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Building Information Literacy Through *Interdisciplinary Research*

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Abstract: We are living through a very difficult moment in human history where we are having to make almost daily decisions about our health, occupations, environment, economics, and democracy, while being bombarded with disinformation, misinformation, and "alternative facts" relative to those decisions. A highly developed information literacy capacity is a means to critically analyze all incoming information and make sound decisions for ourselves, our families, our communities, and our world (ACRL, 2000). Allen Repko and Rick Szostak's (2021) *Interdisciplinary Research: Process and Theory* aids in building this information literacy capacity in undergraduate interdisciplinary students through its examination of the disciplines students have been studying, while explaining to them the central components of interdisciplinary inquiry. It helps students understand the unique languages of disciplines, unpacks the limitations of individual disciplines in confronting complex, real-world issues, and then aids them in developing the tools and understanding the constructs they need to function as interdisciplinarians. This article will thoroughly explain the concept of information literacy and its value to interdisciplinary learners and demonstrate how *Interdisciplinary Research* can be used to foster student development of this skill. The article will conclude by discussing one specific assignment that engages *Interdisciplinary Research* to begin the process of building information literacy in undergraduate interdisciplinary students so that they may better understand the academic degree they are pursuing and set them on a pathway to apply their course of study in both their careers and the complex, real-world issues they will encounter in their ongoing lives.

Keywords: interdisciplinary studies, interdisciplinary research, information literacy, integration, pedagogy

We are living through a very difficult moment in human history. We are having to make almost daily decisions about our health, finances, occupations, and democracy, while being bombarded with disinformation, misinformation, and "alternative facts" concerning those decisions. Information literacy abilities help us find, interrogate, and understand the information needed to make and apply decisions relating to issues we face. Everything from what career to enter to whether to receive a COVID vaccine can be more thoughtfully decided through

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a well-developed information literacy capacity, a necessary means to critically analyze all information that we accumulate on a subject and make sound decisions for ourselves, our families, our communities, and our world (ACRL, 2000).

Decisions on complex issues, it should be noted, are all potentially interdisciplinary in nature. The decision-making process of whether to be vaccinated for COVID-19, for example, could include developing an understanding of the chemistry of vaccine science, the statistical analyses used in drug trials, the principles guiding epidemiology and public health, the political interests of various parties in the disease/vaccine debate, and the philosophical viewpoints underlying issues of individual and communitarian choice. Given the many disciplines involved, the decision-maker would benefit from understanding the central tenets of interdisciplinarity and the skills necessary to its practice, especially information literacy skills capable of interpreting and analyzing information within and between disciplines.

Allen Repko and Rick Szostak's (2021) *Interdisciplinary Research: Process and Theory* aids in building this information literacy capacity in undergraduate interdisciplinary students through its examination of the disciplines students have been studying, while explaining to them the central components of interdisciplinary inquiry. It helps students understand the unique languages of disciplines, unpacks the limitations of individual disciplines in confronting complex, real-world issues, and aids them in developing the tools and understanding the constructs they need to function as interdisciplinarians. *Interdisciplinary Research* is an excellent text for teaching students the interdisciplinary research process, but its more broadly applicable value is in how it can contribute to students becoming better interdisciplinary real-world thinkers by building their information literacy capacity.

This article will begin by explaining some central tenets of interdisciplinary studies and the process of becoming an interdisciplinary thinker. The next section will explore information literacy, its value to all learners, but specifically interdisciplinary learners, and the best practices for teaching information literacy. The third section will demonstrate how *Interdisciplinary Research* can be used to foster student development of information literacy. Finally, the article will conclude by discussing one specific assignment that uses *Interdisciplinary Research* to help students better understand the academic degree they are pursuing and set them on a pathway to apply their course of study to both their careers and the complex, real-world issues they will encounter in their ongoing lives.

