

RUNNING HEAD: INTERDISCIPLINARY LEARNING ASSESSMENT RUBRIC

**Targeted Assessment Rubric:
An empirically grounded rubric for interdisciplinary writing**

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Abstract

The *Targeted Assessment Rubric for Interdisciplinary Writing* was developed and tested through analysis of 86 pieces of freshmen, sophomore and senior college student work. Four levels of interdisciplinary understanding are described considering four dimensions of interdisciplinary work (a) purposefulness, (b) disciplinary grounding, (c) integration, and (d) critical awareness.

Introduction

At the dawn of the 21st century, the American academy is marked by a renewed interest in interdisciplinary research and education. Multiple drivers propel the surge. Socio-environmental challenges such as mitigating climate change or eliminating extreme poverty demand interdisciplinary solutions that mirror their complexity. Technologies have ignited interdisciplinary innovations, from unprecedented information sharing to systemic accounts of gene regulation. Recent analyses of the future of industry and labor call for individuals who can understand, employ, and integrate knowledge, methods, and approaches in various fields, collaborate across industry sectors, cultures, and disciplinary teams (National Academies, 2005; Levy & Murnane, 2004).

Recognizing this state of affairs, American colleges and universities have increased their interdisciplinary course offerings and plan to continue to do so. In the 2006 *US News & World Report* college and universities ranking, 61.71 % of liberal arts institutions reported offering interdisciplinary studies majors. In a recent Social Science Research Council survey of 109 American Baccalaureate College- Liberal Arts institutions, 99.07% report either being *very* or *somewhat* oriented to interdisciplinary instruction. In this sample, 65.42 % expect to increase their offerings over the next five years contrasting with 32.71 % anticipating no increase in their interdisciplinary initiatives (Rhoten, Boix Mansilla, Chun, & Klein, 2006).

Federal funding agencies also stand prepared to support the development of interdisciplinary initiatives in research and education. For example, the National Institutes of Health (NIH) have launched the Roadmap Initiative to promote “interdisciplinary research teams of the future” (NIH, 2006). In turn, the National Science Foundation (NSF) seeks to promote “investigations that cross disciplinary boundaries and require a systems approach to address complex problems” (NSF, 2006, p 6). At the graduate level, programs have emerged to prepare

young people for new forms of scholarly research and professional work, such as the NSF's Integrative Graduate Education Research Training (IGERT). At the collegiate level, the American Association of Colleges and Universities (AACU) has called for a renewal of liberal education as a means to prepare our youth for the 21st century. Hallmarks of such education include competencies reminiscent of interdisciplinary learning, such as “integrating knowledge of various types and understanding complex systems; resolving difficult issues creatively by employing multiple sources and tools; demonstrating intellectual agility; [and] working well in teams, including those of diverse composition” (AACU:13).

Yet the ongoing growth of interdisciplinary programs and courses is accompanied by deep uncertainty about how to structure interdisciplinary learning experiences and how to measure their success. Overwhelmingly, interdisciplinary programs rely on student grades and opinion surveys as indicators of success (Rhoten et al., 2006). An analysis of four well-regarded interdisciplinary programs (Boix Mansilla & Dawes Duraisingh, 2007) showed that innovative methods to assess learning outcomes (e.g., real-life problems, rubrics, portfolios) are informed by generic criteria (e.g., logic of argument, clarity in presentation, or effort and commitment). Such criteria sidestep the question of what, if any, are the defining qualities that distinguish interdisciplinary achievement (Boix Mansilla, 2005; Boix Mansilla & Dawes Duraisingh, 2007). In an era of increased accountability, reliable approaches to assessing interdisciplinary learning are necessary to ensure not only the effectiveness of interdisciplinary courses and programs but also the survival of programs that can nurture student learning of excellence (Astin, 1993; Banta, 2002; National Academies, 2005).

A growing body of research centered on assessment has yielded a plethora of principles and artifacts to monitor and support student learning. Performance-based rubrics, protocols, and portfolios suggest *how* to make the learning contract between faculty and students clear and

student learning visible. Yet with few exceptions (e.g. Wolfe & Haynes, 2003), this literature has not approached the question of *what* exactly to assess when student work is interdisciplinary.

What constitutes quality interdisciplinary student work and how can faculty validly and reliably distinguish between students' higher and lower achievements? How can administrators of interdisciplinary programs in higher education discern whether their students are developing key competencies of interdisciplinary inquiry and communication?

Here, we introduce the *Targeted Assessment Rubric for Interdisciplinary Writing* an empirically-tested instrument designed to assess interdisciplinary writing at the collegiate level. The rubric proposes four distinct dimensions to be examined in a piece of interdisciplinary writing: a paper's *purposefulness*, *disciplinary grounding*, *integration*, and *critical awareness*. For each criterion, four qualitatively distinct levels of student achievement are described—that is, *naïve*, *novice*, *apprentice*, and *master*. The rubric builds on a clear definition of interdisciplinary work, a related assessment framework, and recent scholarship on interdisciplinary writing (Boix Mansilla, 2006; Boix Mansilla & Dawes Duraisingh, 2007; Boix Mansilla, Miller, & Gardner, 2000; Wolfe & Haynes, 2003). Systematic analysis of student work enabled us to test the rubric's reliability at capturing difference in performance at three stages of collegiate training (freshmen, sophomores, and seniors). These students participate in a unique sequence of team taught interdisciplinary courses toward an individualized interdisciplinary specialization—the Interdisciplinary Studies Major at Miami University . The rubric is designed as a dynamic tool that researchers and faculty can adapt and use to examine student work at a variety of disciplinary crossroads in freshman to senior courses and theses. The rubric is not merely a tool for grading but an instrument to gauge essential qualities of student interdisciplinary understanding and support their further development. In what follows, we begin with a review of the assessment literature and the rubric's conceptual foundations. We then introduce the rubric through an example of

student work and characterize the methods by which we developed and tested the rubric. We conclude with concrete recommendations for practice.

Background

Assessing Learning Outcomes

A key marker of institutional effectiveness—despite being difficult to measure—is the quality of individual student learning (Chun, 2002). The drive to advance valid measures of such learning has yielded new, often conflicting, approaches to assessment (Ewell, 1991; Hutchings, 1990). “Value added” assessments measure students’ growth resulting from participation in an academic program (Chun 2002; Schneider 2001). “Performance-based” assessments demand that students demonstrate their capacity to employ the concepts and skills they have learned. “Evidence-based” assessment calls for systematic gathering and analysis of information about student learning (portfolios, tests, reflective journals) (Allen, 1998; Blythe, Allen, & Powell, 1999). Learning-centered assessment in turn, highlights the importance of informative feedback in support of students’ further growth. (Anderson, 1998; Stowe & Eder, 2002; Wiggins, 1998).

