Interdisciplinarity and the Undisciplined Student: Lessons from the Whittier Scholars Program

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Abstract: Researchers typically embark on interdisciplinarity after the acquisition of disciplinary expertise. This article explores the possibility of teaching interdiciplinarity to undergraduate students who have not yet mastered or are in the process of mastering a discipline or disciplines. It focuses on junior-year students in the Whittier Scholars Program at Whittier College and uses the term "interdisciplinary consciousness" to describe their developing awareness of multiple disciplinary perspectives. The authors adapt the Toolbox dialogue approach from its usual use with teams of older researchers trained in disciplines for application to pre-disciplinary undergraduates and examine its effectiveness as a method both for fostering and for measuring interdisciplinary consciousness.

Keywords: interdisciplinarity, interdisciplinary consciousness, undergraduates, Whittier Scholars Program, Toolbox Dialogue Initiative, structured dialogue

1. Introduction

In this article, we discuss the challenge of teaching interdisciplinary research

to undergraduates who are not pursuing grounding in a traditional discipline, instead choosing to create their own, typically interdisciplinary, academic program. We describe a curriculum designed to facilitate development of what we will call "interdisciplinary consciousness" in these students and discuss implementation of the curriculum across multiple student cohorts. Specifically, we consider the experience of students who participate in the Whittier Scholars Program (WSP), a 40-year-old individualized liberal arts program that gives undergraduates the opportunity to design their own course of study and "embrace the challenge that comes from thinking about their own goals and how their education can help them achieve those goals" (Whittier, 2017). We describe these students lovingly as "undisciplined" in two senses, both of which are important for this study: Negatively, they have not chosen to specialize in an academic discipline, and positively, they are working to acquire an interdisciplinary education that does not hem them in to any particular disciplinary perspective.

Students who enroll in the WSP program are required to take a sequence of interdisciplinary seminars. These are WSP 101: "Individual, Identity, and Community"; WSP 201: "Designing Your Education"; WSP 301: "The Nature, Theory, and Bases of Knowledge"; WSP 401: "Senior Seminar in Whittier Scholars Program"; and WSP 499: "Senior Project." We focus here on WSP 301, the junior-level seminar that aims to help students understand various ways in which knowledge is produced across disciplines. Although students in WSP 301 have taken courses in several disciplines during their first year or two of college before enrolling in WSP 301, they typically do not have the unified disciplinary worldview they would acquire in working toward and pursuing a major; rather, they have been busy piecing together a variety of different disciplinary perspectives relevant to their individualized course of study. After they have benefitted from the raising of their "interdisciplinary consciousness" and the building of attendant skills we offer in WSP 301, they are ready to integrate insights drawn from different perspectives in their senior projects.

To enhance the ability of these students to understand and integrate different disciplinary elements, we modified the widely used Toolbox dialogue approach for use in an undergraduate environment – and specifically for use in WSP 301. The Toolbox approach has been used in over 270 dialogue-based workshops since 2005 to enhance communicative and collaborative capacity in cross-disciplinary groups, typically teams of emerging or established researchers (O'Rourke & Crowley, 2013). Initially we employed the Toolbox dialogue approach in the form it takes in workshops for such research teams and found that it was ill-suited for use in WSP 301. Subsequently, we modified it and embedded it into a broader curriculum before pilot testing it with several WSP

301 classes. We describe these modifications and then provide evidence of their success by drawing on analysis of the Toolbox dialogues in the classes to highlight expressions of interdisciplinary consciousness by students in WSP 301.

In this article, then, we aim to accomplish two objectives. First, we present the Whittier Scholars Program as a model of interdisciplinary curricular design at the undergraduate level, focusing on explicit instruction in the different epistemologies that characterize different disciplines. Second, we present our modified version of the Toolbox dialogue approach as a pedagogical means for enhancing interdisciplinary comprehension – characterized as interdisciplinary *consciousness* – among undergraduates who are not majoring in traditional disciplines.

2. Formulating Our Research Question

Whittier College is a small liberal arts college with a diverse population of about 1600 students. This population includes a consistent sub-population of students who wish to chart their own course through college. WSP exists for these students. For four decades, WSP has provided them with a guided opportunity to create their own undergraduate programs, which are often not constrained within boundaries of traditional disciplines. (And we might also note that the programs of these WSP students are often structured to enable integration of elements drawn from co-curricular experiences such as study abroad and internships.) As we suggested in the introduction, these students are thus "undisciplined" in the sense that there is no one particular discipline that constitutes their scholarly identity, for one or both of two reasons: (a) they have opted not to submit to limiting constraints of traditional disciplinary education, and (b) they are very interested in acquiring an education that combines elements of multiple traditional disciplines.

