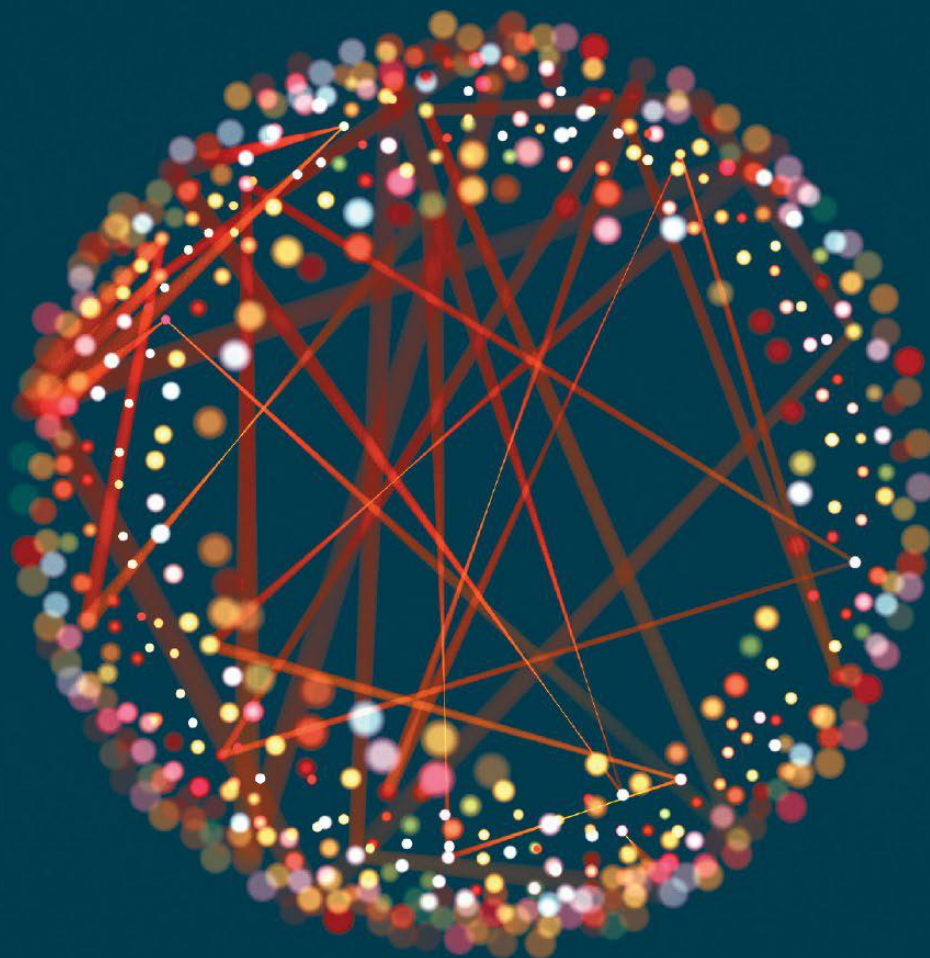


Allen F. Repko • Rick Szostak
Michelle Phillips Buchberger

3
EDITION

INTRODUCTION TO **INTERDISCIPLINARY STUDIES**



Introduction to Interdisciplinary Studies

Third Edition

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Introduction to Interdisciplinary Studies

Third Edition

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PREFACE

The purpose of this book is to provide instructors and students in entry-level interdisciplinary courses and thematic programs with a comprehensive introduction to interdisciplinary studies. This book introduces students to the cognitive process that interdisciplinarians use to approach complex problems and eventually arrive at more comprehensive understandings of them. Put another way, students in these courses will learn to think like interdisciplinarians. By the end of an introductory course in which this book is used, students should be able to differentiate between disciplinary and interdisciplinary approaches to learning and research, follow and critique interdisciplinary arguments, understand interdisciplinary process, and assess the quality of their own work.

Interdisciplinary courses and programs continue to proliferate in higher education. Bestcolleges.com, a website that ranks various university programs, had this to say about interdisciplinary studies:

Interest in integrative studies programs has risen as academics, organizations and students recognize the value of engaging in multidisciplinary and interdisciplinary learning. These types of degrees equip students with a wide-range of knowledge as well as the critical and analytical skills needed to be successful in the workforce.

Rather than focusing on a single discipline, students can tailor their studies to their academic interests and professional goals. The result is an *integrative learning experience* that leads to personal fulfillment, a greater awareness of social responsibility and a thoughtful approach to modern issues. (Bestcolleges.com, paras. 1, 2)

This growing interest in interdisciplinary studies is reflected in the development of new programs. For example, East Stroudsburg University of Pennsylvania established the Department of Intercultural and Interdisciplinary Studies in 2007. In 2010, Southern Utah University announced that it was making interdisciplinarity and a first-year interdisciplinary course the centerpiece of its redefined mission as a public liberal arts and sciences institution. In 2011, Seattle University took an existing Liberal Studies program and overhauled the curriculum to become Interdisciplinary Liberal Studies. This involved adding three new required foundational courses for a total of five, which were phased in from 2011 to 2012.

The authors of this book can attest to the fact that interest in interdisciplinary studies has increased throughout the world. We have been invited to speak about interdisciplinarity in many countries, including Lebanon, Uganda, Mexico, and China. This book is used in several countries on at least four continents. One of us was recently interviewed about interdisciplinarity by a leading publication on higher education in India. In Australia, the University of Melbourne is intensifying its undergraduate emphasis on interdisciplinary learning and research, believing that its graduates should be “knowledgeable across disciplines” and graduate with the ability to “examine critically, synthesize and evaluate knowledge across a broad range of disciplines.” As evidence of its commitment, it has added two theme-based courses that are “explicitly interdisciplinary” (Golding, 2009, p. 1).

The number of interdisciplinary undergraduate programs such as global studies, environmental studies, and human ecology has more than doubled over the past 3 decades—from fewer than a thousand programs in 1975 to more than 2,200 in 2000 (Brint, Turk-Bicakci, Proctor, & Murphy, 2009). More than 30,000 baccalaureate degrees in interdisciplinary-oriented programs were awarded in 2005, an increase of 70% from the previous decade (National Center for Education Statistics, 2007).

Entry-level courses in interdisciplinary studies and thematic programs that include interdisciplinarity as one of their foci have undergone significant changes in recent years in terms of content coverage, orientation, and teaching practice. Unlike a traditional discipline such as sociology, which has long had a recognized core of knowledge that is common to almost all introductory courses and textbooks, the field of interdisciplinary studies is just developing consensus about the principles (i.e., concepts, theories, or method) of the field. This emerging consensus is reflected, for example, in Repko and Szostak’s (2021) *Interdisciplinary Research: Process and Theory* (4th ed.).

THE NEED FOR THIS BOOK

Until recently, it was common practice for entry-level courses, whether in interdisciplinary studies or thematic interdisciplinary programs, to be taught by teams of disciplinarians who had no formal training in interdisciplinarity. Shrinking budgets have made this practice a luxury that few institutions can afford. Today, the responsibility for teaching an introductory course is more commonly the responsibility of a single instructor who often is more familiar with the disciplinary literature pertaining to the course or program theme than with the extensive literature on interdisciplinarity and the principles and best practices of the field. In this circumstance, the instructor is faced with the dual challenge of developing adequacy in the disciplines relevant to the course issue or theme as well as adequacy in the principles and best practices of interdisciplinarity. The single instructor approach will likely be the norm in coming years. The implication of this trend is that

instructors, more now than ever, need a comprehensive textbook that introduces students to the principles of interdisciplinarity, prepares them to produce quality interdisciplinary work, and develops their ability to work with complex issues, problems, or questions that span multiple disciplines.

The authors' experience in designing and teaching entry-level interdisciplinary courses points to the need for a core or supplemental textbook that introduces students to the basic elements of this diverse and maturing field. This book (1) identifies the “drivers” of interdisciplinary learning and research and relates these to students' preparation for the rapidly changing job market of the new millennium; (2) situates interdisciplinary studies as part of the history of knowledge formations and the differentiation of knowledge into disciplines; (3) offers an integrated definition of interdisciplinary studies that helps students articulate the nature, value, and characteristics of interdisciplinary studies to friends, parents, and prospective employers; (4) helps students understand what it means to be interdisciplinary in terms of the cognitive abilities, values, and traits and skills that exposure to interdisciplinary studies fosters; (5) explains the role of the disciplines in the university and how interdisciplinary studies differs from, yet builds upon, the disciplines; (6) examines the diverse forms of interdisciplinary studies in terms of their assumptions, theories, commitment to epistemological pluralism, and perspectives on reality; (7) facilitates students' ability to think critically about real-world problems and intellectual questions that span a range of disciplines and interdisciplinary fields in the undergraduate curriculum; (8) presents models commonly used by practitioners for addressing issues that are complex; (9) introduces a rubric that enables students to assess the quality of interdisciplinary work by others as well as their own; (10) integrates discussions concerning intellectual autobiographies, student portfolios, and service learning; (11) presents material that is consistent with a constructivist and pragmatic approach to learning; and (12) prepares students for advanced interdisciplinary study.