Rubrics have figured prominently in the authentic assessment movement, both in pre-collegiate and higher education contexts. First, grading is seen to be fairer and more consistent when assessment criteria are made explicit and instructors describe different levels of performance. Second, self-assessment is increasingly valued as a means to help students reflect on their work and become more purposeful learners; rubrics allow students to judge the current quality of their work and the ways in which they could develop it further (Black & Wiliam, 1998; Brough & Pool, 2005; Huba and Freed, 2000; Huber and Hutchings, 2004; Walvoord and Anderson, 1998).

Some critics charge that rubrics promote shallow learning and are incongruous with student-centered teaching practices because they promote conformity and standardization (Kohn,

2006; Wilson, 2006). Wilson believes rubrics “violate” the complexity of a piece of written work by dividing it into separate, quantifiable parts which do not capture a piece’s overall impact or quality. However, as Goodrich-Andrade (2006) points out, some of the perceived shortcomings of rubrics stem from a narrow interpretation of rubrics as tools for grading rather than supports for understanding. She and others (e.g., Huba and Freed, 2000) caution that in a well designed rubric, scoring highly on all of a rubric’s criteria is incompatible with not doing the task well. In other words, the power of a rubric rests on the degree to which it captures meaningful dimensions of the work without which a quality product could not be achieved. Such dimensions are generally not as easily agreed upon as “writing mechanics.”

As suggested earlier, while the authentic assessment movement has broadened the *ways* in which students are assessed, determining *what* to assess has proven more difficult (Boix Mansilla and Dawes Duraisingh, 2007; Cizek, 2000). This is particularly true of interdisciplinary work where a range of epistemological challenges are involved and faculty from different disciplinary backgrounds may have conflicting priorities for students’ learning (Klein, 1996; Schilling, 2001). Essential to assessing the *what* of interdisciplinary learning is a clear definition of interdisciplinary understanding and core competencies that characterize accomplished interdisciplinary work.

Defining and Assessing Interdisciplinary Understanding

We define interdisciplinary understanding as the capacity to integrate knowledge and modes of thinking in two or more disciplines or established areas of expertise to produce a cognitive advancement—such as explaining a phenomenon, solving a problem, or creating a product—in ways that would have been impossible or unlikely through single disciplinary means (Boix Mansilla, Miller, & Gardner, 2000). “Understanding” is viewed here in a “performance” sense as the capacity to *use* knowledge flexibly and effectively, rather than *having* or *accumulating* it (Perkins, 1998). Assessing understanding therefore requires that we give students

opportunities to apply or *think with* the knowledge learned—opportunities that simultaneously build and demonstrate understanding. Instructors diagnostically examine students' work to support further development in understanding.

Building on this definition of interdisciplinary understanding, the *Targeted Assessment Framework* (Boix Mansilla & Dawes Duraisingh, 2007) was designed to address long-standing questions of interdisciplinary instruction: What does it mean to understand a problem in interdisciplinary depth? What counts as quality interdisciplinary work? How can one describe core qualities of good interdisciplinary work to students in order to support their learning? What kinds of learning challenges will students confront? The framework serves as a common language for describing a great variety of interdisciplinary student products (multimedia presentations, papers, theses) highlighting core dimensions of interdisciplinary understanding applicable across cases.

First, the framework depicts quality interdisciplinary understanding as *grounded in the disciplines*. Understanding builds on, expands, and revises knowledge and modes of thinking that have survived the scrutiny of expert communities using commonly agreed upon methods and validation standards (Gardner & Boix Mansilla, 1994). Psychological research in domain-specific cognition has documented the numerous challenges that students confront when developing disciplinary expertise. Challenges include: overcoming intuitive misconceptions (e.g., an inclination to linear causal reasoning, social stereotypes, a mechanical use of number systems. (Boix Mansilla & Gardner 1998; Gardner, 2000). Students must also move beyond the view of disciplines as fixed bodies of information. They must understand the constructed and dynamic nature of knowledge production and use concepts flexibly and in informed ways (Boix Mansilla & Gardner, 1998; Gardner 2000). Thus assessing interdisciplinary work involves a close *disciplinary* reading of student work, one that considers the foundational bodies of expertise on which a piece stands and the degree to which a student shows understanding of the chosen

disciplinary insights. Second, essential to interdisciplinary understanding is the “synthesis” or “integration” of disciplinary perspectives that yields a new visual model, explanation, insight, or solution. Assessing the integrative qualities of a piece of work should therefore involve identifying points of disciplinary integration and articulating the cognitive advantage enabled by the combination of perspectives. Third, the *Targeted Assessment Framework* proposes that producing interdisciplinary understanding of quality demands that students have clarity about the purpose of their inquiry and engage in a process of considered judgment and critique—weighing disciplinary options; making informed compromises to achieve their proposed aims; recognizing the limitations of the work produced. Thus, assessing interdisciplinary work calls for attention to students’ ability to reflect on the purpose, choices, opportunities, compromises, and limitations that characterize the kind of interdisciplinary work they are engaged in. Application of the *Targeted Assessment Framework* to practice revealed the need to distinguish between students’ clarity of purpose and their capacity for self-critique. These two sub-dimensions are separated in the rubric proposed here

The Demands of Interdisciplinary Writing

In the past decade, educators have affirmed the importance of writing as a means of acculturating students into a discipline and its way of constructing the world and have noted the challenges writers confront as they adopt academic disciplinary genres (Berkenkotter et al., 1988; McCarthy, 1987; Myers 1990; Thaiss & Zawacki, 2006). Assigning students disciplinary genres offers them the opportunity to practice and internalize the discursive forms, vocabulary, values, assumptions, and epistemological commitments used by experts within that discipline (Bazerman, 2005; Cole & Engeström, 1993; Waldo, 2003; Wenger 1998). Disciplinary writing teaches not only the discipline’s shared assumptions and content but also its rhetoric or the means of organizing information and persuading others.

Because interdisciplinary work is situated at the interface of at least two disciplinary boundaries, or what Norgaard (1999) calls “the contact zone,” producing interdisciplinary written work poses even more demanding challenges for students. Writers must mediate the rhetorical as well as the theoretical and methodological differences inherent in multiple disciplinary discourses. While various scholars have underscored the difficulties of straddling disciplinary divides (Mahala & Swilky, 1994; Bazerman, 2005), the most in-depth work has been carried out by Klein (1996) and Newell (2001) who have theorized the process of interdisciplinary inquiry and, more specifically, the critical role of integration in that process. Klein (1996, p. 212) writes that interdisciplinary work “requires the active triangulation” of “depth” (competence in appropriate specialized disciplinary approaches), “breadth” (comprehensive understanding of the problem or topic), and “synthesis” (multiple integrative actions that combine specialized information to respond to the purpose at hand).