As researchers interested in interdisciplinary education, and in particular in the epistemic aspects of interdisciplinary education, we have found that WSP provides us with an excellent platform for inquiry into the dynamics of interdisciplinary development in which students come to understand differences among disciplines. The program does not emphasize disciplinary depth but it doesn't need to do so, choosing instead to create an interdisciplinary culture that leverages breadth by honoring the multiple interests of students. And rather than emphasizing a specific type of interdisciplinary competence, e.g., boundary crossing between social and natural sciences, it cultivates sensitivities to interdisciplinary combinations that could vary dramatically, depending on insights and literatures that serve as inputs into student projects.

We call these cultivated sensitivities "interdisciplinary consciousness" (IC), highlighting their role in making students aware of conditions under which inputs drawn from multiple disciplines can be integrated into interdisciplinary outcomes, as in research that may become their senior project.

We take IC to be a kind of *know-how* rooted in sensitivities and expectations that manifest in interdisciplinary deliberation and decision-making. IC supports active *perspective seeking*, which consists in a kind of intellectual empathy that enables the adoption of multiple epistemic perspectives (Davis, 1996; Salazar, Doiron, Widmer, & Lant, 2018). Successful perspective seeking requires sensitivity to differences in knowledge-making practices, including differences in data, methods, and regimes of confirmation. This sensitivity fosters an ability to take a complex scholarly position and deconstruct it, recognizing inputs that figure into it. These inputs derive in many cases from academic disciplines, so awareness of the perspectives of those disciplines qualifies as sensitivity to disciplinary difference. Further, the increased ability to reflect on one's own modes of knowledge making tracks the process of knowledge integration as it unfolds in all of its complexity (Lewis, Belliveau, Herndon, & Keller, 2007). As a determinant of IC, *reflexivity* of this sort positions students to compare and contrast their own knowledge making to that of others. Finally, IC is marked by the presence of a "yes, and" attitude expressed in openness to new perspectives and complex responses (Strober, 2010).[1]

Awareness of these aspects of interdisciplinary knowledge practices produces concomitant expectations, such as the expectation that disciplinary perspectives on a project will differ in important and predictable respects and the expectation that conflict among these perspectives may require negotiation and compromise (Repko, 2012). Such expectations underlie attunement to the range of differences and the complexity of integrative processes that mark successful interdisciplinary work. Our students come to understand that interdisciplinary projects are often *sui generis* responses to contextually specific problems that leverage available epistemic resources (Klein, 2012); hence, attunement to difference and complexity can enable the nimbleness and flexibility that will help to produce an effective interdisciplinary response. Thus, IC is a construct that systematizes a number of psychological characteristics related to integrative practice and can, as our experience has shown, structure a pedagogical approach that enhances interdisciplinary

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[1] This is related to "both/and" thinking, which has been discussed by a number of interdisciplinary scholars (e.g., Beier & Arnold, 2005; Newell, 2007; Arvidson, 2014). We choose to use the parlance of improvisational theater to emphasize the pro-active attitude exhibited by those operating under the influence of IC.

facility.

As we understand it, IC can reside in an individual or in a group. Individuals are described as "interdisciplinary" when they combine more than one discipline in their research or practice. In individuals, aspects of IC have been studied by Nikitina (2005) and Boix Mansilla (2010). The principal type of group that has been evaluated as a locus of interdisciplinarity is the team. Interdisciplinary teams typically seek to integrate the disciplinary insights of different teammates participating on a single project. In teams, IC has received attention under the banner of "team meta-cognition" (Fiore, Smith-Jentsch, Salas, Warner, & Letsky, 2010), "collaborative readiness" (Hall et al., 2008), and "integrative capacity" (Salazar, Lant, Fiore, & Salas, 2012).

In our work with WSP students and in this article about our work, we focus on groups of individuals who interact with one another over time (in the core courses of the program) but who are not working together on a team project and so do not count as teams. Call these *communities*. Communities of students, as we understand them in this context, comprise members drawing from different disciplinary experiences who may or may not be interdisciplinary (or even disciplinary) individuals themselves. Piso, O'Rourke, and Weathers (2016) have conducted research on IC in the context of research communities, but our interest is more squarely in student communities, and a typical undergraduate classroom will qualify as a community in the sense that interests us here.[2]

The specific communities on which we focus in this article are WSP cohorts that are working their way through the program, taking the core courses identified above, culminating in the senior project.[3] Although WSP projects are normally individual, students are expected to be able to communicate with faculty from many disciplines and with one another about their projects, which entails that they anticipate differences in perspective and craft any comments on their projects so they can be understood by a wide range of disciplinary audiences. Thus, they do have an interest in becoming aware of

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[2] These communities are similar to *communities of practice* (Wenger, 1998), in that they operate as learning environments in which participants engage in a common practice that involves the co-creation of meaning.