THE INTENDED AUDIENCES

The book is intended for multiple audiences. Programs that are explicitly interdisciplinary and that offer an entry-level course will find the book particularly useful as a primary text that offers a comprehensive overview of the field and develops students' ability to begin thinking like interdisciplinarians. These courses are taught under a variety of titles such as “introduction to liberal studies,” “interdisciplinary perspectives,” and “introduction to interdisciplinary studies.” Their focus is on presenting the basic principles of interdisciplinarity, exposing students to writings by the field's leading practitioners, and developing the ability to critically analyze the work of practitioners and students like themselves. Because this book is thoroughly grounded in the field's extensive literature, students using it will be well prepared to pursue more advanced study. For courses that include a short

paper or culminating project that demonstrates achievement of interdisciplinary learning outcomes, the book includes chapters that explain how to apply the easy-to-follow, step-like process described in the “Broad Model” of interdisciplinary process to researching and writing papers. These chapters also include a rubric based on the Broad Model that students can fruitfully use to assess the interdisciplinary work of others as well as their own.

This book will also be useful as a supplemental text for entry-level courses in thematic multidisciplinary “studies” programs that focus on a single issue or theme. These programs include non-Western cultural studies (Asian area studies, Latin American area studies, African area studies, Middle Eastern studies), race and ethnic studies (African American studies, ethnic and race studies, Chicano/Hispanic studies, American Indian studies, Asian American studies), Western studies (European studies, North American studies, Western period history studies, European origin studies, Western studies, Canadian studies), environmental studies, international and global studies (international relations, global, peace, conflict studies, political economy), civic and government studies (urban studies, public affairs and public policy, legal studies), women’s studies, American studies (American culture or studies, U.S. regional studies), and brain and biomedical studies (cognitive, neuroscience, biomedical, biotechnology, medical technology). Other programs include literary studies (and the rapidly expanding “digital” humanities), film studies, liberal studies, gerontology, Judaic studies, science and technology, arts management, health management, folk studies, ethics and values studies, and sexuality studies.¹

Many of these programs claim interdisciplinary status, which means that they probably subscribe to the core principles of interdisciplinarity discussed in this book. The majority of the readings used in introductory courses to these programs focus primarily on the topic of the course and only secondarily on interdisciplinarity, which is referenced in class discussion during the semester. However, these courses need to introduce students to the basics of interdisciplinarity as well as to the substantive content of the theme. After all, thematic programs typically build on disciplinary courses from several disciplines. Students can use the information in this book to understand, for example, the concept of disciplinary perspective, when to use an interdisciplinary approach, how to identify disciplines that are most relevant to the course theme (even if these are preselected), and how to critically analyze disciplinary insights using interdisciplinary techniques. Systematic coverage of this and other relevant information in this book will enhance the coherence and rigor of these courses.

As it is, considerable overlap exists between multidisciplinary and interdisciplinary approaches to learning and research. This book addresses instances of overlap but is careful

¹Data compiled from College Catalog Study Database. Brint, Turk-Bicakci, Proctor, & Murphy (2008). Original publication of the table, copyright held by publisher the Johns Hopkins University Press: Brint, S. G., Turk-Bicakci, L., Proctor, K., & Murphy, S. P. “Expanding the Social Frame of Knowledge: Interdisciplinary, Degree-Granting Fields in American Colleges and Universities, 1975–2000.” *Review of Higher Education*, 2009, 32(2), 155–183.

to distinguish between these two broad approaches and to show how interdisciplinary approaches build on multidisciplinary approaches. The book identifies and explains the principles of interdisciplinarity *without being prescriptive concerning how these principles should be applied in a particular context of interdisciplinary learning*. This flexible approach enables instructors to strike a balance between introducing students to the substantive content of their course, say the environment, and the principles of interdisciplinarity.

This book will also be useful to general education programs. The great deficiency of many general education programs is their lack of cohesion and identifiable learning outcomes. This is remedied, in part, by structuring the program around a unifying issue, problem, or question that connects it to the disciplines participating in the common core curriculum and labeling it “interdisciplinary.” However, the critical element that is lacking is an introductory course or cohort experience that prepares students to understand what a university is, the role that disciplines and interdisciplinary programs play in it, and how to make connections among knowledge areas that are epistemologically distant. All general education programs, therefore, need some basic understanding of interdisciplinarity. Even if the program merely requires students to take a menu of courses from participating disciplines, there should be an introductory course or entry-level cohort experience that introduces students to the disciplines constituting the common core. (The website of the Association for Interdisciplinary Studies at <https://oakland.edu/ais/> has a set of pages devoted to interdisciplinary general education.)

To Instructors

There are at least five major problems that you face when designing and teaching an introductory-level interdisciplinary course. The first is “making do” with materials that typically do not reflect recent advances in the burgeoning literature on interdisciplinary studies. The unfortunate result is that interdisciplinary instructors are often unwittingly teaching and modeling multidisciplinary, not interdisciplinarity. Faulty course design and the absence of rigorous learning outcomes that are explicitly interdisciplinary misinform students about the principles of the field and ill prepare them for advanced interdisciplinary course work. This book reflects the significant advances in interdisciplinary practice and theory over the past decade. Research shows that repeated exposure to interdisciplinary learning contexts fosters the development of certain cognitive abilities such as perspective taking and thinking critically about conflicting information on an issue or problem from multiple knowledge sources. The book also draws on the experience and wisdom of instructors in the field, many of whom have published valuable insights.

The second problem is how to structure the course and sequence the content so that it helps students advance cognitively from merely collecting and recalling information to creatively applying it. The organization of this book will aid instructors in designing their courses.

The third problem is how to engage and sustain student interest in multidisciplinary and interdisciplinary learning and research. Here the challenge is to engage students cognitively and introduce them to new ways of addressing complexity, diversity, and conflict. This book will help them develop the capacity to address pressing real-world problems, prepare them to make decisions about how to approach these problems, equip them to assess solutions to problems, and enrich them intellectually. Importantly, it will also inform them of the value in their future careers and lives of being able to perform interdisciplinary analysis.

The fourth problem is how to meaningfully assess the quality of student work. In recent years, assessment has become a major focus of the field of interdisciplinary studies. Consequently, the book draws on the research of leading authorities on interdisciplinary learning and assessment including Veronica Boix Mansilla and Lana Ivanitskaya. The last chapters of the book feature the Broad Model Rubric that each of the three authors have applied in courses and presented at conferences. The rubric may be flexibly applied to a broad range of entry-level student work.

The fifth problem is how to introduce students to the concept of interdisciplinary integration and the process that makes integration possible. The book presents theories of interdisciplinary integration and helps students to recognize the integrative work of practitioners who draw on multiple disciplines. However, the book does not explain the *process* of integration, believing that it should be reserved for advanced course work in interdisciplinary studies. Experience has shown that when students are thoroughly grounded in the material presented in this book, they will be ready to engage in this challenging process. Instructors who want their students to learn *how* to create common ground and integrate should use the follow-on text, *Interdisciplinary Research: Process and Theory* (4th ed.).

Test questions and PowerPoint® slides for each chapter can be found on the Instructor side of the accompanying website at edge.sagepub.com/repkointrois3e.

To Students

You face three major obstacles in an entry-level multidisciplinary or interdisciplinary course. The first is comprehending subject matter that differs markedly from your prior exposure to disciplinary learning and thinking. This book helps you transition from disciplinary to interdisciplinary approaches to learning, problem solving, and research. The second is that you often bring into the course misperceptions about interdisciplinarity learned from other students or from disciplinary instructors who may have given the impression that such courses and programs are superficial or not have appreciated that employers increasingly look for interdisciplinary skills. This book corrects these misconceptions and explains how to effectively counter these criticisms. The third obstacle that you face is how to articulate what interdisciplinary studies is. This book develops your

ability to understand interdisciplinarity so that you can clearly articulate its meaning and value to your family, peers, and potential employers.