Becoming an Interdisciplinary Thinker

In *Interdisciplinary Research*, Repko and Szostak (2021) define interdisciplinary studies work as "a process of answering a question, solving a problem, or addressing a topic that is too broad or complex to be dealt with adequately

by a single discipline, and draws on the disciplines with the goal of integrating their insights to construct a more comprehensive understanding" (p. 9). Interdisciplinary studies work is an extremely complex endeavor to carry out. Repko and Szostak (2021) lay out the complexity in the following progression of thought:

- Interdisciplinary studies draws on two or more disciplinary perspectives;
- Complex events or processes and behaviors have facets or parts that cohere;
- Each facet is typically the focus of a particular discipline;
- When the same facet is studied by more than one discipline, there are often conflicting insights generated;
- Understanding each facet involves drawing on the insights of the corresponding discipline(s);
- Understanding the complex phenomenon or behavior as a *whole* involves integrating insights from the relevant disciplines. (p. 15)

What interdisciplinarians must do to integrate insights from individual disciplines to confront complex problems or questions is find the common ground among them (Arvidson, 2016). According to Arvidson (2014), "Common ground is the middle construct or span between disciplinary and interdisciplinary work" (p. 173) and represents the "pivot from disciplinary to interdisciplinary perspective" (p. 171). To accomplish this goal, an interdisciplinarian must have a working knowledge of what goes into a discipline's perspective, including:

- The phenomena it studies;
- Its epistemology or rules about what constitutes evidence;
- The assumptions it makes about the natural and human world;
- Its basic concepts or vocabulary;
- Its theories about the causes and behaviors of certain phenomena;
- Its methods (the way it gathers, applies, and produces new knowledge). (Repko & Szostak, 2021, p. 34)

To understand and solve real-world problems that require interdisciplinary thought, interdisciplinarians need to understand their own disciplines first (Tormey et al., 2009). The better they can understand their own disciplines, the better equipped they will be to understand new disciplinary perspectives and collaborate with others who are approaching these problems from those perspectives (DeVere Wolsey et al., 2019). The challenge that we as educators offering interdisciplinary programming face is that when students arrive as undergraduates at our institutions, they are not experts in interdisciplinary studies. They are also unlikely to be experts in any disciplines at all. Indeed, they may not even know what a "discipline" is (Carmichael et al., 2017). They likely have learned a good deal of content in a variety of different coursework; they just may not understand that they know that content from *a* perspective,

instead of *the* perspective. A crucial component of developing new interdisciplinary thinkers who understand that there are disciplines with a variety of perspectives that need integration is building their information literacy capacity.

What is Information Literacy?

The Association of College & Research Libraries (ACRL, 2016) defines "information literacy" as "the set of integrated abilities encompassing the reflective discovery of information, the understanding of how information is produced and valued, and the use of information in creating new knowledge and participating ethically in communities of learning" (p. 8). With this definition as its foundation, the ACRL views information literacy as the centerpiece of a higher education reform movement focused on turning students into lifelong learners. Essentially, information literacy is the set of reasoning, analytical, and metacognitive or critical self-reflective skills an individual needs to be an informed citizen, responsible community member, and thoughtful consumer (ACRL, 2000; ACRL, 2016).

Colleges and universities aid undergraduate students in becoming information literate by helping students determine what information they need to understand a topic or confront an issue, while developing the skills to effectively access, usually in the digital space, critically evaluate, incorporate, and apply that information appropriately (ACRL, 2000; Fosnacht, 2020; Jones-Jang et al., 2021). Information literacy, then, combines practical skills in searching and resourcing information with an ability to understand and critique that information, including the content of all classes in a student's course of study (ACRL, 2016). Students need to learn that information literacy is framed by a core set of ideas, including that the authority associated with information is constructed and contextual, that information creation is a process with results one should interrogate, that research is an iterative form of inquiry, that scholarship is a discursive practice, and that searching for information, done well, is a strategic exploration that ought to allow the flexibility to pursue new paths as new ideas are considered (for a complete discussion of this framework, see ACRL, 2016). Given this scope, information literacy cannot be developed through a single class, but rather, is a learning outcome that can and should be woven throughout a student's entire curriculum (Carmichael et al., 2017; DeVere Wolsey et al., 2019; Fosnacht, 2020; Murray & Lachowsky, 2017; Tormey et al., 2009).