[3] Students in WSP are members of a community centered not just in the core course classrooms but also in Wardman Residence Hall, the program home, allowing WSP to take advantage of the documented benefits of collaborative learning in all parts of their Whittier experience (Goodsell, Maher, Tinto, Smith, & MacGregor, 1992; Cabrera, et al, 2002). Living together as college students as well as working together in class encourages development of independence and initiative as well as senses of belonging and civic responsibility. Most of all it enables the program to take advantage of the unique diversity of the student body to enhance the quality of the education it supplies.

their own perspectives and assumptions – what they know that others don't, what they take for granted, where others might disagree, etc. While they do not constitute a team with a shared project, such as formulating a climate change adaptation plan, they are participating in an intellectual community in which a variety of disciplines are represented, understood, and respected (cf. Werkheiser, 2016). Consciousness of their positioning in such a community is not, however, something they are fully aware of or able to understand, especially at the beginning. Indeed, enabling cohorts to achieve IC is a key objective for WSP, and the desire to catalyze the IC of this multidisciplinary group motivated our interest in utilizing the Toolbox dialogue approach in the junior-level course, WSP 301.

In what follows, we examine IC in the context of WSP, and in particular, in the context of WSP 301. This goal shaped our core research question: "Can we design a curriculum, featuring the Toolbox dialogue approach, that enhances IC for communities of 'undisciplined' undergraduates?"

3. Background

3.1 The Whittier Scholars Program

Through a series of courses and meetings with faculty advisors and members of the Whittier Scholars Council, students design their own course of study and plan, execute, and present a senior project. This process normally takes place over four years but can be accelerated for transfers and students who join the program later. Students typically hear about the program from promotional literature (many come to the college specifically to enroll in WSP), from their first-year mentors, or from other students. During the Spring of their first year, they enroll in WSP 101, "Individual, Identity, and Community," in which students are introduced to the program and apply for admission. A Fall semester section is offered for students joining the program after their first year. A small number of students are not admitted to the program and a small number choose not to continue, in which case WSP 101 counts towards their total units for graduation in the regular Liberal Education program. In WSP 201, "Designing Your Education," students identify a set of educational goals and prepare an individualized major that they submit to a panel of faculty members at their "Educational Design meeting." In WSP 301, "The Nature, Theory, and Bases of Knowledge," students prepare for a "Senior Project Proposal meeting" at which they review their educational design from the previous year and propose a senior project to be completed over the course of their fourth year in WSP 401 and presented publicly in a series of symposia

for WSP 499. (See Table 1.)

Among interdisciplinary programs at other institutions, one important type involves the similar construction of interdisciplinary majors by individual students, typically in conjunction with faculty members in the disciplines chosen as relevant to their interests (Holley, 2017). Examples of such programs include the Interdisciplinary Studies major at Wheaton, the Plan Process at Bennington, the Individualized Major program at the University of Scranton, and Integrative Studies in Social Science at Michigan State University.[4] (See Appendix A for the differentiating features of some Design-Your-Own-Major and Integrative Studies Programs.) What is distinctive about WSP is its self-conscious cultivation of the students' sense of participation in an interdisciplinary community over the four-year course of study.

Table 1. WSP Courses and Functions

Year One (or functional equivalent)	• *Course*: (WSP 101) The Individual, Identity, and Community
	• *Function*: Apply to program
Year Two	• *Course*: (WSP 201) Designing Your Education
	• *Function*: Educational Design meeting
Year Three	• *Course*: (WSP 301) The Nature, Theory, and Bases of Knowledge
	• *Function*: Progress Report and Senior Project Proposal meeting
Year Four	• *Course*: (WSP 401) Senior Seminar and (WSP 499) Senior Project
	• *Function*: Completion and presentation of senior project.

From 2013 to 2017, we worked with five cohorts enrolled in WSP 301. Paul Kjellberg taught the course in alternate years and Michael O'Rourke (creator of the Toolbox Dialogue Initiative) visited annually to conduct the Toolbox workshop and reflect on methods and outcomes. In the years in which Paul was not teaching 301, Paul and Michael visited the course

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[4] For details about these programs, see: Wheaton College, <https://www.wheaton.edu/academics/programs/interdisciplinary-studies/>; Bennington College, <http://www.bennington.edu/academics/plan>; University of Scranton, <http://catalog.scranton.edu/preview_program.php?catoid=28&poid=5532>; Michigan State University, <http://www.cis-ss.msu.edu/iss/index.php>.

with the permission of the instructor twice during the semester: once for the preliminary exercise described below and, subsequently, for the workshop.

A variety of disciplines are represented in a typical WSP 301 class as a whole, and also within the individuals who constitute them. For example, students have combined Business with Music to create business plans for record labels, Math and Studio Art to generate artworks using mathematical formulae, and Kinesiology and Religious Studies to explore the health benefits of yoga. The variety is driven by student interests, within the boundaries of what the faculty can responsibly advise. (Titles of the individualized majors of students we worked with in 2017 are listed in Appendix B.)

