Interdisciplinary Research

Process and Theory

Third Edition

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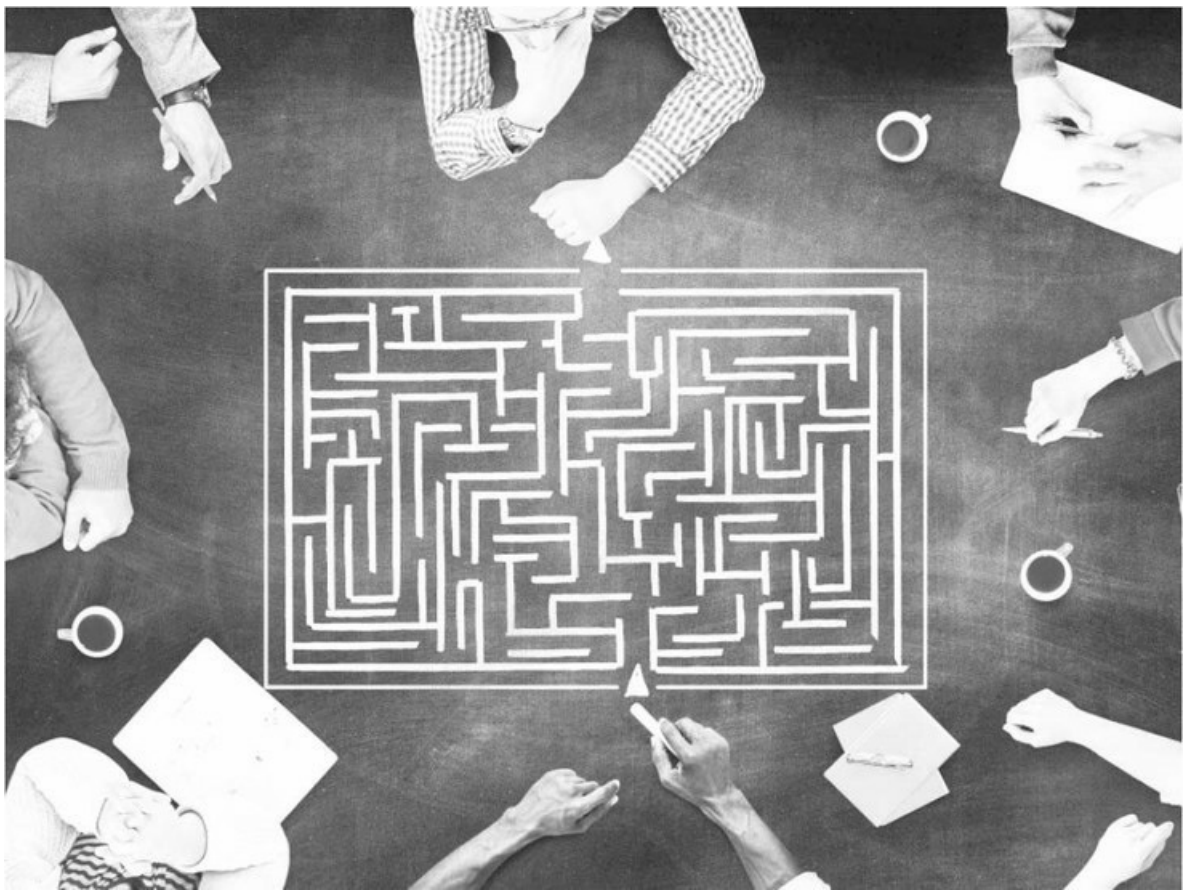
3 Beginning the Research Process



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Chapter 3 Learning Outcomes

By the end of this chapter, you will be able to

- Describe the integrated model
- Describe STEP 1
- Describe STEP 2

Chapter 3 Objectives

Today, there are many types of interdisciplinarity being practiced in the United States, Canada, Europe, Australia, and elsewhere. We might thus ask whether it makes sense to speak of one interdisciplinary research process. The answer is yes. Different types of interdisciplinarity essentially make different decisions *within an overarching research process.*

The chapter presents the integrated model of the interdisciplinary research process (IRP) and explains its defining characteristics. We shall see that interdisciplinary research can be performed by individuals or teams. The chapter also introduces the first two "STEPS" or decision points that the model calls for: define the problem or state the research question (STEP 1), and justify using an interdisciplinary approach (STEP 2).

The Integrated Model of the Interdisciplinary Research Process

When driving to an unfamiliar place far from home, travelers rely on GPS to avoid unproductive, time-consuming detours. Similarly, when proceeding from a problem to an understanding of the problem, interdisciplinarians need a map to guide them through the interdisciplinary research process or IRP. The IRP in its most simplified form is shown in Figure 3.1.

Though helpful, Figure 3.1 lacks the detail necessary to proceed from the problem to the understanding. This book presents a detailed model of the IRP to serve as a GPS. The model presented here integrates the prominent models of the IRP.1 Using 10 STEPS, it provides a proven approach to conducting interdisciplinary research, finding new meaning, and creating new knowledge. Unlike a GPS that tells you when to turn and which way, the IRP can only tell you when to make a decision.

Figure 3.1 From Problem to Understanding

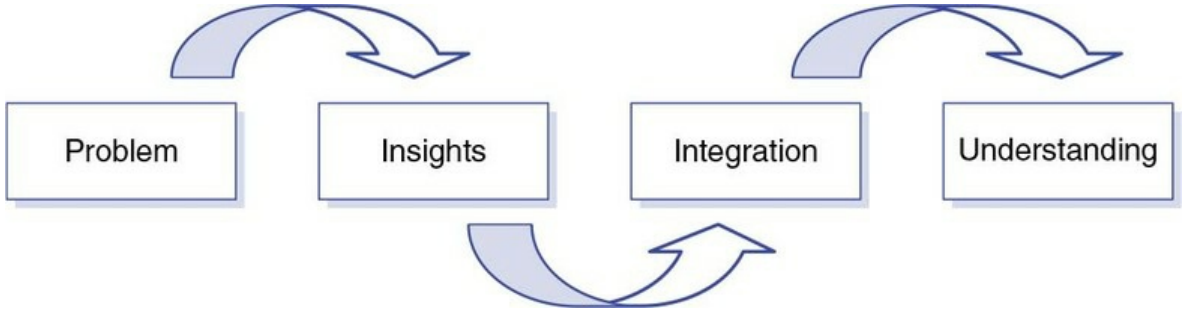


TABLE 3.1 The Integrated Model of the Interdisciplinary Research Process (IRP)

A. Drawing on disciplinary insights[a]
1. Define the problem or state the research question
2. Justify using an interdisciplinary approach
3. Identify relevant disciplines
4. Conduct the literature search
5. Develop adequacy in each relevant discipline
6. Analyze the problem and evaluate each insight or theory
B. Integrating disciplinary insights
7. Identify conflicts between insights and their sources
8. Create common ground between insights
9. Construct a more comprehensive understanding
10. Reflect on, test, and communicate the understanding

Source: Repko, A. F. (2006). Disciplining interdisciplinarity: The case for textbooks. *Issues in Integrative Studies, 24*, 112–142.

a. The term *disciplinary insights* includes insights from disciplines, subdisciplines, interdisciplines, and schools of thought.

The 10 STEPS clarify the "points of decision" or "operations" that are taken in almost any interdisciplinary research project. While those working in the "softer" social sciences and in the humanities may stress the elements of intuition, creativity, and art in the research process over STEPS, the IRP, especially the integrative part of it, involves intuition *and* method, creativity *and* process, art *and* strategic decision making.

Dividing what is essentially a fluid process into distinct STEPS may give the misleading impression that these STEPS do not overlap. They often do. For example, the cursory literature search begins during STEP 1 and continues over the next STEPS until the full-scale search is completed in STEP 4 (see Chapter 5). Some researchers begin conducting the full-scale literature search (shown as STEP 4) as soon as STEP 1, and some continue the search while performing later STEPS. *It is good to consider STEP 4 as a fluid process within the overall research process, especially in its early phases.*

While the various research models on which the integrated model is based differ in the number, description, and order of some STEPS (see Box 3.1), they agree on the need to perform certain essential tasks and make certain critical decisions about how to prepare for integration and then to perform it.1 Subsequent chapters explain each STEP and provide examples of how the model is being used by students and practitioners.

Key Characteristics of Interdisciplinary Research

Interdisciplinary research is a decision-making process that is heuristic, iterative, and reflexive. Each of these terms—*decision making*, *process, heuristic, iterative,* and *reflexive*—requires explanation.