THE APPROACH USED AND STYLE OF PRESENTATION

The style of presentation is succinct, conceptual (i.e., theory based), and eminently practical. It reflects widely recognized approaches to interdisciplinary learning and assessment, while also offering concrete practical examples and strategies of how to engage in interdisciplinary work.

Distinctive approaches to topic coverage include a cognitive development approach on how to become interdisciplinary. This is facilitated by a step-by-step approach to problem solving or meaning making that includes appropriate feedback loops, decision points, and opportunities for reflection as students explore the course theme individually, as an in-class collaborative effort, or cohort experience.

The book adopts Boix Mansilla's neo-Piagetian constructivist and pragmatic approach to teaching, which emphasizes that learners need to be actively involved in the learning process and that deep learning occurs when students are challenged to produce something of value. This book asks students to reflect on what they are learning and experience cognitive conflict as they struggle to reconcile alternative perspectives and conflicting insights.

Design Features and Benefits

The book addresses the major teaching and student learning challenges noted earlier by doing the following:

- To overcome the problem of students' possible difficulty in comprehending subject matter that differs so markedly from their repeated exposure to disciplinary learning, the book creatively uses a variety of visual aids (graphics, figures, tables, cartoons, and photographs) and other devices to make complex and unfamiliar concepts clear and understandable.
- To engage and sustain student interest in the material, the book provides both practical and cognitive features. To engage students practically, the book presents examples of professional and student work, pictures, and stories (such as the fable of the elephant house) that are woven into the narrative. To engage students cognitively, the book includes in-text "Challenge Questions" and end-of-chapter "Critical Thinking Questions," "Applications and Exercises," "Case Studies," and other active learning devices.

- To overcome possible student and parental apprehension about the marketability of an interdisciplinary program or degree, the book includes Chapter 1, which discusses factors that are propelling and sustaining interdisciplinarity as a mode of learning.
- To overcome student difficulty in articulating what interdisciplinarity is, the book presents an easy-to-understand definition of interdisciplinary studies in Chapter 3 that will enable them to explain this often misunderstood concept to parents, friends, and prospective employers.
- To inform students about how they benefit from interdisciplinary studies, the book devotes Chapter 4 to identifying the abilities, values, skills, and traits that interdisciplinarity fosters.
- To counter criticism that interdisciplinary studies is superficial and a poor substitute for disciplinary depth (i.e., a traditional disciplinary major), the book emphasizes the foundational importance of the disciplines, examines their perspectives, identifies their defining elements, and critically analyzes their approach to learning, meaning making, and creation of new knowledge.
- To demonstrate that interdisciplinary studies is a maturing academic field, the book introduces students to the assumptions, theories, approaches to research, epistemology, and perspectives that undergird the field and give it credibility, coherence, and rigor.
- To present a balanced approach to the complex concept of interdisciplinarity, the book acknowledges counterviews on several points of controversy.
- To introduce students to interdisciplinary thinking and help them recognize quality interdisciplinary work, the book presents the “Broad Model,” which integrates commonly used approaches to conducting interdisciplinary research. This model presents an easy-to-follow step-by-step approach to the interdisciplinary research process that emphasizes the importance of personal reflection on each STEP taken. This model leads students through the early STEPS of interdisciplinary process but stops short of those STEPS that call for creating common ground and integrating insights.
- To empower students to examine a complex problem from multiple disciplinary perspectives, the book presents a theory-based approach to perspective taking and applies it to a variety of contexts using examples from student and professional work.
- To address the widespread use of student intellectual autobiographies, student portfolios, and service learning, the text references these approaches and follows them up with detailed discussions in the appendixes.

- To meet the need of students whose instructors require an interdisciplinary product or paper rather than just walking students through the interdisciplinary process as an in-class collaboration, the last three chapters of the book present easy-to-follow STEPS that are applicable to a variety of group or individual projects.
- To address the need for increased rigor and coherence in the field, especially at the entry level, the book includes a “Broad Model Rubric” that students can use to assess examples of interdisciplinary work, as well as their own, as they engage in each STEP of the process called for in the Broad Model.

Changes in the Third Edition

This third edition is completely revised and updated to reflect both the comments we received from several scholars who had read and/or taught from the second edition, as well as the insights of works published since the second edition. We made numerous additions to the text:

- We have added guiding questions at the start of each chapter.
- We have added a discussion of “basic income” at the end of each chapter to illustrate how the material of each chapter can inform our understanding of a complex public policy issue.
- We have expanded our discussion of ethical decision making (in Chapters 1 and 4 especially).
- We have added a section to the Preface, urging students to apply the insights of this book while learning about them.
- We have suggested some group exercises in Chapter 10. We report on a class project in Chapter 9.
- We have added examples throughout the text to facilitate student learning.
- We have added insights from some dozen scholarly works published since the last edition. These address a wide range of issues: the history of interdisciplinarity in Europe, creativity, philosophy of integration, library search, and more.
- We have added a discussion of confirmation bias in social media to Chapter 7.
- We discuss in many places how interdisciplinary skills and attitudes can be applied in daily life (beginning with a brief discussion of transdisciplinarity in Chapter 1).
- We invite students near the end of Chapter 12 to reflect on how they could speak about their interdisciplinary education in a job interview.
- And of course, we re-edited the entire text with hundreds of small changes to enhance clarity and narrative flow.

An Engaged Student Is a Better Learner

Students will be better able to learn about interdisciplinarity if they practice interdisciplinarity analysis while mastering the material in this book. Only then can students fully appreciate the value of the advice and information provided in this book. In the Appendix, we describe three possibilities (the first two are also addressed in Chapter 4). The first is an ePortfolio or intellectual autobiography in which students are guided to reflect on various questions—about themselves and about the course—as the course proceeds. Students can then observe how their understanding of interdisciplinarity, and their ability to perform interdisciplinarity analysis, has been enhanced by this course. The second possibility is to engage in community service learning where the student volunteers with some community organization during the term. At the end of the term, they write a reflective essay on their experience, and the advice that they have for the organization. They should explore how techniques of interdisciplinarity analysis can be applied to the work of the organization. (Community service may not be possible for introductory-level students.) The third opportunity is the most traditional: Students can individually or in teams perform a research project (although the instructor might decide that they prefer some sort of video or live presentation of results along with or instead of the traditional paper). Team research may be especially valuable because it forces students to appreciate the perspectives of other team members.

We provide much detailed advice on how to perform interdisciplinarity analysis in the last three chapters of this book. We encourage instructors and students to “cheat” by looking at these chapters earlier in the course. Although students can only fully appreciate the material in these chapters after reading the earlier chapters, they can nevertheless glean much practical advice on how to begin an interdisciplinarity research project or reflective essay by perusing these chapters early. They can then appreciate how each of the earlier chapters enhances their ability to perform interdisciplinarity analysis.

We have added at the end of each chapter a discussion of the idea of a “basic income.” This is a policy option that is both supported and derided by commentators of various political allegiances in many countries. It is also a policy option that can be addressed by multiple disciplines. We will explore in each chapter how the discussion in that chapter can inform understanding and analysis of a basic income. In Chapter 8, we suggest that students critically analyze a text about basic income. This might be a writing assignment that students build toward during the course (and Chapter 9 then suggests comparing two texts about basic income). Alternatively, students could be asked to address a topic of their choice in a similar manner to the way basic income is treated in each chapter.

Contents

The book is divided into three parts, each organized around a theme that addresses a key aspect of interdisciplinary studies as described in this book.

PART I: UNDERSTANDING INTERDISCIPLINARY STUDIES

The theme of Part I is understanding interdisciplinary studies as a diverse, dynamic, and growing field. It includes six chapters that explain the emergence of the interdisciplinary idea and its defining elements while presenting counterviews along the way. Chapter 1 contextualizes interdisciplinary studies in the real world and identifies factors propelling its continuous advance inside and outside the academy. Chapter 2 draws on widely accepted but contrasting definitions of interdisciplinary studies and presents an integrated definition. Chapter 3 examines the abilities, values, traits, and skills that interdisciplinary studies fosters and introduces students to the intellectual autobiography, the portfolio, and service learning. Chapter 4 traces the rise of interdisciplinarity as a corrective to disciplinary dominance. Chapter 5 examines the defining elements of the disciplines and explains how these are of importance to interdisciplinarians. Chapter 6 presents the “DNA” of interdisciplinary studies, which are the assumptions, theories, epistemology, and perspectives that provide coherence and rigor to the field.