Significant differences separate students in these WSP cohorts or communities from general studies students although they do fill general studies requirements, usually in their first two years. WSP does more than simply expose students to a variety of disciplines as a general education program does. Between their Educational Design and Project Proposal meetings at the ends of their sophomore and junior years, students need to move well beyond the casual combinations of a "gen ed" curriculum. They need to learn to weave the perspectives of the disciplines they've chosen as relevant together into a coherent methodological approach that will enable them to complete their original scholarly project.[5] And WSP 301 is the course that helps them do that. Some students start with a project in mind and then construct an interdisciplinary approach to support it. Others come with a set of disciplines in mind that they want to explore and then find a project to combine them. In either case, they are doing more than simply browsing the variety: They are creating a unity out of the variety. In this way, WSP contributes to both the general education and the interdisciplinary education of its students.

The course also helps students contextualize their individual development as scholars within the development of a scholarly *community*, and, specifically, an *interdisciplinary* scholarly community, showing them that (a) different scholarly identities are complementary in various ways and (b) individual Whittier Scholars can learn about themselves and their perspectives, disciplinary and otherwise, as they learn about their classmates (cf. Newell, 1990). Successful participation within the community then becomes a common goal and an experience that reinforces their growing sense of interdisciplinary consciousness.

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[5] As we noted above, not all Whittier Scholars pursue an interdisciplinary course of study; however, even those who pursue a conventional disciplinary major in the context of WSP are exposed to multiple disciplines and must adapt their disciplinary methodology in a way that allows them to communicate their work to people from other disciplines.

This community-based development of their scholarly identity as interdisciplinarians and the consciousness that shapes it are central features of WSP. This approach flies in the face of the more traditional belief about interdisciplinary training according to which high quality interdisciplinary work must have a "rigorous disciplinary grounding" (Boix Mansilla & Duraisingh, 2007, p. 222). The belief one should become expert in all relevant disciplines before capably conducting an interdisciplinary effort has roots in the historical and cultural ascendancy of disciplines. In a culture where disciplinary expertise is most prized, interdisciplinary efforts by those not well grounded in disciplines are often judged negatively. However, we are among the growing number of those who believe that the integrative sensibilities and skills that are the hallmark of IC can be developed while disciplinary training is still in its nascent stages. Our experience has persuaded us that WSP provides its students with the resources they need to acquire and hone sensibilities and skills sufficient to the interdisciplinary task of their senior project. Hence our claim: WSP challenges the idea that being disciplinary is a pre-requisite to being interdisciplinary.

3.2 The Toolbox Dialogue Initiative

As a pivotal course in the parallel construction of their scholarly identity and IC, WSP 301 introduces students to the notion of an *epistemology* as a system and style of knowledge making. Through this notion they learn to systematically differentiate the disciplinary inputs and modes of interdisciplinary combination their projects will entail. Our plan to integrate the methodology of the Toolbox Dialogue Initiative in WSP grew out of recognition that a philosophically structured way for students to think about disciplinary epistemologies could have pedagogical value. Specifically, we saw an opportunity to take the Toolbox dialogue approach, a way of structuring dialogue designed originally for interdisciplinary teams of almost always post-graduate researchers (Eigenbrode et al., 2007), and adapt it to the undergraduate context.

The Toolbox dialogue approach involves using dialogue in a workshop setting to enable groups of participants to discuss their different discipline-based perspectives (O'Rourke & Crowley, 2013). A survey instrument – the *Toolbox* – structures dialogue around prompts that help participants articulate key dimensions of research practices. Organized into thematically unified modules, these prompts are Likert-type items, and participants in the workshops respond to the prompts by indicating their level of agreement or disagreement before discussing them in dialogue. As originally designed and typically deployed, the approach presupposes that workshop participants

have a well-developed research or practice worldview that they can represent in the dialogue. In fact, as noted earlier, most of the 270+ dialogue-based workshops that have been conducted by the Toolbox Dialogue Initiative (formerly the "Toolbox Project") since its inception have involved researchers in training (e.g., graduate students, post-doctoral researchers) or established researchers. Prior to the start of our work with the students in WSP 301, only twelve Toolbox workshops had involved undergraduate students, and these were groups of science students engaged in research who were actively acquiring a disciplinary perspective (e.g., several cohorts in an NSF-sponsored Research Experience for Undergraduates project at the University of Idaho). It was obvious that the Toolbox approach would have to be modified if it were to work with our Whittier students.[6]

4. Methods

We thought integrating a modified version of the Toolbox approach into WSP 301 would go a long way towards preparing students for the Senior Project Proposal meeting that typically takes place at the end of the second semester of a Whittier Scholar's junior year – and for the senior project itself. Granted, by the time they arrive in WSP 301, most students have begun to develop competence in the disciplines they will need to engage as they tackle their project, including early-stage understanding of core tenets and practices in those disciplines, and will have recruited an advisor or advisors who worked with them in crafting a draft of a project proposal. And granted, most students have the capacity to develop their initial intuitions about knowledge making in different disciplines and then compare and contrast them with those articulated by others with whom they discuss their project plans. However, we thought Toolbox dialogue that foregrounds different epistemologies would build on the competencies and capacities students bring into the class and develop there – promoting the kind of thoroughly deliberative process that should take place in WSP 301. We considered that the Toolbox instrument, adapted to our situation, could provide scaffolding – rooted in philosophical subdisciplines such as epistemology, metaphysics, philosophy of science, and value theory – that would support development of the kind of individual and group reflexivity and perspective seeking that are key in IC and in the quality interdisciplinary work IC allows. In what follows, we describe the process that enabled us to structure dialogue

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[6] For complete Toolbox instruments, see Schnapp, Rotschy, Hall, Crowley, and O'Rourke (2012) and Looney et al. (2013). See also Appendix C for the Toolbox prompts we produced as part of this project.

conducive to enhancement of IC within WSP 301 students.