It Is a Process

Doing interdisciplinary research, whether performed individually or collaboratively, is a process (Newell, 2007a, p. 246). **Process** means following a procedure or strategy.

Interdisciplinary research has in common with all disciplinary research an overall plan or approach. Reduced to its simplest terms, all applied research has these three steps in common:

- The problem is recognized as needing research.
- The problem is approached using a research strategy.
- The problem is solved or at least a tentative solution is devised.

Each discipline has developed its own methods and preferred research strategy, as noted in Chapter 2. Likewise, interdisciplinary studies has developed a research process that differs in important respects from disciplinary methods *and subsumes them,* as shown in Figure 3.2. *The IRP is an overarching research process (noted by the arching line) that draws on disciplinary perspectives and their insights that are relevant to the problem.* The process of interdisciplinary research is necessarily distinct from the processes employed in disciplinary research because integration is at the very core of interdisciplinary activity, whereas it is not at the core of disciplinary activity.

It Is Iterative

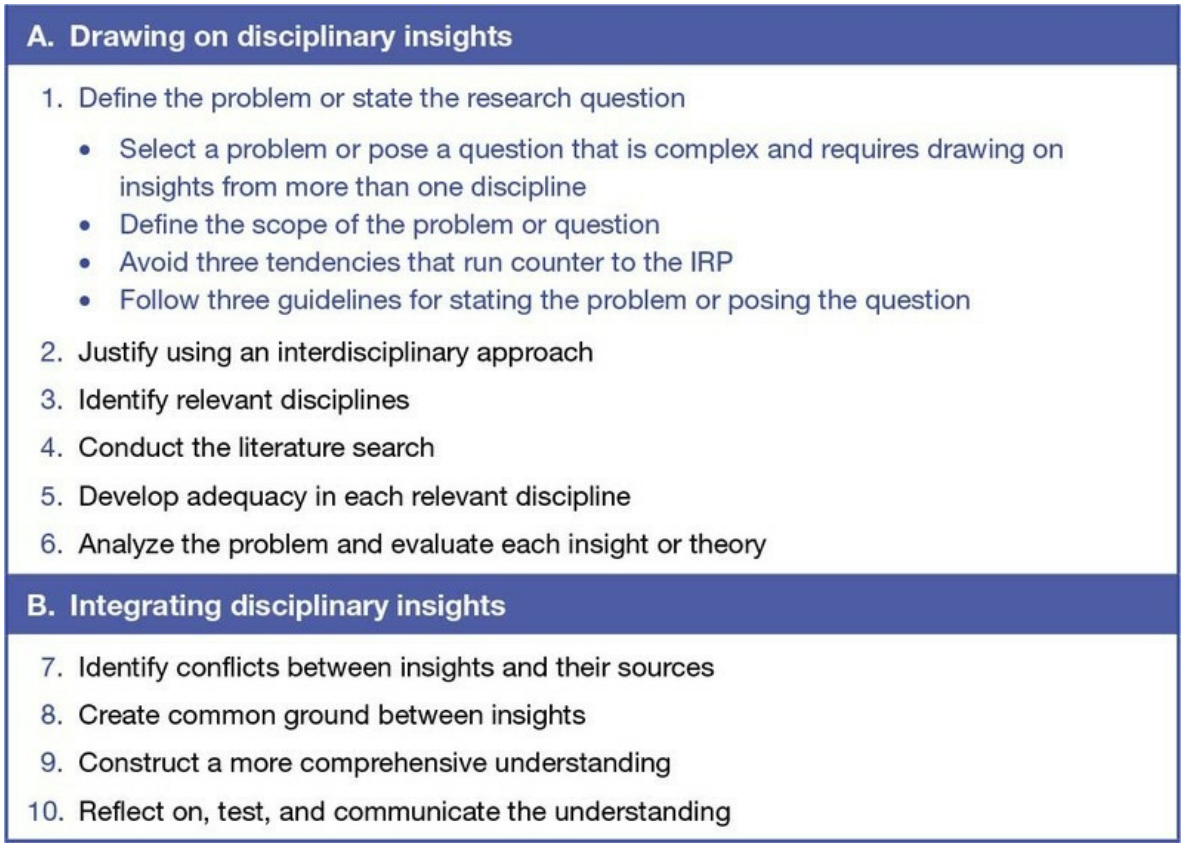
The IRP is **iterative** or procedurally repetitive. Though the research process features decision making and STEP taking, the process is by no means linear. That is, the process is not a simple matter of moving from point "A" to point "B" to point "C" and on to the end. Rather, when you get to point "B," you may discover that you need to revisit and revise the decision you made at point "A." In fact, revising work performed at earlier STEPS is likely to happen at any given point in the process. For example, the process of selecting the most relevant disciplines (STEP 3; see Chapter 4) may lead to restating the problem identified in STEP 1. And you may revisit the literature search as you perform later STEPS. *Throughout the research process, you should expect to revisit earlier work.*

Interdisciplinary researchers rely on "systems thinking" to approach a problem creatively, thinking about it "outside the box" without being influenced by solutions attempted in the past, and viewing it from different perspectives. **Systems thinking** is a method of visualizing interrelationships within a complex problem or system by (1) breaking it down into its constituent parts, (2) identifying which parts different disciplines address, (3) evaluating the relative importance of different causal linkages, and (4) recognizing that a system of linkages is much more than the sum of its parts. **Feedback loops,** depicted in Figure 3.1, are central elements of systems thinking. They describe the process that requires the researcher to periodically revisit earlier activity. **Feedback** is corrective information about a decision, an operation, an event, or a problem that compels the researcher to revisit an earlier STEP. This corrective information typically comes from previously overlooked scholarship. As you proceed, periodically ask questions such as these:

- Have I defined the problem or the question too broadly or too narrowly?
- Have I correctly identified the parts of the problem?
- Have I identified the disciplines most relevant to the problem?
- Have I gathered the most important insights concerning the problem?
- Am I privileging one discipline's literature or terminology over another's simply because I am more comfortable working in the discipline?
- Have I allowed my personal bias to shape the direction of the study?

STEP 1: Define the Problem or State the Research Question

This graphic shows the STEPS of the research process. We highlight STEP 1 and bullet point the decisions that it involves.



Defining the problem or stating the research question is the first and most basic activity that one undertakes in conducting research or engaging in problem solving of any kind. It is also the STEP that often takes considerable time and effort because you do not yet know much about the problem or even if it is researchable in an interdisciplinary sense. For this reason, expect to revisit your definition of the problem or statement of the research question as you take additional steps.

Select a Problem or Pose a Question That Is Complex and Requires Drawing on Insights From More Than One Discipline

A problem is ripe for interdisciplinary study when

- it is complex (i.e., requires insights from more than one discipline), and
- it is **researchable in an interdisciplinary sense** (i.e., authors from at least two disciplines have written on the topic or at least on some aspect of it).

If you have trouble telling *in advance* if a problem is complex, a useful *initial test* is to ask if there is more than one legitimate way to look at the problem and, if so, which disciplines would likely be interested in it. Referring to Tables 2.2 and 2.3 in Chapter 2 will aid you in making this tentative determination. (Note: A more detailed discussion of complexity as a criterion for interdisciplinary inquiry follows below.)

To decide with confidence if a problem is researchable requires conducting the literature search (the subject of Chapter 5). A problem may be complex but for some reason has failed to generate scholarly interest outside a particular discipline. Such is the case with the problem "The Effects of Physician Shortages on Society." The problem appears to be complex and is certainly important to society. But for whatever reason, it has failed to attract much scholarly attention outside the field of medicine (though it is a subject of discussion in multiple arenas that draw on economic, sociological, political, and demographic perspectives). (Note: The discovery of such gaps in research opens the door to potentially fruitful interdisciplinary inquiry, though undergraduates may want to avoid such questions, while graduate students and scholars may see an opportunity.)

Frequently, the research problem that we would *like* to investigate cannot be the problem that we *can* investigate because the cursory literature search has failed to reveal relevant insights concerning it from two or more disciplines. Consequently, we must revise the problem, question, or topic based on material that the search has revealed.

