conceptions that have permeated past discussion of craft instruction, balanced writing instruction rests instead on creative thinking, interactive language processes, and thoughtful practice. Craft is an integral part of writing instruction, and it includes each of the following elements of written language on an age- and skill-appropriate basis throughout the grades: sentences, relationships between and among sentences, paragraphs, relationships between and among paragraphs, and mechanical control.

**Sentences**

The fundamental element of craft is the sentence. Writing, at least in English, doesn’t work in prepositional phrases, compound predicates, nouns, or dependent clauses. *English works in sentences and only in sentences.*
3.3 Top Ten Sentence Problems and Parts of Speech

Raimes, A.  

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"switch codes"—that is, to move from a local dialect into Standard English—whenever the occasion demands it. Knowing how to make your writing conform to the conventions of Standard English whenever the audience and the occasion call for it is also a good practice.

This section first shows you ten common problems facing all writers of Standard English sentences. You can use the list to test yourself and as a checklist for your own writing. Cross-references in parentheses direct you to detailed discussions in sections 38–46. If you feel you need to brush up on the grammatical conventions of Standard English, turn to sections 37b–37e for a review of basic principles and common terminology. You might also find the Glossary of Grammatical Terms (see 66) helpful if class discussion uses terms you are not entirely familiar with. Computer grammar checkers may alert you to possible grammar problems. However, they have not reached a high level of linguistic sophistication, so you need to weigh whatever they suggest and not automatically act on every suggestion.

**Top ten sentence problems**

1. **Phrase fragments** To be complete, a sentence must have both a subject and a verb. A phrase fragment lacks a subject, a verb, or both. Identify phrase fragments, and edit to attach them to a sentence that contains a subject and a verb (38a).
   - She never talks about her inner feelings. Her feelings of fear or of joy.

2. **Clause fragments** A dependent clause must always be connected to an independent clause. If you begin a sentence with *when, because, although,* or some other subordinating conjunction, connect that clause to an independent clause (38b).
   - The play failed because it received three bad reviews.

3. **Run-on sentences and comma splices** Separate or revise independent clauses that are connected incorrectly (see 39).
   - He trained hard he never considered the strain.
   - The city is lively, the restaurants and clubs are open late.
   - The film has been released, however, it has not come to our theater.
4. **Fuzzy syntax**  Look for sentences that might make readers say “Huh?,” sentences that begin in one way but end in another, mixing constructions (40a). Readers should be able to tell clearly who (or what) is doing what (30a).

   - In the essay “Notes of a Native Son” by James Baldwin discusses . . .

5. **Wrong verb forms**  Be sure to use standard verb forms. Avoid nonstandard forms, such as brung, has went, should of went, have being noticed, have drank (41a).

6. **Tense shifts**  Avoid flip-flopping between past and present time (41h).

   - Foote wrote about Shiloh and describes its aftermath.

7. **Lack of subject-verb agreement**  A singular third person subject (he, she, it, or a singular noun) takes a singular verb, with an -s ending in the present tense (43a); a plural subject takes a plural verb. Check carefully for verbs with -s endings. Look for and edit non-standard forms.

   - The owner have
   - she don’t
   - the author suggest

   ![has](https://example.com)
   ![doesn’t](https://example.com)
   ![suggests](https://example.com)

   - It pose a problem.
   - The students in the class like peer response.

8. **Faulty pronoun case and reference**  Check that subject and object pronouns are correct (44a), and avoid ambiguous or unclear pronoun references (44c).

   - My sister and I
   - Me and my sister went to Florida.

   - The incident in the story reminds me of my mother and I.

   - When Dean and George crossed the border with two customs officers friends, they searched all the luggage.
9. *Adjective/adverb confusion* Use the right forms of adjectives and adverbs in the right places (45a–45c).

- They did **good** in the playoffs.
- They managed to compete **really well** in the playoffs.

10. *Double negatives* Double negatives can be vibrant in speech and are customary in some dialects, but avoid them in formal writing (45g).

- They don’t have **no problems** with that.
- He can’t hardly wait.

---

**37b Parts of speech**

Words are traditionally classified into eight categories called *parts of speech*. See the Glossary of Grammatical Terms (66) for further definitions and examples.

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**KEY POINTS**

**Using the Parts of Speech**

**Nouns** Words that name a person, place, thing, or concept— *teacher, valley, furniture, Hinduism*—are called nouns. When you use a noun, determine the following: Is it a proper noun, requiring a capital letter? Does it have a plural form? If so, are you using the singular or plural form? See 60a ESL.

**Pronouns** Words that are substitutes for a noun, a noun phrase, or another pronoun— *she, his, those, themselves, whom, whoever, anyone*—are called pronouns. When you use a pronoun, determine the following: What word or words in the sentence does the pronoun refer to? Does the pronoun refer to a noun or pronoun that is singular or plural? See 43h, 43i, 43j, 44a, 44h, and 46a.

**Verbs** Words that tell what a person, place, thing, or concept does or is— *smile, throw, think, seem, become, be*—are called verbs. Verbs change form to refer to present or past time. Every clause needs a
(Continued)

verb. When you use a verb, determine the following: What time does the verb refer to? What auxiliary or modal verbs are needed? Is the subject of the verb singular or plural? Is the verb in the active voice or passive voice? What are the five forms of the verb (sing, sings, singing, sang, sung), and are you using the correct form? For more on verbs, see 41, 42, and 43.

Adjectives Words that describe nouns—purple, beautiful, big—are called adjectives. An adjective can precede a noun (purple boots) or follow a linking verb: Her boots are purple. Also functioning as adjectives (before a noun) are a, an, and the, as well as many pronouns: a cabbage, an allegory, their shoes. For more on adjectives, see 45.

Adverbs Words that provide information about verbs, adjectives, adverbs, or clauses are called adverbs. Many but not all adverbs end in -ly: efficiently, undoubtedly. Adverbs provide information about “how” or “when”: very, well, sometimes, often, soon. Conjunctive adverbs—however, therefore, furthermore—make connections between independent clauses. See also 2d and 45.

Conjunctions Words that connect single words, phrases, and clauses are called conjunctions. Coordinating conjunctions—and, but, or, nor, so, for, yet—connect ideas of equal importance. Subordinating conjunctions—because, if, when, although, for instance—make one clause dependent on another. Consider the meaning before using a conjunction. See 31c and 37e.

Prepositions Words used before nouns and pronouns to form phrases that convey relationships such as of time and space (in the poem, throughout the day, behind her, without a doubt, for you) are called prepositions. Prepositional phrases are often idiomatic: on occasion, in love. To understand their use and meaning, consult a good dictionary. See also 63 ESL.

Interjections Words that express emotion and can stand alone—Ha! Wow! Ugh! Ouch! Say!—are called interjections. Use them only in informal writing.

37C Common sentence patterns

A sentence in English usually consists of a subject (the person or thing doing the action) and a predicate (a comment or assertion about that subject). A subject can be a word, a phrase, a clause, or a combination.
WRITING
4. Documentation

4.1 Avoiding Plagiarism and Documenting Sources

Aaron., J.E.
Pearson Education. (2005).

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How can I use sources honestly?

Using sources honestly means clearly distinguishing others' work from your own. Plagiarism (from a Latin word for "kidnapper") is the opposite—presenting someone else's words or ideas as if they were yours. Whether deliberate or accidental, plagiarism is a serious and often punishable offense.

- **Deliberate plagiarism:**
  - Copying or downloading a phrase, a sentence, or a longer passage from a source and passing it off as your own by omitting quotation marks and a source citation.
  - Summarizing or paraphrasing someone else's ideas without acknowledging your debt in a source citation.
  - Handing in as your own work a paper you have bought, copied off the Web, had a friend write, or accepted from another student.

- **Accidental plagiarism:**
  - Forgetting to place quotation marks around another writer's words.
  - Carelessly omitting a source citation for a paraphrase.
  - Omitting a source citation for another's idea because you are unaware of the need to acknowledge it.