Scholars have analyzed ways in which disciplines can be integrated in interdisciplinary work (Fuller, 1993; Journet 1997; Newell 2001), offering general approaches to teaching and assigning interdisciplinary writing in the classroom (Haynes, 2004; Seabury, 2002) and suggesting guidelines of the assessment of interdisciplinary learning (Field & Stowe 2002; Klein, 2002). However, little work has been done to develop instruments for assessing interdisciplinary work. One exception is the “Interdisciplinary Writing Assessment Profiles” that provides a checklist for assessing undergraduate interdisciplinary expository writing of thesis-length (Wolfe & Haynes, 2003). However none has achieved what we are proposing here: to develop a rubric with gradations of quality for the assessment of interdisciplinary writing.

A Grounded Rubric

Our *Targeted Assessment Rubric for Interdisciplinary Writing* includes 10 judgments grouped into four categories: (a) purposefulness, (b) disciplinary grounding, (c) integration, and (d) critical

awareness or metacognition. On each of these dimensions, the papers are rated on one of four levels: naïve, novice, apprentice, or master. Appendix A includes a scoring version of the rubric. In this section we first characterize the four levels of understanding across dimensions and indicate the instructional effort that they invite. We then describe each dimension of interdisciplinary understanding, outlining particular learning demands that they present to learners working on interdisciplinary papers. A full characterization of levels of dimensions and levels of *disciplinary* understanding has been previously described (Boix Mansilla & Gardner, 2000).

Four Levels of Interdisciplinary Understanding

The levels of interdisciplinary understanding are presented as ideal types. They offer a coherent characterization of a piece of student work. In reality, however, a single student's paper may represent more than one level, depending on the dimensions assessed. For example, a student could produce a paper that shows a clear purpose and robust disciplinary grounding but only limited synthesis of disciplinary insights. Another paper may articulate integrations well but exhibit disciplinary misconceptions that compromise its quality. Ultimately, this rubric seeks to diagnose student learning at a level of granularity that enables further instructional support.

(i) Naïve interdisciplinary understanding.

A paper can be characterized as naïve when it lacks clarity of purpose and audience; it is primarily built on common sense or folk beliefs about the topic at hand and fails to draw on disciplinary insights. Indeed, there is no effort to integrate multiple perspectives because perspectives themselves are not considered as such. Students who exhibit a naïve understanding of the problem under study will benefit from instruction that engages them in wondering about the topic in ways that may call for interdisciplinary exploration. These students may benefit from discussions about why the topic matters, what would be gained by understanding it in depth, how

the topic connects with and expands personal experience, where one might go to gain information about the topic, or how their intuitions about the topic may be challenged.

(ii) Novice interdisciplinary understanding.

A piece of work exemplifies a novice understanding when it exhibits a student's nascent grasp of the nature of interdisciplinary academic work. Often such work is still mechanistic and tentative; it is primarily informed by the rituals of schooling and it presents important composition challenges. At this level, the paper may have been undertaken in the spirit of writing an interdisciplinary paper *per se* rather than seeking to advance understanding of a complex problem. Disciplinary concepts and theories are typically presented as matters of fact, and misconceptions may still be abundant. When novice writers do seek to incorporate multiple disciplines, the purpose of their paper may be too broad and unviable, or the integrative language may be mechanistic and pro-forma. Students are likely to balance perspectives according to superficial criteria, such as allocating equal length of text for each discipline. Unlike their naive counterparts, students whose papers are characterized as novice are beginning to engage in academic writing and may be intrigued by a problem to be examined. These students will benefit from support in understanding the nature of and differences between disciplinary and interdisciplinary work and the process of inquiry. Students whose work is consistently at this level may find it helpful to analyze examples of work by experts in which the process of knowledge construction in and across disciplines is made visible, as well as to critically reflect on the benefits and shortcomings of the disciplinary contributions.

(iii) Apprentice interdisciplinary understanding.

Papers at this level mirror experts' interdisciplinary work in multiple ways. They exhibit a clear and viable purpose and a sense of the multiple audiences for the work. The paper presents adequate use of disciplinary concepts and modes of thinking and most claims are supported

effectively with examples and sources. The integration between perspectives is reached through a metaphor, conceptual framework, causal explanation, or other device that contributes to a deepening understanding of the topic. The paper may still include unnecessary diversions, and some clear opportunities to make connections across disciplines may be missed. Students whose work falls primarily at this level are attaining a robust understanding of disciplinary foundations and how and why integration can deepen understanding of the topic at hand. Further support for these students could involve polishing the piece to maximize its effectiveness and critical stance. Students may be invited to compare their approach to the topic (e.g., disciplinary selections and integrations) to competing scholarly ones to discern how understandings may be best advanced. They may also be well served by in-depth reflection on the shifting terrain of existing disciplinary or knowledge structures and how their inquiry could be further advanced by deeper levels of integration.

(iv) Master interdisciplinary understanding.

Papers at the master level are characterized by their creativity, parsimony, and sophisticated self-reflection. At this level, students demonstrate comfortable understanding of disciplinary foundations and interdisciplinary integration. Their papers exhibit a clear sense of purpose and need for an interdisciplinary approach. They have mastered multiple expressive genres and can effectively create a hybrid form. These papers introduce new insightful examples to support disciplinary claims. Perspectives are integrated elegantly and coherently, and opportunities to advance the argument are not overlooked. At the undergraduate level, students performing at this level are ready to move to a new topic. At the graduate level, student writing will confront additional demands. New criteria can be considered including originality in the field, potential impact of the interdisciplinary paper and systematic account of scholarly precedents and contributions.

A psychologically tested developmental progression of interdisciplinary cognition is clearly beyond the scope of this paper. However, the conceptual progression we propose can aid faculty in their effort to find adequate levels of intervention that will support development in student understanding from one level to the next. For example, if a student is unable to engage in interdisciplinary understanding of the problem under study, an appropriate intervention might be to focus on the relevance of the topic and an interdisciplinary approach. Calls for originality and a critical stance may exceed the capacity of these students who are still to encounter the basic tools of disciplinary reasoning and integration. At the other end of the spectrum, students who are engaged in and capable of constructing an interdisciplinary understanding of complex problems may not need a discussion of relevance as much as they do an invitation to nuance and critical reflection on their approaches. In other words, used as a diagnostic tool, our rubric could help faculty to personalize their instruction and select appropriate interventions for different students.