To build information literacy capacity, those offering that curriculum should help students:

- To use evidence and sources experts use without overwhelming the students;
- To know how vocabulary informs [any] discipline and the teaching of that discipline;
- [To understand] how experts in a discipline read and write texts;
- To ask the types of questions experts ask (so that they can understand how those experts think about that aspect of reality being studied); and
- To be conversant across disciplines (DeVere Wolsey et al., 2019, pp. 255).

Recent research on information literacy supports the claim that well-developed information literacy skills are an invaluable aim for the higher education student. Studies have found that students who are explicitly trained in information literacy are better able to access and evaluate academic sources than students who are not trained in information literacy (Murray & Lachowsky, 2017). They have found, too, that information literacy activities are positively and significantly correlated with student engagement in higher-order learning, reflective and integrative learning activities, and perceived college learning gains (Fosnacht, 2020). One recent study even found that individuals with highly developed information literacy skills have a particularly valuable ability in our current digital media landscape: the ability to identify "fake news" (Jones-Jang et al., 2021). Again, then, there is clear value to undergraduate students becoming information literate. The challenge facing interdisciplinary students comes not only from needing to gain the general skills any information literate student should have, but also from having to apply those skills to foster a deeper level of understanding of information offered within and across many different disciplines. The *Interdisciplinary Research* text by Repko and Szostak aids the interdisciplinary student in that process.

Engaging *Interdisciplinary Research* for Information Literacy

There are several chapters of *Interdisciplinary Research* instructors could engage with students to develop information literacy capacity. In the contexts in which I have taught—primarily classes with undergraduate students new or relatively new to interdisciplinary and individualized study programs—I have found these chapters, starting with Chapter Two, then Chapter One, to be most beneficial in helping students begin the information literacy learning process:

- Chapter Two, "Introducing the Disciplines and Their Perspectives," encourages critical self-reflection on students' current knowledge of disciplines they have previously studied.
- Chapter One, "Introducing Interdisciplinary Studies," shows students the essential nature of interdisciplinarity and interdisciplinary studies,

while juxtaposing this new knowledge with their current disciplinary knowledge.
- Chapter Four, "Identifying Relevant Disciplines," helps students to break down problems into their disciplinary parts and discern which disciplines are most important to confronting those problems.
- Chapter Five, "Conducting the Literature Search," assists students in conducting an advanced literature search, a key skill in building information literacy capacity.
- Chapter Six, "Developing Adequacy in Relevant Disciplines," takes students through the processes required to comprehend disciplines to the point that they can be engaged to help people confront real-world problems.[1]

I begin with Chapter Two, "Introducing the Disciplines and Their Perspectives," because it helps students understand and reflect upon where they have been in their academic journey so far. Chapter Two introduces students to the disciplines. It defines "discipline" and describes in thorough detail the major components of a discipline that a developing information literate student should know, including a discipline's category, perspective, phenomena, epistemology, assumptions, and methods. Additionally, Chapter Two, while not going into every discipline and interdiscipline that currently exist, provides examples of all these constructs in many of the major disciplines. This material is crucial. Students may have never been tasked with defining the concept of a discipline, but they have likely been studying a variety of disciplines for an extended period and should be equipped to recognize the central tenets of disciplines with which they are familiar. Chapter Two helps students understand the lenses through which each discipline sees and interprets the world, including those in their prior disciplinary coursework, and the examples help them to critically self-reflect on what they "know" and how they came to know it. They will be more adept at evaluating past information they have learned in their courses (and outside of class) and should be better able to evaluate the information of novel scenarios.

The discussion of the disciplines in Chapter Two can also make students more adept at identifying disciplines that may be relevant in consideration of a complex topic. For example, if you asked students after they read Chapter Two what methodological approach would be most appropriate for determining a vaccine's efficacy, students should be able to tell you, even if they have never heard of epidemiology, that a quantitative study based in biology and chemistry makes the most sense. Further, if you asked students what

1 In my experience teaching for information literacy capacity building with new interdisciplinary students, I cover Chapters Four, Five, and Six concurrently. Usually, I will lead with some skill development elements from Chapter Five, but the key concepts of these three chapters really meld together well in building information capacity.

methodological approach would be most appropriate for understanding vaccine hesitancy, they should be able to tell you that there are qualitative and quantitative approaches out of psychology and sociology that should get you the answers to your questions.