In most schools, a code of academic honesty calls for severe consequences for deliberate or accidental plagiarism: a failing grade, suspension from school, or even expulsion.

The way to avoid plagiarism is to acknowledge your sources by documenting them. This chapter discusses plagiarism and the Internet shows how to distinguish what doesn't require acknowledgment from what does, and provides an overview of source documentation.


- Research writing
- Video tutorials
- Avoiding plagiarism
- Web exercises
- Exer. 9
- Downloads
- Checklist for avoiding plagiarism
- Chapter 54 exercise in electronic format
- Web links
- Avoiding plagiarism
- Documentation in the disciplines
More than in many other cultures, teachers in the United States value students' original thinking and writing. In some other cultures, for instance, students may be encouraged to copy the words of scholars without acknowledgment, in order to demonstrate their mastery of or respect for the scholars' work. In the United States, however, the writing of an author is considered his or her property, and using that writing without a source citation is considered theft. When in doubt about the guidelines in this chapter, ask your instructor for advice.

**Checklist for avoiding plagiarism**

**Type of source**

Are you using
- your own independent material,
- common knowledge, or
- someone else's independent material?

You must acknowledge someone else's material.

**Quotations**

- Do all quotations exactly match their sources? Check them.
- Have you inserted quotation marks around quotations that are run into your text?
- Have you shown omissions with ellipsis marks and additions with brackets?
- Does every quotation have a source citation?

**Paraphrases and summaries**

- Have you used your own words and sentence structures for every paraphrase and summary? If not, use quotation marks around the original author's words.
- Does every paraphrase and summary have a source citation?

**The Web**

- Have you obtained any necessary permission to use someone else's material on your Web site?

**Source citations**

- Have you acknowledged every use of someone else's material in the place where you use it?
- Does your list of works cited include all the sources you have used?

You can download this checklist from this book's Web site: see the box on the previous page. Working with a copy of the list, question every use you make of someone else's material.

**54a Beware of plagiarism from the Internet.**

The Internet has made it easier to plagiarize than ever before, but it has also made plagiarism easier to catch.

Even honest students risk accidental plagiarism by downloading sources and importing portions into their drafts. Dishonest students may take advantage of downloading to steal other's work. They may also use the term-paper businesses on the Web, which offer both ready-made research and complete papers, usually for a fee. Putting for research or a paper does not make it the writer's work. Anyone who submits someone else's work as his or her own is a plagiarist.

Students who plagiarize from the Internet both deprive themselves of an education in honest research and expose themselves to detection. Teachers can use search engines to locate specific phrases or sentences anywhere on the Web, including among scholarly publications, all kinds of Web sites, and term-paper collections. They can search the Web sites easily as students can, looking for similarities with papers they've received. Increasingly, teachers can use special detection programs that compare students' work with other work anywhere on the Internet, seeking matches as short as a few words.

Some instructors suggest that their students use plagiarism-detection programs to verify that their own work does not include accidental plagiarism, at least not from the Internet. This book's Web site includes links to such programs; see the box on page 459.

**54b Know what you need not acknowledge.**

1. **Your independent material**

   - Your own observations, thoughts, compilations of facts, or experimental results—expressed in your words and format—do not require acknowledgment. You should describe the basis for your conclusions so that readers can evaluate your thinking, but you need not cite sources for them.

2. **Common knowledge**

   Common knowledge consists of the standard information on a subject as well as folk literature and common-sense observations.

   - **Standard information** includes the major facts of history, such as the dates of Charlemagne's rule as emperor of Rome (800-14). It does not include interpretations of facts, such as a historian's opinion that Charlemagne was sometimes needlessly cruel in extending his power.
462 Avoiding plagiarism and documenting sources

• Folk literature, such as the fairy tale "Snow White," is popularly known and cannot be traced to a particular writer. Literature traceable to a writer is not folk literature, even if it is very familiar.

• A commonsense observation is something most people know, such as that inflation is most troublesome for people with low and fixed incomes. However, an economist's argument about the effects of inflation on Chinese immigrants is not a commonsense observation.

If you do not know a subject well enough to determine whether a piece of information is common knowledge, make a record of the source as you would for any other quotation, paraphrase, or summary. As you read more about the subject, the information may come up in other people's work without any source citation, in which case it is probably common knowledge. But if you are still in doubt when you finish your research, always acknowledge the source.

54c Know what you must acknowledge.

You must always acknowledge other people's independent material—that is, any facts or ideas that are not common knowledge or your own. The source may be anything, including a book, an article, a movie, an interview, a microfilmed document, a Web page, a newsgroup posting, or an opinion expressed on the radio. You must acknowledge summaries or paraphrases of ideas or facts as well as quotations of the language and format in which ideas or facts appear: wording, sentence structures, arrangement, and special graphics (such as a diagram). You must acknowledge another's material no matter how you use it, how much of it you use, or how often you use it.

1 Using copied language: Quotation marks and a source citation

The following example baldly plagiarizes the original quotation from Jessica Mitford's Kind and Usual Punishment, page 9. Without quotation marks or a source citation, the example matches Mitford's wording (underlined) and closely parallels her sentence structure:

Original The character and mentality of the keepers may be of more importance in understanding prisons than the character and mentality of the kept.

Plagiarism But the character of prison officials (the keepers) is more important in understanding prisons than the character of prisoners (the kept).

To avoid plagiarism, the writer has two options: (1) paraphrase and cite the source (see the examples labeled "Revision (paraphrase)") below or (2) use Mitford's actual words in quotation marks and with a source citation (here, in MLA style):

Revision (quotation) According to one critic of the penal system, the character and mentality of the keepers may be of more importance in understanding prisons than the character and mentality of the kept. (Mitford 9)

Even with a source citation and with a different sentence structure, the next example is still plagiarism because it uses some of Mitford's words (underlined) without quotation marks:

Revision (paraphrase) According to one critic of the penal system, the psychology of the keepers may say less about prisons than the psychology of the keepers. (Mitford 9)

2 Using paraphrase or summary: Your own words and sentence structure and a source citation

The example below changes the sentence structure of the original Mitford quotation, but it still uses Mitford's words (underlined) without quotation marks and without a source citation:

Plagiarism In understanding prisons, we should know more about the character and mentality of the keepers than of the kept.

To avoid plagiarism, the writer has two options: (1) use quotation marks and cite the source (see above) or (2) use his or her own words and still cite the source (because the idea is Mitford's, not the writer's):

Revision (paraphrase) Mitford holds that we may be able to learn more about prisons from the psychology of the prison officials than from that of the prisoners (9).

Revision (paraphrase) We may understand prisons better if we focus on the personalities and attitudes of the prison workers rather than those of the inmates (Mitford 9).

In the next example, the writer cites Mitford and does not use her words but still plagiarizes her sentence structure:

Plagiarism One critic of the penal system maintains that the psychology of prison officials may be more informative about prisons than the psychology of prisoners (Mitford 9).
One critic of the penal system maintains that we may be able to learn less from the psychology of prisoners than from the psychology of prison officials (Milford 9).

54d Take care with online sources.

Online sources are so accessible and so easy to download into your own documents that it may seem they are freely available, exempting you from the obligation to acknowledge them. They are not. Acknowledging online sources is somewhat trickier than acknowledging print sources, but no less essential. Further, if you are publishing your work online, you need to take account of sources’ copyright restrictions as well.

1 • Online sources in an unpublished project

When you use material from an online source in a print or online document to be distributed just to your class, your obligation to cite sources does not change: you must acknowledge someone else’s independent material in whatever form you find it. With online sources, that obligation can present additional challenges:

- **Record complete publication information each time you consult an online source.** Online sources may change from one day to the next or even disappear entirely. See page 413 for the information to record, such as the electronic address and the publication date. Without the proper information, you may not use the source.
- **Acknowledge linked sites.** If you use not only a Web site but also one or more of its linked sites, you must acknowledge the linked sites as well. The fact that one person has used a second person’s work does not release you from the responsibility to cite the second work.
- **Seek the author’s permission before using an e-mail message or a contribution to a discussion group.** (See p. 441 for advice on tracing online authors.) Obtaining permission advises the author that his or her ideas are about to be distributed more widely and lets the author verify that you have not misrepresented the ideas.