Four Dimensions of Interdisciplinary Understanding

To guide the assessment of students' work, we propose four dimensions of interdisciplinary understanding: *purposefulness, disciplinary grounding, integration, and critical awareness*. Each dimension includes core guiding questions and descriptors of typical performances for each one of the developmental levels introduced above. To introduce the four dimensions of the *Targeted Assessment Rubric for Interdisciplinary Writing*, we begin with a brief description of a piece of student work on which we will draw for illustration.

Rebecca's Paper

"At the root of all modern political and societal organizations is a philosophical theory of human nature" (p.1), claims Rebecca, in the introduction to her final essay for a sophomore course on Human Nature. She asserts that differences between political and social systems can be attributed

to their “different conceptions of human nature” (ibid). To explore this contention, Rebecca analyzes Marx’s vision of the ideal classless society taking the perspectives of sociobiology, capitalist economics, and sociology. She claims that for socio-biologists “it is the biological nature of humans to be socially stratified.... a classless society seems to be impossible from their standpoint.” (p 3) She later adds: “the conception of human nature based upon selfishness, individualism, and competition held by capitalist economists and game theorists does not allow for a [Marxist] society based upon community, cooperation and compassion.”(p.6) However, taking a sociological perspective, Rebecca concludes that Marx’s utopia is theoretically possible. She alludes to ideology’s power to create or approximate a new social reality: “when ideologies are internalized they become resistant to change and in fact a sort of reality for believers.” (p 7) Rebecca brings the paper to a close by putting forth her personal vision for an ideal society—one that is based on competition but which supports those who are biologically disadvantaged.

Employing the rubric to assess Rebecca’s interdisciplinary understanding involves considering four fundamental aspects of her work: her intellectual purpose, disciplinary grounding, integration of disciplines to advance understanding, and critical stance on her own interdisciplinary enterprise. In each case, the rubric invites us to gauge the quality of her performance and consider what her next learning challenge might be.

(1.) Purposeful interdisciplinary work.

This dimension examines the degree to which students exhibit clarity about the aims and audience of their interdisciplinary writing. Two fundamental questions guide assessment in this dimension:

(1.1.) Does the framing of the problem invite an integrative approach?

Inherently multi-faceted, interdisciplinary work presents students with the challenge of defining their object of study in ways that are both viable in scope and clearly multidimensional.

For example, students' framing of a paper on the incest taboo may move from proposing to examine "the historical, political, biological and psychological dimensions" of the taboo, to considering "whether or not the cultural belief of incest taboo represents an example of evolutionary adaptation." In the first example, disciplinary dimensions are named without a clear sense of purpose. In the second, disciplines are put to the service of a question that drives inquiry.

In Rebecca's paper, the opening and concluding paragraphs suggest an ambitious intellectual goal: to discern whether philosophy is relevant in the modern world. Inevitably, she falls short in answering this question. However, the main body of her paper is concerned with the more manageable issue of examining whether Marx's ideal of a classless society is conceivable given the "theories of human nature" advanced by her three chosen scholarly traditions. The question about the theoretical feasibility of Marx's ideal is clearly stated and demands an integrative approach, placing her paper at an "apprentice" level. To move to a "master" level of clarity of interdisciplinary purpose, Rebecca would be advised to restrict her paper's focus to this issue and to present a more explicit rationale for taking an approach which compares different disciplinary perspectives.

(1.2.) Does the paper use the writing genre effectively to communicate with its intended audience?

This criterion pertains to students' understanding of their audience and communicative means. To produce a piece of interdisciplinary writing students must navigate domains that often embody contrasting discursive forms. Literature from the business world tends to employ non academic language and be rich in case examples, scientific literature is highly technical and grounded in scrutinized evidence. Interdisciplinary writing demands that students select an appropriate genre for their work (e.g., essay, research report in social science or in business).

Successful students can work across genres but maintain coherence in their own piece.

Successful students also keep multiple disciplinary audiences in mind.

Overall, Rebecca's paper uses appropriate tone and vocabulary. Some slips in register and several categorical claims place her work at an *apprentice* level—e.g., “ ‘Philosophy today gets no respect,’ says psychologist Steven Pinker, and he is dead right”. Rebecca's most important discursive accomplishment is evident in her conclusion as she characterizes how readers operating in each of the traditions she reviewed would react to her synthetic position on classless society.

(2.) Disciplinary grounding in interdisciplinary understanding.

This dimension examines students' understanding, selection, and use of the bodies of expertise that inform their work. Two questions guide assessment in this case:

(2.1.) Does the paper use disciplinary knowledge accurately and effectively (e.g., concepts, theories, perspectives, findings, and examples)?

Clearly, grounding a paper on robust disciplinary understanding (as opposed to overgeneralizations or misconceptions) is an essential marker of quality work. A key conceptual change for students in this regard involves the shift from summarizing isolated bits of information stemming from multiple disciplines toward building a rich and flexible understanding of the disciplinary concepts to be borrowed. In masterful writing, students move flexibly and effectively between abstract ideas and concrete examples, creating a rich conceptual network.

In Rebecca's paper, concepts such as “natural selection,” “class,” and “conflict” were accurately employed and associated to not one but multiple experts in each domain. She cites relevant and credible sources such as works by E.O. Wilson, Steven Pinker, and Matt Ridley. In most cases, Rebecca does not merely summarize expert definitions but applies them to the issue

of the Marxist ideal of a classless society. Some of her citations are presented as self-explanatory rather than unpacked but with very few adjustments in this regard, Rebecca's paper could exhibit a "master" level in this dimension.

(2.2.) Does the paper use disciplinary methods accurately and effectively (e.g., experimental design, philosophical argumentation, textual analysis)?

Students' understanding of how knowledge is constructed in the fields relevant to their paper constitutes an important learning benchmark. For example, students may employ (or report) on philosophical argumentation or experimental designs. Their papers will score higher if they show understanding of methods and validation criteria and if they present disciplinary knowledge as grounded in systematic inquiry and as being provisional and fallible.

Accomplished students can readily recognize methodological differences and similarities in forms of knowledge production across domains and explore their tensions and complementarities.