4.1 Data Collection

The primary focus of regular Toolbox workshops has been STEM-based interdisciplinarity, and the instrument used in most of these workshops has been the Science-Technology-Engineering-Mathematics (STEM) instrument designed for interdisciplinary teams of STEM researchers (Looney et al., 2013) almost always working at a post-grad level, as mentioned above. The STEM instrument comprises six modules, with each module consisting of a core question followed by a series of probing statements. The core questions announce the module themes: what motivates the focus of research, methods used, identification of findings, perception of reality, values operative in a particular research activity, and whether to embrace reductionism or alternative stances. The probing statements develop the module themes in more specific detail; they are Likert-type items that prompt participants to indicate their degree of agreement from strongly disagree to strongly agree, plus "Don't Know" and "Not Applicable." The STEM instrument includes prompts such as "Scientific research [applied or basic] must be hypothesis driven," "Validation of evidence requires replication," "Models inevitably produce a distorted view of objective reality," and "Value-neutral scientific research is possible." There is also a table of demographic questions at the end.

We suspected the issues raised by prompts in the STEM instrument would not strike the WSP 301 students as salient enough to discuss in great depth. Nevertheless, to get a sense of our baseline in WSP, we initiated our project in April 2013 by running two workshops with the STEM instrument, conducted in the context of two hour-long class meetings. As such, they were abbreviated versions of the standard Toolbox workshop, which typically lasts for two to three hours. After a brief preamble in which we described the Toolbox approach, participants filled out the STEM instrument, discussed it, and then filled it out again. As in the standard workshops, students were invited to begin anywhere they wanted and follow their interests through the instrument. The workshops were lightly facilitated to ensure the dialogue was an authentic reflection of the students' interests and priorities.

As we had anticipated, lack of uptake of and engagement with the prompts indicated that issues articulated by Likert-type items in the STEM instrument did not resonate with the students. Conversations with the students after the workshops revealed that the scientific vocabulary was unfamiliar to them, and even when that vocabulary was explained, the prompts did not supply

congenial parameters within which the students might locate their own scholarly activities. This difficulty was not a surprise, since few participants in class and hence in the workshops were science students. Most were engaged with projects that involved business, the arts (e.g., film), or social justice issues. On the basis of these results, we realized that if we were going to be successful in using the Toolbox approach to help WSP 301 students explore their own epistemologies and the epistemologies of others, we would need to structure a different kind of dialogue highlighting epistemic challenges related to the scholarly work they were doing.

We therefore set about revising the instrument for our next trial in the spring of 2014. To begin with, we used a bottom-up approach, talking with students about goals of the workshops and the instrument. Based on these discussions, we hypothesized an effective organizing concept would be *scholarship*, given its central role in their identity as Whittier Scholars. Using our previous results as well as class discussions, we proceeded to generate a revised instrument – the *WSP Toolbox* – focusing on five central aspects of scholarly activity: one's scholarly objective (e.g., practical or theoretical), the audience of one's work (e.g., general or specialized), the input into one's scholarly process (e.g., facts or people's opinions), the output of one's scholarly process (e.g., self-expression or objective truth), and the process itself (e.g., unique or standardized).

Whereas the probing statements of the original instrument were meant to tease out differences of opinion about core scientific concepts (e.g., "Scientific research [applied or basic] must be hypothesis driven"), the revised versions were written to promote reflection on their own project (e.g., "Good scholarship convinces people of something"). While disagreement in response to prompts can catalyze discussion among older scholars in standard Toolbox workshops, with younger students we found that the specter of conflict tended to discourage frank responses and follow-up discussion. In light of this, we made an effort to phrase the statements in a way that promoted the non-divisive articulation and sharing of one's perspectives, a key part of the perspective seeking behavior so important for IC.[7]

In addition, we decided to supplement the Toolbox experience with a curricular exercise they completed well ahead of the workshops. We asked

[7] For instance, in the first version of the WSP Toolbox that we used in spring 2014, we phrased several prompts in terms of *good* scholarship, such as the example in the text and this one: "Good scholarship gives people something to think about." However, when we found that the normative term "good" in these prompts was causing distraction ("Who is to say what 'good scholarship' is?"), we modified the instrument and just asked about "scholarship" in subsequent years.

students to do advance homework to describe in one or two sentences each of the five aspects of their project: Objective, Audience, Input, Output, and Process. In class, they were asked to distill their two-sentence answers down to a word or phrase and then write the word or phrase onto color-coded cards. All the Objective responses went on green cards, the Audience responses on red, etc. Students were then put into teams, and each team received a set of all the cards for one aspect, which they then arranged into typologies or maps of, for instance, different kinds of Objectives of WSP projects. While discussions were sometimes confused (for instance, as to whether PowerPoint and Prezi constitute different Outputs) and results inconclusive (e.g., it was hard to tell if different mappings were analogous), the exercise was effective in helping students recognize differences in their methodologies and begin reflecting on the implications of these differences. In this way the exercise was an effective preparation for the Toolbox workshops later in the semester. (See Appendix D for the assignment.)