2 • Print and online sources in a Web composition

When you use material from print or online sources in a composition for the Web, you must not only acknowledge your sources but also take the additional precaution of observing copyright restrictions. A Web site is a form of publication just as a book or magazine is and so involves the same responsibility to obtain reprint permission from copyright holders.

The legal convention of fair use allows an author to quote a small portion of copyrighted material without obtaining the copyright holder’s permission, as long as the author acknowledges the source. The online standards of fair use differ for print and online sources and are not fixed in either case. The guidelines below are conservative:

- **Print sources:** Quote without permission fewer than fifty words from an article or fewer than three hundred words from a book. You’ll need the copyright holder’s permission to use any longer quotation from an article or book; any quotation at all from a play, poem, or song; and any use of an entire work, such as a photograph, chart, or other illustration.
- **Online sources:** Quote without permission text that represents just a small portion of the whole—say, forty words out of three hundred. Follow the print guidelines above for plays, poems, songs, and illustrations, adding multimedia elements (audio or video clips) to the list of works that require reprint permission for any use.
- **Links:** You may need to seek permission to link your site to another one—for instance, if you rely on the linked site to substantiate your claims or to provide a multimedia element.

Generally, you can find information about a site’s copyright on the home page or at the bottoms of other pages: look for a notice using the symbol ©. Most worthwhile sites also provide information for contacting the author or sponsor. (See p. 414 for an illustration.) If you don’t find a copyright notice, you cannot assume that the work is unprotected by copyright. Only if the site explicitly says it is not copyrighted or is available for free use can you exceed fair use without permission.

**EXERCISE 54.1**
Recognizing plagiarism

The numbered items on the next page show various attempts to quote or paraphrase the following passage. Carefully compare each attempt with the original passage. Which attempts are plagiarized, inaccurate, or both, and which are acceptable? Why?

I would agree with the sociologists that psychiatric labeling is dangerous. Society can inflict terrible wounds by discrimination, and by confusing health with disease and disease with badness.

—George E. Vaillant, Adaptation to Life, p. 361
1. According to George Vaillant, society often inflicts wounds by using psychiatric labeling, confusing health, disease, and badness (361).
2. According to George Vaillant, "psychiatric labeling [such as 'homosexual' or 'schizophrenic'] is dangerous. Society can inflict terrible wounds by . . . confusing health with disease and disease with badness" (361).
3. According to George Vaillant, when psychiatric labeling discriminates between health and disease or between disease and badness, it can inflict wounds on those labeled (361).
4. Psychiatric labels can badly hurt those labeled, says George Vaillant, because they fail to distinguish among health, illness, and immorality (361).
5. Labels such as "homosexual" and "schizophrenic" can be hurtful when they fail to distinguish among health, illness, and immorality.
6. "I would agree with the sociologists that society can inflict terrible wounds by discrimination, and by confusing health with disease and disease with badness" (Vaillant 361).
III THINKING

5 Reasoning
5.1 Nineteen Common Thinking Errors to Avoid Asa Berger
5.2 Making Good Arguments Wayne Booth

6. Reflection
6.1 Reflection in Action Donald Schon

Highlights
The chapters on thinking listed above apply to all modes of thesis inquiry: research, iterative design, and written documentation. Each chapter approaches thinking from differing perspectives, however: Chapter 5.1 on thinking errors comes from the perspective of logic (a sub-domain of philosophy) and discusses common logical fallacies; Chapter 5.2 will help you make persuasive representations of your work in writing and critique-presentations. This chapter discusses claims, reasons, and evidence. The word “argument” has a special meaning in thesis. “Making Good Arguments” (5.2) is not about being quarrelsome in the everyday sense, but rather about how convincing you can be in your explanations and demonstration of your thesis intent. Chapter 6.1 makes a distinction between ‘reflection on action’ – stopping to think or think back – and ‘reflection in action’ – a fluent response during action that typically cannot be explained out loud that becomes a form of know-how as designers learn by doing. Its author, Donald Schon, heavily influenced by John Dewey’s work - especially How We Think (1933), is the seminal thinker and major influence on the ‘reflection’ movement in design and other applied professions.

Refer to these chapters often throughout your thesis year.
THINKING
5. Reasoning

5.1 Nineteen Common Thinking Errors to Avoid

Berger, A.
*Media and Communication Research Methods.*

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Chapter 15

Nineteen Common Thinking Errors to Avoid

In this chapter, I will list and briefly explain some of the more common errors we make in our thinking processes—including errors known, in philosophical parlance, as fallacies. There is a strong relationship between logical and correct thinking and designing research projects. So it is important that we examine our thinking for mistakes that we inadvertently might be making. I assume, of course, that all of the thinking errors I am discussing are made by accident and are due to carelessness or not recognizing that some kind of thinking error has been made.

Researchers must be honest and report the results of their research; that is part of the ethics of research. But occasionally, researchers inadvertently make mistakes of one sort or another. That’s to be expected. All anyone can ask when you do research is that you do the best job you can in designing your research and carrying it out and that you report your results—even if your findings surprise you or are, for some reason, distasteful to you.

—Eugene Ionesco. The Bald Soprano (1958, p. 22)
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A Short Theatrical Piece on Correct Thinking

Grand Inquisitor: Are people bald because they have no hair, or is it that they have no hair because they are bald?

Arthur: Isthay esti oqway isway absurdway. Pons asinorum, post hoc ergo propter hoc, petitio principii, ad populam. Quid nunc.

Grand Inquisitor: Why is it that newspapers give the age of people when they die but not when they are born?

Arthur: I don’t know. That’s a very profound question. Probably because there is a bias in this country against babies. The elderly have great political power, but who cares about babies, since they don’t vote.

Grand Inquisitor: What’s the difference between an alligator?

Arthur: I give up!

Grand Inquisitor: An alligator can swim in the ocean but not on the land.

Arthur: Did you ever study critical thinking?

Grand Inquisitor: I’m naturally very critical—especially of others. I prefer not to think, except when it is absolutely necessary. With all the great computer programs now, one needn’t do so.

Common Fallacies

1. Appealing to False Authority. We often use authorities when supporting our arguments—people who have expertise in certain areas—but we must be certain that the authorities we cite can speak with legitimacy on the subject we are dealing with. An authority on medicine is not an authority on education, for example. Some commercials for health products have actually used actors who play doctors in television programs as “authorities” when really what they are is actors or, perhaps, “celebrities.”

2. Stacking the Deck (selected instances). When we make arguments, we must be careful that we do not neglect information that negates our position and cite only information, data, and statistics that support our position. We must be scrupulously honest when doing research and deal with all data. The other side of this fallacy is to use examples that are not generalizeable. For example, I once mentioned in a class that smoking is bad for people, and one of my students told us about his uncle who is 92 and smokes two packs a day. His uncle is obviously not a representative figure.

3. Overgeneralizing (allness). This error involves assuming that what is true of some X is true of all X. The term generalization comes from the Latin genus (kind, class, genre) and refers to a statement that is true for every member of the group or class. If there is one contrary instance, it negates the generalization. Therefore, it is generally a good idea to qualify generalizations so that one contrary instance will not invalidate them. Not everyone in England speaks the kind of English the queen does or that certain members of the upper classes do (what is known as “the received pronunciation”). Actually, a relatively small proportion of the people in England do. So we have to be careful and avoid making generalizations about how “the English” speak. We cannot assume that what is true of some is true of all. (This is the kind of thinking that is behind stereotyping.)

4. Imperfect Analogies and Comparisons. When we make an analogy, we compare two things and allege that they are similar in some important way or ways. In ancient days, supporters of royalty asserted that a country was like a body and needed a head (the monarch) to rule; otherwise, there would be chaos. This notion is silly, because a country is not like a body, which may explain why there are so few kings and queens nowadays. And when there were kings, there also was a great deal of chaos and confusion.