Chapter 1: Interdisciplinary Studies in the Real World

The emergence of interdisciplinary studies and its demonstrated ability to sustain itself as a recognized approach to learning and research is no accident. There are powerful “drivers” of the field’s continued advance. The chapter begins by asking why interdisciplinary studies matters and identifies six drivers of interdisciplinary learning and research. The chapter discusses how each of these is relevant to students who are both intellectually concerned about our world and practically concerned about preparing themselves for work in the new century. The chapter summarizes the case for interdisciplinary studies and discusses its implications for students’ career development.

Chapter 2: The Rise of the Modern Disciplines and Interdisciplinarity

The genesis of the interdisciplinary idea and its demonstrated ability to sustain itself as a recognized approach to learning and research is actually rooted in the history of the modern disciplines. The chapter begins by discussing why the past matters and explains that the disciplines (e.g., art history, psychology, and chemistry) have existed for less than 200 years. Understanding why knowledge came to be differentiated into disciplines and why they have come to dominate the contemporary university is foundational to understanding why interdisciplinarity came about and why it is able to adapt to new challenges. The chapter surveys developments in the natural sciences, social sciences, humanities, and fine and performing arts. This chapter also explains the emergence of interdisciplinarity as a logical response to disciplinary reductionism, dualism,

and hegemony. Specifically, it identifies interdisciplinary studies' six criticisms of the disciplines and disciplinary specialization.

Chapter 3: Interdisciplinary Studies Defined

Interdisciplinary studies, *interdisciplinary learning*, and *integrative learning* are terms that have become part of the vocabulary of higher education. This chapter begins by explaining “why definitions matter.” It defines the terms *interdisciplinary* and *interdisciplinarity* and presents widely recognized definitions of interdisciplinary studies. It then deconstructs these definitions to identify their commonalities and key concepts before presenting an integrated definition of interdisciplinary studies. The chapter explains the difference between critical and instrumental interdisciplinarity and how the concepts of disciplinarity, multidisciplinarity, transdisciplinarity, and interdisciplinarity differ. The chapter closes with a critical analysis of useful and not so useful metaphors to describe interdisciplinary studies.

Chapter 4: The Interdisciplinary Studies “Cognitive Toolkit”

Advocates of interdisciplinary studies claim that it fosters the development of certain abilities, values, traits, and skills. Research on cognition and learning shows that exposing students to interdisciplinarity fosters cognitive abilities that are distinctive to interdisciplinary studies and do not occur naturally in disciplinary contexts. And while all disciplines and fields boast of teaching critical thinking skills, interdisciplinary studies and interdisciplinary fields do so of necessity, employing distinctive strategies. Additionally, interdisciplinary learning promotes certain competencies and values and emphasizes the development of certain traits and skills that will serve students well as they venture forth into the world outside the academy. The chapter explains how students can apply this “cognitive toolkit” by creating intellectual autobiographies, developing portfolios or blogs, and participating in service-learning projects, which are discussed more fully in the appendixes. We also in this chapter discuss how to perform interdisciplinary ethical analysis.

Chapter 5: Academic Disciplines

The disciplines are the foundational units of learning and knowledge production in most university settings. Since most interdisciplinary activity draws on the disciplines and their insights, it is of fundamental importance for students to understand the disciplines. The chapter acknowledges counterviews of the role of disciplines in interdisciplinary work, presents definitions of discipline, examines commonalities shared by these definitions, and presents an integrated definition. The chapter also discusses disciplines as epistemic, social, and organizational structures, and presents a taxonomy of disciplines, fields, and

professions. Most important for interdisciplinary work, the chapter discusses the key concept of disciplinary perspective, defines this all-important concept, explains how perspective taking is used in multidisciplinary and interdisciplinary contexts, examines misconceptions about disciplinary perspective, and identifies the defining (and mutually reinforcing) elements of a discipline's perspective. Perspectives are carefully distinguished from disciplinary insights.

Chapter 6: The “DNA” of Interdisciplinary Studies

All disciplines and knowledge formations are undergirded by certain assumptions, theories, epistemologies, and perspectives on reality. This is inherently true of the field of interdisciplinary studies, which, despite its great diversity, is knit together by certain assumptions. Many in the field embrace certain theories, such as theories on complexity, perspective taking, common-ground creation, integration, and production of interdisciplinary understandings or cognitive advancements. The chapter acknowledges counterviews on many of these points. In addition, the field shares an epistemology or way of knowing that goes against the mainstream approaches of reductionism and dualism. In combination, these intellectual currents provide the field with a distinctive perspective on reality that motivates its pedagogy and research.

PART II: THINKING CRITICALLY ABOUT INTERDISCIPLINARY STUDIES

The theme of Part II is how to think critically as interdisciplinarians about disciplinary and interdisciplinary approaches to complex problems. This theme is explored in three chapters: Chapter 7 explains how to recognize and think critically about disciplinary perspectives; Chapter 8 examines how to recognize and think critically about disciplinary insights; and Chapter 9 focuses on how to recognize and think critically about interdisciplinary integrations and understandings.

Chapter 7: Thinking Critically About Disciplinary Perspectives

Thinking critically in interdisciplinary studies begins with developing a sophisticated conception of knowledge and truth so that we can make sense of the multiple and often conflicting disciplinary perspectives on problems that are complex and multidimensional. The chapter challenges students to reflect on their present epistemological position (i.e., how one determines whether something is true), assess their tolerance for multiplicity, and move toward critical pluralism. By moving toward critical pluralism, students are equipped to interrogate (i.e., critically analyze) disciplinary perspectives as these bear

on the problem or issue under study. There are several practical benefits of interrogating disciplinary perspectives: It is an interdisciplinary move that is necessitated by complexity; it is a prerequisite for turning multidisciplinary work into interdisciplinary work; it enables us to see the relevance of other perspectives; it illuminates our understanding of the problem *as a whole*; it reduces the possibility of making poor or narrow decisions; and it exposes the strengths and limitations of each perspective. The chapter then examines the work of practitioners and students to demonstrate how interdisciplinarians interrogate disciplinary perspectives. Importantly, we discuss the need to combat “confirmation bias” on social media.

Chapter 8: Thinking Critically About Disciplinary Insights

Students, especially early in their college education, often wonder how they can be expected to critically evaluate books or articles written by disciplinary experts. Since the author knows so much more about the subject than the student does, how can the student presume to critique? Interdisciplinary students may have an advantage here, for as this book contends, disciplinary authors provide an incomplete analysis of any complex problem. Students familiar with the material in earlier chapters will, in other words, know that there is a downside to expertise: Experts may ignore much that is beyond their experience. But this lesson has broader import: Since no work is perfect, *all* works need to be critically evaluated. The objective of this chapter is to provide practical advice on how to critically evaluate any text, whatever the disciplinary or interdisciplinary orientation of its authors. One important technique in critical analysis is to map an author’s arguments. The chapter explains how to map arguments and concludes by mapping the scholarly enterprise.

Chapter 9: Thinking Critically About Integration and Its Results

Thinking critically in interdisciplinary studies extends to integration and its result. The chapter describes three commonly used approaches to perform interdisciplinary integration—contextualization, conceptualization, and problem centering. Examples of each approach are presented along with analyses of their respective strengths and limitations. The chapter then introduces the “Broad Model,” which subsumes these approaches and presents examples of how practitioners creatively apply the model to problems spanning the disciplines, professions, and applied fields. Techniques of interdisciplinary integration are introduced. The meaning of *integration* is clarified. The chapter concludes by discussing the result of integration, and the core premises that underlie the concept of more comprehensive understanding.

PART III: INTERDISCIPLINARY RESEARCH AND WRITING

The theme of Part III is applying interdisciplinary processes in contexts where students, whether working in cohorts or individually, are asked to produce products that are explicitly interdisciplinary. These products may assume many forms, such as posters, plays, or video productions. But they should also include a written component that confirms student understanding of interdisciplinary concepts, theory, and research process and the ability to apply these to a concrete project. Part III includes three chapters that present interdisciplinary process as a step-like and reflexive research road map called the Broad Model and explain how to apply its easy-to-follow STEPS. These chapters also introduce and apply the “Broad Model Rubric,” based on the Broad Model, which establishes easy-to-understand criteria for each STEP, allowing students to evaluate their work as they go.