Rebecca's work is primarily rooted in philosophical argumentation. She prioritizes underlying assumptions and logical compatibility or incompatibility among intellectual positions. She alludes to the constructed nature of disciplinary knowledge with comments such as "the sociological worldview seems to be the most difficult to argue against, but there is no absolute proof that it is correct." In a further iteration of this piece, Rebecca could directly consider the evidentiary forms employed by socio-biologists, economists, and sociologists to ground their claims. Such attention to how forms of knowledge production relate to claims and assumptions would considerably strengthen this already accomplished piece.

(3.) Integration

Key to our definition of interdisciplinary understandings is students' capacity to *integrate* perspectives. Presented as detailed characterization of the phenomenon of integration, this

dimension examines how perspectives are selected, how connections across disciplines are framed, how they are articulated into a coherent whole, and what the advantage is of such articulation. Four criteria guide assessment at this level:

(3.1.) Does the paper include two or more disciplinary perspectives and insights relevant to the paper's purpose?

Interdisciplinary work calls for purposeful disciplinary selection. In this regard, students must overcome the belief that the more disciplines they employ the stronger their papers will be, or that “full mastery” of a discipline is needed before interdisciplinary work can be engaged. Rather, a deep understanding of the particular theories, concepts, and findings to be employed is necessary, and their selection depends on the specific purpose of the paper at hand.

In her paper, Rebecca makes reasonable selections both of disciplines (philosophy, sociobiology, economics, and sociology) and particular insights within each discipline (natural selection, game theory, ideology, and classless society). The selected perspectives offer contrasting views of the roots underlying social contracts. Arguably, Rebecca's question also invites other disciplinary perspectives—such as anthropologists' documentations of humans living in what seem to be classless societies. However, for the purposes of this paper—that is, to reveal the underlying assumptions about human nature made in each of the three disciplines and to assess the viability of Marxist views—Rebecca's disciplinary selection is appropriate.

(3.2.) Is there an integrative device or strategy (e.g., a model, metaphor, analogy)?

At the heart of any interdisciplinary integration lies an integrative device—that is, a cognitive platform on which the articulation of distinct traditions is produced. Integrative devices vary in their form and function. In some cases, metaphors reorient the conceptualization of a phenomenon yielding novel interpretations for further study—for example, “the mind is a machine.” In other cases, complex explanations—for example, why the climate is changing—

provide the structure for multiple and distinct disciplinary insights to interact. Occasionally, as in Rebecca's paper, integration is framed around a particular bridging concept—such as, classless society—as it plays out in a variety of disciplinary contexts (e.g., sociobiology, economics) yielding a more nuanced understanding of the concept in turn. After concluding that Marx's ideal is “simply incompatible with the socio-biological conception of human nature” and “absolutely impossible from the classical, rational, autonomous, and hedonistic theory of human nature held by capitalist economists and game theorists,” Rebecca reaches a workable compromise that borrows insights from each tradition: a society that recognizes its ties to human biology but overcomes undesired biological impulse through the power of culture and ideology.

(3.3.) Is there a sense of balance in the overall composition of the piece with regard to how the disciplinary perspectives are brought together to advance the purpose of the piece?

This dimension examines the relative attention given to particular disciplines in the construction of an interdisciplinary argument. To reach an adequate balance, students must often overcome the inclination to give each discipline an equal share—a mechanistic approach common among novice interdisciplinary writers. Quality interdisciplinary papers may exhibit a dominant discipline if the purpose of the paper so requires. Disciplinary balance, as this guiding question suggests, is to be determined by the purpose of the piece at hand.

On the whole, Rebecca gives appropriate weight to the different disciplinary lenses she brings to bear on the issue of classless society. Her comparative argument does require a comparable treatment of sociobiology, economics, and sociology—something she achieves at least in part, despite presenting the socio-biological position with more nuance than the other two. In addition, as she reaches her conclusion, some of Rebecca's claims stand ungrounded and unexplained. For example, she argues that “more feminist-based characteristics could balance the

aggressive male tendencies dominant in our societies,” offering no further elaboration of this claim.

(3.4.) Do the conclusions drawn by the paper indicate that understanding has been advanced by the integration of disciplinary views?

This final question assesses the effectiveness of an interdisciplinary integration. It essentially poses the question of “Was the effort worth it? Did it yield a new, richer, deeper, broader, more nuanced understanding?” If the integrative device sets the stage for the articulation of disciplines (a metaphor, complex explanation, or conceptual bridge), this question assesses the outcome of the integration, since not uncommonly, students eloquently announce how disciplines will come together in a piece of work but fail to fulfill their promise.

In Rebecca’s paper, disciplinary integration yields important results: Socio-biological and economic perspectives shed doubt on the viability of Marx’s ideal. In turn, a sociological perspective strengthens her point that a socio-biological stance should not be taken to an extreme. As a result, she develops a new, more nuanced, and multidimensional stance on the question of human nature and society:

I believe the majority of human beings work best in a competitive environment ... individuals have unique abilities and some are more gifted than others. Ideally a society would encourage all to reach their full potential but support those who are biologically unable to perform equally. Nature is not fair but society should be. There will inevitable be stratification but not as drastic and harmful as is currently.
(p.8)

(4.) Critical awareness.

Finally, the critical awareness dimension calls attention to students’ capacity to take a meta-disciplinary perspective on their interdisciplinary work and its limitations. Indeed, this dimension examines the degree to which students reflect explicitly about the craft of interdisciplinary work. Two questions guide assessment:

(4.1.) Does the paper exhibit awareness of the limitations and benefits of the contributing disciplines and how the disciplines intertwine?

As the previous categories suggest, interdisciplinary work requires a deliberate intertwining of disciplinary perspectives and an assessment of disciplinary insights for their potential contributions and limitations. For instance, faced with the challenge of mitigating climate change, a student will need to decide whether insights in economics, political science, or psychology are most adequate to advance her argument. All disciplines address changes in human behavior, yet they operate with distinct units of analysis and expected impact. In masterful pieces, students also characterize disciplinary connections—that is, how disciplines balance and question each other.

Rebecca’s paper—like many of the papers we assessed—could be developed in this category. Although she names the differing disciplinary perspectives she makes use of, she makes only fleeting explicit reference to how each one could potentially limit or advance her argument. To improve the paper, Rebecca could explicitly consider why the strictly biological or monetary emphasis of sociobiology and economics are limited in their approach when a cooperative social model is considered—a meta-disciplinary comparison assessed by this rubric criterion.

(4.2.) Does the paper exhibit self-reflection?

Finally, academic writing is strengthened by its authors’ awareness of the limitations of the work. Less experienced writers, interdisciplinary or not, offer no such awareness or merely offer pro-forma statements such as “more research is needed on this topic.” Masterful papers, on the other hand, recognize the strengths and limitations of the integration proposed, weighing their outcome against alternative integrative approaches that might be considered.