Near the end of the Spring 2014 semester, we conducted the workshops. These workshops followed the abbreviated format described above and utilized the WSP Toolbox we had designed for an epistemically diverse undergraduate class, comprising the modules mentioned above (viz., Objective, Audience, Input, Output, and Process), each of which contains a core question and Likert-type items as probing statements, after the fashion of the STEM instrument. The final probing statement in each module prompts participants to reflect on whether they think other scholars in the program share their views. After the workshops concluded, we distributed a post-workshop questionnaire via Qualtrics that asked about their experience. Together, these activities yielded several different types of data, reflecting the Toolbox instruments filled out both before and after the workshop discussions, transcripts of the discussions, and the post-workshop questionnaire. We have conducted two workshops with the WSP Toolbox each spring since 2014, collecting data from a total of eight different WSP 301 classes. (See Table 2 for participation numbers in each of these workshops.)

Table 2. Toolbox workshop sizes, by year

Year	Number of students in Toolbox workshop	
	Workshop 1	Workshop 2
2013	12	10
2014	17	15

2015	10	6
2016	18	11
2017	13	8

4.2 Data Analysis

In analyzing the data collected for this project, we were primarily interested in identifying indicators of IC in WSP 301 students. Quantitative responses to the Likert items before and after the dialogue sessions were helpful in identifying changes in attitude but remained largely silent about whether those changes indicate anything about IC in the students. Similarly, post-workshop questionnaires were helpful as a way of assessing whether the students enjoyed the experience and found it valuable; however, they did not yield insight into IC in an individual or group. The best source of insight was the transcribed dialogue from the workshops. In the dialogue, students articulated their perspectives on their own projects and compared them to the projects of others. These comments supplied insight into their IC, both in how they communicated their own projects to a multidisciplinary audience and in how they interrogated similarities and differences among the projects of those in the class.

Each workshop contained a single dialogue session, which was recorded and then transcribed. Employing the methods of discourse analysis (e.g., Gee, 2014), we evaluated speaking turns in the transcribed dialogue to determine if they supplied evidence of IC. Doing so required that we evaluate transcripts qualitatively, using a coding structure that would highlight indications of IC in participant contributions to dialogue. We began the coding process by developing a coding structure that tracked the determinants of IC discussed in §2 above. Specifically, we sought to determine the presence of four student abilities that correspond to these determinants:

      1. The ability to reflect on their own scholarly perspective;

      2. The ability to appreciate the difference between their perspective and those of others;

      3. The ability to integrate what they know about self and others to support active perspective seeking;

      4. The ability to exhibit a "yes and" attitude.[8]

The codes we used in evaluating transcripts were associated with specific

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[8] Although different in important respects, this set of abilities shares certain things in common with the "T-shaped" competencies that have been emphasized in connection with interdisciplinary practice, such as the centrality of reflexivity (cf. Uhlenbrook & de Jong, 2012).

behaviors that serve as proxies for these abilities and are easily identifiable in the transcripts. We further organized these abilities and their associated codes under the headings "Self-awareness," "Other-awareness," and "Integration," with the last heading comprising both perspective seeking and the "Yes and" attitude. The transcribed dialogues were then coded independently by the two faculty members involved in the study, with illustrative quotes in the Results section drawn from speaking turns interpreted in the same way by both coders. For details about the codes, see Table 3 and discussion in the next section.

Table 3. IC determinants and associated qualitative codes

Category	Determinant of IC	Associated Qualitative Codes
Self-awareness	*Reflexivity:* an ability to track the progress of one's own knowledge making and recognize the result as different from other perspectives	• *Self-description:* description of one's own work • *Agree/Disagree:* indication of agreement or disagreement with what is said
Other-awareness	*Sensitivity to disciplinary similarity and difference:* sensitivity to similarities and differences in knowledge-making practices across disciplines	• *Assimilation:* commentary on categorical similarity between one's work and that of others • *Differentiation:* commentary on categorical difference between one's work and that of others • *Clarification:* expansion on something the speaker had said
Integration	*Perspective seeking:* a form of intellectual empathy that supports looking at problems from different intellectual perspectives	• *Question:* real petition for information and engagement of others • *Elaboration:* building on ideas of others
	"Yes and" attitude: an attitude exhibiting an openness to new perspectives and complex responses	• *Change of mind:* indication that one has changed one's mind about a prompt topic; not just an openness to new perspectives but an adoption of them

