STEP 8 of the interdisciplinary research process (IRP) calls for creating common ground between conflicting concepts or theories. This process plays out differently depending on whether one is working with concepts or theories. Whether one is focusing on concepts or theories, common ground is created by modifying them directly or via their underlying assumptions. In both cases, common ground must be created so that the insights in which they are embedded (and the disciplinary authors that produced them) can “talk to each other.”

Though creating common ground between conflicting concepts or theories is the focus of a single STEP, the discussion is split between two chapters because by this point in the IRP, readers know whether they are working with a set of concepts alone or with theories as well. Consequently, STEP 8 is divided into two sub-STEPS: the first addressing the creation of common ground between concepts (the subject of this chapter), the second dealing with the creation of common ground between the theories themselves (the subject of Chapter 12).

This chapter is divided into two sections: Section 1 discusses the theory of common ground as the basis for collaborative communication and interdisciplinary integration; section 2 explains how to create common ground between conflicting insights either directly by modifying their concepts or indirectly by modifying their underlying assumptions. Techniques used to modify concepts or assumptions are illustrated from student and professional work. While there is no guarantee that common ground can be achieved in every case, this chapter and the following chapter are guided by the idea that conflicting disciplinary insights and theories are potentially complementary if their concepts and/or assumptions are sufficiently modified.
In interdisciplinary work, creating common ground is undoubtedly the most challenging task that one faces. This is probably because it requires a combination of original thought, close reading, analytical reasoning, creativity, and intuition. But it is achievable if one takes a systematic approach, pays attention to the nature of the challenge, and chooses an appropriate technique.

The Theory of Common Ground as the Basis for Collaborative Communication and Interdisciplinary Integration

The basis for collaborative communication across disciplines and integration of their conflicting concepts or theories is the creation of common ground. From the earliest conceptions of interdisciplinarity, researchers have recognized the need for a common or collaborative language. Joseph J. Kockelmans (1979) was the first to use the term common ground, seeing it as the basis for collaborative communication—"a common ground"—among research scientists from different disciplines working on large government and industry projects. Common ground, he says, is the fundamental element of all interdisciplinary investigation because without it, "genuine communication between those who participate in the discussion would be impossible" (Kockelmans, 1979, p. 141). Kockelmans was also the first to connect integrating disciplinary insights with developing common ground (pp. 142-143). In explaining how to teach interdisciplinary research practice, Szostak (2007a) stresses the importance of first creating common ground among different disciplinary insights (p. 2).

A Definition of Interdisciplinary Common Ground

Interdisciplinary common ground is one or more concepts or assumptions through which conflicting insights or theories can be largely reconciled and subsequently integrated, thus enabling collaborative communication between disciplines. Common ground is not the same as integration, but it is integral to the process of integration. The creation of common ground is a necessary but not a sufficient condition for integration. Common ground is achieved through the use of language.

Two metaphors, though imperfect, depict what common ground is like: the bridge and the golden thread. Creating common ground is like building a bridge in order to span a deep chasm. The near side is the place of conflicting insights and the lack of a common language (STEP 7; see Chapter 10); the opposite side is the product of the process of integration: the more comprehensive understanding (STEP 9; see Chapter 13). Unless the interdisciplinarian first builds the bridge of common ground to connect the two sides (STEP 8; see also Chapter 12), the integrative enterprise cannot succeed. The bridge metaphor is
useful because it shows how, in operational terms, the steps in the integrative process (identifying conflicts, creating common ground to reconcile them, and producing a more comprehensive understanding) are connected yet discrete. Another metaphor descriptive of common ground is that of the golden thread, which connects many different textures, shapes, and colors of cloth.

This definition and description of common ground is foundational to the core ideas developed in the first section of this chapter:

- Common ground is necessary for collaborative communication.
- Common ground requires unconventional thinking.
- Common ground is achieved through the use of language.
- Common ground must be created whenever concepts or theories conflict.  
- Common ground is created by modifying concepts or theories directly or through their assumptions.
- Creating common ground is integral to preparing concepts and theories for integration.
- Creating common ground requires using intuition.
- Creating common ground plays out differently in contexts of narrow versus wide interdisciplinarity.
- Creating common ground is the interdisciplinarian's responsibility.

**Common Ground Is Necessary for Collaborative Communication**

The purpose of creating common ground is to develop collaborative communication among disciplinary scholars and reconcile (to the extent possible) their different insights and theories on a particular problem. The term *common ground* is not just academic; it has entered the mainstream media. According to a report from the Associated Press, “Seeking elusive common ground on abortion, prominent activists and clergy on both sides of the debate are throwing their support behind a bill aimed at preventing unintended pregnancies and supporting pregnant women [italics added]” (USA Today, 2009). A headline by National Public Radio (NPR) reporter Liz Halloran (2009) reads, “Gay Activists, Black Ministers Seek Common Ground.” On such controversial and emotionally charged issues, creating common ground between differing or opposing views is often difficult, but not impossible.

Sometimes attempts are made to communicate across disciplines without realizing the necessity of first creating common ground among them. Eugenia P. Gerdes, former dean of liberal arts at Bucknell University, illustrates this point in the story of her efforts to revise the general education curriculum and expose students to multiple disciplinary perspectives. Her challenge was to communicate this noble vision to her faculty in language that they would all understand and rally behind. Instead, she inadvertently "stepped on the toes" of one discipline by using language appropriate to her discipline but that struck some in the creative arts as "discordant." She said
to the faculty, “I want our students to be able to get outside their own intuitive perspective—to recognize where they are situated in nature, in history, among the world’s cultures, and in a pluralized American society [emphasis added]” (Gerdes, 2002, p. 50).

To Gerdes (2002), a social psychologist, “‘intuition’ represents the unexamined biases of self-interest, stereotypes, prejudices, etc.” (p. 50). To her shock and embarrassment, an indignant studio artist informed her, “a professor in the arts not only values, but also seeks to put students in touch with, the intuitive!” (p. 50). Unfortunately, she confesses, “in attempting to espouse [that] all students [be] exposed to a variety of disciplinary perspectives, I excluded one type of perspective as legitimate because of my ignorance of other disciplines” (pp. 49–50).

Common ground is required in at least two circumstances. The first is when people (or disciplines) use different concepts or terms to describe the same thing. For example, the terms city and suburb have different meanings across disciplines. The second is when people take opposing positions on a particular issue stemming from conflicting assumptions or values. If these are the sources of difference or even outright conflict, then the solution must be to create common ground. Common ground is not needed, however, in cases where authors seem to be disagreeing but may not be because they are talking about different things—altogether different phenomena or variables. Mapping their arguments will reveal if this is so.

There are at least five additional occasions when creating common ground is required. These include when (1) research scientists trained in different disciplines need to develop a collaborative language, (2) planners need to develop a comprehensive approach to community development, (3) business needs to produce a comprehensive strategy to produce and market a new product, (4) counselors need to reconcile partners who are contemplating divorce, and (5) policy makers need to develop broad support for a particular legislative action.

But what about issues that involve diametrically opposed ethical values, deeply held religious beliefs, or sharply conflicting political ideals? Such issues are often emotionally charged, supposedly reducing notions of common ground to mere wishful thinking. But even when dealing with such issues, it is often possible to create common ground.

Common Ground Requires Unconventional Thinking

Chapter 1 emphasizes that interdisciplinarity requires altering the way we think about thinking. Achieving common ground, and indeed the whole interdisciplinary research process, requires that we engage in unconventional thinking about how to approach problems and their solutions. In this connection, it is worth contrasting our natural thinking process with our learned thinking process. While unconventional thinking may seem challenging, in reality we are naturally able to pursue common ground but are commonly educated not to do so.
Psychologists tell us that the human brain is designed to process information integratively. This is evident from the many complex activities that a person engages in every day. People seldom even realize the extent to which they are thinking and acting in an integrative way when they play an instrument, plant a garden, cook a meal, or drive to work. A person’s ability to make a series of complex decisions without consciously reflecting on all the components of those decisions is an example of a person’s natural capacity to process information integratively.

But a person’s natural thinking process stands in sharp contrast to a person’s learned thinking process. Much of modern education teaches students to think in three nonintegrative ways:

- **Disciplinary categories.** From kindergarten onward, students are taught to think in disciplinary categories. They are told that knowledge is found in clearly marked “boxes” or disciplines called math, social studies, English, and art (though this is slowly changing). Learning, students discover, occurs through a process of knowledge fragmentation, compartmentalization, and reductionism.