There are two kinds of analogies: metaphors, which state equivalence (My love is a red rose) and similes, which use “like” or “as” and state similarity (My love is like a red rose). When you make analogies, you must be certain that the analogy is correct and fitting.

5. Misrepresenting Ideas of Other People. We often inadvertently misrepresent the ideas people have because we are in a hurry or careless. We must be careful, for example, when we quote people that we do so accurately. Leaving off a word can alter the meaning of the material.
quoted to a considerable extent. And the same applies to leaving out sentences that qualify previously discussed material. Misrepresenting the ideas of people is also known as creating “straw men” that are easy to knock down.

6. Pushing Arguments to Absurd Extremes. We do this when we take a reasonable statement by someone and greatly exaggerate it so that it loses any semblance of credibility. When we do this, we fail to notice any qualifications that might have been made or any limitations made by the person whose ideas we are distorting. This kind of thinking—pushing arguments to absurd extremes—is quite common and is done because we do not like an idea, have an emotional reaction to a statement, or want to generate an emotional reaction to an idea. Thus, for example, advocates for the National Rifle Association often argue that any attempt to limit the sales of guns means the government (or whoever) will “end up taking everyone’s guns away.”

7. Before, Therefore Because Of (post hoc ergo propter hoc). This argument reasons that if X occurs before Y, X causes Y. Just because something takes place before something else does not mean it caused it. Determining what causes anything is very difficult. For example, suppose a person goes to a restaurant for lunch. Later that night, he has an upset stomach. It is possible, but not necessarily the case, that the lunch led to the upset stomach. It might have been dinner or a snack, or might not be caused by anything eaten but by a flu bug or something else. So we have to be very careful about assigning causes to phenomena.

8. Misleading Percentages. Sometimes percentages can be misleading. You must give an absolute number so the percentages can be interpreted correctly. In some cases, a 50% increase in the sale of books, in a given period (from 100 to 150 copies sold) looks impressive when you see the percentage but turns out to be trivial when you see the raw data. You must always mention the raw numbers on which the percentages are calculated.

9. Using Seemingly Impressive Numbers. Quoting numbers without giving the reader a sense of what percentage of the base the numbers represent is also a means of misleading people. Suppose one were to say that a survey shows that 500 economists believe that inflation is a dan-

ger. That figure means a lot if there are 1,000 economists in the country but not very much if there are 20,000 economists in the country. This mistake is the reverse of the one discussed above, using percentages without giving absolute numbers. You should always know the percentages that lead to the use of numbers.

10. Misleading Use of the Term Average. We saw, in the chapter on statistics, that there are three ways of figuring out averages: the mean, the median, and the mode. The mean is defined as the total divided by the number. Suppose we are dealing with salaries in the United States. You get a considerably different figure if you use the median—the figure half way between the lowest and the highest salary—rather than the mean. That’s because very high salaries will skew the final figure considerably. If there are a lot of millionaires and billionaires in a given population, the median salary will be skewed upward and will not give us a true picture of people’s salaries.

11. Incorrect Assumptions. You have to make sure that what you assume to be the case in some situation is correct. If you begin your research with incorrect assumptions, your research—which builds on these assumptions—will be deeply flawed. It’s a wise policy to always check on your assumptions, because they may be incorrect. For example, many people assume that murder and violence in high schools is an urban phenomenon. What we’ve seen in the United States, however, is that many killings and massacres that have taken place in our high schools have been in the suburbs.

12. False Conclusions. Let us suppose that a survey is taken of a class of 200 students and 8 people in the class complained that they did not like it. That does not allow you to argue that 92 people “liked” the class; all you know is that they did not complain. Many students in the class might not have liked it but did not indicate their feelings, for one reason or another.

13. Mistaking Correlation and Causation. Just because there is a correlation between X and Y does not mean that X causes Y. For example, there may be a correlation between amount of higher education and small families, but it does not mean that the amount of education causes small families. There may be other factors involved, such as the
age at which people with higher education get married. We have to distinguish between some factor causing something to happen and that factor contributing to something’s happening.

14. Diversion of Attention by Using Emotional Language. There is a wonderful joke about what a minister scribbled in the margin of one of his sermons. “Argument weak—yell like crazy.” The point is that people who feel very strongly about some issue may become very emotional about it, and their use of emotion often blinds them and those listening to them or reading what they have written to the weakness in their argument. Sometimes people use “red herrings” (any means of distracting people from the issue at hand) to evade dealing with a question.

   Father: Why did you come home after midnight when I told you to be back by 11:00 p.m.?
   Son: You’re always picking on me.

The question was why the son came home late, but the son has tried to divert to it to why the father is always picking on his son.

   Let me offer another example of this, taken from a famous Jewish joke, which is another red herring—but in this case, more literally, a pink salmon.

   A beggar named Cohen meets a wealthy person and pleads for some money for his starving family. The wealthy person gives Cohen some money. A short while later the wealthy man goes to a restaurant and sees Cohen eating a very expensive dish there—salmon and mayonnaise. When the man asks Cohen about it, he says, “When I don’t have money, I can’t eat salmon and mayonnaise. When I do have money, I shouldn’t eat salmon and mayonnaise. So when can I eat salmon and mayonnaise?”

Cohen has shifted the argument from why he isn’t spending money to feed his hungry family to when can he eat salmon and mayonnaise.

15. Begging the Question (petitio principii). If we look at the Latin, petitio means request or petition and principii means beginning or at the start. So petitio principii is an argument that assumes its conclusion. That is, we accept as true what we are supposed to prove. When we argue cor-

rectly, the premises and conclusions must be separate. We beg the question by assuming that the answer to the question we are asking is obvious, because it is in the conclusion; thus, by using different words, we “answer” the question. For example, the statement “Smoking marijuana is good for you because it is healthful” really begs the question. Saying it is “healthful”—the conclusion—is used to support the argument that “smoking marijuana is good for you.”

16. Oversimplification. When dealing with complicated issues, to make ourselves clear or do the best we can with a weak position, we sometimes oversimplify things. Often, elements of the reasoning error discussed earlier, misrepresentation, are at work here. When we have oversimplified arguments that have been made by others and weakened them by doing so, it generally is much easier to claim support for our own position.

17. Ad Hominem Arguments. The term ad hominem is Latin for attacking the person—literally “to the man.” We don’t focus our attention on the argument being made but on the person who has made the argument. And by insulting or casting doubt on the “good name” of that person, we indirectly attack his or her ideas. We focus on “who” is making the argument and not on “what” argument is being made.

18. Ad Populum Arguments. In Latin, ad populum means appealing to the populace. These arguments usually take the form “everyone knows ...” or “everyone believes ...” This kind of argument is really an appeal to be guided by so-called public opinion, but the appeal is spurious. When you say “everyone knows...” you cannot possibly know what everyone knows. What you are probably doing is taking your assumptions and generalizing from them—assuming that everyone agrees with you. These “everyone knows” arguments imply that they are based on common sense, but as “everyone knows,” common sense tells us that the world is flat.

19. “Pooh-Poohing Arguments.” Pooh-poohing involves ridiculing other people and failing to take their ideas seriously. It is a means of avoiding logical argument and often uses the “everyone knows” argument to suggest that an idea is so absurd it shouldn’t be even considered. “Pooh-poohing” is a common evasive technique.
Conclusions

It’s very easy to make some of the mistakes discussed above. In part, this is because we often drop our guard when we become involved in a research project and don’t examine our thinking processes as carefully as we should. There is no “perfect” research project; every kind of research has strong points and weak points, and there are almost always methodological problems that affect what we do and what we find. And then there is the matter of interpreting what we’ve found; different people may “read” the same data differently. Economists, for example, are notorious for taking the same data about the economy and interpreting them in wildly different ways.