There are, of course, many more responses that could be given to these prompts, but if students are able to understand that a topic can elicit very different responses depending on how that topic is examined, they are taking a necessary step in becoming information-literate learners. Thorough responses will demonstrate students' developing information literacy capacity to know what disciplines are needed to understand a topic or confront an issue and will help them begin to critically evaluate, incorporate, and apply the disciplinary knowledge from their own academic backgrounds appropriately. You, as an educator, are laying the foundation for your students to engage in the perspective taking required of interdisciplinary thinkers and are priming them to learn the core interdisciplinary concepts of common ground and integration. It is at this point that you can begin to layer in that new interdisciplinary knowledge on top of their developing disciplinary understanding by exploring Chapter One, as well as Chapters Four, Five, and Six.[2]

Chapter One, "Introducing Interdisciplinary Studies," does for Interdisciplinary Studies what Chapter Two did for the disciplines in general. It helps students understand the major components of interdisciplinary studies, including its perspective, phenomena, epistemology, assumptions, and methods. Perhaps even more important, though, it defines interdisciplinary studies as an applied field in which people try to confront real-world concerns in a manner that cannot be accomplished by practitioners of a single discipline and introduces the concepts of common ground and integration within and between disciplines. As you will see, below, information literacy is central to the understanding and application of both of those key concepts of interdisciplinarity.

After thoroughly discussing the content of Chapter One, you could ask each student, working individually, to explore a real-world concern that they have studied at some point in their previous coursework in college. I have had students explore concerns as disparate as ending fossil fuel reliance and paying college athletes for playing their sports. I have always found that letting

2 I must note a word of clarification in using Chapters Four, Five, and Six in *Interdisciplinary Research*. These chapters discuss steps 3, 4, and 5 in the Interdisciplinary Research Process (IRP). The IRP is an excellent approach to conducting interdisciplinary research, but these chapters are also valuable to students trying to gain information literacy skills and become interdisciplinary thinkers, regardless of their aspirations related to research. This will need to be explained to students in courses focused on interdisciplinarity, but not necessarily interdisciplinary research, before having students read these chapters. If you are teaching for information literacy skill development and not for research design, it may be advisable to skip certain sections of these chapters that are more squarely concerned with the research process.

students explore their unique interests assists in their developing information literacy capacity and comprehending the tenets of interdisciplinarity. Once students have decided on a real-world concern they are interested in, have them state what disciplines could be used to confront this concern and whether they have adequate understanding of the relevant disciplines and their perspectives to confront the concern. The likely outcome is that students realize there is much that they do not know along those lines. This will likely be true not only of disciplines that they have not studied, but also of those they have. They will probably see their current disciplinary knowledge bases are insufficient for determining common ground among disciplinary perspectives and almost certainly for integrating perspectives around their real-world concern.

This realization should spur students to consider more deeply what is missing in their current knowledge about the relevant disciplines and the concern. Chapter Four, "Identifying Relevant Disciplines," and Chapter Six, "Developing Adequacy in Relevant Disciplines," can aid students in addressing their need for more information. Chapter Four introduces systems thinking and the system map as a means of analyzing a complex problem. This concept and this analytical tool assist students in determining what they need to know about a topic before they can begin to confront it. Chapter Six carries this process forward by introducing the idea that disciplines are not monolithic in their interpretation of a topic. Even single disciplines may have internal debates and conflicting schools of thoughts and theoretical frameworks. To adequately apply a disciplinary perspective to a topic, students will need to learn about these debates and theories, evaluate which views make the most sense to them, and determine which apply best to a particular topic. Knowing what information to include and discard when considering a topic and where one stands on a topic reflects the evaluative and critical thinking components of information literacy, skills necessary to determine common ground across views of relevant disciplines as is required of an interdisciplinary thinker. Students, however, will not be able to engage in this practice without developing the practical skills necessary to retrieve appropriate resources. Chapter Five, "Conducting the Literature Search," aids them in this portion of the information literacy development process.