Define the Scope of the Problem or Question

Once you have identified the topic or problem, your next decision is to define its scope. **Scope** refers to the parameters of what you intend to include and exclude from consideration. In other words, you are telling your readers how much of this problem you plan to investigate. For example, if the problem is repeat spousal battery, how will you approach it? Will you focus on the *causes* of repeat spousal battery or on the *prevention* of repeat spousal battery? Will you research the *treatment* of the perpetrator and/or the victim of spousal battery? Or will you focus on the *effects* of repeat spousal battery on a particular demographic, say the children? Though all these options are clearly related to the overall problem of repeat spousal battery, narrowing the scope of the problem at the outset, to the extent possible, will facilitate the literature search and provide focus to subsequent STEPS in the research process. The extremes to be avoided are conceiving the problem too broadly so that it is unmanageable (such as investigating both the causes and effects of repeat spousal battery), and conceiving the problem too narrowly so that it is not interdisciplinary or researchable (such as focusing just on the psychological effects of spousal battery on the children).

Subsequent STEPS in the research process may require revisiting your initial statement of the problem or focus question and modifying it in some way. Here is an example (developed in a class) of how to transition from the *very broad topic* of "ways to prevent domestic violence" to a narrower and more focused *interdisciplinary statement* of the problem:

> The problem of domestic violence is broad, and developing strategies to prevent one of its most insidious manifestations—repeat spousal battery—is a pressing social need. Whereas single disciplinary approaches focus on only a single aspect of repeat spousal battery, an interdisciplinary approach that takes into account all aspects of the problem will hopefully lead to interventions that will mitigate this social scourge.

This transition from broad to narrow was possible after the class had read more widely about domestic violence and had begun to understand its complexity. This statement, which appeared in the introductory paragraph, was the product of several iterations, each of which was made after the class had taken additional STEPS in the IRP.

Follow Three Guidelines for Stating the Problem or Posing the Question

If a problem appears suitable for interdisciplinary inquiry, it should be phrased in conformity to these important guidelines:

- *The problem should be stated clearly and concisely.* This statement demonstrates lack of clarity: "The majority of complaints registered by the Childcare Licensing Agency (CLA) concern unsafe child care facilities." It is unclear what the focus of the investigation is: the complaints (whether or not they are valid), lack of enforcement of safety regulations by the CLA, lack of funding of the CLA by the federal government, or lack of legislation that establishes strict enforcement procedures. Sometimes greater clarity can be achieved by stating the problem as a question.
- *The problem or focus question should be sufficiently narrow to be manageable within the specified limits of the essay.* The problem of "Securing the southern border of the United States" was too broad for an essay requiring only three disciplinary perspectives. Upon discovering that the literature on border security was vast, the student narrowed the problem to the more manageable one of "Perspectives on securing the southern border of the United States against human smuggling: An interdisciplinary study."
- *The problem should appear in a context (preferably in the first paragraph of the introduction) that explains why it is important—that is, why the reader should care.* The following introduction (developed in class) places the problem of wife battery in a context that not only engages the reader but, more important, indicates why the problem warrants the reader's interest:

> Wife battery is a widespread problem in the United States. It is urgent that a solution be found because of its devastating effects on the victim, including debilitating depression and redirected violence against her children. The wife's extended family and associates also feel the effects of her physical and emotional pain. Most tragically, studies show that children who grow up in abusive homes tend to be abusive to their own children, thus perpetuating a vicious cycle of violence.

Examples of Statements of an Interdisciplinary Problem or Question

The following are examples from published work and student projects of well-written statements introducing the problem that illustrate the above criteria. The student projects are identified by an asterisk (*).

From the Natural Sciences:

Dietrich (1995), *Northwest Passage: The Great Columbia River.* William Dietrich introduces the problem of how dams on the Columbia River system in the Northwest are impacting the salmon populations and the people who depend on them for their livelihood:

> To a Pacific Northwest journalist such as myself, the river was inescapable as a subject. Its energy powered the region and its history dictated the region's history. . . . Many of the people I

> encountered, however, looked at the river from the narrow perspective of their own experience. One colleague said it was as if everyone was looking at the Columbia River through a pipe. . . . Each interest group looked at the Columbia and saw a different river.
>
> That experience dictated the approach of this book. One of the mistakes of the past . . . has been the tendency to focus narrowly on development of some part of a river without considering the consequences for the whole. "When we [whites] are confronted by a complex problem, we want to take a part of the complexity and deal with that," remarked Steve Parker, a fish biologist hired by the Yakima Indian tribe. The Henry Ford assembly line is an example of this kind of specialization, Parker said. Its economic success is why narrow focus and admiration of specialists became ingrained in American culture. (pp. 23–24)

From the Natural Sciences:

Smolinski* (2005), *Freshwater Scarcity in Texas.* Joe Smolinski introduces the problem of freshwater scarcity in Texas in this clearly written introductory paragraph:

> There is little doubt among experts that freshwater is one of the most valuable natural resources in the state of Texas. Experts, in a variety of disciplines, have not yet been able to reach agreement as to the cause and effect of the widespread freshwater shortages currently experienced across the state. With population predictions calling for a dramatic increase in the number of residents over the next fifty years, the competition between these uses will only become more intense. How we address the use and allocation of water will have a dramatic impact on the environment and the quality of life for all Texans. (p. 1)

From the Social Sciences:

Fischer (1988), "On the Need for Integrating Occupational Sex Discrimination Theory on the Basis of Causal Variables." Charles C. Fischer introduces the problem of occupational sex discrimination (OSD) in the workplace as follows:

> The majority of complaints filed with the Equal Employment Opportunity Commission under Title VII of the Civil Rights Act involve sex discrimination. Complaints of sex discrimination pertain mainly to pay discrimination, promotion (and transfer) discrimination, and occupation discrimination. Occupational sex discrimination (OSD) is particularly serious since other forms of sex discrimination are, to a large degree, symptomatic of a lack of female access to "male" occupations—those occupations that pay good wages, that are connected to long job ladders (that provide opportunities for vertical mobility via job promotion), and that offer positions of responsibility. (p. 22)

From the Social Sciences:

Delph* (2005), *An Integrative Approach to the Elimination of the "Perfect Crime."* Janet B. Delph introduces the growing problem of unsolved homicides, which she calls "perfect crimes," in these stark terms:

> Modern day criminal investigation techniques do not eliminate the possibility of the "perfect crime." . . . A "perfect crime" is one that will go unnoticed and/or for which the criminal will never be caught (Fanton, Tolhet, & Achache, 1998). The public is all too aware of these likely outcomes and consequently feels unsafe and vulnerable. Parents experience silent fear each time their child wanders beyond their reach. While "men are afraid women will laugh at them, women are afraid that men will kill them" (DeBecker, 1997, p. 77). Deviant minds should not be allowed to think that they can commit murder without suffering the gravest consequences. (p. 2)

From the Humanities:

Bal (1999), "Introduction," *The Practice of Cultural Analysis: Exposing Interdisciplinary Interpretation.* Mieke Bal's introduction serves two purposes. The first is to decipher the complex meaning of the object she is subjecting to interdisciplinary scrutiny: an enigmatic love poem written in yellow paint on a red brick wall (e.g., a graffito) in post–World War II Amsterdam, the Netherlands. The second and closely related purpose is to introduce the reader to the interdisciplinary process of cultural analysis, of which she is a leading practitioner, and illustrate its ability to reveal new meaning in an object or a text like the graffito.

> Cultural analysis as a critical practice is different from what is commonly understood as "history." It is based on a keen awareness of the critic's situatedness in the present, the social and cultural present from which we look, and look back, at the objects that are already of the past, objects that we take to define our present culture. . . .
>
> This graffito, for example, has come to characterize the goals of the Amsterdam School for Cultural Analysis (ASCA). . . . In the most literal translation the text means:
>
> Note
>
> I hold you dear
>
> I have not
>
> thought you up
>
> This graffito fulfills that function because it makes a good case for the kind of objects at which cultural analysis would look, and—more importantly—how it can go about doing so. (pp. 1–2)