That’s why it is always a good idea to have other people look at your research design to see what suggestions they have to make. They may help you avoid making some of the thinking errors that I’ve discussed in this chapter or other kinds of mistakes I’ve discussed in the previous chapters. Although you might be able to discover thinking errors in the work of others, it is generally very difficult to see these errors in your own work. We all suffer from this problem—because we are so intimately involved in our research that we don’t, or can’t, see it objectively. It’s a good idea to put your work aside for a short period of time so you can look at it more objectively. You wouldn’t want to have your research attacked for appealing to false authorities, overgeneralizing, stacking the deck, making imperfect analogies, arguing on the basis of incorrect assumptions, or any of the other errors I’ve mentioned.

Further Reading


THINKING
5. Reasoning

5.2 Making Good Arguments

Booth, W. et al.
The Craft of Research, Second Edition

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CHAPTER SEVEN

Making Good Arguments

AN OVERVIEW

In this chapter we discuss the five elements of research arguments, showing how they respond to readers' predictable questions and how you can organize them into a genuinely coherent argument.

When you know enough to start planning your research report, you should have a tentative but clear understanding of your question and why it might matter to your readers, and a tentative but reasonably specific answer. You should have a list of reasons that support your claim and evidence to support those reasons, and some idea about the kinds of questions and objections your readers would be likely to raise, were they there in front of you. You won't be able to imagine all of their questions, nor will they expect you to. But you must anticipate at least the questions that generate the five elements of an argument and answer them before they're asked.

ARGUMENT AND CONVERSATION

In a research report, you make a claim, back it with reasons based on evidence, acknowledge and respond to other views, and sometimes explain your principles of reasoning. There's nothing arcane in any of this, because you use those elements in every conversation that inquires thoughtfully into an unsettled issue:

A: I hear you had a rocky time last semester. How do you think this term will go? [A poses a problem that interests her, put in the form of a question.]

B: Better, I hope. [B makes a claim that answers the question.]

A: Why is that? [A asks for a reason to believe B's claim.]

B: I'll finally be taking courses in my major. [B offers a reason.]

A: Why do you think that'll make a difference? [A doesn't see how B's reason is relevant to his claim that he will do better.]

B: When I take courses I'm interested in, I work harder. [B offers a general principle that relates his reason to his claim.]

A: What courses? [A asks for evidence to back up B's reason.]

B: History of architecture, introduction to design.

A: But what about that calculus course you have to take again? [A offers a point that contradicts B's reason.]

B: I know I had to drop it last time, but I found a really good tutor. [B acknowledges A's objection and responds to it.]

A: But won't you be taking five courses? [A raises another reservation.]

B: I know. It won't be easy. [B concedes a point he cannot refute.]

A: Will you pull up your GPA? [A asks about the limits of B's claim.]

B: I should. I'm shooting for at least a 3.0, as long as I don't have to get a part-time job. [B limits the scope of his claim and adds a condition.]

If you can imagine playing the roles of both A and B, you will find nothing strange about assembling a research report, because every written argument, research or not, is built out of the answers to those same five questions that you must ask on your readers' behalf:

1. What do you claim?
2. What reasons support that claim?
3. What evidence supports those reasons?
4. Do you acknowledge this alternative/complication/objection, and how do you respond?
5. What principle (warrant) justifies connecting your reasons to your claim?
7.2 BASING CLAIMS ON REASONS

At the core of every research report is your claim, the answer to your research question, along with two kinds of support for it. The first support is at least one reason, a sentence or two explaining why your readers should accept your claim. We can usually join a claim and a reason with because:

The emancipation of Russian peasants was an empty gesture because it did not improve the material quality of their daily lives.

TV violence can have harmful psychological effects on children because those exposed to lots of it tend to adopt the values of what they see.

At this point, we have to pause to clarify some terms. We must distinguish claims in general from main claims, and both from reasons:

- As we will use the term, a claim is any sentence that asserts something that may be true or false and so needs support: The world's temperature is rising.

- A main claim is the sentence (or more) that your whole report supports (some call this its thesis). If you wrote a report to prove that the world's temperature is rising, the sentence stating that would be its main claim.

- A reason is a sentence supporting a claim, main or not.

These terms can get confusing, because a reason is often supported by more reasons, which makes that first reason a claim in its own right. In fact, a sentence can be both a reason and a claim at the same time, if what it states (1) supports a claim and (2) is in turn supported by another reason: For example,

TV violence can have harmful psychological effects on children because those exposed to large amounts of it tend to adopt the values of what they see. Their constant exposure to violent images makes them unable to distinguish fantasy from reality.

Reasons can be based on reasons, but ultimately a reason has to be grounded on evidence.

7.3 BASING REASONS ON EVIDENCE

In casual conversation, we usually support a claim with just a reason:

We should leave because it looks like rain.

We don't ask, What evidence do you have that it looks like rain? (unless someone thinks he's a meteorologist: Those aren't rain clouds; they're just . . .).

When you address serious issues in writing, though, you can't expect readers to accept all your reasons at face value. Careful readers behave more like that would-be weatherman, asking for the evidence, the data, the facts on which you base those reasons:

TV violence can have harmful psychological effects on children because those exposed to large amounts of it tend to adopt the values of what they see. Their constant exposure to violent images makes them unable to distinguish fantasy from reality.

Smith (1997) found that children ages 5–9 who watched more than three hours of violent television a day were 25 percent more likely to say that most of what they saw on television was "really happening."

At least in principle, evidence is something you and your readers can see, touch, taste, smell, or hear (or is accepted by everyone as just plain fact—the sun came up yesterday morning). It makes no sense to ask, Where could I go to see your reasons? It does make sense to ask, Where could I go to see your evidence?

For example, we can't see children adopting values, but we could see a child answer the question Do you think that what you see on TV is real? That somewhat oversimplifies the idea of "evi-
dence from out there," but it illustrates the principle. (We'll discuss this distinction between reasons and evidence in more detail in chapter 9.)

We now have the core of a research argument:

**Claim because of Reason based on Evidence**

### 7.4 ACKNOWLEDGING AND RESPONDING TO ALTERNATIVES

A responsible researcher supports a claim with reasons based on evidence. But thoughtful readers don't accept a claim just because you back it up with your reasons and your evidence. Unless they think exactly as you do (unlikely, given the fact that you are making an argument), they will probably think of evidence you haven't, interpret your evidence differently, or, from the same evidence, draw a different conclusion. They may reject the truth of your reasons, or accept them as true but deny that they are relevant to your claim and so cannot support it. They may think of alternative claims you did not consider.

In other words, your readers are likely to question any part of your argument. So you have to anticipate as many of their questions as you can, and then acknowledge and respond to the most important ones. For example, as readers consider the claim that children exposed to violent TV adopt its values, some might wonder whether children are drawn to TV violence because they already are inclined to violence of all kinds. If you think readers might ask that question, you would be wise to acknowledge and respond to it:

TV violence can have harmful psychological effects on children because those exposed to large amounts of it tend to adopt the values of what they see. Their constant exposure to violent images makes them unable to distinguish fantasy from reality. Smith (1997) found that children ages 5-9 who watched more than three hours of violent television a day were

25 percent more likely to say that most of what they saw on television was "really happening." It is conceivable, of course, that children who tend to watch greater amounts of violent entertainment already have violent values. But Jones (1989) found that children with no predisposition to violence were just as attracted to violent entertainment as those with a history of violence.

The problem all researchers face is not just responding to readers' questions, alternatives, and objections, but imagining them. (In chapter 10 we'll review questions and objections you should expect.)

Since no research argument is complete without them, we add acknowledgment/responses to our diagram to show that they relate to all the other parts of an argument:

### 7.5 WARRANTING THE RELEVANCE OF REASONS

Even if readers agree that a reason is well supported by evidence, they may not see why it should lead them to accept your claim. They will ask why that reason, though factually true, is relevant to the claim. For example, suppose you offer this claim and its supporting reason (assume the evidence is there):

Children who are exposed to large amounts of violent entertainment tend to become adults who think violence is a legitimate component of daily life because as children they tend to adopt the violent values in what they see.