Chapter Five discusses how to conduct a literature search (or literature review). Repko and Szostak (2021) state, "This search carefully examines previous research in journals, books, and conference papers to see how other researchers have addressed the problem. The literature search also serves to demonstrate adequacy in the disciplinary literature on the problem" (p. 128). In addition to explaining the value of the literature search to a research enterprise, Chapter Five discusses the unique challenges of conducting an interdisciplinary search in that search engines and databases are usually discipline-based so that interdisciplinary students have to conduct a more

expansive search than would disciplinary students. The chapter also offers key insights on searching in different digital spaces, using library resources, performing subject and keyword searches, performing a tiered search, reading and analyzing the literature, avoiding disciplinary bias, and appropriately organizing all of the sources so they can be synthesized when the search is complete.

Knowing how to conduct a literature search is foundational to building information literacy capacity. The other core components of information literacy cannot be acquired if students cannot find resources to better understand a subject. Moreover, doing the search can serve as a critical self-reflective exercise that can demonstrate how well students have learned the concepts presented in Chapters One, Two, Four, and Six. If all goes well, interdisciplinary students should emerge from a literature search better able to see the framework of the disciplines in which they and the topic they have chosen to research are embedded. They should be able to identify the unique language, assumptions, methods, sources, and rationales a discipline uses to explain a phenomenon and apply that knowledge to find the best resources from among the disciplines most relevant to their topic. Additionally, reading material representing disciplines not their own helps students see the inadequacies that sometimes exist within a discipline in understanding phenomena and helps them develop the critical thinking skills that interdisciplinary thinkers need. This article concludes with a discussion of an assignment that shows the information literacy and interdisciplinary skills that students can gain when *Interdisciplinary Research* is engaged with student-centered learning strategies.

Using *Interdisciplinary Research* to Build Information Literacy

In a prior research study I conducted (Brooks & Widders, 2012), alumni of a large interdisciplinary program that used *Interdisciplinary Research* as a core text overwhelmingly reported that they were satisfied with their degrees (84.6% of respondents). This was in large part due to assignments in the introductory and capstone courses of the program that focused on helping students understand the uniqueness of their degree in relation to post-graduation life (and helping them in explaining their degree to people unfamiliar with interdisciplinarity, interviewing, resume/cover letter writing, etc.). These assignments were perceived as highly valuable by alumni. The study also found that 74.5% of alumni perceived significant value in an academic paper assignment that asked students to integrate their disciplinary knowledge bases to examine a real-world problem. Overall, 92.1% of respondents felt the program, through assignments like these, helped them better integrate knowledge and modes of thinking across disciplines as they so often had to do in their post-graduation lives, even if they did not go on to graduate school

or do work explicitly interdisciplinary. *Interdisciplinary Research* was a crucial resource in helping them better understand their own disciplinary background and their interdisciplinary degree, and our findings suggest that text had a positive impact on their careers post-graduation. Anecdotally, in subsequent positions in interdisciplinary programs at two additional universities, I have seen many students find similar value in using *Interdisciplinary Research* to better understand their disciplinary roots and the interdisciplinary degree.

Backed by the findings from this research study and other internal assessment work done at my current institution, I (in collaboration with others) began to craft an assignment that would serve as a foundational exercise in the interdisciplinary major that could be used to further improve an already well-regarded degree. Below is the assignment[3]:

> *Assignment: Understanding Your Own Disciplinary and Interdisciplinary Roots*
>
> In a narrative of approximately 1000 words, address the following prompts:
>
> 1. Name three disciplines you have studied extensively while in school. Describe the central assumptions of those disciplines. What linkages do you see between these disciplines' assumptions? Which of these disciplines do you think will factor into your life after graduation?
>
> 2. Explain, in a paragraph each, SIX key concepts (two from each of your disciplines) you have learned during your schooling (for example, if you have studied management, you could explain principles of negotiation). If you studied a single concept in two disciplines, try to explain that concept according to both disciplines.
>
> 3. Give an in-depth example of how a concept from one of your disciplines shares common ground with a concept from another of your disciplines and how those two concepts can be integrated to examine a real-world construct (for example, if you have studied Women and Gender Studies and Leadership Studies, you could apply concepts from those fields to examine inequity in women's representation in leadership roles).