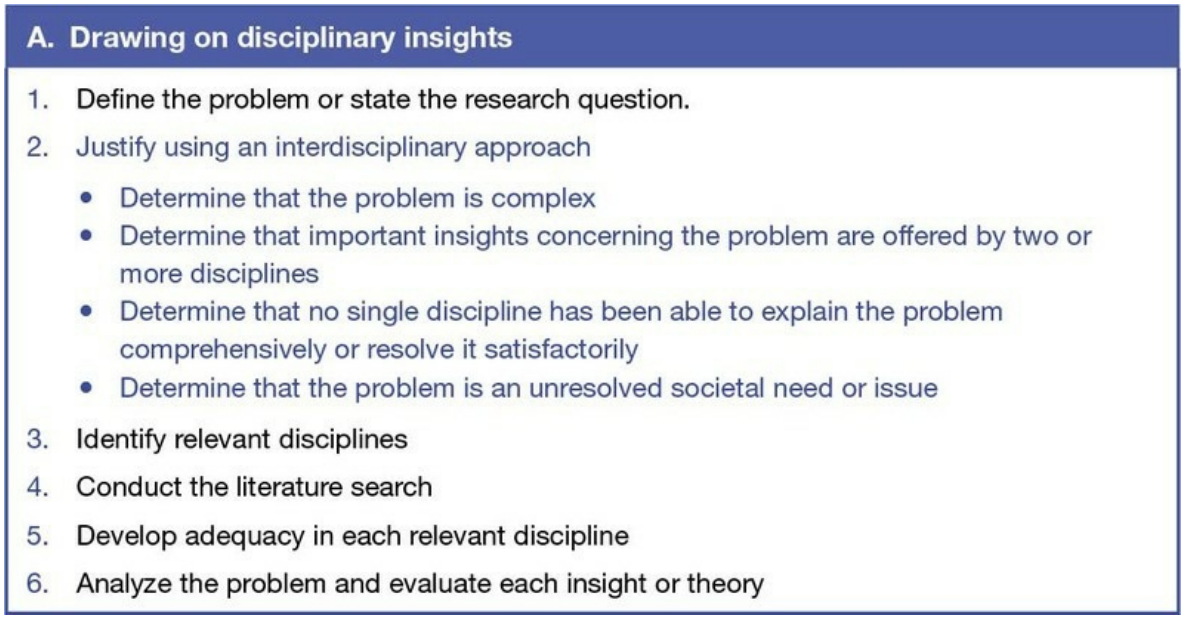
From the Humanities:

Silver* (2005), *Composing Race and Gender: The Appropriation of Social Identity in Fiction.* Lisa Silver writes an informal personal narrative of how she became interested in her subject, the appropriation of social identity in

fiction writing. Her story begins with her trip to Mexico during spring break of her junior year. When she returned, she had a story due in her creative writing class, so she tried writing about the people she met in the mountain villages in Oaxaca, Mexico.

> And that's when the interdisciplinarity kicked in. . . . In Mexico we learned it would be offensive for us, as outsiders, to assume we could fix their problems. What could we, carrying our Nalgene bottles, comprehend of the effects of water privatization and pollution? How could we listen to the plight of maquiladora workers while wearing Nikes and stonewashed jeans? How could I understand the lives of the indigenous Oaxacan villagers enough to write about them—especially from their own points of view? I couldn't separate the sociological and political lessons I'd learned in Mexico from my fiction. I ended up writing my story from the first-person peripheral perspective of a white college-aged female looking in at the village. I got good critiques in class, but was never personally satisfied with the story. It felt like I'd written a nonfiction piece. I wanted to create characters with backgrounds unlike my own, but suddenly didn't know how. (p. 2)

STEP 2: Justify Using an Interdisciplinary Approach



STEP 2 is to justify using an interdisciplinary approach. Though typically absent from professional writings, this STEP is worthwhile for undergraduates (and even graduate students) to take because it provides an opportunity to see if their projects meet the four criteria (bullet pointed in the graphic) commonly used for justifying an interdisciplinary approach and supported by the National Academies (2005).

Determine That the Problem Is Complex

The **operational definition of complexity** used in this book is that the problem has multiple parts studied by different disciplines. The definition of interdisciplinary studies appearing in Chapter 1 states that *complexity requires interdisciplinarity.* We know of no way other than interdisciplinarity to study specific complex problems such as global warming, freshwater scarcity, and terrorism. That is, *interdisciplinarity is necessary for the study of complexity* (Newell, 2001, p. 2). The criterion of complexity also extends to problems that those in the humanities typically examine, such as the contextual meaning of an object or a text. [3]

Examples of complex questions include these: What is consciousness? What is freedom? What is a family? What does it mean to be human? Why does hunger persist? Admittedly, these problems are so fundamental and complex, requiring sophisticated analysis from so many disciplines, that they are beyond the capacity of most undergraduates to address comprehensively. Nevertheless, movement toward a more comprehensive understanding of these questions is possible even if students are limited to using only a few relevant disciplines.

Confirmation of complexity will be forthcoming as additional STEPS are taken, especially STEP 3 that involves mapping the problem to reveal its disciplinary parts (see Chapter 4), and STEP 4 that calls for conducting a full-scale literature search (see Chapter 5).

Determine That Important Insights Concerning the Problem Are Offered by Two or More Disciplines

A problem that is controversial, such as global warming, has likely generated interest from two or more disciplines, each offering its own insights or theories in the form of books and journal articles. This condition makes the problem researchable. Sometimes, however, scholars from the disciplines you plan to consult have not yet published on the problem because its occurrence is recent.

Determine That No Single Discipline Has Been Able to Explain the Problem Comprehensively or Resolve It Satisfactorily

A problem is ripe for interdisciplinary inquiry if no single discipline has been able to explain it comprehensively or resolve it satisfactorily. For example, several disciplines consider terrorism within their respective domains, but no one discipline has been able to create a single comprehensive theory explaining terrorism in all of its complexity, let alone propose a holistic solution to it. For instance, political scientists typically use rational choice theory to explain terrorist behavior, but the theory fails to address religious and cultural variables. Other topics that no single discipline has been able to address comprehensively include undocumented immigration, human cloning, and genetically engineered food. The value of an interdisciplinary approach over a single disciplinary approach is that it can address complex problems in a more comprehensive way.

Determine That the Problem Is an Unresolved Societal Need or Issue

Societal/public policy problems necessitate what is widely referred to as **problem-based research,** which focuses on unresolved societal needs, practical problem solving, and intellectual problems that are the focus of the humanities, such as the meaning of some artifact. What distinguishes problem-based research from other applied research is its holistic focus that involves more than one discipline.

Examples of Statements That Justify Using an Interdisciplinary Approach

The rationale for using an interdisciplinary approach should be made explicit in the introduction to the research project. After all, this rationale distinguishes truly interdisciplinary research from multidisciplinary, not to mention disciplinary, research. Stating the rationale has the added benefit of alerting the researcher to possible problems with the topic. Spending extra time in carefully screening a potential topic according to these criteria will minimize the possibility of investing in an enterprise that later may prove unprofitable.

Satisfied that the proposed problem or topic meets one or more of the above criteria, it is then possible to present a clear rationale for using an interdisciplinary approach. Common practice is to include this statement of justification in the introduction to the study, as shown in these examples of professional work and student projects (marked with an asterisk) from the natural sciences, the social sciences, and the humanities.

From the Natural Sciences:

Dietrich (1995), *Northwest Passage: The Great Columbia River.* Dietrich is struck by how narrowly people continue to look at the Columbia River. This narrowness of perspective and the lack of systems thinking provide his justification for taking an interdisciplinary approach, as follows:

> My work as a writer on environmental issues, particularly the old-growth forests of the Pacific Northwest, had introduced me to the idea of ecosystems and the interrelationships of many parts to a greater whole. I wanted a comprehensive understanding of the river embracing history, Earth science, biology, hydrology, economics, and contemporary politics and management. (pp. 23–24)

From the Natural Sciences:

Smolinski* (2005), *Freshwater Scarcity in Texas.* Smolinski is concerned that after years of study, disciplinary experts have not been able to reach agreement on the cause and effect of the worsening problem of freshwater scarcity. This failure provides ample justification for taking an interdisciplinary approach.

> The causes and effects of freshwater scarcity across Texas are beyond the ability of any single discipline to explore. A review of the professional literature in political science, Earth science, and biology shows that these disciplines are most relevant to the problem. Each has produced its own well-defined theories about how the shortages impact the state of Texas and its communities. While

each of these theories reflects the perspective of its particular discipline, none of these explanations comprehensively addresses the issues posed by the statewide shortage of freshwater. (p. 3)

From the Social Sciences:

Fischer (1988), "On the Need for Integrating Occupational Sex Discrimination Theory on the Basis of Causal Variables." Fischer provides an example of professional work from the social sciences that presents a clear rationale for taking an interdisciplinary approach.

> It appears that the problem of OSD is a good candidate for an IR [interdisciplinary] approach. OSD is a problem that a number of disciplines have separately analyzed, yet it is a problem of such complexity and breadth that its division among individual disciplines leads to incomplete and naïve views.
>
> Another important advantage of IR is that it can . . . lead to [a] more complete understanding by providing a dynamic, holistic view of the problem. (p. 37)

From the Social Sciences:

Delph* (2005), *An Integrative Approach to the Elimination of the "Perfect Crime."* Having introduced the topic and explained its importance, Delph justifies using an interdisciplinary approach.