Readers might question not the truth of that reason, but its relevance to the claim:
Why should children who adopt violent values necessarily become adults who tend to accept violence as a legitimate component of everyday life? I don’t see how your claim follows from your reason.

To answer, you must offer a general principle that shows why you believe your particular reason is relevant to your particular claim so that you are justified in connecting them:

Whenever children adopt particular values, as adults they tend to accept as “normal” any behavior that reflects those values.

That statement—sometimes called a warrant—expresses a general principle of reasoning that covers more than violent TV. It covers all values acquired as a child and all adult behaviors.

Think of a warrant as a principle claiming that a general set of circumstances predictably allows us to draw a general consequence. You can then use that warrant to justify concluding that a specific instance of that general consequence (your claim) follows from a specific instance of that general circumstance (your reason). But for that warrant to apply, readers must first agree that the specific circumstance (or reason) qualifies as a sound instance of the general circumstance in the warrant and that the specific consequence (or claim) qualifies as a sound instance of the general consequence.

As you’ll see, it is not easy to decide where to put warrants in the sequence of an argument, or even whether you need them at all. In fact, writers state warrants rarely, only when they think readers might question the relevance of a reason to their claim. For example, suppose you said:

Watch out going down the stairs, because the light is out.

You wouldn’t need to add the warrant

When it’s dark, you have to be careful not to misstep. So watch out going down the stairs because the light is out. reason

That would seem condescending.

But if you think readers won’t immediately see how a reason is relevant to your claim, then you have to justify the connection with a warrant, usually before you make it:

Violence on television and in video games can have harmful psychological effects. Few of us question that when children are repeatedly exposed to particular values in graphic and attractive form, they use those values to structure their understanding of their world. warrant In the same way, children constantly exposed to violent entertainment tend to adopt the values of what they see. . . .

(As you can see, no aspect of argument is as abstract and difficult to grasp as warrants.)

We add warrants to our diagram to show that they connect a claim and its supporting reason:

Those five elements constitute a “basic” argument. But many also include explanations of issues that readers might not understand. If, for example, you were making an argument about the relationship between inflation and various forms of money supply to readers not familiar with economic theory, you would have to explain the different ways that economists define “money.”

7.6 BUILDING COMPLEX ARGUMENTS OUT OF SIMPLE ONES

The arguments in research reports are, of course, more complex than these simple ones. First, researchers almost always support
a claim with more than one reason, each of which is supported by its own evidence and may be justified by its own warrant. Second, since readers can be expected to see many alternatives to any complex argument, careful researchers typically respond to a number of them.

But most important, each element of a substantial argument is itself likely to be treated as a claim, supported by its own argument. Each reason will typically be treated as a claim supported by other reasons, often reasons that are themselves claims. A warrant may be supported by its own argument, with reasons and evidence, perhaps even with its own warrant and acknowledgments and responses. Each response might itself be a mini-argument, sometimes a full one. Only the evidence "stands alone," but you may have to explain where you got it and why you think it's sound.

7.7 ARGUMENTS AND YOUR ETHOS

This process of "thickening" an argument with other arguments is one way that writers gain the confidence of readers. Readers will judge you by how well you manage the elements of an argument so that you anticipate their concerns. In so doing, they are in effect judging the quality of your mind, even of your implied character—an image of yourself that you project through your argument, traditionally called your ethos. When you seem to be the sort of person who supports your claims thoroughly and who thoughtfully considers other points of view, you give readers reason to trust what you say and not to question what you don't. By acknowledging their views and differences, you foster their desire to work with you in developing and testing new ideas.

In the long run, the ethos you project in individual arguments settles into your reputation, something every researcher must care deeply about, because your reputation will be an invisible sixth element in every argument you write. It answers the unspoken question Can I trust this person? If your readers don't know you, you have to earn that trust in each argument. But if they do know you, you want the answer to their question to be Yes.

In the next four chapters, we look at each element of an argument, to show you both how to assemble them into a complete argument and how to think about them critically. In part IV we take up the matter of arranging those elements into a coherent report.
Designing Arguments Not for Yourself but for Your Readers: Two Common Pitfalls

Arguments fail for many reasons, but inexperienced researchers stumble most often when they rely too much on what feels familiar and comfortable and too little on what their readers need. Here are two common problems to avoid.

INAPPROPRIATE EVIDENCE

If you are working in a new field and unfamiliar with its characteristic modes of argument, you’ll be tempted to fall back on forms of argument you already know. Every time you enter a new research community, though, you must find out what’s new about the kinds of argument those in that community expect you to make. If you learned in a first-year writing class to search for evidence in your own experience or take a personal stand on issues of social concern, do not assume that you can do the same in fields that emphasize “objective data,” such as experimental psychology. On the other hand, if as a psychology or biology major you learned to gather data, subject them to statistical analysis, and avoid attributing to them your own feelings, do not assume that you can do the same in art history.

This does not mean that what you learn in one class is useless in another. All fields share the elements of argument we describe here. But you do have to watch for what’s distinctive in how a field handles those elements and be flexible enough to adapt—trusting, at the same time, the skills you already command. You can anticipate this problem as you read by noting the kinds of evidence used by the sources you consult. Here are just a few of the different kinds of evidence to watch for in different fields:

- personal beliefs and anecdotes from writers’ own lives, as in a first-year writing course;
- direct quotations, as in most of the humanities;
- citations and borrowings from previous writers, as in the law;
- fine-grained descriptions of behavior, as in anthropology;
- statistical summaries of behavior, as in sociology;
- quantitative data gathered in laboratory experiments, as in natural sciences;
- photographs, sound recordings, videotapes, and films, as in art, music, history, and anthropology;
- detailed documentary data assembled into a coherent story, as in some kinds of history or anthropology;
- networks of principles, implications, inferences, and conclusions independent of factual data, as in philosophy.

Just as important, note the kinds of evidence that are never used in your field. Anecdotes enliven literary history but rarely count as good evidence in sociological explanations; fine-grained narratives are crucial in many anthropological reports but are irrelevant in an argument about subatomic physics.

COMFORTABLE SIMPLICITY

When you are new to a field, everything you read may seem confusing. Like everyone else in those circumstances, you will look for a familiar method or an unambiguous answer, any simplification that helps you manage the complexity. Once you find it, you are in danger of oversimplifying your argument. But no complex effect has a single unambiguous cause; no serious question has a single unqualified answer; no interesting problem has a single methodology to solve it. So when you are new to a field, seek out qualifications; formulate at least one alternative solution to your problem; ask whether someone else in the field approaches your problem differently.

As you learn the typical problems of a field, its methods,
schools of thought, and so on, you will begin to be comfortable with its standard forms of argument. It is at this point that newly experienced researchers succumb to another kind of overgeneralization: once you learn how to construct one kind of argument, you try to make that same argument over and over. Be aware that every field exhibits a second kind of complexity, the complexity of competing solutions, competing methodologies, competing goals and objectives—all marks of a lively field of inquiry. The more you learn, the more you recognize that while things are not as blindingly complex as you first thought, neither are they as simple as you then hoped they would be.