Throughout her paper, Rebecca employs a suitably tentative tone in her presentation of her ideal society; however, she does not attempt to critique (or justify) the integrative approach she takes in the paper, placing her work between a novice and apprentice level. A more self-reflective stance toward her own endeavor, especially given the meta-disciplinary nature of the paper itself, would make her argument more sophisticated.

In sum, the *Targeted Assessment Rubric for Interdisciplinary Writing* offers a detailed characterization of interdisciplinary writing. The rubric outlines the fundamental components of interdisciplinary writing and thinking, from establishing a clear and viable inquiry purpose, to ensuring robust disciplinary grounding, to integrating disciplinary perspectives effectively to reflecting on the nature and limitations of the work. The rubric also offers descriptors of levels of performance, from naïve, to novice, apprentice, and master. To capture the complexity of interdisciplinary writing at a broad range of disciplinary intersections and college years, the rubric must be reliable and valid; careful development and empirical testing of the rubric enabled us to validate the rubric on both grounds. In what follows we describe our methodological approach and results. We then turn our attention to the rubric applications by students, instructors, staff in writing centers, interdisciplinary studies programs, program evaluators among others.

Constructing the *Targeted Assessment Rubric for Interdisciplinary Writing*

The rubric was developed through an iterative process of theory, validation, and revision. Using the *Targeted Assessment Framework* as a point of departure, we set to the task of identifying lower and higher levels of accomplishment. Wolfe and Haynes' interdisciplinary writing profiles (2003) and Boix Mansilla and Gardner's proposed progression of disciplinary understanding (1998) guided our hypothesizing about differences in performance. We reasoned that an empirically grounded rubric assessing interdisciplinary student learning should show

developmental differences between the interdisciplinary writing produced by upper division and lower division undergraduate students of interdisciplinary studies. Moreover, the rubric should reliably find differences between the writing of disciplinary and interdisciplinary seniors.

Our initial rubric included 10 judgments grouped into four categories: (1) purposefulness; (2) disciplinary grounding; (3) integration; and (4) critical awareness or metacognition. On each of these dimensions, the papers were rated on one of four levels: naïve, novice, apprentice, or master level.

Sampling

We collected 84 essays on a variety of topics in the humanities and social sciences that students had produced as part of their regular course assignments at Miami University (see Appendix B for assignment topics). Sixty four essays were written by students in the School of Interdisciplinary Studies (Western College Program) at Miami University who take a sequence of team-designed and often team-taught interdisciplinary courses preparing them for an individually tailored interdisciplinary major. Each course has specified writing-related and learning outcomes that steadily increase in complexity, culminating in a year-long interdisciplinary thesis (Haynes, 2004), making essays from this population a particularly appropriate test of our theory and rubric.

The selected essays ranged in length from four to 115 total pages. Interdisciplinary freshman essays (N= 24) were typically three to five pages long. Interdisciplinary sophomore (N=20) essays were typically 10-15 pages long. Interdisciplinary senior projects (N= 20)¹ were typically 80-90 pages long. To offer a point of comparison, twenty disciplinary senior honors projects (N=20) outside of the interdisciplinary studies programs were selected as well. These were typically 50-60 pages long. All students agreed to have their essays used for this research by responding to course specific e-mail requests and completing an informed consent form.

¹ Interdisciplinary projects included 11 university honors and 9 not honors. Disciplinary senior projects all received university honors.

Student names and all identifying information were removed from the essays by an assistant not directly connected to this project, and essays were scored only by a code number linked to class year and course of study.

Rubric Development and Reliability Test

The iterative process progressed as follows. Two groups of five essays were randomly selected from the set of 84 essays. The first group was independently scored by two raters at Miami University. The judges met to discuss their ratings and the scoring criteria. Discrepancies were settled by consensus. Considerable effort was devoted to clarifying the difference between the various levels of quality and the extent to which the different dimensions were measuring distinct constructs. The judges repeated this procedure with the five additional essays. During these sessions the judges made changes to the rubric or the specific criteria for determining the level. When changes were made, the judges re-scored the previous essays to reflect the rubric modifications. The 10 essays and a revised rubric were sent to researchers at Harvard University for blind co-coding to test inter-rater reliability across research groups. Further adjustments on the rubric were made, and essays re-scored when necessary. A third iteration of calibration and revision was conducted by the Miami University team with 10 essays, and a fourth with 25 essays.

After 45 essays were scored, papers and scores were sent to the Harvard team again for score shadowing and rubric calibration. Minor adjustments to the rubric were necessary at this point, and they were made by consensus of all of the researchers. Earlier judgments were revised accordingly. After this round of revision, the remaining essays were scored by one of two researchers, with two or three difficult cases decided by consensus. Two judges independently scored 45 essays (54% of the total) with the final version of the rubric. Inter Rater Reliability (IRR) was assessed by the number of judgments on which the raters exactly agreed divided by the total number of judgments, $IRR = 83.5\%$. We consider this to be adequate inter rater reliability.

Validity Test

The validity of the rubric was tested with a series of four 4 x 1 ANOVAs corresponding to each dimension of the rubric. We hypothesized that interdisciplinary seniors would score significantly higher than interdisciplinary first-year and sophomore students on all categories. For each category our hypotheses were further tested with Fisher's PLSD tests to distinguish among specific groups (reference?). Our hypotheses were confirmed (see Table 1). Senior interdisciplinary student essays scored significantly higher than their freshman and sophomore counterparts on the four rubric dimensions. On the ability to (a) frame the *purpose* of their paper with clarity inviting interdisciplinary approaches, $F(3,80) = 15.86, p < .0001$; Fisher's PLSD = .327, $p < .0001$. On the ability to (b) employ *disciplinary* concepts modes of thinking adequately, $F(3,80) = 38.80, p < .0001$, Fisher's PLSD = .323, $p < .0001$. On the exhibited capacity to (c) *integrate perspectives* $F(3,80) = 14.717, p < .0001$, Fisher's PLSD = .421, $p < .0001$. Finally, on the ability to (d) offer a *self critical and meta-cognitive* perspective on their work, $F(3,80) = 19.058, p < .0001$, Fisher's PLSD = .346, $p < .0001$.