> To achieve the level of expertise necessary to solve more crimes, the criminal justice system must integrate a wide range of skills from multiple disciplines. This synthesis of skills and insights could serve as a strong deterrent to crime and result in safer communities. (p. 2)

From the Humanities:

Bal (1999), "Introduction," *The Practice of Cultural Analysis: Exposing Interdisciplinary Interpretation.* The topic of the graffito is not a societal problem; it is an intellectual one that cries out for interdisciplinary understanding or meaning. Bal (1999) sees cultural analysis as an interdisciplinary practice and the field as a counterweight to critics who charge that interdisciplinarity makes objects of inquiry "vague and methodically muddled" (p. 2). Seeking to correct this mistaken view, she justifies using cultural analysis, an interdisciplinary approach, to find meaning in the graffito.

> As an object, it requires interdisciplinarity [and calls for] an analysis that draws upon cultural anthropology and theology [and] reflection on aesthetics, which makes philosophy an important partner. . . . [T]he humanistic disciplines . . . brutally confront scholars with the need to overcome disciplinary hang-ups. . . . Museum analysis requires the integrative collaboration of linguistics and literary, of visual and philosophical, and of anthropological and social studies. . . . Instead of speaking of an abstract and utopian interdisciplinarity, then, cultural analysis is truly an

interdiscipline, with a specific object and a specific set of collaborating disciplines. (pp. 6–7)

From the Humanities:

Silver* (2005), *Composing Race and Gender: The Appropriation of Social Identity in Fiction.* From her fiction class experience, Silver (2005) discovered that she did not know how to write authentically about the people in the Mexican village whose backgrounds were very different from her own. Frustrated and disappointed with the artificial characters she had created for her fiction piece, she decided to use the topic of character appropriation for her senior project. Character appropriation refers to a writer's attempt to write about, or an actor's attempt to assume, another person's identity. As Silver read, she developed "a sense of what different disciplines—sociology, psychology, cultural studies, and creative writing—[said] about the matter" (p. 2). Finding that each of these disciplines offered an important perspective on an important subject, she determined that an interdisciplinary approach was clearly called for (pp. 1–6).

Each of these examples conforms to one or more of the above criteria. In most cases, the writer also identifies the disciplines relevant to the problem that informs the reader which disciplinary insights the author will draw upon.

4 Identifying Relevant Disciplines

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Chapter 4 Learning Outcomes

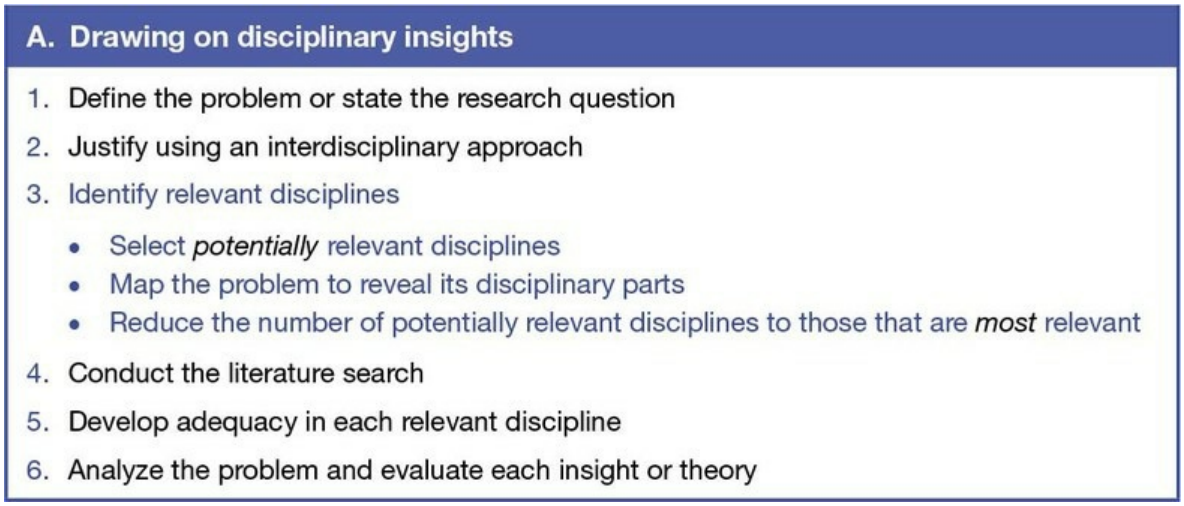
By the end of this chapter, you will be able to

- Select *potentially* relevant disciplines
- Map the problem to reveal its disciplinary parts
- Reduce the number of potentially relevant disciplines to those that are *most* relevant

Chapter 4 Objectives

The fable of building a house for an elephant (referenced in Chapter 1) shows the importance of taking into account *all* relevant disciplinary perspectives when trying to solve complex problems or understand complex systems. Interdisciplinary studies tends to focus on complex problems or systems such as global warming, gun violence in inner-city neighborhoods, or the meaning of a grafitto. These problems are complex because they involve many variables that are typically studied by different disciplines.

After stating the research problem (STEP 1) and justifying an interdisciplinary approach (STEP 2), the next challenge is deciding which disciplines are *potentially* relevant to the problem and then which of these are *most* relevant (STEP 3). This chapter presents a way to quickly identify disciplines *potentially* relevant to the problem. It discusses the value of mapping the problem so that its constituent disciplinary parts are revealed. It then shows how to narrow the number of disciplines to those that are *most* relevant. Once these disciplines are identified, the full-scale literature search (STEP 4; see Chapter 5) can proceed.



An Example of How to Select Potentially Relevant Disciplines

Using phenomena *and* perspective approaches is illustrated in the example of a student who was interested in writing an interdisciplinary research paper on the topic of human cloning. After referencing Tables 2.4 and 2.3, the student consulted Table 2.2 on perspectives to see if the topic as a whole was included in the phenomena studied by two or more disciplines. Since it was, the student then skimmed these disciplinary literatures and found that the topic was ripe for interdisciplinary inquiry. But final confirmation had to wait until the student completed the full-scale literature search. If, however, the student had found that human cloning is embraced by the perspective of only one discipline, then the problem would likely not have merited interdisciplinary study at the undergraduate level, and the topic would have had to have been revised or abandoned.

In fact, the student discovered that no fewer than seven disciplinary perspectives embraced the topic of human cloning, as shown here in Table 4.1. The characterization of these disciplines as *potentially relevant* is based on the fact that their perspectives include some aspect of human cloning. The information in the right-hand column is derived from the more general information in Table 2.2 in Chapter 2. For example, it states in the overall perspective for biology that "when biologists venture into the world of humans, they look for physical, deterministic explanations of behavior (such as genes or evolution)." It is reasonable to conclude, then, that biology is likely to be interested in human cloning *as a biological process* and to be concerned with its rates of success or failure.

Identifying potentially relevant disciplines on the basis of whether or not a discipline's perspective embraces the research problem is only a starting point. As noted earlier, broad statements of disciplinary perspectives are typically matters of scholarly contention. For this reason, the results of the perspectival approach should be verified, as this student did, by identifying phenomena that are typically of interest to disciplines. In this way, we might find different disciplines that investigate different parts of the complex problem.

TABLE 4.1 **Disciplines Potentially Relevant to the Problem of Human Cloning and How They Illuminate Some Aspect of It (Before the Full-Scale Literature Search)**

Discipline, Interdiscipline, and Applied Field	How Each Illuminates Some Aspect of the Problem of Human Cloning
Biology	The biological process of human cloning and rates of success or failure
Psychology	Possible psychological impact on the cloned person of a sense of personhood
Political Science	The role of the federal government
Philosophy	Ethical implications of cloning a human life and what it means to be human
Religious Studies	Sanction in sacred writings against the creation of a new form of human life
Law[a]	Legal rights and relationships of the cloned child and its "parents"
Bioethics[b]	Ethical implications of the technical procedures used to clone a human, particularly in the event of failure

a. Law is an applied field in many taxonomies.

b. Bioethics is an interdisciplinary field in many taxonomies.