5. Results

Our project suggests IC is a kind of *know-how* exhibited by individuals involved in a group process who can actively empathize with different disciplinary perspectives. This consciousness entails the ability to recognize differences and similarities among disciplinary perspectives, including one's own, and then combine insights based on those perspectives into a coherent point of view that is a combination of the inputs. The WSP Toolbox was designed to invite WSP 301 students to discuss their scholarly perspectives, creating a context in which differences and similarities among these perspectives could become topics of conversation. Transcripts of dialogues structured by this instrument provide illustrative indications of the presence or absence of IC, and in this section we detail some of them according to whether they reveal awareness of one's own view (*self-awareness*), awareness of the views of others (*other-awareness*), or the ability to combine insights from different disciplinary perspectives (*integration*).

Self-awareness

A key indicator of IC in the transcripts is *self-description,* exhibited by statements participants make about themselves, their projects, their approach to knowledge, etc. For example, "What I'm looking at in my project is how like socio-cultural effects [influence] the consumption of chili. And whether or not those have biological implications. Because that's something new to look at and I haven't found any literature on that." These contributions are the foundational material for subsequent discussions. They are, however, in a sense "solipsistic," in that they do not by themselves make reference to any other views in particular or even necessarily to the existence of other views in general.

Unlike self-descriptions, simple *agreements* or *disagreements*, such as "Yes," "No," "I agree," or "I disagree," do make reference to another point of view, at least insofar as they can only be understood as affirmations or rejections of remarks by other speakers. To the extent that such a contribution merely accepts or rejects another's view without giving reasons or qualifications to locate that view relative to the speaker's own – that is, to the extent that it was merely a "Yes" or "No" – we continue to rank it as solipsistic, as a description primarily of the self. Consider "I disagree." The content of this claim is dependent on what someone else has said, since the schema "I disagree with the claim P" can only be filled out with the substitution of P; however, this still only tells us that the speaker disagrees

without elaborating on *P*. Thus, the only new information it supplies in the context of the dialogue is information about the speaker.

Although self-descriptions, agreements, and disagreements do not display IC in any robust form, we take them to be the necessary foundation on which such consciousness can be built. Taken by themselves, they demonstrate *reflexivity*, a key cognitive ability that makes possible the effective representation of one's perspective in an interdisciplinary context. It does so in two ways. First, one cannot represent what one does not know, and the ability to describe one's personal view indicates self-knowledge. Second, one cannot ably represent a personal view when confronted with alternatives unless one can recognize that they are alternatives. Expressions of agreement and disagreement indicate a speaker's ability to situate himself or herself and personal perspective in a space of difference, although as we will see in the next subsection, more is required for robust IC.

Other-awareness

Whittier Scholars must evince greater appreciation of the variety of disciplinary perspectives to demonstrate more substantial IC. It isn't enough to have the sense that one's view agrees with some views and disagrees with others. Appreciation for similarities and differences among these views is crucial. Contributions to the discussion that explicitly juxtaposed scholarly perspectives to one another demonstrated this more nuanced IC. If these comments identified similarities, we categorized them as *assimilations*. For example, one student observed "We all go through the process of observation, identifying a question and wanting to explore the question." In response, another student elaborated:

> I would agree, in cinematography, when you're trying to light a subject or something, you're gonna, you're gonna hypothesize right? … Even if it's having a small level in multiple times in every shot, I think you're definitely going through some sort of scientific method, scientific process. In art, or cinematography at least.

These comments were similar to *agreements* in that they typically affirmed similarities between the position of the speaker and other positions, although they went further by detailing these similarities.

If comments identified differences, we categorized them as *differentiations*. For example, one film student made the following observation about how film's perspective on truth differs from perspectives of other disciplines on truth:

> The first [prompt] says, "The goal of my project is to arrive at the truth."

>And coming from, from our background, from a film background, um, that's not necessarily true. Um, not as much as maybe people in the sciences or economics or business, [it] is not always the intention to arrive at the ultimate truth in film.

These comments go beyond *disagreements* in identifying and, in some cases, developing the nature of observed differences.

Not uncommonly, assimilations and differentiations went together when students moved to the cognitive level of recognizing that certain approaches to knowledge were similar in some ways and different in others:

>. . . Also number four [says] "Another scholar applying similar methods to similar outputs should reach similar conclusions." I think that that is one of those statements that's incredibly different on the field of study. So I think that in certain fields of study, it's an expectation that the outcomes for the same sets of data will be the same conclusions, but in other fields of study the same set of data could result in completely dissonant conclusions.

Note that in this remark, the speaker highlights both similarities and differences in a way that is not anchored in an individual perspective. Assimilation and differentiation among disciplinary perspectives demonstrate sensitivity to disciplinary differences, and these can be demonstrated whether or not the speaker involves his or her own perspective in the comparison. Thus, this type of other-awareness is independent of self-awareness, understood as reflexivity on the part of the speaker.