Chapter 10: An Interdisciplinary Research “Road Map”

Being educated includes understanding the importance of research and having the ability to gather information on subjects of interest. This chapter compares disciplinary and interdisciplinary approaches to research and explains the utility of the Broad Model’s approach to the interdisciplinary research process. The chapter examines the model’s first two STEPS: defining the problem or stating the research question (STEP 1) and justifying using an interdisciplinary approach (STEP 2). It then explains how to evaluate practitioner and student work using the Broad Model Rubric so that students can assess their understanding of key concepts and the quality of their work. Group exercises are suggested.

Chapter 11: Identifying Relevant Disciplines and Gathering Information About the Problem

Because interdisciplinary studies is rooted in the disciplines, the interdisciplinary process involves drawing on disciplinary perspectives and their insights when addressing complex problems. This chapter presents strategies for identifying disciplines that are relevant to the problem under study (STEP 3) and gathering information about the problem (STEP 4). The chapter also demonstrates how to apply the Broad Model Rubric to examples of practitioner and student work to prepare students to assess their performance of these STEPS.

Chapter 12: Analyzing Insights and Reflecting on Process

This chapter completes our discussion of the STEPS of the Broad Model and the application of the Broad Model Rubric with examples of practitioner and student work. The chapter demonstrates how to assess practitioner and student attempts to critically analyze disciplinary insights and locate their sources of conflict (STEP 5). It discusses how

students can achieve and demonstrate “disciplinary adequacy.” It assesses examples of practitioner and student reflection on how using the interdisciplinary process described in this book has enlarged their understanding of the problem (STEP 6). Students are asked to reflect on how they can employ interdisciplinary strategies in real life, and in particular in a job interview.

Website

To enhance your use of the book, visit edge.sagepub.com/repkointrois3e for additional resources.

Allen F. Repko
Rick Szostak
Michelle Phillips Buchberger

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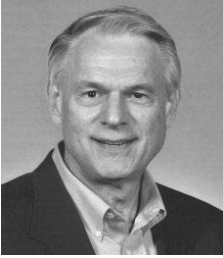
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UNDERSTANDING INTERDISCIPLINARY STUDIES

The theme of Part I is understanding interdisciplinary studies as a diverse, dynamic, and growing field. Its six chapters explain what is driving the field's steady advance, offer an integrated definition of this often misunderstood concept, and discuss the intellectual capacities, values, traits, and skills that interdisciplinary studies fosters. The chapters explain the rise of the modern disciplines and the emergence of interdisciplinary studies. They also identify the defining elements of disciplines; describe them as epistemic, social, and organizational communities; and discuss the key concept of disciplinary perspective. Part I closes with a detailed examination of the "DNA" of interdisciplinary studies in terms of its assumptions, theories, epistemology, and perspectives.



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INTERDISCIPLINARY STUDIES IN THE REAL WORLD

CHAPTER OBJECTIVES

This chapter explains why interdisciplinary studies is now considered basic to education, problem solving, professional practice, and innovation. Interdisciplinarity provides a time-tested practical way to address the inherent complexity of

real-world problems, including those problems arising in the workplace. The overall objective of this chapter is to spark your interest in interdisciplinary studies and help you appreciate the real-world significance of interdisciplinarity that is set out in the chapters ahead. Related objectives include understanding why interdisciplinary studies is considered basic to education and research, the factors driving the advance of interdisciplinary studies, and the relevance of interdisciplinary studies to your career development.

LEARNING OUTCOMES

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

Demonstrate an understanding of why interdisciplinary studies is considered basic to education, problem solving, professional practice, and innovation

Describe the “drivers” of interdisciplinary studies today

Identify and describe new and emerging interdisciplinary fields of study and their significance

Explain why systems thinking and contextual thinking are increasingly viewed as important

Explain why a knowledge society needs both disciplinary specialization and interdisciplinary breadth

Explain the academic benefits of pursuing an interdisciplinary studies degree

Explain the relevance of interdisciplinary studies to your career development

GUIDING QUESTIONS

Why is interdisciplinarity increasingly recognized as important?

What is the value of an interdisciplinary education? In particular, how might it be important to your educational goals?

What is the relationship between disciplines and interdisciplinarity? (*Note:* This is a question we will revisit in later chapters.)

What kinds of questions do interdisciplinary scholars engage?

Now that you are in university and enrolled in an interdisciplinary studies (IDS) course or program, you need to understand how IDS can help you achieve your long-term career goals. We begin by explaining why IDS matters and what is driving this innovative approach to learning and problem solving today. We then discuss the academic benefits of IDS and explain how IDS aids your career development.

WHY INTERDISCIPLINARY STUDIES MATTERS

We desire to have our lives count for something, to do something meaningful, to make a contribution to society. Thus, we come to the university to learn how to make a difference in the world. There are many ways to do this: educating our children, becoming responsible workers and citizens, protecting the environment, combating poverty, reducing crime and violence, creating new art forms, discovering cures for diseases, developing new technologies, starting new businesses, improving public policies, and promoting peace, justice, and security. To make such a difference, we must prepare for the realities of life in the twenty-first century with its growing complexities and new challenges. This requires developing the skills to make connections, understand others, solve complex problems, develop leadership skills, engage in strategic thinking, communicate effectively, practice analytical thinking, and work collaboratively. IDS helps you to develop these skills.

WHAT IS DRIVING INTERDISCIPLINARY STUDIES TODAY?

For over two decades, major scientific organizations, funding agencies, and prominent educators have advocated the need for interdisciplinary studies. The current interest in interdisciplinarity is widespread and increasing in intensity, motivated by the belief that it is now basic to education and research. To meet this perceived need, educators have developed a wide range of interdisciplinary courses and “studies” programs. Interdisciplinarity, it is fair to say, is becoming an integral part of higher education.

There are solid reasons for this development with which you, as an educated and responsible person, should be familiar. These reasons or “drivers” are the subject of several recent reports by leading scientific and educational organizations and are the focus of this chapter: (1) the complexity of nature, society, and ourselves; (2) the complexity of the globalized workplace; (3) the need for systems thinking and contextual thinking; (4) the changing nature of university research; (5) the public world and its pressing needs; and

(6) a knowledge society's need for *both disciplinarity and interdisciplinarity*. Combined, these drivers make a powerful case for interdisciplinary studies.

The Complexity of Nature, Society, and Ourselves

The first driver of interdisciplinary studies is the complexity of nature, society, and ourselves—all amazingly complex systems. A subject or problem is complex when its multiple parts require study by different disciplines. These parts interact in important ways, but the disciplines by their nature fail to study the interactions. For example, the subject of illegal immigration is complex because it has multiple parts, each of which is studied by a different discipline: the immigrant's home country (history, sociology, cultural anthropology); proximity of home country to country of destination (Earth science); immigration policies of country of destination (political science); and economic opportunity (economics). However, studying each part in isolation of the others and ignoring their interactions will not explain the cause or the effects of illegal immigration. What is required is an interdisciplinary approach that views the subject as a complex system with multiple interacting parts. An interdisciplinary approach critically analyzes the relevant disciplinary insights (i.e., what experts have written) and attempts to create common ground among them in order to produce a more comprehensive understanding or propose a holistic solution.

Razmak and Bélanger (2016) study the question of why electronic medical records have been adopted more slowly in North America than in Europe. They suggest that several factors, studied by different disciplines, are important: psychological resistance among some medical staff, managerial challenges, complex political decision-making processes, financial limitations, and problems in software application. They argue that only interdisciplinary research (using the research steps that are outlined in the later chapters of this book) can address such a complex problem, or indeed a host of problems in the area of business/management studies.

The Complexity of the Globalized Workplace

A second driver of interdisciplinary studies is the complexity of the globalized workplace where effective communication requires sensitivity to diverse cultures. Today, the need to understand this complexity is more urgent than ever before, especially since the human population has reached 7.7 billion, straining our planet's finite resources. In the past decade, the world economy has undergone radical change, raising the question of what knowledge college graduates need in the new globalized workplace. Pulitzer Prize-winning columnist Thomas Friedman and foreign policy expert Michael Mandelbaum (2011) describe this change in their book *That Used to Be Us*. Similarly, Buchberger reminds us that workplace changes are increasingly recognized worldwide (see Box 1.1).