- **Right or wrong answers.** We are trained to think in terms of answers to questions as being either right or wrong. Standardized tests that promote a focus on facts over reasoning lead to education that, for example, asks students to read a novel like *Tom Sawyer* and choose whether Huck Finn is a good or bad influence on Tom, even though most of us recognize that humans are a mixture of good and bad, and that mixture can change with the circumstances, and that the very concepts of “good” and “bad” are contested.

- **For or against something.** Though debates on controversial topics are effective ways to engage students and teach debating techniques, they reinforce the idea that the point of it all is to win and that the purpose of confronting alternative perspectives is to choose one and reject the rest.

However, the interdisciplinary enterprise is not like prosecuting a case, defending a client, or just adding another pro or con opinion to the many pro or con opinions already offered on the issue. Rather, the interdisciplinary enterprise is about building bridges that join together rather than erecting walls that divide. It is about creating commonalities rather than sharpening differences. It is about inclusion rather than exclusion. It is about producing understandings and meanings that are new and more comprehensive rather than those using a single disciplinary approach. And this requires a different kind of thinking and mode of analysis, one that draws (critically but sympathetically) on most, if not all, available disciplinary perspectives and their insights. So, instead of asking if Huck was a good or bad influence on Tom, the interdisciplinarian would ask about the whole package of Huck’s influences (positive, negative, and mixed) on Tom, and probably about Tom’s influences on Huck as well.
Common Ground Is Achieved Through the Use of Language

Common ground is achieved through the use of language. In everyday communication, we encounter people who have different perspectives than we have on a wide range of matters. Our everyday perception of facts and events depends on the categories we bring to a certain situation, raising the question of how we are able to comprehend so many different perspectives.

Cognitive psychology explains successful communication between individuals having different perspectives by exploring the way our brain subjectively constructs perceiving, seeing, and acting. Common ground theory says that "every act of communication presumes a common cognitive frame of reference between the partners of interaction called the common ground" (Bromme, 2000, p. 119). The phrase "common cognitive frame of reference between the partners of interaction" simply refers to everyday social interaction where two individuals enter into each other's frame of reference, attempt to discuss a problem, try to identify sources of disagreement concerning it, and arrive jointly at a resolution of it. Common ground theory postulates further that "all contributions to the process of mutual understanding serve to establish or ascertain and continually maintain this common ground" (p. 119). This theory applies to both oral and written communication.

The theory assumes that any successful verbal encounter represents an act of cooperation by both parties. When we communicate, we do so to attain a certain goal or to respond to a certain question, whether verbalized or unspoken. According to cognitive psychologist Rainer Bromme (2000),

all contributions to communication are formulated and understood on the basis of background assumptions we make about the situation in question, the object of conversation and its goal: "Two people's common ground is, in effect, the sum of their mutual, common, or joint knowledge, beliefs, and suppositions" (Clark, 1996, p. 93). . . . One's own assumptions on which the conversation is based are designated as one's own perspective and that of the other person as [the] perspective of the other. (p. 120)

Though common ground theory was developed to explain everyday interactions, cognitive psychology is now applying it to communication across academic disciplines, especially the natural sciences.

Note to Readers

The process of integration and creating common ground between conflicting concepts involves adjudicating disciplinary disputes over their meaning. For undergraduates, creating common ground involves closely reading definitions of concepts and identifying differences in their meaning. For
graduate students, mature scholars, and members of research teams, creating common ground necessarily involves drawing on the intellectual skills of philosophy (using abstract thinking to make fine distinctions about the gradations of meaning).

**Common Ground Must Be Created Whenever Concepts or Theories Conflict**

Since common ground is achieved through the use of language, creating common ground requires modifying definitions of key concepts and/or their underlying assumptions, or modifying theories. (Both concepts and theories are sources of insights.) Here, we discuss common definitions of concepts.

In most cases, if not all cases, common definitions must be created since different disciplines have different definitions—connotative if not denotative—for the same concepts. For example, disciplines have different understandings of “sustainability” and “social justice” that are rooted in their overall perspectives on reality and the phenomena they typically study. Creating common ground involves identifying one or more latent commonalities that are embedded in the concepts from two or more disciplines. Authors communicate their insights using concepts based on assumptions that typically reflect the assumption(s) and perspective of each author’s home discipline. Newell (2007a) says that the step of creating common ground can be carried out either directly or indirectly: directly by modifying the concepts, or indirectly by modifying the assumptions. In either case, he says, “the challenge is to decide how to modify concepts or assumptions as little as possible to bring out latent commonalities” (p. 257). How to modify concepts and assumptions is explained in the second section of this chapter.

**Common Ground Is Created by Modifying Concepts or Theories Directly or Through Their Assumptions**

The nature of the challenge of creating common ground varies with what common ground is created from. Common ground is created from conflicting concepts or theories. Both concepts and theories are sources of insights. (Theories can be thought of as specifying relationships among concepts—more accurately variables—and those concepts or theories can be modified either directly or indirectly through assumptions in which they are grounded. How to do this is the subject of Chapter 12.)

Whether working in the natural sciences, the social sciences, or the humanities, one typically creates common ground by modifying concepts directly. (Note: Concepts refer not just to things but also to the processes that these are involved in and the influences exerted by one thing on another.)

But what about situations where insights conflict because of conflicting values? Values manifest themselves in common ground creation as assumptions.
Rick Szostak (personal communication, January 2010) urges us to appreciate that conflicts are generated not just from the assumptions made within a theory but from a broader set of philosophical assumptions: the epistemological, ethical, religious, and ideological views that may inform theory construction. These philosophical assumptions may or may not be clearly stated by the scholar.

Common ground, it must be emphasized, is created not from a discipline's perspective (in a general sense), but from the concepts or assumptions embedded in the insights or theories themselves. Consequently, when working with insights in which theories are not present, one must decide what to create common ground from: concepts or the assumptions underlying them.

Creating Common Ground Is Integral to Preparing Concepts and Theories for Integration

Creating common ground is integral to the process of integration (Kockelmans, 1979, pp. 142–143; Repko, 2007). The purpose of performing integration, as noted in Chapter 9, is to develop collaborative communication across disciplines and reconcile different or conflicting insights. The connection between creating common ground and performing integration is established by a study conducted by the Interdisciplinary Studies Project (Project Zero), Harvard Graduate School of Education. It examines exemplary practices of interdisciplinary work at the precollegiate, collegiate, and professional levels. The study finds that there exists an important similarity—and possibly a fundamental connection!—between the interdisciplinary efforts and other mental operations that involve internal or external dialogue such as metaphoric thought, collaborative work, and other forms of negotiating differences [i.e., creating common ground] and merging [i.e., integrating] ideas. (Nikitina, 2005, p. 392)

According to the study, interdisciplinary thinking occurs as the mind performs a complicated chain of cognitive operations in which it integrates disciplinary ideas. At the juncture of disciplines, the mind is involved in two cognitive activities: (1) overcoming internal monodisciplinarity (i.e., the preference for a single and simplistic disciplinary perspective), and (2) attaining integration. A key finding of the study is the possibility that there exists “a central cognitive process,” expressive of the dialogical tendency of the human mind, that manifests itself in interdisciplinary thinking (Nikitina, 2005, p. 414). This “central cognitive process,” which is a natural tendency of the human mind, involves creating common ground.
Creating Common Ground Requires Using Intuition

Any discussion of common ground and its underlying theory must include the role of intuition. Intuition is the natural ability to understand or perceive something immediately without consciously using reason, analysis, or inference (Welch, 2007, p. 3). This definition may be satisfying to students working in the humanities where creativity and spontaneity are prized, but it may be disconcerting to students working in the natural sciences and hard social sciences where rational or logical methods are highly valued. In the sciences, intuition is typically seen as a form of common sense. In fact, science advances not so much by incremental expansion of knowledge but more often by discontinuous leaps of creative or intuitive thought (Csikszentmihalyi & Sawyer, 1995, p. 242; Kuhn 1996). Historians of science generally agree that both logic and intuition are involved in scientific discovery. Scientists work hard on a problem and gather relevant information. But the insight often comes while they are taking a break from work, allowing their subconscious mind to do its work while they are walking in the park or taking a bath.

Intuitive understanding is experienced in a number of modes. It may occur as

- a moment of instant assessment of a complex situation or object;
- a “gut instinct”—visceral, emotional, and empathetic—in a social situation (D. G. Myers, 2002, pp. 33–38);
- the result of mulling over a problem that is “on the back burner” of our mind, “where insight into a persistent conundrum that had been dismissed from consciousness comes to light ‘out of the blue’” (Welch, 2007, p. 3);
- a “common sense” insight into “the complexity of ordinary decision-making, which is embedded in collective cultural standards” (Gerber, 2001, p. 72);
- creativity, which is entwined with the process of inspiration, imagination, artistic expression, and symbolic understanding (D. G. Myers, 2002, pp. 59–61); or
- insight, which is understanding the underlying structure of a problem and attaining a more holistic synthesis of the relationships among its disparate elements (Csikszentmihalyi & Sawyer, 1995, p. 329; Dominowski & Ballob, 1995, p. 38; D. G. Myers, 1995, p. 28).