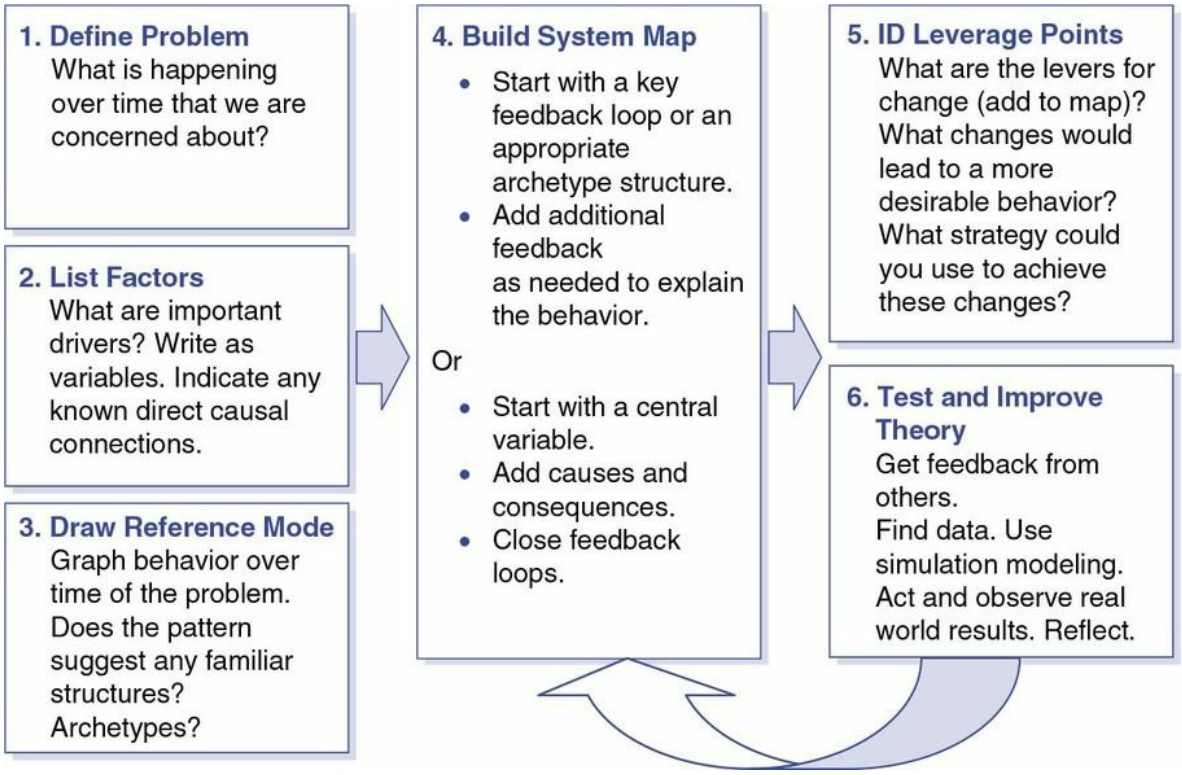
Map the Problem to Reveal Its Disciplinary Parts

Mapping may well assist in identifying relevant disciplines. After selecting the disciplines potentially relevant to the research question, you need to identify the constituent parts of the problem, understand how these relate to each other and to the problem as a whole, and view the problem *as a system.* Using systems thinking to map the problem facilitates this understanding.1

The map may reveal a gap in your understanding of the problem or establish that you are placing too much emphasis on a few disciplinary components at the expense of other equally important components. Whereas the disciplinarian is often satisfied to focus on a single part or on a few "neighboring" parts of the problem, the interdisciplinarian is concerned with achieving an interdisciplinary understanding of the problem *as a whole*.

Maps profitable to interdisciplinary work include the system map, the research map, the concept or principle map, and the theory map. Mapping the problem may occur as early as STEP 1 but should occur before conducting the full-scale literature search (STEP 4).

Once you see the problem as a complex whole, you can then shorten the list of disciplines to those that are essential before conducting the full-scale literature search. The results of the search should confirm the completeness and accuracy of the map.



Source: Mathews, L. G., & Jones, A. (2008). Using systems thinking to improve interdisciplinary outcomes. Issues in Integrative Studies, 26, 73–104, 81.

The Research Map

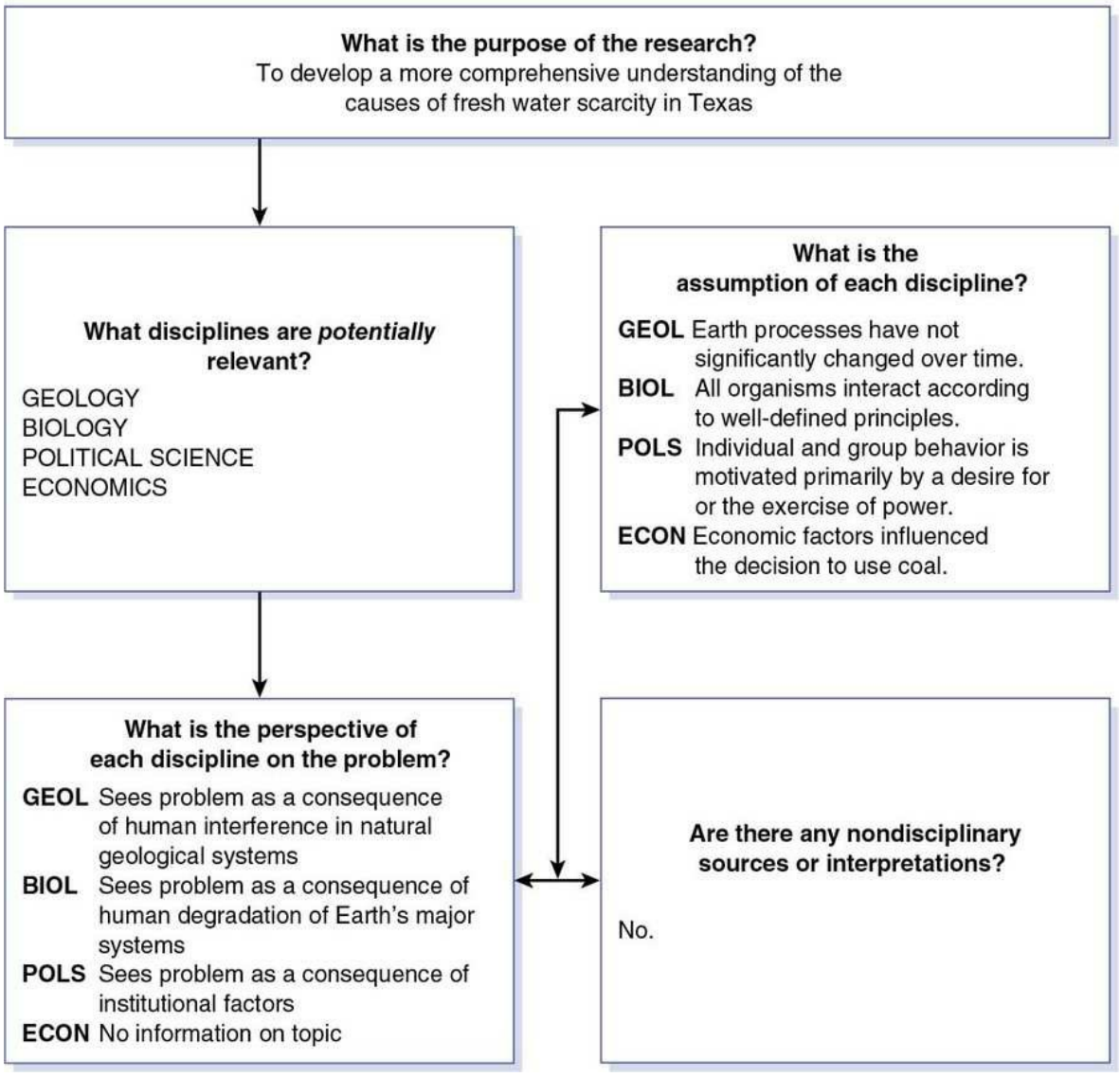
The **research map** helps those new to interdisciplinary research visualize the research process from beginning to end. While creating a research map may at first appear as a diversion from the more important business of "getting on" with the project, experience shows that investing time in constructing the research map—formulating the problem and identifying its various components—increases efficiency in performing subsequent STEPS of the IRP. The sample research map, shown in Figure 4.4, reveals key components of the research map:

- It states the purpose of the research.
- It identifies what disciplines are *potentially* relevant.
- It states the perspective of each discipline on the problem.
- It identifies the assumptions of each discipline.
- It identifies nondisciplinary sources or interpretations.

Figure 4.4 Research Map

Research Map

To fully understand a piece of research, the student must understand the purpose of the research, the particular methods used in the investigation, and the findings. The student should also understand the implications of the study: How do the findings fit with existing scientific knowledge, what impact did the study have on subsequent research on the particular topic, and what impact did the findings have on society? Finally, the student should also know about any alternative interpretations of the study.