Cognitive Overload: Some Reassuring Words
At this point, you may be feeling a bit overwhelmed. Take comfort in the fact that your anxieties have less to do with age or intelligence than with sheer lack of experience in a particular field. One of us was explaining to teachers of legal writing how being a novice makes new law students feel insecure. At the end of the talk, one woman reported that she had been a professor of anthropology whose published work had been praised for the clarity and force of her writing. Then she switched careers and went to law school. She said that during her first six months, she wrote so incoherently that she feared she was suffering from a degenerative brain disease. Of course, she was not: she was experiencing a kind of temporary aphasia that afflicts most of us when we try to write about matters we do not entirely understand for an audience we understand even less. She was relieved to find that the more she understood law, the better she wrote about it.
THINKING:
6. Reflection

6.1 Reflection in Action

Schon, D.  
*Educating the Reflective Practitioner.*  

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Reflection-in-Action

When we have learned how to do something, we can execute smooth sequences of activity, recognition, decision, and adjustment without having, as we say, to "think about it." Our spontaneous knowing-in-action usually gets us through the day. On occasion, however, it doesn't. A familiar routine produces an unexpected result; an error stubbornly resists correction; or, although the usual actions produce the usual outcomes, we find something odd about them because, for some reason, we have begun to look at them in a new way. All such experiences, pleasant and unpleasant, contain an element of surprise. Something fails to meet our expectations. In an attempt to preserve the constancy of our usual patterns of knowing-in-action, we may respond to surprise by brushing it aside, selectively inattending to the signals that produce it. Or we may respond to it by reflection, and we may do so in one of two ways.

We may reflect on action, thinking back on what we have done in order to discover how our knowing-in-action may have contributed to an unexpected outcome. We may do so after the fact, in tranquility, or we may pause in the midst of action to make what Hannah Arendt (1971) calls a "stop-and-think." In either case, our reflection has no direct connection to present action. Alternatively, we may reflect in the midst of action without interrupting it. In an action-present—a period of time, variable with the context, during which we can still make a difference to the situation at hand—our thinking serves to reshape what we are doing while we are doing it. I shall say, in cases like this, that we reflect-in-action.

Recently, for example, I built a gate out of wooden pickets and strapping. I had made a drawing and figured out the
dimensions I wanted, but I had not reckoned with the problem of keeping the structure square. As I began to nail the strapping to the pickets, I noticed a wobble. I knew the structure would become rigid when I nailed in a diagonal piece, but how could I be sure it would be square? There came to mind a vague memory about diagonals: in a rectangle diagonals are equal. I took a yardstick, intending to measure the diagonals, but I found I could not use it without disturbing the structure. It occurred to me to use a piece of string. Then it became apparent that, in order to measure the diagonals, I needed a precise location at each corner. After several trials, I found I could locate the center point at each corner by constructing diagonals there (see illustration). I hammered in a nail at each of the four center points and used the nails as anchors for the measurement string. It took several minutes to figure out how to adjust the structure so as to correct the errors I found by measuring. And then, when I had the diagonals equal, I nailed in a piece of strapping to freeze the structure.

Here, in an example that must have its analogues in the experiences of amateur carpenters the world over, my intuitive way of going about the task led me to a surprise (the discovery of the wobble), which I interpreted as a problem. In the midst of action, I invented procedures to solve the problem, discovered further unpleasant surprises, and made further corrective inventions, including the several minor ones necessary to carry out the idea of using string to measure the diagonals. We might call such a process “trial and error.” But the trials are not randomly related to one another; reflection on each trial and its results sets the stage for the next trial. Such a pattern of inquiry is better described as a sequence of “moments” in a process of reflection-in-action:
• There is, to begin with, a situation of action to which we bring spontaneous, routinized responses. These reveal knowing-in-action that may be described in terms of strategies, understandings of phenomena, and ways of framing a task or problem appropriate to the situation. The knowing-in-action is tacit, spontaneously delivered without conscious deliberation; and it works, yielding intended outcomes so long as the situation falls within the boundaries of what we have learned to treat as normal.

• Routine responses produce a surprise—an unexpected outcome, pleasant or unpleasant, that does not fit the categories of our knowing-in-action. Inherent in a surprise is the fact that it gets our attention. For example, I might not have been surprised by the wobble in my gate because I might not have attended to it; the structure might not have ended up square, and I might not have noticed.

• Surprise leads to reflection within an action-present. Reflection is at least in some measure conscious, although it need not occur in the medium of words. We consider both the unexpected event and the knowing-in-action that led up to it, asking ourselves, as it were, “What is this?” and, at the same time, “How have I been thinking about it?” Our thought turns back on the surprising phenomenon and, at the same time, back on itself.

• Reflection-in-action has a critical function, questioning the assumptive structure of knowing-in-action. We think critically about the thinking that got us into this fix or this opportunity; and we may, in the process, restructure strategies of action, understandings of phenomena, or ways of framing problems. In my example, the surprise triggered by my observation of the wobble led me to frame a new problem: “How to keep the gate square?”

• Reflection gives rise to on-the-spot experiment. We think up and try out new actions intended to explore the newly observed phenomena, test our tentative understandings of them, or affirm the moves we have invented to change things for the better. With my measuring-string experiment, I tested both my understanding of squareness as equality of diagonals and the effectiveness of the procedures I had invented for determining when diagonals are equal. On-the-spot experiment may work, again in the sense of yielding intended results, or it may produce surprises that call for further reflection and experiment.

The description I have given is, of course, an idealized one. The moments of reflection-in-action are rarely as distinct from one another as I have made them out to be. The experience of surprise may present itself in such a way as to seem already interpreted. The criticism and restructuring of knowing-in-action may be compressed into a single process. But regardless of the distinctness of its moments or the constancy of their sequence, what distinguishes reflection-in-action from other kinds of reflection is its immediate significance for action. In reflection-in-action, the rethinking of some part of our knowing-in-action leads to on-the-spot experiment and further thinking that affects what we do—in the situation at hand and perhaps also in others we shall see as similar to it.

The distinction between reflection- and knowing-in-action may be subtle. A skilled performer adjusts his responses to variations in phenomena. In his moment-by-moment appreciations of a process, he deploys a wide-ranging repertoire of images of contexts and actions. So a baseball pitcher adapts his pitching style to the peculiarities of a particular batter or situation in a game. In order to counter an opponent’s changing strategies, a tennis player executes split-second variations in play. We can say, in cases like these, that the performer responds to variation rather than surprise because the changes in context and response never cross the boundaries of the familiar.

However, in a kind of process that may look from the outside like the ones described above, a skilled performer can integrate reflection-in-action into the smooth performance of an ongoing task. I recently heard the story of a cellist who had been called to join in performing a new piece of chamber music. Because of illness, he missed the first few rehearsals and finally put in an appearance the day before the performance was to take place. He sat down with the other musicians and sight-read his way through the difficult part, playing it so well that the conductor had no need to reschedule the performance. As the cellist sight-read the score, he could not have known for certain where the piece
was heading. Yet he must have sensed at each moment the
direction of its development, picking up in his own performance
the lines of development already laid down by others. He must
have encountered surprises in response to which he formed, on-
line, an interpretation guided by his emerging sense of the whole.
And the execution of this feat left him with a newly developed
understanding of the piece and how to play it that he would reveal
as knowing-in-action on the day of the performance.

When good jazz musicians improvise together, they simi-
larly display reflection-in-action smoothly integrated into
ongoing performance. Listening to one another, listening to
themselves, they “feel” where the music is going and adjust their
playing accordingly. A figure announced by one performer will be
taken up by another, elaborated, turned into a new melody. Each
player makes on-line inventions and responds to surprises
triggered by the inventions of the other players. But the collective
process of musical invention is organized around an underlying
structure. There is a common schema of meter, melody, and
harmonic development that gives the piece a predictable order. In
addition, each player has at the ready a repertoire of musical
figures around which he can weave variations as the opportunity
arises. Improvisation consists in varying, combining, and recom-
bining a set of figures within a schema that gives coherence to the
whole piece. As the musicians feel the directions in which the
music is developing, they make new sense of it. They reflect-in-
action on the music they are collectively making—though not, of
course, in the medium of words.

Their process resembles the familiar patterns of everyday
conversation. In a good conversation—in some respects predictable
and in others not—participants pick up and develop themes of
talk, each spinning out variations on her repertoire of things to
say. Conversation is collective verbal improvisation. At times it
falls into conventional routines—the anecdote with side comments
and reactions, for example, or the debate—which develop accord-
ing to a pace and rhythm of interaction that the participants seem,
without conscious deliberation, to work out in common within the
framework of an evolving division of labor. At other times, there

may be surprises, unexpected turns of phrase or directions of
development to which participants invent on-the-spot responses.