Intuition has been the subject of extensive research in cognitive psychology. According to James Welch (2007), the unconscious mind is now seen as a kind of reality processor that in many ways is superior to the processes of consciousness. The unconscious mind is not merely cataloguing discreet packets of experiential information, but accumulating an adaptive multidimensional matrix of associations (p. 6).
Intuitive insights do not just happen. They are, says Arthur Miller (1996), the inevitable result of a process of mental gestation—a highly trained mind has been purposefully focusing on a particular problem for a length of time (p. 419). This finding has important implications for interdisciplinary research, which features an "iterative process that works toward solution through an interweaving of generative and cognitive processes, not a big bang that comes all at once, then not again" (Sill, 1996, p. 144).

Interdisciplinarians are conflicted concerning the role of intuition in interdisciplinary research. Some argue against an uncritical acceptance of intuitive insight, arguing that any valid understanding of reality must be based upon logic and empirical methods. Others assert that interdisciplinarity, seen from the perspective of postmodernism, "must be highly individual, unspecifiable, and institutionally anarchical" (Welch, 2007, p. 5). Szostak (2002), however, views this dichotomy between structure and intuition as essentially false. In good interdisciplinary fashion, he argues that both structure and intuition are necessary for developing new integrative approaches (pp. 131-137). Welch (2007) agrees and argues for what he calls equilibrium between intellect and intuition. This equilibrium is expressed in what he calls "integrative wisdom." This he defines as the synthetic interaction between "inspiration, intellect, and intuition" (p. 149).

Wisdom is the synthesis of all avenues of insight—rational, experiential, intuitive, physical, cultural, and emotional. [It] breaks down all boundaries between categories of knowledge and returns them [to] holistic understanding. Wisdom creates equilibrium among these faculties, minimizing their individual weaknesses and achieving synergy. (Welch, 2007, pp. 149–150)

This book reflects Szostak's stress on balance and Welch's call for equilibrium between intellect and intuition. When it comes to intuition, says Welch (2007), interdisciplinary studies, "with its emphasis on practical problem solving, cannot afford to dismiss such a potentially powerful [cognitive] faculty for integrative understanding" (p. 148).

Also, adherence to a steplike research process cannot automatically resolve all problems, including the challenging problem of creating common ground. That is why students are well advised to leave room, in some cases a great deal of room, for an "intuitive leap" or a "eureka moment" when, after a period of struggle, reflection, and analysis, they suddenly discover how to create common ground.

An Example of How Intuition Helps to Achieve Common Ground

The story of Helen Keller provides an example, though imperfect, of how intuition helps achieve common ground between two persons who have been
unable to communicate with each other. Helen, after an illness in infancy, was left unable to see or hear, and thus unable to speak or communicate with anyone. Though everyone had given up on Helen, her young teacher, Anne Sullivan, did not, believing that she could find a way to communicate with Helen. For some time, Anne’s best efforts proved fruitless, and Helen grew more and more incorrigible—until one day when they were at the well outside the cabin where they were staying, and Helen knocked over the bucket of drinking water that Anne had just drawn. In that moment, water became more than water. In an intuitive flash, Anne realized that she could use the spilled water to make the sign for “water” in the palm of Helen’s wet hand. It worked. Helen understood. Anne had achieved common ground with Helen. Water became the key that ended Helen’s terrible isolation and enabled her to comprehend and communicate with her world. The result was a new and an amazingly productive life. (Note: This example overlooks the fact that one usually has to redefine disciplinary concepts to create or even discover common ground. And without using redefinition or some other integrative technique discussed in this chapter, common ground, and thus integration, can seldom be achieved.)

Creating Common Ground Plays Out Differently in Contexts of Narrow Versus Wide Interdisciplinarity

Creating common ground plays out differently in contexts of narrow versus wide interdisciplinarity. Narrow interdisciplinarity draws on disciplines that are epistemologically close (e.g., physics and chemistry). Wide interdisciplinarity draws on disciplines that are epistemologically farther apart (e.g., art history and mathematics). The epistemological presuppositions of the natural sciences promote a focus on facts—on what something is and how it works. Scientific presuppositions do not allow us to assign value (in a moral or ethical sense) to facts as do the epistemological presuppositions of the humanities that give us access to moral reality. This means that it should be easier to discover commonalities between insights produced by the natural sciences concerning a problem (given their more narrow epistemological focus) than it is to find commonalities between insights produced by disciplines spanning the natural sciences and the humanities, whose epistemologies differ widely. In general, the greater the epistemological distance between disciplines, the more difficult it is to create common ground between their insights.

Creating common ground is possible in contexts of narrow and wide interdisciplinarity. As noted, creative insight is dependent upon mental gestation. Regardless of the epistemological distances between the relevant disciplines, students must immerse themselves in each discipline’s insights, concepts, assumptions, theories, and so forth, concentrate on the problem, and not be in a rush to “get it done.”
Creating Common Ground Is
the Interdisciplinarian’s Responsibility

There is an abundance of opinion (scholarly and otherwise) but a scarcity of understanding of the many complex problems that bedevil our society and characterize our world. *Interdisciplinary study is not about who can win the argument but about who can bring together the best ideas of all stakeholders to get the job done.* The task of the interdisciplinarian is to achieve this much needed understanding in a way that is similar to the role played by a marriage counselor.

The marriage counselor knows that nothing lasting will be achieved if the parties remain focused on the differences that divide them, much as the interdisciplinarian knows that common ground will not be created if the focus remains on the differences between disciplinary insights. Marriage counselors try to get behind the conflicting positions of the parties to find out what commonalities exist, much as the interdisciplinarian tries to get behind the conflicting insights to find the commonalities that they share. Marriage counselors try to find common ground by identifying interests that are

- shared or overlapping (analogous to common meaning revealed through redefinition, explained later in this chapter);
- similar or related (analogous to common ground achieved through extension, explained later in this chapter);
- compatible (analogous to common ground achieved through organization, explained later in this chapter); or
- negotiable (analogous to common ground achieved through transformation, explained later in this chapter).

Though instructive, the example is not truly interdisciplinary in that the conflicting issues straining the relationship cannot be neatly categorized in disciplinary or theoretical terms.

The interdisciplinarian looks at the conflicting insights and asks, “Where can I narrow the conflict or make concepts or assumptions more commensurate, and how can I get these folks to stop talking past each other?” Interdisciplinarians cannot promise that if we create commonalities between disciplines (and stakeholders outside the academy) integration will result; but we can promise that if we fail to create commonalities between disciplines so they can talk to one other, integration cannot occur.

**Modifying Concepts and Assumptions**

The first section of the chapter established that creating common ground between conflicting concepts and theories is the basis for collaborative communication and a focus of integration. This next section explains how to actually
create common ground between conflicting concepts by modifying them and/or their underlying assumptions. This discussion assumes that the reader has had little or no formal experience in attempting to create common ground. It begins by discussing how to proceed with creating common ground between conflicting concepts and then introduces techniques for modifying them. Each of these techniques is illustrated from professional and student work.

**How to Proceed**

Deciding how to proceed with creating common ground calls for asking this question: What is necessary for integration? The answer to this question involves (1) knowing when to seek common ground, (2) deciding how comprehensive the study will be, (3) and deciding what common ground will be created from.

**When to Seek Common Ground**

Researchers should seek common ground only when different concepts and their insights are in conflict regarding the same problem or process. Logically, then, they seek common ground after having mapped the problem in order to determine that different authors are in fact talking about the same thing. Mapping the problem and each author's insight into it enables one to distinguish real conflicts (over the same thing) from apparent conflicts (when authors talk about different things). In the course of mapping each author's insight, the researcher looks for concepts that are the source of the insight. In other words, mapping helps us make sure that creating common ground is even necessary. If authors seem to be disagreeing, it may be not because common ground is lacking but because they are talking about two different things—altogether different phenomena or causal relationships.

One only needs to find common ground between authors who are disagreeing about the same “something,” not between those who are talking about two different things. If the authors are talking about completely different aspects of a complex system such that they have no concepts or processes in common, the place to address that is in Chapter 13 on constructing a more comprehensive understanding. If they share at least one “something” in common, however, then one needs to create common ground for it.