The in-depth exploration and, eventually, interrogation of their disciplinary and interdisciplinary roots required in this assignment are usually a novel and challenging experience for students. To help them meet the challenge, I schedule students for seven class periods (usually 75 minutes each) of work focused on better understanding of their academic and disciplinary roots. Next, I will describe the content of these classes, including key instructional components and pedagogical techniques when appropriate.

Class One. In the first of these class periods, I have the students tell the rest of the class about their academic journeys to date, ultimately concluding with how they ended up in this interdisciplinary class. I ask general, but

3 The version of the assignment detailed in this paper is a general format version of the assignment. Readers may modify it to fit their students, program, and institution.

probing questions to get the students thinking about what they know and do not know about their academic history and evaluating the quality of the knowledge they have attained.

Class Two. After the initial class period, the students read Chapter Two in *Interdisciplinary Research*, "Introducing the Disciplines and Their Perspectives." The second class period consists of a mix of lecture and discussion to make sure they understand the core concepts explored in Chapter Two and to see what they know about the disciplines they themselves have been studying in school. The students, individually, then in groups, and finally with the entire class, try to identify the major components of their own disciplines—perspective, phenomena, epistemology, assumptions, and methods. This self-reflective activity helps students begin to see what they know not as content, but as disciplinary knowledge, while also helping them evaluate the limits of what they know and see that there are things they do not know at all.

Class Three. In the third class, I help students explicitly engage with the concept of metacognition so that they can begin the critical self-reflective process of understanding how they know what they know and what the limitations and inaccuracies in their knowledge bases might be. Metacognition, put in the simplest terms, is thinking and learning about how one thinks and learns. Numerous research studies have shown the value of using metacognitive learning strategies for improving student learning (for a complete discussion of metacognition see Brooks et al., 2019). The scope of this class discussion can extend beyond prior academic study and encompass how students have come to understand and have opinions about real-world questions and problems. Students will likely find preferences and, possibly, biases in the sources and modes of inquiry that they have accepted and incorporated into their knowledge bases. Such insights deepen the evaluation process in relation to students' disciplinary knowledge. Students will become more astute at interpreting and applying their disciplinary knowledge to novel contexts and better at making use of others' disciplinary knowledge, too, thus beginning to develop as interdisciplinary thinkers.

Class Four. By the fourth class period, it is finally time to *formally* introduce interdisciplinarity. The concept of interdisciplinarity will have been informally woven into the content and discussions of the prior three classes, but it is in the fourth class period that interdisciplinarity becomes the focus of student learning. Students read Chapter One, "Introducing Interdisciplinary Studies," prior to this class. I begin with a lecture to make sure the students understand the core concepts of Chapter One most important to our efforts, including the definitions of interdisciplinary studies, perspective taking, common ground, and integration. The remainder of the class is a discussion that allows students to begin to explore real-world concerns they have in relation to the disciplines they have studied. I pose questions that get the students to see the perspective taking in which they are engaging and to see if maybe there is common ground

among any of the views associated with disciplines they have studied. It is at the end of this class that the above assignment of a paper on their own disciplinary and interdisciplinary roots is introduced and explained.

Classes Five, Six, and Seven. In the next three class periods I have students explore the elements of Chapters Four and Six that focus on determining appropriate disciplines to examine a real-world topic and the level of adequacy needed to understand that topic from those disciplinary perspectives. As students again evaluate what they know, most realize that they do not have the requisite disciplinary knowledge to fully explore a real-world topic, and they realize that they must begin to learn how to find new resources if they are to proceed with the interdisciplinary work. This ability to find appropriate resources on a topic representing views from multiple disciplines is the foundation of information literacy, so important to developing as an interdisciplinary thinker.