To further test the validity of our rubric, we applied it to a set of 20 senior *disciplinary* honors papers. Although the grounded rubric is not intended for use with disciplinary papers, the disciplinary senior honors essays were selected as a comparison group for a number of reasons. Almost by definition the honors students write well, and thus their essays serve as a good test of whether the rubric assesses more than generic writing quality. We reasoned that good disciplinary and interdisciplinary writing are grounded in disciplines but only interdisciplinary papers exhibit integration across disciplines. Thus, we predicted no differences between disciplinary and interdisciplinary senior papers regarding disciplinary grounding but significant ones regarding integration. We also understood that quality disciplinary and interdisciplinary papers have a clear purpose and exhibit a critical stance. Yet because qualitative descriptors of these dimensions in the rubric include direct reference to interdisciplinarity (e.g., “the

paper's purpose is clear and viable and calls for an interdisciplinary approach"), we expected interdisciplinary papers to score slightly higher than their disciplinary counterparts.

As expected, on the dimension of purposeful understanding, the interdisciplinary senior papers scored slightly but not significantly higher than the disciplinary senior honors papers, Fisher's PLSD = .327, $p = .098$. On the dimension of critical awareness and metacognition, the interdisciplinary senior papers scored largely and significantly higher than the disciplinary senior papers, Fisher's PLSD = .361, $p < .0006$. This larger than expected difference may be due to the fact that while both disciplinary and interdisciplinary senior students tend to exhibit a reflective and self-critical stance on their papers (highlighting the limitations of their arguments), interdisciplinary seniors readily take a *meta-disciplinary* stance, examining the limitations of particular disciplines to address the problem at hand or the need to complement disciplinary perspectives with one another.

On the dimension of disciplinary grounding, the disciplinary papers scored slightly, but not significantly higher than the interdisciplinary senior projects, Fisher's PLSD = .337, $p = .109$. As predicted, on the dimension of interdisciplinary integration, the interdisciplinary senior papers scored significantly higher than the disciplinary honors papers, Fisher's PLSD = .440, $p < .0001$. Of the 20 disciplinary papers, 13 (65%) showed no evidence of attempting integration between disciplines nor theories or positions within their own discipline. For purposes of comparison, these essays received the lowest score of 1. In other contexts, researchers may wish to count the frequency of "No Evidence of Integration" responses rather than assign them the lowest numeric score.

Because seven disciplinary senior honors papers demonstrated an attempt to integrate distinct theories or traditions *within* their discipline, we conducted an additional analysis. While these can hardly be seen as *interdisciplinary* connections, we compared papers that included such forms of *intra-disciplinary* integration with our interdisciplinary senior pieces. Our reasoning was that if we extended our definition of "integration" to include integration of traditions within

a discipline, our rubric should capture the capacity for synthesis exhibited by disciplinary papers as well. This hypothesis was confirmed. In fact, disciplinary papers earned a mean score of 3.14 (.476), which is higher than 2.70 (.724), for the interdisciplinary senior projects. Of course, with such a small sample, theoretical inferences about this comparison are unwarranted, and the difference is not statistically significant, $F(1,25) 2.25, p = .146$.

These data suggest that the grounded rubric is sensitive to differences between high-quality disciplinary essays and interdisciplinary essays on the dimensions of integration and critical awareness. Although it may be inappropriate to draw inferences about the *ability* of honors students to engage in integration (some apparently did not even attempt integration in their papers, and those who did earned high scores), it does provide additional evidence for the validity of the rubric in making sensitive judgments.

Insert table one about here

Post Hoc Tests for Length of Essay

Not surprisingly, as the interdisciplinary students advance from freshman to sophomore to the senior years, their essays become considerably longer. Considering pages of text excluding the title, tables, figures, and references, the essays were a mean of 3.9 (.80) pages in the first year, 13 (3.46) pages in the sophomore year, and 83 (19.46) pages of text in the senior year of interdisciplinary study. Although this is developmentally appropriate, it raises the concern that essay length is confounded with years of education. Indeed there was a positive correlation between the number of pages and each of the four outcome variables, for (a) purposeful understanding and pages of text, $r = .62, Z = 6.57, p < .0001$; for (b) grounded in disciplines and pages of text, $r = .72, Z = 8.11, p < .0001$; for (c) integration and pages of text, $r = .42, Z = 4.00, p < .0001$; and for (d) critical awareness and pages of text, $r = .53, Z = 5.35, p < .0001$.

To address the issue of page length as a potentially confounding variable, we conducted a set of four *post hoc* Analysis of Covariance (ANCOVA) tests using pages of text as the covariant and group (freshman, sophomore, or senior year of interdisciplinary study) as the independent variable. On each of the four outcome measures, group significantly predicted outcomes (indeed pages of text was sometimes no longer significant in conjunction with class year). For (a) purposeful understanding, group was significant at $F(2,58) = 8.59$, $p = .0005$, pages of text was not significant, $F < 1$, and the group by page interaction was also significant, $F(2,58) = 0013$. For (b) grounded in disciplines, group was significant at $F(2,58) = 4.13$, $p = .021$, pages of text was not significant, $F < 1$, and the group by pages of text interaction was not significant with $F(2,58) = 2.95$, $p = .06$. For (c) integration, group was significant at $F(2,58) = 4.48$, $p = .016$, pages of text was significant at $F(1,58) = 4.96$, $p = .03$, and the group by pages of text interaction was also significant at $F(2,58) = 3.83$, $p = .027$. Finally, for (d) critical awareness, group was significant at $F(2,58) = 5.84$, $p = .005$, pages of text was not significant with $F(1,58) = 2.37$, $p = .129$, and the group by pages of text interaction was not significant with $F(2,58) = 2.84$, $p = .067$. These results suggest that developmental differences in the quality of interdisciplinary writing found between first year and senior students are a function of educational experience rather than the number of pages they wrote. Despite the high correlation between class year and essay length, class year remained significant on each outcome variable, even controlling for pages of text. More central to our current purpose, these data provide more evidence that the grounded rubric is a valid instrument for assessing interdisciplinary writing.

In sum, taken together, these results provide good evidence for the reliability and validity of the rubric. We were able to reliably score undergraduate essays covering a diverse range of topics, and validly capture developmental differences among interdisciplinary studies students. Designed to validly and reliably score student work in a variety of interdisciplinary programs and years, the rubric can be used to inform student assessment, support further learning, redesign

instruction, evaluate interdisciplinary programs, and conduct research on interdisciplinary competencies. In our conclusion we turn our attention to the adaptation and use of the rubric.