The order, then, is this: First, map the problem to see if authors are talking about the same thing. Second, if they are, see if they use concepts the same way. Third, create common ground between concepts; and only if there are still conflicts work with assumptions.

**Decide How Comprehensive the Study Will Be**

Researchers need to decide how comprehensive their study will be. Most undergraduates and even some graduate students will find themselves limited
in the number of disciplines on which they can draw. But these students can and should seek to integrate fully the insights of the disciplines from which they draw. For individual mature scholars and members of interdisciplinary research teams, their studies will be comprehensive: They will draw on all relevant disciplines and all relevant insights and seek full integration.

Decide What Common Ground Will Be Created From

Researchers must also decide what common ground will be created from: concepts and/or assumptions. A situation typically encountered is after locating a number of important insights on the topic, the student finds that some authors refer to concepts and others present theories, but few, if any, refer explicitly to their assumptions. How should one proceed when facing a patchwork quilt of approaches? A best practice is to begin with concepts before working with assumptions.

1. Begin looking for concepts. One needs to return to the data table created earlier (see Chapter 6, Table 6.1) to see which insights make explicit reference to one or more concepts. One may discover that only a few authors reference one or more concepts while others do not reference any. To create common ground using concepts, all the authors must use one or more concepts that reference the problem in some way, even though these concepts may have different (apparent or real) meanings. For a concept to be used as the basis for creating common ground, it must be applicable to all, not just a few, of the insights. Examples of how to modify concepts for this purpose appear below.

2. Work with assumptions when this seems more promising. One needs to consult the data table to identify the assumptions of each author's insight. If this information was not collected earlier, it will have to be now. Identifying assumptions is often challenging to undergraduates because authors seldom state them explicitly. Assumptions, it will be recalled, are what each author assumes or believes to be true about the problem. One strategy for ferreting out assumptions is to identify the discipline that has produced each of the insights and refer to the tables on disciplinary assumptions in Chapter 4, applying each relevant discipline's overall assumptions concerning the problem. This often requires close rereading of the insight to see how it reflects the overall assumptions of the discipline that produced it. For example, Martha Crenshaw (1998), a political scientist, writes that her approach to understanding the cause of suicide terrorism "permits the construction of a standard which can measure degrees of rationality, the degree to which strategic reasoning is modified by psychology and other constraints, and explain how reality is interpreted" (pp. 9-10). As a political scientist, Crenshaw is likely to share one of the discipline's major assumptions that are noted in Table 4.11. Her statement about the importance of measuring "degrees of rationality" (as well as other statements that she makes in her essay) appears to reflect the modernist and secular assumption that "human beings are...in part intentional actors, [and] capable of cognition and
acting on the basis of it” (Goodin & Klingerman, 1996, pp. 9–10). Thus, from the text of Crenshaw’s insight and from the assumption statements concerning political science in Table 4.11, it is relatively easy to construct an assumption statement as follows: “Suicide terrorists follow logical processes that can be discovered and explained.” The same assumption may be stated even more succinctly like this: “Suicide terrorists are rational actors.”

3. Work with theoretical explanations only when all authors use them to explain the cause of the behavior in question. Authors in the social sciences typically base their insights on theoretical or causal explanations. How to integrate different theoretical explanations of the same problem is the subject of the following chapter.

Another situation commonly encountered is working with insights by authors from applied fields (such as education or business) and/or interdisciplinary fields (such as bioethics or women’s studies). The defining elements of these fields are not included in Chapter 4. Consequently, the researcher will have to carefully examine each insight and look for statements that reveal the author’s assumption (i.e., what the author believes to be true about the problem).

_A Best Practice When Working With Concepts and Assumptions_

A best practice when working with concepts and assumptions is to follow the principle of least action. This means making sure that the changes made in them are the smallest possible to still create sufficient common ground on which to construct the more comprehensive understanding. The rationale for using this principle is essentially grounded in the conservative laws of thermodynamics: Nature finds the path that requires the least expenditure of energy. It will also make it easier to communicate back to disciplines.

_Techniques Demonstrated for Modifying Concepts and Assumptions_

Having decided what common ground will be created from, the next decision concerns which technique to use when modifying concepts and assumptions. This decision should be based on the nature and extent of the conflict. There are three possible situations:

- Concepts and assumptions do not conflict at all, though commonality is still obscured by discipline-specific terminology or context.
- Concepts and assumptions of two disciplines are different but not opposing; they really represent alternatives.
- Concepts and assumptions are diametrically opposed (Newell, 2007a, p. 258).
For most complex problems, says Newell (2007a), “the challenge of creating common ground confronts the interdisciplinarian with more than one of these situations; for problems that require input from the social sciences and humanities, all three are likely to be involved” (p. 258). Of the four techniques discussed here, some are useful in more than one situation, so the interdisciplinarian needs to understand the range and applicability of each technique.

Four techniques are used for creating common ground: redefinition, extension, transformation, and organization, or possibly some combination of these. Students, especially those new to the interdisciplinary research process, will almost always use redefinition (whether it takes the form of a new term or a new meaning for an old term). But whether they also use the technique of extension, transformation, or organization depends on the challenges posed by those concepts and assumptions.

Examples of each modification technique are drawn from problem-based course projects, published literature, and student papers that are explicitly interdisciplinary. An asterisk (*) after the surname identifies the student examples. As with the touchstone examples written by professional interdisciplinarians, the problem-based course project and student papers illustrate many, but not all, of the possible features of an interdisciplinary research paper. The categorization of these examples refers to the area of the researcher’s training and the orientation of the topic more than to the disciplines from which insights were drawn.

1. The Technique of Redefinition

Redefinition concerns what we call something—its label. It concerns language. Redefinition applies only to concepts, not assumptions. The technique of redefinition involves modifying or redefining concepts in different texts and contexts to bring out a common meaning. In interdisciplinary work, the technique of redefinition is sometimes referred to as “textual integration” (Brown, 1989, cited in Henry & Bracy, 2012, p. 264). As noted earlier, each discipline has developed its own technical vocabulary to describe the phenomena it prefers to study. Since every discipline has its own vocabulary expressed as concepts, it is necessary for the interdisciplinarian to create a common vocabulary to facilitate communication between disciplines—that is, to “get them on the same page.” This new vocabulary may amount to only a few key terms, just enough of them to enable disciplinary specialists to communicate effectively with each other (Wolfe & Haynes, 2003, p. 155). Since most disciplinary concepts and assumptions are couched in discipline-specific language, the technique of redefinition is used in most efforts to create common ground, in conjunction with other techniques as well as by itself (Newell, 2007a, p. 258). The trick is to modify terms as little as possible while still creating common ground on which to construct a more comprehensive understanding (Newell, 2001, pp. 19–20). Redefining a concept might also involve some modification of the assumption(s) underlying the concept.
Example of the Admission, Review, and Dismissal (ARD) Meeting  

The importance of finding common ground when trying to achieve coherent understanding of a complex problem is illustrated in the example of an Admission, Review, and Dismissal (ARD) meeting in special education. The purpose of this meeting is to develop a comprehensive approach to providing individualized instruction for a student with learning disabilities. Those attending the meeting include administrators, various specialists, the student, the student's parents, and the facilitator whose job it is to move the discussion toward an integrated plan for the student's educational needs for the coming year. The facilitator asks each person—the speech pathologist, the social studies teacher, the neurologist, an assistant principal—to propose a solution designed to meet the student's ongoing educational needs for the coming year. The specialists commonly use highly technical concepts or language to describe the student's disability. Perhaps sensing that the parents do not understand what the specialists are saying, the facilitator asks the specialists to "translate" the technical jargon into language that the parents, and indeed all in attendance, can understand. The facilitator attempts to find common ground among the various proposals offered by the specialists and the parents. These proposals are typically grounded in theory. Then, building on that, the facilitator proposes an integrative solution.

The facilitator's role in the ARD meeting is similar to that of the interdisciplinary student who is attempting to produce an integrative understanding of, say, the causes of the high rate of obesity among adolescents. Each discipline interested in the problem brings its perspective to the table. And experts in each of these disciplines attribute the causes of the problem to various factors. The task of the student working on this problem, like that of the ARD facilitator, is to allow each viewpoint to be expressed, identify conflicts and their sources, and then encourage one or more points of agreement to surface. This latter activity is creating or finding common ground.

Two lessons can be drawn from the above narrative. The first is the role of technical language (i.e., concepts) in establishing common ground. The second is the importance of recognizing that underneath the technical language used by the various professionals are disciplinary perspectives (i.e., theories, concepts, and assumptions) on how to treat a child with learning disabilities. In interdisciplinary work, one must take into account not only disciplinary terminology but also disciplinary perspectives.