The merger of globalization and the IT revolution that coincided with the transition from the twentieth to the twenty-first century is changing everything—every job, every industry, every service, every hierarchical institution. It is creating new markets and new economic and political realities practically overnight. This merger has raised the level of skill a person needs to obtain and retain any good job, while at the same time increasing the global competition for every one of those jobs. It has made politics more transparent, the world more connected, dictators more vulnerable, and both individuals and small groups more empowered.

All of these dramatic changes in the workplace, coming in rapid-fire succession, have left a lot of people asking, “Where do I fit in? How do I stay relevant in my job? And what kind of skills

do I need to learn at school?” The short answer is that the workplace is undergoing a fundamental restructuring that every educator, parent, and worker needs to understand (Friedman & Mandelbaum, 2011, pp. 54, 72). These workplace changes are increasingly recognized worldwide. “Today’s graduates face a rapidly changing work environment. They are also entering a world with complex problems that individual disciplines are ill-equipped to address. Historically, our educational systems have been set up to produce graduates who are specialized in only one academic area. . . . By contrast, interdisciplinary studies is a cognitive process where individuals or groups seek insights from all the disciplines relevant to the question being considered and then integrate these insights to gain a more holistic understanding of a complex problem” (Buchberger, quoted by Tejaswi, 2019).

This fundamental restructuring of the economy and the workplace demands a new type of worker with a new set of skills. This is a person who can understand, use, and integrate knowledge, technology, and methods, as well as collaborate with persons from diverse cultural backgrounds with diverse disciplinary training. This person must be able to work with intangible information to produce a tangible product. Most tangible products are the result of integrating information from multiple and diverse knowledge domains and require working in teams. For example, designing an “app” for the Apple iPhone involves, at a minimum, the ability to integrate software, art, math, gaming, English grammar, marketing, law, database management, finance, and interpersonal communication—everything that goes into an application. In other words, designing an app requires a lot more training and creativity than just writing software code.

The world of business is becoming increasingly interdisciplinary because business is transacted within an increasingly fast-paced and complex environment that demands interdisciplinary skills to address this complexity. Among these skills, the ability to integrate knowledge from multiple disciplinary sources is critical. Jan Rivkin (2005), a professor in the Strategy Unit of the Harvard Business School, identifies the skills that are crucial for today’s managers (see Box 1.2).

Integrative skills are crucial. Managers who possess them can spot the core of an innovative strategy, grasp the implications for other parts of the company, and build out the idea relentlessly until it comes to pervade a company's entire

value chain. They see, for instance, how improvements in a retailer's information system have implications for store location, store manager autonomy, pricing policy, and vendor relations. (Rivkin, 2005, p. 42)

The Need for Systems Thinking and Contextual Thinking

A third driver of interdisciplinary studies is the need for systems thinking and contextual thinking. Reduced to its most basic meaning for the purposes of this book, **systems thinking** is the ability to break a problem down into its constituent parts to reveal internal and external influences, figure out how each of these parts relates to the others and to the problem as a whole, and identify which parts different disciplines address. The ability to analyze systems is thus a key component of the increased job complexity discussed earlier. Addressing pressing public policy problems such as climate change or inner-city poverty also require systems thinking.

Everything we do takes place within systems. Examples of systems in which we operate daily include the environment, the economy, and transportation. It is useful to understand how complex systems function and how their various parts interrelate so we can understand how they affect our lives. We also need to understand the operation of complex systems so we can figure out which public policies to support.

An example of a complex system is the U.S. economy. A key component of an economy is its central bank (e.g., the Federal Reserve, the “Fed,” in the United States) and its power to set interest rates. By lowering the prime interest rate, the Fed impacts the U.S. economy in multiple ways, economic as well as noneconomic. First, a lower prime rate reduces the cost of loans to consumers, such as car loans (which has a positive effect on the economy by stimulating car sales and thereby increasing the number of cars produced, which means that manufacturers should eventually have to hire more workers). But a lower prime rate also reduces the interest rate that banks can pay on savings (which has a negative impact because it reduces the interest income that retirees depend on to purchase things such as cars). There are also the unexpected political impacts of a reduction in the prime rate. For example, China (which already holds a substantial amount of U.S. national debt) may be less interested in purchasing more debt because of the lower rate of interest it would receive. So if you ask the question, “What interest rate *should*

the nation’s central bank charge?” answering it requires input from several disciplines including political science (which studies government policies and international relations), economics (which studies consumer behavior), philosophy (which studies ethics and logic), and possibly history (which studies historical patterns).

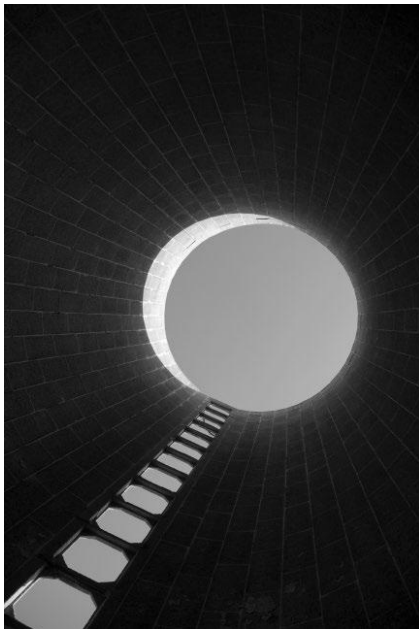
In addition to being able to apply systems thinking upon entering the globalized workplace, students need to be prepared to apply contextual thinking to complex problems. **Contextual thinking** is the ability to view a subject from a broad perspective by placing it in the fabric of time, culture, or personal experience. This kind of thinking, which is a primary focus of interdisciplinary learning, “is characterized by wholeness, by the relationship between parts, and by the assumption that knowledge changes” (King & Kitchener, 1994, p. 40).

However, contextual thinking is not a primary learning outcome of traditional disciplinary majors. After completing their general requirements (which vary from university to university), many undergraduates specialize or “major” in a traditional discipline. As

they proceed in their major, they are prone to develop a **silos perspective**, meaning the tendency to see the university and the larger world through the narrow lens of that major (see Figure 1.1). What a traditional major typically fails to provide is context—the context of the whole system—and the ability to view reality through multiple disciplinary lenses and make connections across different knowledge formations (see Figure 1.2).

In contrast, undergraduates pursuing an interdisciplinary field such as environmental studies, cultural studies, American studies, urban studies, and health management studies are taught to relate the smallest parts of the system they are studying to the whole. A hallmark of interdisciplinary studies is relating the particular to the whole by drawing on multiple disciplinary perspectives that are relevant to a specific problem or question. This feature is

FIGURE 1.1 ● View From Inside a Silo



Source: ©iStockphoto.com/Michael Westhoff.

FIGURE 1.2 ● Integrative Thinking

Source: ©iStockphoto.com/danleap.

one of the reasons interdisciplinary studies is becoming a key component in liberal arts programs across the United States and elsewhere.

A liberal education fosters both systems thinking and contextual thinking. It develops the “integrative arts” necessary for meeting the challenges of our globalized world (Schneider, 2003). A liberal education helps you to learn how to learn, draw on multiple sources of knowledge, apply theory to practice in various settings, critically analyze information, integrate diverse and even conflicting points of view, collaborate with others in problem solving, and understand issues and positions contextually. A liberal education that emphasizes integrative and interdisciplinary learning—the ability to make connections—is well worth pursuing (Huber, Hutchings, & Gale, 2005, pp. 4–5).

Students are rarely—even in general education programs—given a sense of how the academy as a whole is organized. The modern university has generally been structured around discipline-based departments. These departments usually have considerable autonomy in decisions about whom to hire and what to teach. As we shall see in Chapter 4, disciplines are each characterized by a set of research questions, theories, and methods (and other characteristics). Universities may thus encompass scholars with expertise on every phenomenon that scholars study and every type of theory and method that they employ, but the university has no master strategy for best communicating this knowledge to students. Indeed, university presidents do not even have a visual map of what theories, methods, and subjects are addressed across their various departments (though it is possible to construct such a map). Universities may use their general education programs to achieve some broad overview of the scholarly project, but general education programs themselves often defer to departments and thus simply require students to take courses from several disciplines without providing much advice on how to draw connections across these courses. The various “studies” programs noted above have emerged in recent decades to allow insights from diverse disciplines into a common theme to be gathered (but not always integrated). Universities are still experimenting with the best way of achieving interdisciplinary understandings within an organizational structure designed with disciplines in mind. Should “studies” programs be freestanding departments, or should

they employ faculty that are also appointed to a disciplinary department? How can general education programs best be structured so that students gain some sense of the academy as a whole and an idea of how to integrate insights from different disciplines? This book, and the literature on interdisciplinarity in which it is grounded, provides important input into these debates regarding the organization of the academy by showing that there is a coherent body of understanding about interdisciplinarity itself that all students should be exposed to.