Given the importance of developing this ability, I have generally spent a full class period exploring Chapter Five's concepts concerning the conducting of a literature search. Usually, I choose the fifth class period to explore Chapter Five as the search and organization skills students encounter in this chapter can help them to better apply the core elements of Chapter Four and Six to the concepts they have begun to explore in the "roots" assignment. Additionally, I should note that my students' ability in conducting literature searches is generally rudimentary at best. If your students are more familiar with literature searches, you may be able to reduce the time spent on Chapter Five and increase the time spent on the most useful material in Chapters Four and Six.

And finally, in reviewing the way instructors might use this series of class periods to prepare students to put in a good effort on the "roots" assignment, I'd like to mention something else I do that others might wish to do, too. After all, while the assignment itself and the classes I have described are primarily student driven, instructors can still play a key role—by supplementing the information available in the Repko and Szostak text. In addition to explaining core concepts from *Interdisciplinary Research*, instructors can show students how they themselves would conduct this kind of work, discovering what common ground exists among the disciplines they study, and integrating disciplinary knowledge bases in seeking a solution to a single problem. I do this by telling students about my own academic journey and by showing them examples of how I would answer the "roots" assignment's prompts. For example, I share this discussion of one of my "key concepts":

> *Complexity thinking and complex systems*: Complexity thinking is a mode of analysis that embraces the "emergent, interactive dynamic" of situations and behaviors within a system (Uhl-Bien et al., 2007). Complexity thinking is a central component of complexity science, which "is the study of dynamic behaviors of complexly interacting, interdependent, and adaptive

> agents under conditions of internal and external pressure" (Marion, 2008, p. 3). Uhl-Bien and Arena (2017) describe complexity by its "rich interconnectivity," arguing that a system is complex and "that when things interact, they change one another in unexpected and irreversible ways" (p. 9). They further differentiate *complexity* from *complicated* by stating, "Complicated systems may have many parts but when the parts interact they do not change each other" whereas the components of complex systems are "fundamentally changed" by their interactions in that the "system is not decomposable back to its original parts" (Uhl-Bien & Arena, 2017, p. 9–10). Most, if not all, organizations and institutions fit the definition of complex systems.

In illustration of my role as an interdisciplinarian, I explain that this key concept, which has roots in biology, can be applied to leadership studies (the labeled subject of our interdisciplinary degree program). I explain there is a common ground that exists between the ways biology and leadership studies interpret and understand social systems, allowing for complexity thinking to be integrated into the analysis of leadership situations. I also show them how I found the resources to write about this key concept through a library database search and how I cataloged the information from these resources using the strategy proposed in Chapter Five of *Interdisciplinary Research*.

If everything goes well, I get results like this example of discussion of a "key concept" from a student studying psychology, religious studies, and leadership studies (included with permission):

> One of the major concepts in the discipline of psychology is perception. Perception is how an individual experiences the world around them. There are many different factors that play into perception, the main one being the five senses: taste, touch, smell, sight, and sound. Each sense has a role in various kinds of perceiving, and the combination of senses creates levels of and adds context to our perception of our surroundings. An interesting thing about perception is that there are certain stimuli in our environment that we [are] keen to, while others are filtered out of our perception as our mind deems them as not as important or pertinent to us in the moment. There also is an aspect to perception that is affected by our own personal experiences. If we are exposed to a certain stimulus more often, then we will perceive that stimulus differently than someone who has never encountered it in their own experience.

This example shows a depth of understanding on perception. It explores what it is as a construct and offers some interesting information on how it can be applied to different phenomena. It is not comprehensive, but it is thoughtful and explained well. Those are clear indicators of an information literate student.