Working With Concepts  Concerning concepts, then, researchers should do two things. First, pay close attention to how the same concept may have different meanings when used by different disciplines within the context of the same problem. As mentioned before, the concept "efficiency" has quite different meanings for economists (money out/money in), biologists (energy out/energy in), and political scientists (influence exerted/political capital expended) (Newell, 2001, p. 19).
Second, one should be alert to how experts from different disciplines use different concepts in their discussion of the same problem. Also, one should be able to distinguish between cases in which these different concepts refer to quite different things, and cases where different concepts have overlapping meanings. Both are common occurrences. From these, it is often possible to identify one concept that can be modified by using the technique of redefinition.

When redefining a concept, one should avoid using terminology that tacitly favors one disciplinary approach at the expense of another. Using the technique of redefinition can reveal commonalities in concepts that may be obscured by discipline-specific language. Once this language is stripped away, the concept can be redefined, enabling it to become the basis for creating common ground between the conflicting insights. Sometimes this occurs in conjunction with other integrative techniques, as shown in these threaded examples.

*From the Humanities: Silver* (2005), Composing Race and Gender: The Appropriation of Social Identity in Fiction. Creative writing, says Silver, like all other disciplines, sees the world through its own “peephole” or perspective. “I love this peephole deeply,” she confides, “but I also want to see the entire truth [because] truth is fundamental to fiction” (p. 75). For Silver, seeing the “entire truth” as a writer of fiction involves crossing disciplinary boundaries. One way fiction writers do this is by appropriating (i.e., assuming) social identities, which are reflected in their characters. Silver uses the modification technique of redefinition to resolve an ethical dilemma that exists when fiction writers, actors, and filmmakers regularly and uncritically appropriate a person’s identity. That dilemma is how to engage in this practice in an ethical, by which Silver means truthful or authentic, way. The disciplines that Silver finds most relevant to the topic are sociology, psychology, cultural studies, and creative writing. The challenge for Silver was identifying a concept that these disciplinary insights shared concerning this common practice. This concept, she concluded, was “implicature,” which denotes either (a) the act of meaning, implying, or suggesting one thing by saying something else, or (b) the object of that act (Stanford Encyclopedia of Philosophy, 2010). By redefining “implicature” to mean “the ultimate level of empathy that one person can have with another,” Silver makes it possible to practice appropriation in a way that is ethical rather than hypocritical.

*From the Natural Sciences and the Social Sciences: Delph* (2005), An Integrative Approach to the Elimination of the “Perfect Crime.” Delph questions whether advances in criminal investigatory techniques are able to eliminate the possibility of the “perfect crime.” She defines a “perfect crime” as one that goes unnoticed and/or as one for which the criminal will never be
caught (p. 2). Of the several disciplines and subdisciplines that are relevant to crime investigation, the three that Delph finds most relevant are criminal justice, forensic science, and forensic psychology. Delph identifies the current theories of these rapidly evolving subdisciplines and finds that the source of conflict between them is their preference for two different investigatory methods and reliance on two kinds of evidence. Forensic science analyzes physical evidence, whereas forensic psychology analyzes behavioral evidence. Each approach constructs a “profile” of the criminal, with forensic science using physical evidence and forensic psychology using a combination of intuition informed by years of experience and information collected from interviews and other sources.

Delph creates common ground between the conflicting approaches by redefining the concept of profiling to include both forensic science, with its emphasis on physical evidence, and forensic psychology, with its emphasis on “intuition” born of extensive experience and insights derived from crime scene analysis. This redefinition of criminal profiling enables her to bridge the physical (i.e., forensic science) and behavioral sciences (i.e., forensic psychology and criminal investigation). Forensic scientists do not need to use profiling as long as they have adequate evidence to analyze. But in the absence of such evidence, profiling can move the investigation forward by using a combination of “intuition” born of extensive experience and insights derived from crime scene analysis (p. 29). In this way, the redefined concept of profiling serves as common ground between the specialized knowledge that criminal investigation, forensic science, and forensic psychology offer.

From the Social Sciences: Schoenfeld* (2005), Customer Service: The Ultimate Return Policy Schoenfeld draws from the disciplines of psychology, sociology, and management to address an all-too-often overlooked and underappreciated aspect of consumerism, customer service. She defines customer service as “anything we do for a patron that embraces their experience” (p. ii). The goal of her study is to probe “the deeper levels of providing customer service,” which is another way of saying “to develop a holistic approach to the customer experience” (pp. 3–4). Schoenfeld distinguishes between the concept of customer service (any steps that are taken to satisfy and retain customers’ loyalty while they are in the store) and the concept of customer relationship management, or CRM (any steps taken to satisfy and retain customers when they are not in the store), and seeks to create common ground between them (p. 6). Her approach is to identify theories generated by psychology, sociology, and anthropology—including social exchange theory, expectancy theory, reasoned action, role theory, and attribution theory—that explain customers’ expectations, behaviors, and habits. Schoenfeld observes that these theories describe the concept of customer service in two different ways: from the perspective of the customer and from the perspective of the merchant or store owner instead of from just
one or the other. To create common ground, she redefines the concept of customer service so that it includes both perspectives. The focus of the concept is unaltered, or altered only slightly.

2. The Technique of Extension

Extension in an interdisciplinary sense refers to increasing the scope of the "something" that we are talking about. Whereas the focus of redefinition is linguistic, the focus of extension is conceptual. It involves addressing differences or oppositions in disciplinary concepts and/or assumptions by extending their meaning beyond the domain of the discipline that originated them into the domain(s) of the other relevant discipline(s) (Newell, 2007a, p. 258).

Example of Extending Concepts  The following is an example of a concept that was birthed in one disciplinary domain and later extended into other disciplinary domains. In the threaded example of the graffito, Bal extends the concept of exposure so that it includes three different perspectives on a note or letter written on a brick wall (i.e., graffito).

From the Humanities: Bal (1999), “Introduction,” The Practice of Cultural Analysis: Exposing Interdisciplinary Interpretation The challenge Bal faces with the graffito is how to expose its fullest meaning while not privileging any single disciplinary perspective. Her strategy is to analyze it from three perspectives (but not disciplinary ones) simultaneously: from the perspective of its author, from the perspective of the subject (i.e., the author’s beloved), and from the perspective of one who is reading the graffito and pondering its meaning. Bal uses the technique of extension to create a common vocabulary centered on the verb to expose, to which she connects three nouns: exposition, exposé, and exposure. These are the three meanings or insights that this close reading of the graffito brings together. The verb refers to making a public presentation or to “publicly demonstrating”; “it can be combined with a noun meaning opinions or judgments and refer to the public presentation of someone’s views; and it can refer to the performing of those deeds that deserve to be made public” (pp. 4–5). The graffito, as an exposition, brings out into the public domain the deepest held views and beliefs of the author. Exposition, says Bal, “is also always an argument. Therefore, in publicizing these views the author objectifies or exposes himself as much as the subject. This makes the graffito an exposure of the self. Such exposure is an act of producing meaning, a performance” (p. 2).

Example of Extending Assumptions  Concepts as well as assumptions can and often are extended (e.g., the concept of sustainability has been extended in recent decades from economic development to include the ecology, culture,
and political system of a country). The example of extending assumptions that follows addresses the assumption of rationality, which some authors make explicit and others leave implicit.

*From the Social Sciences and the Humanities: Repko (2012), “Integrating Theory-Based Insights on the Causes of Suicide Terrorism”* In previous STEPS, Repko identifies the relevant insights (noting that all of them explicitly espouse a particular theoretical explanation) and the sources of conflict between them. Given the great diversity of concepts used and their conflicting meanings, he concludes that common ground cannot be created by redefining any one of these concepts. So, unable to work with concepts, he decides instead to work with assumptions. He begins by reflecting on the taxonomy of theory-based insights he developed earlier, shown here as Table 11.1.