It deserves emphasis that general education programs that expose students to different disciplinary perspectives but provide no encouragement toward integrating these can inadvertently encourage a narrow disciplinary focus. Students can become understandably frustrated when experts reach different conclusions about the same issue. They are then guided—likely subconsciously—to cling to the consensus within their disciplinary major. An exposure to interdisciplinary thinking—that there are reasons that experts disagree, that undergraduate students can understand these reasons and learn to evaluate and integrate differences in insights across disciplines—can transform frustration into excitement. Students should see coping with complexity as a challenge: It is not always easy, but there are techniques for proceeding toward a more comprehensive understanding. This book can only explore some of these techniques, but we hope nevertheless to fire students’ excitement toward addressing complex questions.

The Changing Nature of University Research

A fourth driver of interdisciplinary studies is the changing nature of university research. Leaders of major U.S. scientific organizations are emphasizing the importance of increased interdisciplinarity. The reason, explains Rita Colwell (1998), former director of the National Science Foundation (NSF), is that “interdisciplinary connections are absolutely

fundamental” because “it is at the interfaces of the sciences where the excitement will be most intense.” Emphasizing more interdisciplinary research is both financially and scientifically sensible, says Columbia University Professor Mark C. Taylor, because graduates are becoming too specialized to find employment due to the unsustainable nature of department-based hierarchies (Baskin, 2012). In 2011, the NSF dispatched one of its top officials and University of Michigan Professor Myron P. Gutmann to college campuses to promote the need for greater interdisciplinary research if they wish to win NSF grants. Gutmann notes that such research has yielded rapid advances in various fields, such as health care applications of atomic-scale science and the study of extreme weather events through analysis of both natural and social variables (see Box 1.4).

The social, behavioral, and economic sciences—familiarily known as the “SBE sciences”—increase fundamental understanding of human social development and interaction and of human behavior, as individuals and as members of groups and more formal organizations. Our sciences contribute knowledge that has societal relevance and can inform critical national areas such as job creation, health care, education, public safety, law enforcement, and national security, among others. NSF’s SBE directorate is unique in that it houses a mosaic of related programs

enabling fundamental research in crosscutting topics by combinations of economists, political scientists, sociologists, psychologists, linguists, neuroscientists, anthropologists, and other social and behavioral scientists. This focus on fundamental research allows us to collaborate effectively with our colleagues in other directorates and federal agencies to address problems that range from coastal flood response to the needs of an aging population to preparing our military with the insights they need to understand behavior in a changing world (Gutmann, 2011).

Similarly, the U.S. National Institutes of Health (2012) describes how interdisciplinary connection making is essential to the advancement of health research (see Box 1.5).

Health research traditionally has been organized much like a series of cottage industries, lumping researchers into specialty areas, where their

efforts remain disconnected from the greater whole by artificial barriers constructed by technical and language differences between different

(Continued)

(Continued)

disciplines and departmentally based specialties. But, as science has advanced over the past decade, two fundamental themes are apparent: The study of human biology and behavior is a wonderfully dynamic process, and the traditional divisions within health research may in some instances impede the pace of scientific discovery.

The broad goal for the [Interdisciplinary Research] Program, therefore, is to change academic research culture, both in the extramural research community and in the intramural program at the NIH, such that interdisciplinary approaches are facilitated. The . . . Program includes initiatives

to dissolve academic department boundaries within academic institutions and increase cooperation between institutions, train scientists to cultivate interdisciplinary efforts, and build bridges between the biological sciences and the behavioral and social sciences. Collectively, these efforts are intended to change academic research culture so that interdisciplinary approaches and team science are a normal mode of conducting research and scientists who pursue these approaches are adequately recognized and rewarded. [U.S. National Institutes of Health, 2012, Overview section, para. 2]

Increasingly, the significant advances in knowledge production are occurring at the interdisciplinary borderlands between established disciplines and fields. (On team research, see Cooke & Hilton, 2015.)

Interdisciplinary Borderlands

This perceived need to cross disciplinary boundaries in order to advance scientific progress is reflected in the results of the national survey of interdisciplinary programs at 222 colleges and universities conducted in 2006 by the Social Science Research Council (SSRC; see Table 1.1). Clearly, a wide variety of interdisciplinary programs have become common in recent years.

TABLE 1.1 Top 10 Interdisciplinary Majors and Percentage of Institutions Offering Major	
Top 10 Interdisciplinary Majors	Percentage of Institutions Offering Major
Intercultural studies*	13.08
Latin American studies*	16.82
African American and Africana studies***	21.50
International relations*	28.04
Asian and East Asian studies*	31.78
Biochemistry and molecular biology**	33.64
American studies*	36.45

Top 10 Interdisciplinary Majors	Percentage of Institutions Offering Major
Neuroscience and psychobiology**	36.45
Women's and gender studies***	44.86
Environmental studies and science** (could also be ***)	63.55

Source: Rhoten, D., Boix-Mansilla, V., Chun, M., & Klein, J. T. (2006). *Interdisciplinary education at liberal arts institutions*. Brooklyn, NY: Social Science Research Council.

Note: Of the top 10 interdisciplinary majors, more than half are in global or area studies (*), three follow a biology-plus model (**), and the most popular are in areas often considered advocacy/activism fields (***). Also striking is that two thirds of respondents expected to increase interdisciplinary offerings over the next 5 years. "The most commonly cited motivation was research, based on the belief that the kinds of questions students and faculty are investigating today often require the expertise of scholars from more than one discipline" (Klein, 2010, p. 43).

The Public World and Its Pressing Needs

The public world and its pressing needs is a fifth driver of interdisciplinary studies. The need to resolve problems of a general public interest is noted by the National Academy of Sciences (2005; see Box 1.6).

Human society depends more than ever on sound science for sound decision making. The fabric of modern life—its food, water, security, jobs, energy, transportation—is held together largely by techniques and tools of science and technology. But the application of technologies to enhance the quality of life can itself create problems that

require technological solutions. Examples include the build up of greenhouse gases (hence global warming), the use of artificial fertilizers (water pollution), nuclear power generation (radioactive waste), and automotive transportation (highway deaths, urban sprawl, and air pollution). (National Academy of Sciences, 2005, p. 34)

These public interest problems cannot be adequately addressed by individual disciplines because they require drawing on expertise from multiple disciplines: Should we genetically modify plants and animals? Is an affordable university education a civic right? What is the meaning of the rise of populist movements? What causes income inequality?

It is worth noting here that an interdisciplinary approach to public policy issues seeks to dispassionately evaluate differing policy suggestions and aspires to combining the best

elements of competing policy analyses. An interdisciplinary approach steers us away from vilifying those we might disagree with toward seeking to understand why they disagree and what we might learn from them.

When addressing problems of general public interest, it is often necessary (and even preferable) to draw on expertise from public stakeholders. Such a **stakeholder** is a person or an entity outside the academy who is interested in and may have a material stake in the outcome of a particular societal issue. For example, community development projects in urban areas typically recruit expertise from relevant disciplines as well as from community institutions and interest groups. They join forces around complex societal issues of mutual concern such as homelessness, gang violence, affordable housing for low-income families, green spaces for recreation, public transportation, small business development, and venues for local artists and musicians.

The word *transdisciplinarity* is often employed to describe research efforts that involve stakeholders from outside the academy. Scholars of transdisciplinarity often note that many of the same challenges are faced when involving such stakeholders as when performing interdisciplinary team research within the academy. In particular, researchers need to address the fact that different team members have different perspectives and employ terminology in different ways. Although this book will focus on interdisciplinarity rather than transdisciplinarity, it is important for students to appreciate that many of the strategies for interdisciplinary analysis they will encounter in this book are also useful beyond the academy. They can apply interdisciplinary skills and attitudes in their careers, as members of local and national and global communities, and in their personal lives anytime they must address complex challenges or interact with people with differing perspectives or understandings. (*Note:* Much more information on transdisciplinarity is available at www.transdisciplinarity.ch/en/td-net/Ueber-td-net.html.)