Source: Adapted from Mores, M. A., Bahr, G. S., Atha-Weldon, C., & Dansereau, D. F. (2003). Academic guide maps for learning psychology. Teaching of Psychology, 30(3), 240–242.

Source: Adapted from Mores, M. A., Bahr, G. S., Atha-Weldon, C., & Dansereau, D. F. (2003). Academic guide maps for learning psychology. Teaching of Psychology, 30(3), 240–242.

The Concept or Principle Map

More advanced students working with more complex or larger-scale problems can benefit from using concept or principle maps. The **concept or principle map** organizes information about the problem showing meaningful relationships between the parts of the problem that requires thinking through all the parts of the problem and anticipating how these behave or function, as shown in Figure 4.5.

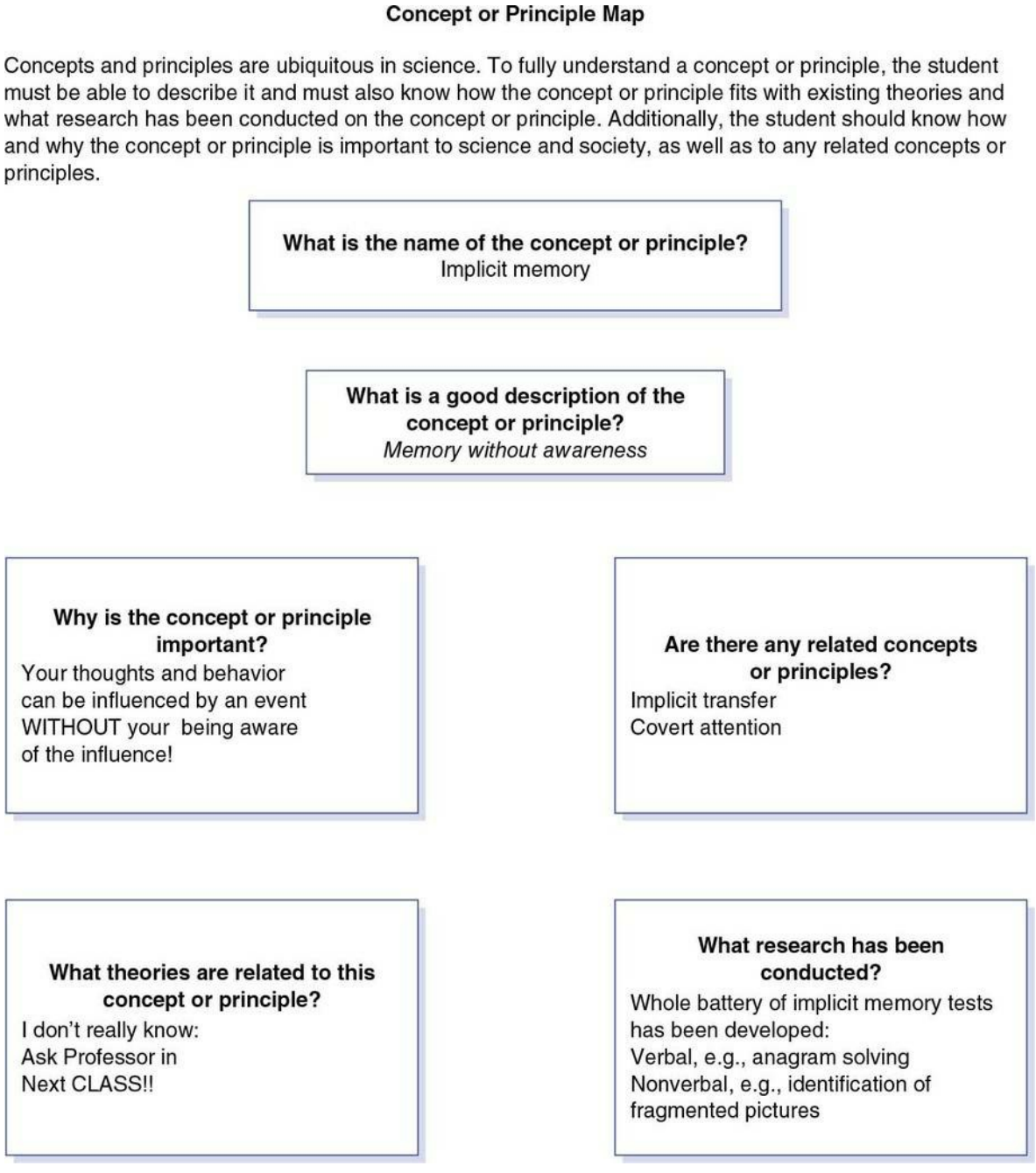
The Theory Map

The **theory map** describes a theory's supporting evidence and importance, and compares it to other theories. In the following chapters, we shall see that theories are important in most of the professional work and student projects used to illustrate aspects of the interdisciplinary research process. For example, a student investigating the causes of freshwater scarcity in Texas discovered that the insights from each of the relevant disciplines are couched in terms of theories that are well known within that discipline. If one or more disciplinary theories are involved in an inquiry, you must develop adequacy in each theory and in each discipline that produced it. We will discuss theory in more detail in STEP 5 (Chapter 6). Preliminary to developing adequacy, however, is mapping the problem. The theory map on Piaget's theory of cognitive development shown in Figure 4.6 can easily be modified to focus on additional aspects of any theory.

Reduce the Number of Potentially Relevant Disciplines to Those That Are *Most* Relevant

Once you have selected the disciplines potentially relevant to the problem, you must decide which of these are *most* relevant. Conduct a cursory search of the literature of each *potentially* relevant discipline in order to identify the disciplines *most relevant* to the problem. The **most relevant disciplines** are those disciplines, often three or four, that are most directly connected to the problem, have produced the most important research on it, and have advanced the most compelling theories to explain it. These disciplines, or parts of them, will provide information about the problem that is essential to developing a comprehensive understanding of it.

Figure 4.5 Concept or Principle Map



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Source: Adapted from Mores, M. A., Bahr, G. S., Atha-Weldon, C., & Dansereau, D. F. (2003). Academic guide maps for learning psychology. Teaching of Psychology, 30(3), 240–242.

Figure 4.6 Theory Map

Theory Map

To fully appreciate a scientific theory, the student should be able to describe the theory, know evidence for and against the theory, know why the theory is important, and know whether there are any similar and competing theories.

What is the name of the theory?
Piaget's Theory of
Cognitive Development

What is a good description of the theory?

Our actions are based on our available schemas. Upon encountering new situations, we either assimilate the new information into old schemas (i.e., respond in old ways) or accommodate the new information by creating new schemas (i.e., respond in new ways).

Stages
Sensorimotor - 0–2 yrs: reacts to sensory stimuli through reflexes; seems not to understand object permanence (according to Piaget)

Preoperational - 2–7 yrs: develops language; can represent objects mentally by words and symbols; shows object permanence; lacks concept of conservation

Concrete Operations - 7–11 yrs: understands conservation; can reason logically with regard to concrete objects

Formal Operations - 11 yrs: can reason logically about abstract and hypothetical concepts

What evidence is there for and against this theory?

For Piaget's methods of testing each stage (object permanence and conservation tasks) reveal the child's ability or inability to accomplish certain tasks; Piaget found reasoning mistakes made on IQ tests

Against Stages are discontinuous; arguments about age estimates and about reasons for difficulty (e.g., object permanence appears much earlier, and conservation failures may be due to demand characteristics because rewording the questions changes the outcomes)

Conservation of volume is found much earlier if the researcher states a reason for changing from a short fat glass to a tall thin glass; studies of other cultures

Why is the theory important?

Major influence on and contributions to developmental and cognitive psychology

Are there any similar or analogous theories?

Neo-Piagetian theories concentrate on scientific or logical aspects, Fifth-Stage Theorists

Which theories compete with this one?

Bayley, Gessell, Vygotsky zone of proximal development, Info-Processing Theorists

Source: Adapted from Mores, M. A., Bahr, G. S., Atha-Weldon, C., & Dansereau, D. F. (2003). Academic guide maps for learning psychology. Teaching of Psychology, 30(3), 240–242.

Source: Adapted from Mores, M. A., Bahr, G. S., Atha-Weldon, C., & Dansereau, D. F. (2003). Academic guide maps for learning psychology. Teaching of Psychology, 30(3), 240–242.