<table>
<thead>
<tr>
<th>Theory</th>
<th>Insight of Theory Stated in General Terms</th>
<th>Concept</th>
<th>Assumption</th>
</tr>
</thead>
<tbody>
<tr>
<td>Terrorist psycho-logic</td>
<td>“Political violence is not instrumental but an end in itself. The cause becomes the rationale for acts of terrorism the terrorist is compelled to commit” (Post, 1998, p. 35).</td>
<td>Special logic (Post, 1998, p. 25)</td>
<td>Terrorists are rational actors who organize their mental life through psychological constructs.</td>
</tr>
<tr>
<td>Self-sanction</td>
<td>“Self-sanctions can be disengaged by reconstruing conduct as serving moral purposes, by obscuring personal agency in detrimental activities, by disregarding or misrepresenting the injurious consequences of one's victims, or by blaming and dehumanizing the victims” (Bandura, 1998, p. 161).</td>
<td>Moral cognitive restructuring (Bandura, 1998, p. 164)</td>
<td></td>
</tr>
<tr>
<td>Martyrdom</td>
<td>“Terrorist suicide is basically an individual rather than a group phenomenon; it is done by people who wish to die for personal reasons. . . . Personality factors seem to play a critical role in suicidal terrorism . . . It seems that a broken family background is an important constituent” (Merari, 1998, pp. 206–207).</td>
<td>Indoctrination (Merari, 1998, p. 199)</td>
<td></td>
</tr>
</tbody>
</table>

(Continued)
Table 11.1 (Continued)

<table>
<thead>
<tr>
<th>Theory</th>
<th>Insight of Theory Stated in General Terms</th>
<th>Concept</th>
<th>Assumption</th>
</tr>
</thead>
<tbody>
<tr>
<td>Collective rational strategic choice</td>
<td>“This approach permits the construction of a standard that can measure degrees of rationality, the degree to which strategic reasoning is modified by psychology and other constraints, and explain how reality is interpreted (Crenshaw, 1998, pp. 9–10).”</td>
<td>Collective rationality (Crenshaw, 1998, pp. 8–9)</td>
<td>“Terrorism may follow logical processes that can be discovered and explained” (Crenshaw, 1998, p. 7).</td>
</tr>
<tr>
<td>“Sacred” terror</td>
<td>“Holy” or “sacred” terror is “terrorist activities to support religious purposes or terror justified in theological terms” (Rapoport, 1998, p. 103).</td>
<td>“Holy” or “sacred” terror (Rapoport, 1998, p. 103)</td>
<td></td>
</tr>
<tr>
<td>Identity</td>
<td>“Religious identity sets and determines the range of options open to the fundamentalist. It extends into all areas of life and respects no separation between the private and the political” (Monroe &amp; Kreidie, 1997, p. 41).</td>
<td>Identity</td>
<td>Religious identity explains “political” behavior.</td>
</tr>
<tr>
<td>Fictive kin</td>
<td>Loyalty to an intimate cohort of peers who are emotionally bonded to the same religious and political sentiments (Atran, 2003a, pp. 1534, 1537).</td>
<td>“Religious communion” (Atran, 2003a, p. 1537)</td>
<td>Personal relationships shape people’s ideas about what is “good.”</td>
</tr>
<tr>
<td>Modernization</td>
<td>Explains the process of historical and cultural change and why some cultures “modernize” or transform themselves politically, economically, and technologically following the Western model while others do not (B. Lewis, 2002, p. 59).</td>
<td>Modernization</td>
<td>Terrorists behave rationally in response to these exogenous factors.</td>
</tr>
</tbody>
</table>

Repko observes that insights from the same discipline usually share the same assumption. For example, the political science theories of collective rational strategic choice and sacred terror share the assumption that terrorists are rational actors who follow logical processes that can be discovered and explained.

He also observes that conflicts exist between the assumptions of different disciplines:

The assumption underlying self-sanction theory (from cognitive psychology) is that understanding the behavior and motivation of
suicide terrorists requires studying primarily the mental life and the psychological constructs of individual terrorists. By contrast, the assumption of identity theory (from political science) is that understanding the behavior and motivation of suicide terrorists requires studying their cultural as well as their religious identity, but not at the expense of taking into account personality traits (inherent and acquired). (p. 145)

A deeper probing of the assumptions of these theories reveals a commonality that both share, namely the goals of suicide terrorists. These are understood not in terms of self-interest as rational choice advocates would have it, but rather as “moral imperatives” or “sacred duties.” It so happens that this deeper—and extended—assumption is also shared by the theories of fictive kin, strategic rational choice, “sacred terror,” martyrdom, terrorist psycho-logic, and modernization. He concludes that the common ground assumption shared by all of the theory-based insights to varying degrees is this: The goals of suicide terrorists are “moral” and “sacred”—and, thus, rational—as defined by Islamic fundamentalism (p. 145).

3. The Technique of Transformation

The technique of transformation is used to modify concepts or assumptions that are not merely different (e.g., love, fear, selfishness) but opposite (e.g., rational, irrational) into continuous variables (Newell, 2007a, p. 259). For example, Amitai Etzioni (1988) in The Moral Dimension: Towards a New Economics addressed the problem of how to overcome diametrically opposed concepts and assumptions about the rationality (economics) or irrationality (sociology) of humans. His solution was to transform them by placing them on opposite ends of a continuous variable called “the degree of rationality.” By studying the factors that influence rationality, he found that it is possible to determine in principle the degree of rationality exercised in any given situation. Similarly, Etzioni treated trust and governmental intervention as continuous variables, making it possible to explore and estimate determinative influences in any particular context rather than as dichotomous assumptions to accept or reject.

The value of transformation in creating common ground is this: Rather than forcing us to accept or reject dichotomous concepts and assumptions, continuous variables allow us to push back assumptions and extend the scope of theory. The effect of this strategy is not only to resolve a philosophical dispute but also to extend the range of a theory (Newell, 2007a, p. 260). Transforming opposing assumptions into variables allows the interdisciplinarian to move toward resolving almost any dichotomy or duality, as illustrated in these examples.
From the Social Sciences: Englehart* (2005), Organized Environmentalism: Towards a Shift in the Political and Social Roles and Tactics of Environmental Advocacy Groups. Englehart is concerned that anti-environmentalism was becoming institutionalized in American politics during the G. W. Bush administration. To ensure that environmental responsibility becomes an integral part of our society, she proposes that environmental advocacy groups integrate their social and political agendas. These groups assume various active roles in society: They challenge and pressure the government with an environmental ethic; they are actors in the political arena who influence policy making by lobbying and campaigning in election cycles; and they are what sociologists call “social movement organizers” who mobilize the public to take action on pressing environmental issues. To better understand the roles and tactics of environmental groups, Englehart examines them in light of relevant theories, including social movement theory (in its several variations), rational choice theory, collective identity theory, and structural network theory. By comparing these theories and the insights they have generated, she finds that for environmental groups to grow and recapture the political initiative, they must change their approach to what they do and how they do it.

Creating common ground among the various theories and insights requires that she use the technique of transformation. This involves transforming opposing theoretical assumptions so as to extend the scope of social movement theory. This resulted in transforming the “I” of self-interested economics and political advocacy and the “We” of collective identity in social movements into a jointly maximized “I” and “We” for environmental advocacy. Englehart advocates using face-to-face relationships within an environmental organization to shift members along the continuum from “I” to “We,” and then to extend the “We” (for the purposes of interorganizational networking) to include those with differing environmental values. Practically, this will cause environmental organizations to concentrate their efforts on educating and politicizing the social arena and creating their own political opportunity structures through innovative mobilization strategies so as to challenge current anti-environmental political action. Integration via transformation of these theoretical and disciplinary insights, Englehart argues, would result in a bottom-up, grassroots, coalition-driven social emphasis that, when combined with the traditional top-down, legislative-driven political pressure, will help environmental advocacy groups recapture the political initiative (pp. 58–63).

From the Natural Sciences and the Humanities: Arms* (2005), Mathematics and Religion: Processes of Faith and Reason. Arms compares faith and reason, which are often seen as polar opposites. “People think,” she says, “that religion finds its home in the heart and faith, while mathematics belongs in the brain and reason” (p. i). The disciplines of her focus are mathematics, philosophy (i.e., logic), and religion. Logic, she finds, is the fulcrum discipline
for mathematics and religion because both rely on it. Religion employs logic, albeit according to its own rules and within its own frame of reference. Logic is also used in determining the provability of mathematics, and this requires that one employ deductive reasoning. Gödel's Incompleteness Theorems, says Arms, show that we cannot prove necessary truths in mathematics. But by his Completeness Theorem, we know that first-order logic, sometimes called mathematical logic, is complete, and therefore at least trustworthy (p. 5). She also draws upon sociology and Durkheim's theory of religion and extracts from the latter his definition of religion as a socially constructed belief system, which she employs in her study.