Community Development

Interdisciplinarity has implications not just for global challenges such as climate change, but also for a host of more local concerns. Butterfield and Korazim-Korosy (2007) discuss both how and why to pursue community development in an explicitly interdisciplinary fashion. They argue that experts trained in many fields need to work collaboratively with community members. There are thus two types of collaboration and integration involved: among disciplines and between academy and community. Butterfield and Korazim-Korosy note that these disciplinary experts generally lack training or encouragement to support interdisciplinary interactions. Social work in particular is, like all professions, inherently interdisciplinary, but interdisciplinary techniques are not always taught to social work students.

Interdisciplinary courses often have a community–service–learning component, where students can apply their interdisciplinary skills (see Box 1.7). Students can then engage with the community and draw upon information from multiple disciplines to help develop community initiatives. Many students in interdisciplinary programs have an interest in addressing community challenges, and they enter careers or volunteer roles later in life where they can apply interdisciplinary understandings in the pursuit of novel community programs.

Many colleges and universities these days have “Integrative Studies” initiatives that look beyond integrating academic material. They hope to connect students’ course work with their residence life, volunteer activities, and more. These programs provide further evidence that integrative skills have value far beyond one’s course work.

And these programs find indeed that the integrative challenges students face outside the classroom are similar to and can be addressed in similar ways to the integrative challenges addressed within interdisciplinary courses. See Hughes, Munoz, and Tanner (2015).

Successful Intelligence and Integrative Thinking

It is tempting to suppose that revolutionary insights and generative technologies come only from a gifted few such as a Jeff Bezos, a Mark Zuckerberg, or an Elon Musk. Not so. Revolutionary insights and generative technologies require what Robert J. Sternberg (1996) calls “**successful intelligence**.” Sternberg, one of the world’s leading researchers and authorities on intelligence, says that successfully intelligent people think well in three different ways: creatively, analytically, and practically.

Sternberg describes the three types of intelligence that together make for successful intelligence:

- **Creative intelligence** formulates ideas and makes connections.
- **Analytical intelligence** breaks a problem down into its component parts, solves problems, and evaluates the quality of ideas.
- **Practical intelligence** applies an idea in an effective way, whether in business or in everyday life.

What makes for successful intelligence, says Sternberg, is keeping these three ways of thinking in balance and knowing how and when to use each way of thinking.

Interdisciplinary learning fosters the development of all three components of successful intelligence. First, it helps to build the creative thinking tools of observing, imaging, abstracting, recognizing patterns, forming patterns, analogizing, empathizing, modeling, transforming, and integrating. Second, it stresses the importance of breaking a problem down into its component parts and connecting each part (if applicable) to a discipline. Third, it values applying the result of the interdisciplinary project in a way that is practical and critical.

Producing revolutionary insights and generative technologies requires the ability to think integratively as illustrated in Figure 1.2. **Integrative thinking**, a defining characteristic of interdisciplinary learning, is the ability to knit together information from different sources to produce a more comprehensive understanding or create new meaning. Integrative thinking is a subject of Howard Gardner's *Five Minds for the Future* (2008).

The mind that is able to integrate and communicate complex ideas is one of the five minds that the fast-paced future will demand as described by Gardner in Box 1.8.

Against all odds, individuals seek synthesis, . . . the most ambitious form of synthesis occurs in *interdisciplinary work* [emphasis added]. Biochemists combine biological and chemical knowledge; historians of science apply the tools of history to one or more fields of science. In professional life, interdisciplinarity is typically applied to a team composed of workers who have different professional training. In a medical setting, an interdisciplinary team might consist of one or more

surgeons, anesthesiologists, radiologists, nurses, therapists, and social workers. In a business setting, an interdisciplinary or cross-functional team might feature inventors, designers, marketers, the sales force, and representatives drawn from different levels of management. The cutting-edge interdisciplinary team members are granted considerable latitude on the assumption that they will exit their habitual silos and engage in the boldest forms of connection making. (Gardner, 2008, p. 54)

The rapidly changing workplace that Gardner describes highlights the need for interdisciplinary studies. Increasingly, workplaces need people who are educated in multiple disciplines, who know how to gather and integrate knowledge from those disciplines, and who know how to apply that knowledge to complex problems. Because the pace of job destruction and job creation is increasing, students entering today's workforce will not only need to change jobs several times in the course of their working life but also

need to change careers. According to Andrew Ross (2012), “no one, not even in the traditional professions, can any longer expect a fixed pattern of employment in the course of their lifetime.” This means that you must learn to be flexible and develop a broad range of cognitive and technical skills that you can apply as your jobs and careers change. Interdisciplinary learning provides you with the cognitive tools that will enable you to integrate information and synthesize new solutions.

Ethical Analysis. We will focus most of our attention in this book on interdisciplinary analysis of how the (natural and social and individual) world works. That is, we will discuss how different disciplines analyze the world we live in, and how interdisciplinary analysis can lead to more comprehensive understandings of how the world works. It is important to appreciate, though, that interdisciplinary analysis can also be applied to ethical questions. Just as we can strive to understand and eventually integrate differing insights into how the world works, we can strive to understand and perhaps integrate different beliefs about how the world *should* work and how individuals *should* behave within it. Note that our ability to address pressing public policy issues often requires us to achieve some consensus both about what our goals should be (how we want the world to work) and how best to achieve these (the practical challenges of making the world work the way we want it to). It may often be harder to achieve consensus on goals than on the means to achieve these. We shall discuss in Chapter 4, though, how interdisciplinary analysis can be applied to ethical issues.

One characteristic of the world of the twenty-first century is cultural diversity. Most countries, including the United States, have become much more culturally diverse in recent decades. And there is much greater contact between countries than there used to be. Yet diversity can make it harder to achieve consensus on the goals of public policy. More dangerously, people may come to doubt that consensus is possible. They may even doubt that we can understand why others disagree with us about the goals of public policy. An interdisciplinary understanding of how the world works will be of limited value unless we can also strive for some societal consensus about how the world ought to work.

A Knowledge Society Needs Both Disciplinarity and Interdisciplinarity

A sixth driver of interdisciplinary studies is the awareness that a knowledge society needs *both* disciplinarity and interdisciplinarity. Science and society now recognize that disciplinarity and interdisciplinarity are not mutually exclusive but are complementary within a knowledge society (Frodeman & Mitcham, 2007, p. 1). As we shall see in later chapters, there are advantages of disciplines: Scholars who share understandings of theories, methods, and terminology can communicate easily about shared research interests.

Yet these very advantages mean that alternative theories, methods, and subject matter will be largely ignored within a discipline. Interdisciplinarity can combine the best that disciplines have to offer to produce a more comprehensive understanding.

A **knowledge society** is one in which the development and creative application of knowledge is the primary engine of economic growth, prosperity, and empowerment of all developing sectors of society. According to Robert Frodeman and Carl Mitcham (2007),

Knowledge *production* today has a tendency to swamp knowledge *use systems* [emphasis added] at both the individual and institutional levels. Overwhelmed by knowledge, we find it increasingly difficult to make good decisions—or, Hamlet-like, any decision at all. . . . [P]oliticians, [for example], when faced with difficult problems, often call for more research as a way to stall for time. (p. 2)

In addition to data overload, Frodeman and Mitcham assert that our knowledge society is increasingly characterized by a disconnect between knowledge production and knowledge utilization (see Box 1.9).

This disconnect is in part the result of the sheer volume of information being produced. Disciplines pursue more and more specialization and detail, crowding out awareness of ends or purposes. Interdisciplinary efforts are often characterized as shallow, but this is true only in comparison with the [silo] narrowness of depth in disciplinary detail and specialization. It's equally the case that the disciplines are unable to offer any width and

breadth of contextualization. Moreover, no epistemological justification is offered for why we should prioritize the vertical as compared to the horizontal dimensions of knowledge. In what sense does a PhD know something more valuable than a person with three masters? As important as disciplinary depth is [equally important is] knowledge of the overall topographic landscape of human affairs. (Frodeman & Mitcham, 2007, pp. 2–3)

THE ACADEMIC BENEFITS OF PURSUING AN INTERDISCIPLINARY STUDIES DEGREE

Fortunately, once closed-minded disciplines and applied fields are beginning to recognize that interdisciplinarity is necessary for four practical reasons. (1) Interdisciplinary—*that is*, scholars familiar with strategies for integrating insights from diverse disciplines—are uniquely equipped to ask and answer questions about complex issues that transcend the