To further demonstrate to my students the discovery of common ground and practice of integration required in the third component of the assignment,

I give this example from my own work that integrates principles of economics, philosophy, and leadership studies:

> The concept of "stakeholders" and stakeholder theory, as popularized by economist Edward Freeman (1984), posits that "To be an effective . . . strategist, you must deal with those groups that can affect you, while to be responsive (and effective in the long run) you must deal with those groups that you can affect" (p. 46). Stakeholder theory is a counter to the traditional capitalist, economic approach of "stockholder theory" popularized by Milton Friedman. Stockholder theory essentially states that the aim and primary concern of a business is to meet the needs and demands of its stockholders—those who have financially contributed to that business's continued existence. The main aim then is a return on investment. Other than being bound by the rules and laws of the space in which the business functions, no other considerations are required. The assumption underlying a stakeholder-based leadership approach then is that an individual, group, or organization should make decisions with all constituents' interests in mind (Laplume et al., 2008) and that "values are necessarily and explicitly a part of doing business" (Freeman et al., 2004, p. 364).

This example, brief as it is, compares two economic theories, examines the common ground between economic and ethical principles, and applies them to the problem and purpose of leadership. Even if all the concepts are unknown to a student the example should make clear how they have been integrated.

Again, if the training and preparation have gone well, the third prompt will yield results like this one from a student who integrates concepts from sociology, religious studies, neuroscience, women and gender studies, and leadership studies on a very tragic real-world, issue, rape culture:

> To put it simply, society has perpetuated for hundreds of years that women are weaker than men, and therefore should be submissive. Our society also sexualizes and objectifies women at every turn: the indulgence of female promiscuity in marketing ("sex sells"), pornography that depicts violence against women, and the perpetuation that a woman's worth is subject to her relationship to a man (that's someone's daughter, sister, wife, etc.). Because what society consumes objectifies women, men in turn do so on a personal scale. This is why our culture sees such a disparity among young women and the prevalence of sexual assault. Women are perceived as submissive, so they become prey. Women ages 18–25 are the most likely population to be targeted for violent crimes such as domestic violence, sexual assault, and homicide, and one in three women in the United States [have experienced sexual violence in their lifetime]. This concept is mind-blowing to me because women are not the minority! Statistically speaking, the female population encompasses roughly 53% of all human life, which is a simple majority. So how is it that women are still struggling for equality? Rape Culture is how.

This student does not explicitly show any sourcing, but there is clear evidence that the ideas expressed here come from the student's disciplines, have been resourced and researched, evaluated and interpreted, and then applied in an integrated manner on a topic that is the domain of no single discipline. An example such as this not only demonstrates the information literacy capacity of the student, but also the student's development as an interdisciplinary thinker. This is what can be achieved when interdisciplinary educators engage sound teaching strategies to build information literacy capacity, and it has been my experience that the Repko and Szostak text, *Interdisciplinary Research*, can be an invaluable tool in producing this level of achievement.

Conclusion

To my knowledge, the student who wrote the last example of a response to a prompt in the assignment that asks the students in my interdisciplinary program to articulate their understanding of their own disciplinary and interdisciplinary roots has no plans to go to graduate school, and neither of the students whose work is presented here plans to be a researcher in the field, and yet both reported finding great value in the work they produced in the course. This is a common refrain among my students. And my course evaluations are overwhelmingly positive on this "roots" assignment in particular. Students appreciate the practical skills gained through the readings from the Repko and Szostak text and the class periods in which we worked with the text, but more than anything they appreciate this assignment that has helped them learn how to think and talk about their degree, enhancing their understanding of everything they have been studying in the pursuit of their degree. By studying disciplinary perspective (centering on Chapter Two of the text), within an interdisciplinary context (developed in the other chapters discussed above), they gained *perspective*.

I was recently working with a student applying for a prestigious award. The student almost quit the process out of stress and frustration because she could not explain how her interdisciplinary degree made her a *good* candidate for the award. And she also did not understand my claim that her interdisciplinary degree made her a *perfect* candidate for the award. I took her through an abbreviated version of the assignment above, including some review of excerpts from *Interdisciplinary Research*, and by the end of that conversation it was like I was talking to a brand-new person. In the rest of her conversation with me and in her finished application she spoke brilliantly of her interdisciplinary degree and how what that course of study had taught her applied to the real-world problem she hopes to explore through the opportunity supported by this award. She now knows she is a deserving candidate for the award, and, with any luck, in a few months, she will be its recipient. Even a brief review

of the concept of information literacy and the content of the *Interdisciplinary Research* text made that possible for her.

Biographical Note

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