The belief in the existence of a Christian God and the belief in the completeness and consistency of mathematics are not only belief systems, Arms says, but faith-based belief systems, and very different ones at that (pp. 66–67). She uses the concept of faith to continue the idea that mathematics and religion still have the possibility of certainty. Her reasoning runs as follows:

We take it on faith that reason is a good thing. Since reason is an object of faith, it is reasonable to assume than an object of reason can become an object of faith. Faith is justifiable in keeping belief in the certainty of mathematics. Mathematics has made it clear to us that we cannot depend on it purely through reason. And even if Gödel and his Incompleteness Theorems had never come about, there would still be things in mathematics that are not provable. There are plenty of problems that have never been solved, and many that may never be solved. It took mathematicians over 300 years to solve Fermat's Last Theorem, but they had faith that it was true and that they would find a solution. In mathematics, it is common to prove something using an idea that we do not know is true, but assume it is. (p. 76)

To find common ground between faith and reason, Arms transforms the dichotomies of faith and reason and, by implication, the dichotomies of mathematics and religion. In the end, she confesses that she had been under the impression that her logic could “go anywhere”; that “science trumped religion, and [that] logic trumped science.” Therefore, logic was obviously stronger than faith. Then she learned that her “dear logic,” while complete, could not prove even mathematics. This rude awakening kept faith “afloat” and enabled her to accept “the complementary nature of reason and faith” (p. 80).

From the Social Sciences: Boulding (1981), A Preface to Grants Economics: The Economy of Love and Fear Boulding's study of research grants involved him probing the complexities of human behavior that motivates grant bequests. More particularly, Boulding sought a way to transform the debate about whether human nature in general is selfish or altruistic, as described in Newell's (2007a) summation:
Boulding (1981) recognized that both benevolent behavior (studied by sociologists) and malevolent behavior (studied by political scientists) can be understood as other-regarding behavior (positive and negative, respectively). He then arrayed them along a continuum of other-regarding behavior. The self-interested behavior studied by economists became the midpoint on that continuum because its degree of other-regarding behavior is zero. Thus, he set out a way to transform the debate about whether human nature in general is selfish or altruistic into a choice of where on the continuum of motivations people are likely to fall in the complex problem under study. By combining into a single continuum with self-interest the motivations of love and hate/fear that support or threaten the integrative mechanisms binding societies and politics together, Boulding used the technique of organization to integrate the differing conceptions of human nature under economics, sociology, and political science. (p. 259)

4. The Technique of Organization

The technique of organization creates common ground by clarifying how certain phenomena interact and mapping the causal relationships. More specifically, organization (1) identifies a latent commonality in the meaning of different concepts or assumptions (or variables) and redefines them accordingly and (2) then organizes, arranges, arrays, or maps the redefined concepts or assumptions to bring out a relationship between them (Newell, 2007a, p. 259). Organization focuses on the overall relations between distinct variables or clusters of distinct variables (but not the precise explicit relationships set out by a particular theory).

At this point in the IRP, the map created earlier may need to be refined so as to show all causal relations (some of which may have been overlooked when the map was first drawn). In effect, the revised map of causal relations depicts the common ground. (This may be true in the sciences but not in the humanities, which often do not stress causation at all.) Sometimes we may already have used organization without realizing it earlier when we first mapped the problem. What we are doing here that is new is appreciating that each discipline tends to make assumptions that privilege its own phenomena. So economists stress individual rational decisions, and sociologists stress the influences of other people, but we can see how the latter shapes the former. Thus, we are indeed coping with the core assumptions of these disciplines. What we tend to address with organization is the type of assumption that limits the phenomena engaged by a particular discipline by stressing the influence of other phenomena (Rick Szostak, personal communication, February 11, 2011).

For example, organization enables us to see cultural values as providing a context within which rational decisions are made. Culture might influence both individual goals and the acceptable means by which those goals can be
pursued. Individuals, then, rationally choose how best to achieve their goals using acceptable means in a particular situation. In this case, rationality is contained within the envelope of culture and is also permeated by it. The map of an individual's decision in a particular cultural context would show the variables of cultural influences and how these influence the choices the person faces, with the person making the best choice given the person's beliefs (Rick Szostak, personal communication, 2010).

From the Social Sciences: Etzioni (1988), *The Moral Dimension: Towards a New Economics*  We turn again to Etzioni's book, this time to show how the technique of organization can be extended from individual concepts and assumptions to large-scale models, major theoretical approaches, and even entire disciplines. Etzioni's use of organization is summarized here by Newell (2007a):

Etzioni argued that there are several identifiable large-scale patterns of interrelationships between the “rational/empirical” factors studied by economics and the “normative/affective” factors studied by sociology. One such pattern I call an envelope. Here the rational behavior studied by economics is bounded, limited, or constrained by the normative factors studied by sociologists. Thus, rational economic behavior functions within a normative sociological envelope. Another pattern might be called inter-penetration. Some sociologic factors directly influence economic behavior, while some economic factors directly influence social behavior. Thus, social relationships can have an effect on how economic information is gathered and processed, what inferences are drawn, and what options are considered. And a third pattern can be referred to as facilitation. Etzioni points out that the “free individuals [studied by economics] are found only within communities [studied by sociologists], which anchor emotions and morals” (xi). Thus, sociological factors such as communities can actually facilitate individual economic behavior. (p. 259)

In this example, the technique of organization can make macro-level applications to bring out the relationship among commonalities of meaning within contrasting disciplinary concepts or assumptions.

The Value of These Techniques

The value of these techniques is that they enable us to create common ground when working with concepts (and their underlying assumptions). They replace the either/or thinking characteristic of the disciplines with both/and thinking characteristic of interdisciplinary integration. Inclusion, insofar as this is possible, is substituted for conflict. Creating common ground does not remove the tension between the
concepts and the insights they produce; it does reduce this tension and make integration possible (but does not guarantee it).

Creating Common Ground When Assumed Values and Rights Conflict

Students commonly work with issues that involve conflicting values and rights. Examples include the value of an unborn's life versus the value that the mother assigns to her freedom of choice, the value of equality for women versus the value of a cultural tradition that denies such equality, the right of the terminally ill to end life with dignity versus the right of society to sustain life, and the value of using fertilizers to increase crop production versus the value of using organic (i.e., sustainable) farming techniques.

Values and rights involve ethics (a subdiscipline of philosophy) and call for students to make ethical evaluations of the relevant insights. Ethics (a type of philosophical theory) is concerned with how the world should work rather than how it does work (which is the function of scientific theory). Ethical evaluations are made at two points in the IRP. The first occurs during the literature search. Here students should strive not to allow their personal views to skew the selection of insights concerning the issue. As noted earlier, such skewing is a common practice but has no place in quality interdisciplinary work where all relevant viewpoints should be accorded equal voice. The second is made when analyzing the problem (STEP 6, the subject of Chapter 8). Here students should strive not to allow their personal views to skew their evaluation of insights with which they may disagree.

A proven way to work with insights that conflict because their ethical positions conflict is to use Szostak's (2004) classification of five broad types of ethical analysis and decision making:

1. **Consequentialism**: where an act is judged in terms of whether its consequences are good or not

2. **Deontology**: where an individual's act conforms to certain rules such as the Golden Rule (i.e., “Do unto others as you would have others do unto you”), the Kantian categorical imperative (i.e., “An act is ethical if and only if it is in accord with general principles that everyone would want to live by”), and arguments from rights

3. **Virtue**: where individuals are urged to live in accord with one or more virtues, such as honesty

4. **Intuition/experience**: where unique insight into an act, person, relationship, group, or decision is based on “knowing” from experience and reliance on one's subconscious mind (An act is thus judged to be good if it feels right.)
5. Tradition: where a behavior, relationship, group, or decision is judged based on its conformity to a historical cultural or societal practice (pp. 124, 194)

These five types of decision-making processes, says Szostak (2004), are mutually exclusive and exhaustive. They “are the five ways in which any person might make any decision. In terms of ethics,” he says, “these five processes describe the five ways in which any person might evaluate any act or outcome” (p. 195).

Arguments for the Validity of These Types

Szostak (2004) advances three arguments for the validity of these five broad types of ethical analysis.

1. They each start from valid premises. It makes sense to judge acts by consequences. But it also makes sense to judge acts in terms of virtues or some predetermined rules. And it makes sense to respect (albeit critically) a society’s traditions, for there is good reason to suspect these have been (imperfectly) selected to serve the society. And it makes sense to not do things that make us feel guilty.

2. Each of us uses these five types of decision making all the time: We rationally evaluate big decisions (going to university), follow certain rules (be nice to strangers, say), identify ourselves as kind or courageous or honest, do what others do (say, when buying clothes), and act on intuition (when dating). Indeed, we usually do and should use more than one type when making particular decisions: A little rational evaluation of dating choices is a good idea, for example.