In such examples, the participants are making something.
Out of musical materials or themes of talk, they make a piece of
music or a conversation, an artifact with its own meaning and
coherence. Their reflection-in-action is a reflective conversation
with the materials of a situation—“conversation,” now, in a
metaphorical sense. Each person carries out his own evolving role
in the collective performance, “listens” to the surprises—or, as I
shall say, “back talk”—that result from earlier moves, and
responds through on-line production of new moves that give new
meanings and directions to the development of the artifact. The
process is reminiscent of Edmund Carpenter’s description of the
Eskimo sculptor patiently carving a reindeer bone, examining the
gradually emerging shape, and finally exclaiming, “Ah, seal!”

Like knowing-in-action, reflection-in-action is a process we
can deliver without being able to say what we are doing. Skillful
improvisers often become tongue-tied or give obviously inadequate
accounts when asked to say what they do. Clearly, it is one thing
to be able to reflect-in-action and quite another to be able to reflect
on our reflection-in-action so as to produce a good verbal
description of it; and it is still another thing to be able to reflect on
the resulting description.

But our reflection on our past reflection-in-action may
indirectly shape our future action. The reflections of a Monday
morning quarterback may be full of significance if the person
reflecting is the quarterback who will play—and play differently
because of his Monday morning quarterbacking—in next Sat-
urday’s game. As I think back on my experience with the wooden
gate, I may consolidate my understanding of the problem or invent
a better or more general solution to it. If I do, my present reflection
on my earlier reflection-in-action begins a dialogue of thinking
and doing through which I become a more skillful (though still
amateur) carpenter. Indeed, as we shall see in later chapters, these
several levels and kinds of reflection play important roles in the
acquisition of artistry.
APPENDIX
Local Research Sources
Selected by Thesis Faculty

The sources listed here are few amongst innumerable places to do research in New York City and its surrounding areas. These are highly-selected, favorite or specialized places that faculty find themselves recommending (or visiting themselves). Observe, find, go, study. (P.S. reference librarians in all places love to answer questions, get you started, and know their stuff.)

New School Resource  http://library.newschool.edu

NSU is a crucial starting point for any resource initiative. Be sure to take a close and careful look early in your research at the databases the school offers to students. Two of the more useful resources are Proquest and Lexis-Nexis which allow you to search for articles in major periodicals, like the New York Times or Wall Street Journal.

NYU Libraries (New School University students have reciprocal privileges at NYU libraries.)

BOBST.  http://library.nyu.edu/index.html
This library will most likely become the nexus of most of your research efforts. Students should go to this library early in the school year and make sure to return frequently. The library contains media research guides and its librarians are adept at answering any research question. The BOBST library catalog – like the New School library catalog – is accessible at http://www.bobcat.nyu.edu.

COURANT:  The Courant School of Mathematics at NYU has an extensive computer-science library located at the top of the Warren Weaver hall on the SE corner of Mercer and West 4th Streets.

New York Public Library (NYPL) Specialized Branch Libraries.

Anyone who lives, works, or attends school in New York State can get an NYPL library card. It’s easy. Many features of the NYPL system are available from the Web for cardholders, including checkout of books, periodicals, DVDs, using the LEO catalogue.)

SIBL – Science, Industry, Business Library
http://www.nypl.org/research/sibl/index.html
New York Public Library’s Science, Industry, and Business Library at 188 Madison Avenue contains a myriad of resources that are extremely useful for doing business and marketing research. Expensive market research reports that Fortune 500 companies purchase for expanding their businesses are all available here for free. If you want to understand more about the trends in your target audience, SIBL is the place to go. NOTE: SIBL has Ethernet-enabled cubbies for you to set up your laptops and work in a quiet space.

The New York Public Library for the Performing Arts
http://www.nypl.org/research/lpa/general/
‘….The New York Public Library for the Performing Arts at Lincoln Center houses the world’s most extensive combination of circulating and non-circulating reference and research materials on music, dance, theatre, recorded sound, and other performing arts.” You can view amazing archival dance footage.

The Donnell Library, The Central Children’s Room
http://www.nypl.org/branch/central/dlc/dch/
The Donnell Library Center has two attractions: (1) it houses the largest NY public library circulating collection of materials in languages other than English, films and videotapes, and materials for children and teenagers…(2) The Central Children's Room is the place for children’s books - illustrated picture books and a huge range of fiction/nonfiction for children – and books about children’s literature. You can also drop by and observe children during during story hour. If you’re interested in doing a project that involves narrative for children, this is a hot spot.

NYPL Mid-Manhattan Library Branch
http://www.nypl.org/branch/central/mml/
Mid-Manhattan branch at 5th Ave and 40th Street is excellent for research with the most extensive NYPL collection of circulating periodicals and reference collections (journals and magazines). “…Shelved in open stacks on five floors, the subject collections cover art, education, consumer health, history, job information, language, law, literature, philosophy, political science, psychology, religion, sociology, and more. These collections are geared to meet the needs of college undergraduates graduate students. For example: its art collection, 3rd floor, has individual files on several thousand visual artists including biographical information and reproductions of artwork. http://www.nypl.org/branch/central/mml/art/index.html Bonus: mid-Manhattan library is kitty-corner from the “humanities and social sciences” library on Fifth/42nd (with the lions), where you can use its famous research reading rooms.

The Museum of the Moving Image http://www.movingimage.us/site/site.php

The Museum of the Moving Image advances the public understanding and appreciation of the art, history, technique and technology of film, television, and digital media. It does so by collecting, preserving, and providing access to moving-image related artifacts; screening significant films and other moving-image works; presenting exhibitions of artifacts, artworks, and interactive experiences; and offering educational and interpretive programs to students, teachers, and the general public. Great interactive exhibits and installations.


“The Whitney Museum houses one of the world’s foremost collections of twentieth-century American art. The Permanent Collection of some 12,000 works encompasses paintings, sculptures, multimedia installations, drawings, prints, and photographs—and is still growing….This museum has an extraordinary selection of more than one hundred sculptures, creating one of the strongest museum collections of post-World War II American sculpture -- works by Alexander Calder and Lucas Samaras, as well as masterpieces by Donald Judd, Dan Flavin, Claes Oldenburg, Louise Nevelson, and George Segal.

Cooper-Hewitt National Design Museum http://ndm.si.edu/

"Cooper-Hewitt, National Design Museum, Smithsonian Institution is the only museum in the nation devoted exclusively to historic and contemporary design. The Museum presents compelling perspectives on the impact of design on daily life through active educational and curatorial programming..." Cooper-Hewitt has an extensive study center and library (70,000 volumes+) of drawings, prints, graphic design, product design & decorative arts, textiles, and wallcoverings: more than 70,000 volumes. http://www.sil.si.edu/libraries/chm/

The American Museum of Natural History http://www.amnh.org/

The American Museum of Natural History’s mission is to discover, interpret, and disseminate - through scientific research and education - knowledge about human cultures, the natural world, and the universe. It was chartered in 1869 as a museum and library ...The American Museum of Natural History Planetarium Authority (the "Planetarium") was chartered in 1933 ... as a public benefit corporation to fund the building of a planetarium.

Design and Technology students will find in this museum a treasure trove of information about human culture and its place on the planet and in the universe. DT Students have found employment here as videographers and exhibition designers. The Museum and Planetarium together ("AMNH") constitute a complex, multifaceted organization with broad international scope and impact. For over a century, AMNH has been a leader of research in the natural sciences and anthropology, as well as in museum education and exhibition. The AMNH mission, which reflects a close integration of science and education, is "to discover, interpret, and disseminate-through scientific research and education-knowledge about human cultures, the natural world, and the universe." The Museum and Planetarium facilities consist of 45 permanent exhibition halls housed in 25
interconnected buildings, including the Rose Center for Earth and Space, totaling 1.6 million square feet on an 18-acre campus on the Upper West Side of Manhattan between 79th and 81st Streets on Central Park West.