Conclusion

The growing interest in interdisciplinary training that characterizes contemporary higher education has been accompanied by distrust about the quality of interdisciplinary programs. Understandably, the assessment of interdisciplinary student work has been stubbornly elusive. Disputes about definitions of interdisciplinary work, the broad variety of disciplinary combinations possible, and the simple fact that interdisciplinary understanding is a complex cognitive enterprise, have militated against clear indicators of quality interdisciplinary student learning. By proposing a theoretically grounded and empirically tested rubric to assess student interdisciplinary writing, we seek to shed new light on the question of interdisciplinary assessment and research on integrative thinking. The rubric outlines an anatomy of interdisciplinary thought and its progression, offering multiple potential applications. All applications will demand an initial calibration in the interpretation of rubric descriptors to ensure appropriate use.

In instructional contexts, the *Targeted Assessment Rubric for Interdisciplinary Writing* may be shared with students as part of their evaluations; reframing descriptors to capture the content of the course is encouraged in this case. For instance, if history and physics are considered as areas for disciplinary grounding in a given course, the particular theories, historical narratives, authors, and approaches could be included under “disciplinary grounding.” If a particular form of integration is sought after, relevant descriptors could be adjusted accordingly. Applying the rubric to assess student work can then yield informative feedback for students and faculty alike. It will enable faculty and students to know exactly what has been accomplished and

what else could be done to advance the work. The rubric can also inform student peer and self-assessment.

Occasionally, as one of our colleagues did while piloting the rubric, instructors may find it of use to teach the content of the rubric in their interdisciplinary courses. These faculty deem internalizing qualities of quality interdisciplinary work to be a valuable learning goal. Results from applying the rubric to a series of paper may also offer feedback for instructional design. For example, recognizing that, like Rebecca, several of her peers scored relatively low on critical awareness, faculty may create opportunities in the course for students to critique each other's papers.

The rubric here introduced has been tested on academic papers. However, with minor adjustments, it could be applied to a variety of forms of student work. The *Targeted Assessment Framework* on which this instrument is rooted was created on the basis of close analysis of a variety of student learning outcomes such as written papers, presentations, works of art accompanied by written reflections, and video or multimedia productions. In all cases, categories and levels remain relevant, but particular descriptors may be adjusted to open room for non-verbal and non-written modalities.

By focusing on interdisciplinary student learning, the rubric sets the foundation for a valid and rigorous evaluation of interdisciplinary programs—one that prioritizes student performance over self reports and targeted assessment of interdisciplinary capabilities over more generic “grades.” Furthermore, the rubric enables us to compare the performance of students at different moments in a multi-year interdisciplinary program. As stated earlier, the rubric is not designed to assess *disciplinary* papers or performances *per se*. However, a valid comparison between graduates of disciplinary and interdisciplinary training programs can be made on the basis of a common interdisciplinary performance task. In fact, that was the choice made by

Rhoten and Hackett in their evaluative study of NSF's IGERT Program. In this case, researchers adapted the rubric to assess the performance of beginning and graduating students in interdisciplinary and disciplinary doctoral programs in environmental sciences. A panel of experts who also designed the performance task on which students were to be tested adjusted the rubric to their assessment purposes (Nature Sept 2006).

At a time of growing calls for academic accountability, a valid measure of interdisciplinary understanding protects against several dangerous impulses: the impulse to reduce learning to information recall or self report; the impulse to close valuable interdisciplinary training programs because their impact on student learning is elusive to single disciplinary standards; and the impulse to sustain weak interdisciplinary offerings whose graduates fail to learn to carry out quality interdisciplinary work.

Theoretically rooted in our understanding of cognition and epistemology embodied in the *Targeted Assessment Framework* and empirically tested on interdisciplinary papers, this rubric offers a preliminary framework to study learning progressions in interdisciplinary thinking. Researchers interested in this area of work may seek to adapt and apply such a framework in a longitudinal study of interdisciplinary cognition. In such a study, the rubric would need to be complemented with empirical findings in progressions in disciplinary thinking, well-tested measures of epistemological beliefs, and adequate controls for learning style, and disciplinary selection. A cognitive developmental portrait of progressions in interdisciplinary thinking will greatly inform educators concerned with identifying adequate benchmarks as well as challenging misconceptions associated with interdisciplinary learning. The *Targeted Assessment Framework* and the rubric we propose should inform a more rigorous and systematic study of interdisciplinary cognition—a phenomenon on which the greatest technical, social, and environmental advancements of the century will rely.

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*Table 1.**Mean score by category and group (SD in parentheses).*

Group	ID First Year (n=24)	ID Sophomore (n=20)	ID Senior (n=20)	Disciplinary Senior (n=20)	Grand Mean (n=84)
Purposeful Understanding	2.229 (.390)	2.175 (.674)	3.100 (.553)	2.825 (.438)	2.565 (.644)
Grounded in Disciplines	1.833 (.381)	2.025 (.550)	3.025 (.743)	3.300 (.441)	2.512 (.825)
Integrative Understanding	1.354 (.321)	2.175 (.487)	2.700 (.724)	1.750 (1.082)	1.964 (.855)
Critical Awareness	1.146 (.275)	1.875 (.582)	2.450 (.776)	1.800 (.594)	1.786 (.737)
Grand Mean	1.641 (.233)	2.062 (.514)	2.819 (.548)	2.419 (.433)	2.207 (.621)

Appendix B

Assigned Essay Topics

First Year Essays

In a first-year interdisciplinary course on "Creativity and Culture" designed to place classic literary works in their historical and socio-cultural contexts, students wrote 5 page essays analyzing the major character in Janet Malcolm's Reading Chekhov.

In a literary criticism course students are invited to deepen their understanding of biographical writing by exploring multiple disciplinary variations (historical, psychological, memoirs) on the genre. For their final essay students apply what they have learned to analyze Sigmund Freud's Dora. They examine whether Dora can be characterized as a biography and discuss the relationship between the writer and his subject.

Sophomore Essay

In a broadly interdisciplinary course encompassing perspectives from the natural sciences, social sciences, and humanities called "What is Human Nature?" students wrote essays of 15-20 pages addressing this question in an integrative manner and defending their position against likely criticisms from each of the major perspectives covered in the course.

Senior Honors Assignment

Seniors earning university honors conduct original research or creative work focusing on a question, problem or issue linked to their area of study. Honors students come from a wide range of majors, spanning all of the departments and divisions of the university, and the form and methodology of senior theses vary greatly. However all theses include at least, 40-50 pages of writing that discusses the process of investigation or creation and grounds the work in relevant professional literature.

Interdisciplinary Senior Projects

Interdisciplinary Studies majors take a two-semester senior project workshop and conduct original research or creative work focusing on a question, problem or issue. Papers are generally at least 70 pages long and call for students to frame a question, problem or topic and draw upon multiple disciplines to address the topic, question or problem in an explicitly interdisciplinary way.