3. Philosophers constantly justify only one type of analysis through appeals to others. Rule utilitarians, for example, justify following rules by arguing that we don’t have the time or cognitive capacity to rationally evaluate each decision, and thus should follow rules that generally lead to good outcomes. In turn, utilitarians, when asked why we should focus on happiness as the consequence we care about, argue that our intuition tells us that humans want to be happy. Indeed, as much as philosophers like to downplay the role of intuition, the fact is that individuals have an incentive to behave ethically (in situations where nobody will know), only because they will feel bad if they don’t (Rick Szostak, personal communication, November 16, 2009).

How to Know If Insights Conflict Over Ethics

Students can determine if insights conflict because of ethical disagreements (rather than because of conflicting theories, concepts, or assumptions) by
asking certain questions of each insight. Note that these questions correspond to the five broad types of ethical analysis and decision making. The following questions are designed to help the student identify which type of analysis—consequences, rights, and so on—is at issue:

- Do the insights differ on the desired *consequences* of individual actions?
- Do the insights differ on the *rights* that should be accorded an individual or group?
- Do the insights differ over the choice of which *virtues* should be appreciated or established (i.e., either at the group level, at the individual level, or by adherence to some universal code)?
- Do the insights differ in their beliefs about human *intuition* (e.g., “If one believes that human intuition is grounded in genetics or ‘the gift of god’ one will expect universal intuitive behavior; if it is thought that intuition is grounded in experience one will not” (Szostak, 2004, p. 195))?
- Do they differ over the role that *tradition* should play when evaluating an act or attitude?

Creating Common Ground When Values and Ethical Positions Conflict

There are at least two possible ways to create common ground when working with dichotomous ethical views. One is to develop a continuum as described in the discussion of transformation and illustrated in the work of Englehart and Etzioni. Readers will recall from their works that they created common ground (though Etzioni did not use this term) between conflicting ethical views. For example, one could develop a continuum between one’s right to act and one’s right not to be hurt by the actions of others. This strategy works when authors employ different versions of the same type of ethical analysis. However, when different types of ethical analysis are employed, a different strategy needs to be employed. For example, when different ethical perspectives focus on different parts of a problem (such that consequentialism stresses results while virtue ethics stresses how we achieve them), it may be useful to redefine terms or employ the technique of organization.

A second possible way to create common ground when identifying and analyzing the potential ethical impacts of decisions is to use the ethical matrix developed by Mepham (2000) for rational ethical analysis. The components of the matrix are based on the work of Beauchamp and Childress (2001) on bioethics that has gained wide support in medicine and medical ethics. They introduced the “four principles approach” through which decision makers were guided to consider four
core values: nonmaleficence (doing no harm), beneficence, autonomy, and justice. As an analytical tool, the matrix

has the three principles (wellbeing, autonomy and justice) on the horizontal axis. On the vertical axis one lists the interest groups—that is, the people, organizations, communities, and so on—who stand to be affected by the decisions being made. The task then is to identify and document the ethical impacts of the matter under consideration in each cell of the matrix. While this task can be undertaken through desk-based research, it is also a dialogue tool when undertaken through group discussion. (McDonald, Bammer, and Deane, 2009, p. 110)

The matrix is particularly useful in situations where, for example, decision makers are concerned that their diverse or conflicting values have the potential to influence their decision on a particularly sensitive matter such as the ethical impacts of introducing a proposed technology (Mepham, 2000, p. 168). “Once the cells of the matrix are filled in,” explain McDonald et al. (2009),

its users weigh the relative importance of the issues identified. Different people might give different weights to a given potential ethical impact on a particular interest group. Through discussion, the users of the matrix reach agreement about how the options under consideration, if implemented, will affect different interest groups with respect to their wellbeing, autonomy and entitlement to justice. (p. 110)

McDonald et al. (2009) identify four primary strengths of the matrix as an approach to prepare for integration:

* It is able to anticipate what the values of different stakeholders might be and how they will be differently impacted by the options available for implementing the initiative.
* It raises the salience of values and conflicts.
* It is grounded in people’s own ways of seeing values.
* It is conceptually straightforward. (p. 113)

However, they point to this critical limitation: The matrix fails to provide any clear guidelines on how to move toward a consensus on (i.e., integrate) the values it identifies (p. 113).

In the end, the researcher should evaluate any ethical statement about reality employed in an ethical argument just as one would with any other argument. Assuredly, it is doubtful that common ground can be created in all ethical disputes.
Chapter Summary

This chapter has argued that the process of creating common ground plays out differently depending on whether disciplinary concepts or theories are in view. If concepts, then these are the objects of modification (or the assumptions underlying them); if theories, then the objects of modification are the theories themselves. The first section of the chapter defined common ground, explained that creating common ground requires unconventional thinking, established that it is necessary for collaborative communication across disciplines, and pointed out that common ground is achieved through the use of language. This section also established that common ground is created from concepts and/or assumptions embedded in disciplinary insights, is integral to performing integration, requires using intuition, and plays out differently in contexts of narrow versus wide interdisciplinarity and that creating common ground is the interdisciplinarian's responsibility. The second section detailed how to modify conflicting concepts and assumptions by using one or more modification techniques. These were illustrated from student and professional work. The section also explained how to create common ground when assumed values and rights conflict.

The discussion of STEP 8 in this and in the following chapter is guided by the idea that disciplinary insights are potentially complementary if their concepts or theories are sufficiently modified. But there is no guarantee that common ground can be achieved in every case. Chapter 12 continues the discussion of STEP 8 by focusing on how to modify disciplinary theories.

Notes

1. This belief is opposed to the belief that disciplines are different worlds capable of being understood only from the inside. Weingast (1998) agrees that disciplinary insights are potentially complementary: "In the past, interaction among scholars using different perspectives has tended to emphasize their seeming irreconcilability, as if Kuhn's 'competing paradigms' provides the unique program for interaction among different approaches in the social sciences. In recent years an alternative program has emerged, emphasizing the complementarities among different approaches. This new program acknowledges differences not as competing paradigms but as potentially complementary approaches to complex phenomena. This suggests a more fruitful interaction among scholars of different approaches, where not only the tools and techniques of the other become relevant, but also too do the phenomena under study" (p. 183).

2. That common ground has to be created is especially true in the social sciences and the humanities. William H. Newell (personal communication, January 25, 2010) says, "While many if not most differences are turning out to be
differences in degree, not in kind, I still see at least one difference in kind (or to such a degree that it may as well be a difference in kind) between the social and natural sciences, namely that humans have mental capacities that lead them to exhibit behaviors that are qualitatively different from those of the rest of the natural world (including the overwhelming majority of other living species). Because humans can think systematically, anticipate the future, imagine alternative futures and how they might be achieved, and distinguish between what is and what is not desirable, they can eventually see when there are undesirable unanticipated systemic consequences of their behavior and sometimes change it by deliberately and systematically manipulating, changing, or adding feedback loops within the system."

3. Several interdisciplinary practitioners—including Klein (1996), Repko (2008), Szostak (2004), and Welch (2007)—agree that intuition deserves a place in interdisciplinary theory and methods.

4. I am indebted to William H. Newell (personal communication, April 2005), who gave me the idea to link the four interests in marriage counseling to these techniques.

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**Exercises**

**Definition**

11.1 How does the definition of common ground complement and extend the definitions of interdisciplinary studies and interdisciplinarity?

**Common Ground Theory**

11.2 How does common ground theory explain how we are able to comprehend so many different perspectives? What are the implications of the theories of Clark and Bromme for dealing with conflict of all kinds, including values?

**Intuition**

11.3 How is the story of Helen Keller an example of how intuition helps achieve common ground, and what does this story overlook?

**Roles**

11.4 How is the role of a marriage counselor similar to the interdisciplinarian's responsibility?

11.5 How is the role that the facilitator plays in an Admission, Review, and Dismissal meeting in special education similar to the role played by the interdisciplinarian in attempting to create common ground among conflicting disciplinary insights?
Best Practice

11.6 How should one proceed with creating common ground in the following situations?
   a. Some of the authors make explicit reference to one or more concepts, but the authors of other insights do not.
   b. All of the authors reference the problem using concepts that have different (apparent or real) meanings.
   c. Some authors use theoretical explanations, but others do not.

Techniques

11.7 What technique(s) might be used in the following situations?
   a. Some of the authors use concepts, and some use theories.
   b. All of the authors use the same concept but use different language to define it.
   c. Authors employ concepts or assumptions and generate insights without formulating theories.
   d. Authors have conflicting conceptions and assumptions about whether behavior is rational or irrational.

11.8 How is Bal’s approach to the graffito an example of extending concepts?

11.9 Why did Repko decide to work with assumptions?