Three Questions to Ask to Distinguish Between Potentially Relevant and *Most* Relevant Disciplines

To identify the most relevant disciplines, ask three questions of each discipline you selected as potentially relevant to the problem:

- Is the problem a natural focus for the discipline's perspective? Is it (or key components of it) a part of the subject matter of the discipline?
- Has it produced a body of research (i.e., insights and supporting evidence) on the problem of such significance that it cannot be ignored?
- Has it generated one or more theories to explain the problem?

Answer these questions as you conduct the cursory literature search.

Applying These Questions to the Disciplines Potentially Relevant to Various Topics

Question 1: Does the discipline have a well-defined perspective on the problem? At this early phase of the research process, you should be able to explain how each discipline's overall perspective illuminates the problem or some facet of it. One way to do this (and perhaps gain new insight into the problem) is to recast each perspective in terms of an overarching question about the problem as shown in Tables 4.2, 4.3, 4.4, and 4.5. Compile this table as you do cursory reading in each discipline's literature.

Question 2: Has the discipline produced a body of research (i.e., insights and supporting evidence) on the problem of such significance that it cannot be ignored? Here, the focus is on the significance of each discipline's published research. Since the goal of any interdisciplinary research effort is to achieve the most comprehensive understanding of the problem possible, it is advisable to include those disciplines producing important insights into the problem, whether the number of insights is one or several. In the example of human cloning, the disciplines include biology, psychology, political science, philosophy, religion, law, and bioethics.

Course requirements generally determine how many disciplines and how much reading in their literatures students can reasonably be expected to handle. Some students may need to limit the number of disciplines used to only three or four, based on the *comparative importance of their insights.* Ways to evaluate the importance of insights include

- seeing how often the insight is cited by other writers,
- consulting disciplinary experts, and
- noting the date of publication.

The last factor is particularly important when dealing with time-sensitive issues involving, for instance, rapidly evolving reproductive technologies. You should focus on research that is published in peer-reviewed journals, by university presses, and by academic presses. There is an abundance of material on the Internet, some of

which is peer reviewed but much of which is not. Your instructor will provide guidelines on how to evaluate information that is not peer reviewed. (Note: These guidelines are discussed in Repko et al. [2014]).

TABLE 4.2 Disciplines and How They Illuminate Some Aspect of the Problem of Human Cloning (Before the Full-Scale Literature Search)

Discipline, Interdiscipline, and Applied Field	Perspective Stated in Terms of an Overarching Question Asked About Human Cloning
Biology	What are the scientific consequences of human cloning?
Psychology	How will the discovery of being cloned affect the cloned person psychologically and the perceptions of others who know this about the person?
Political Science	What should be the role of government concerning this issue?
Philosophy	How will human cloning affect humanity, and what it means to be human?
Religious Studies	Does the science of human cloning conform to sacred writings and, more particularly, to the notion of what it means to be human?
Law	What are the legal implications of human cloning, and what are the rights of those who are participants in human cloning experiments?
Bioethics	What are the ethical implications of the biotechnology used in human cloning?

TABLE 4.3 Disciplines and How They Illuminate Some Aspect of the Columbia River Ecosystem

Discipline	Perspective Stated in Terms of an Overarching Question Asked About the Columbia River Ecosystem
Biology	What are the consequences of the dam system to native salmon populations?
Economics	What are the economic benefits and liabilities of the dam system on the people living in the region?
Earth Science	What are the implications of the dams on the region's hydrological system?
History	What does the damming of the Columbia River system tell us about the nation's confidence at this period of history?
Political Science (Politics)	What should be the role of government at all levels concerning the future of the dam system?

TABLE 4.4 Disciplines and How They Illuminate Some Aspect of Occupational Sex Discrimination (OSD)

Discipline and School of Thought	Perspective Stated in Terms of an Overarching Question Asked About Occupational Sex Discrimination
Economics	What is the economic motivation for OSD?
History	What is the historical context that would help explain OSD?
Sociology	How is OSD a reflection of broader social relationships in society?
Psychology	How does the behavior of the perpetrators and victims of OSD reflect the psychological constructs individuals develop to make sense of their situations?
Marxism	How is OSD a necessary act of preserving capitalism?

TABLE 4.5 Disciplines and How They Illuminate Some Aspect of a Graffito (i.e., a Wall Writing)

Discipline and Subdiscipline	Perspective Stated in Terms of an Overarching Question Asked About the Graffito
Anthropology (Cultural)	Is the graffito an expression of contemporary "popular" Dutch culture?
Art History	Is the graffito merely illustrative of the text about it?
Linguistics (Narratology)	What does the graffito represent?
Philosophy (Epistemology)	What does the graffito suggest is real and unreal?
Literature	What can the graffito be compared to in Dutch poetry?
Psychology	Is the graffito a text of psychic mourning for love lost?

Note: Cultural anthropology, narratology, and epistemology are subdisciplines.

When determining the relative importance of a discipline and its insights, you should not be influenced by the *quantity* of a discipline's research on the problem. If a discipline has just begun to address the problem, or if the problem is of recent origin, then it is not uncommon to find that its experts have published only one or a few insights. But those few may be extremely important because they are based on the latest research and may advance an important theory. A single treatment of the problem by a leading scholar in a discipline may impact the discussion in such a forceful way that one cannot ignore it. In this event, the next question may prove particularly important.

Question 3: Has the discipline generated one or more theories to explain the problem? Theories about the causes or consequences (real or possible) of a problem should be part of developing adequacy in each relevant discipline (STEP 5; see Chapter 6) and may be among the possible sources of conflict between disciplinary insights (STEP 7; see Chapter 9). Whether or not theories are involved can be answered only by conducting a full-scale literature search.

Note to Readers

Advanced undergraduates and some graduate students who labor under time and other constraints must somehow reduce the number of potentially relevant disciplines to those that are the most relevant to the problem, and do so quickly and in a way that does not compromise the integrity of the end product. More senior scholars acting as solo interdisciplinarians conducting solo research have considerably more latitude in identifying relevant disciplines and their insights and theories. Reducing the number of disciplines is not as necessary for them as it is for graduate and undergraduate students who are expected to not overlook any important insight or theory. Interdisciplinary research is a process where the necessarily incomplete research of one scholar is built upon by others. No research is ever completely comprehensive. The process of narrowing may occur also in collaborative research, where interdisciplinary teams conducting basic research are limited by their budget or by the availability of researchers from particular disciplines. Identifying the most relevant disciplines may involve revisiting the formulation of the research question (STEP 1) and undertaking the full-scale literature search (STEP 4).

Applying These Questions to the Problem of Human Cloning

Reading the literature on the problem of human cloning with these questions in mind heightened student awareness of not only the amount of disciplinary activity among the relevant disciplines but also the *differing* insights produced by these disciplines. By asking these three questions of each relevant discipline, the student was able to reduce the former list of seven to five disciplines that were *most* relevant to the problem of human cloning. These are listed here along with an explanation for their selection:

- Biology: The cursory literature search found that more biologists are writing about human cloning than are scholars from any other discipline. This is understandable because human cloning is itself a biological procedure. Students also found that biologists are advancing some of the most important theories on human cloning and are expressing the greatest diversity of opinion on this issue.
- Bioethics: Essays written by bioethicists contain important bridging concepts and methods. The essays may appear to be similar to those written by philosophers but differ from them in one important respect: They are science based.
- Philosophy: Though essays written by philosophers appear to overlap those written by bioethicists, there are important differences. For one thing, the essays are not science based but are grounded in humanistic ethics, thus offering a perspective that contrasts sharply with that of bioethicists on this issue. For another, philosophers tend to exclude important bridging concepts and methods that bioethicists tend to include.
- Religious Studies: Religion and the world's major faith traditions are among the most powerful influences in our society today. This explains, for example, why U.S. congressional hearings on "hot button" social issues such as human cloning typically include taking testimony from representatives of the major faith traditions. Therefore, including the perspective of religion seemed appropriate given the amount of attention religious studies scholars have devoted to this issue, the popular interest in their views, and the need to understand value systems that are faith based rather than empirically based.
- Law: Though the amount of legal scholarship on the issue is far smaller than that from the other disciplines, law offers insights that approach the issue from a unique perspective and is therefore pertinent.

In the end, course constraints required limiting the number of disciplines to three. The decision to consider biology, philosophy (i.e., humanistic ethics), and religion as "most" relevant to the problem of human cloning was made on the basis of the criteria already noted. Whether these criteria or others are used to differentiate between disciplines that initially appear to be relevant and those that are in fact most relevant, the essential thing is to develop some means by which to identify and justify the disciplines ultimately used and make this decision-making process explicit. Later STEPS in the IRP will validate whether the disciplines selected are in fact the most relevant.