Other-awareness may be described as "relativistic" in the sense that remarks indicating its presence locate and understand views relative to one another. We identified as *clarifications* remarks building on these similarities and differences without trying to unify them. For example, when one student disagreed with the prompt asking whether scholarship should be original, another responded,

>Yeah, that's what I thought of it, too. It took me a long time to actually answer that question though. [Laughs.] And then once I got to the, um, "Scholarship should convince people of something." That one kind of helped me answer the first question, because I disagree. I don't think it should like, convince somebody because it could be learning about something new, or introducing something different or different ideas to somebody. You don't have to convince them one way or another.

In exchanges like this, students use each other's perspectives to clarify their own understandings but not yet to collaborate on a shared understanding (cf. Choi & Richards, 2017, Ch. 6).

We take other-awareness to push out beyond self-awareness. Other-awareness requires recognition that other disciplinary perspectives exist, and it also involves an appreciation for ways in which those perspectives are similar to and different from one another. In effect, the discussion goes from a collection of "I"s to a "we." This change is a further step in the direction of robust IC, but it still strikes us as indicative of a passive or preliminary form of IC. Fully formed IC requires appreciation for the combinatory potential of insights from different disciplinary perspectives, which entails the ability to identify similarities and differences among those insights as well as an ability to bring them together. In short, integration extends beyond both other-awareness and self-awareness. We turn now to indications of integration in the transcripts.

Integration

The third phase of IC goes beyond passive awareness of different views to active engagement with them. Sometimes evidence of this engagement took the form of what we termed *elaboration,* denoting the effort to develop different views in ways that make them compatible or coherent with one another, as in the following exchange:

> S_1: I'm not proving anything, I'm just not introducing, but I guess explaining or comparing something. So I'm showing people something that . . .
> S_2: But I still think you're kind of arguing for something. There's still a like different perspective that you may not let . . .
> S_1: No. You don't have to convince a person of ideas . . .
> S_2: No, not consciously, but I think that people are still gonna either agree or disagree with that perception. And in a way, you're ki- . . . You're gonna want people to be with you or to agree with, uh, um, the way you present this data.

Multiple positionings are occurring here, including self-description, agreement, and disagreement. Note, however, that in his or her second remark, S_2 acknowledges that S_1 is attempting to show people something, but then builds on that by noting that if S_1 is successful, the audience will need to agree with him or her, or at least agree with how the data are being presented. This is a way of elaborating S_1's first remark that reveals its compatibility with S_2's suggestion that S_1 is "arguing for something."

Other times, rather than trying to articulate an inclusive perspective, students simply asked *questions* based on the presumption such a perspective exists. For example, one student said,

> We were talking a lot about paradigm shifts in this class, and, um ... I think there's maybe an underlying understanding right now that our generation is kind of experiencing a lot of, um, shifts, like socially, politically, environmentally, all these things are being brought to the light, in, uh, in a certain way. Um, do you guys feel that WSP or, um, the type of interdisciplinary education that we are receiving through WSP, do you feel like some sort of a, um, not an advocate, but a part of, um, the shift?

Questions such as this one go beyond simple requests for clarification or petitions for information. If the nature of different perspectives causes individuals to ask questions about their own, that means each individual is not seeing them simply as separate and independent but as compatible in some as-yet-to-be-determined way. Differences between the "other" perspectives and that of the "self" cause reflection on whether one's understanding is incomplete. Asking the question presumes a shared reality in the form of a truth, or a common understanding, and proposes collaboration in order to arrive at it.

Ideally this collaboration results in learning, which is a form of *change of mind.* Consider this comment during a discussion of the importance of other people's opinions to one's project:

> Yeah I put 3 for that one. And I, now looking back on it I probably would have put 4 or 5, just being a business marketing major, if you're not considering people's opinions you're not going to be a very good marketer. So ... [laughter]

Prior to this comment, the workshop group had been discussing the prompt "Good scholarship always considers people's opinions." After the group worked to identify how they should interpret this prompt, the discussion focused on how one should balance one's own vision as a scholar with the opinions of others. This comment indicates that the speaker has changed her mind about this balance and feels that she has learned something about marketing from her colleagues' remarks. The interdisciplinary consciousness exhibited here is not only shared but sharpened as a result.

Self-awareness, other-awareness, and integration did not all always appear in a transcript, and when they did, they did not appear in a linear or orderly fashion. One might expect, for example, that self-description would precede assimilation and differentiation, to be followed by elaboration and perhaps change of mind. That representation of integrative process, however, is an ideal model. In actuality, dialogues do not typically unfold from self- to other-awareness to integration. On the other hand, it is true that nothing can happen without self-awareness, and integration is only possible based on

other-awareness. While a full integration of insights derived from different perspectives was not typically achieved, students were excited and attracted by the possibility it might be, as evidenced by the following remarks:

> S_3: I feel like if there was any way we could have, like, some kind of, even if it's just like a small way of connecting our projects to somebody else's project and seeing how those fit, because in that sense you tend to understand a lot more of where people are coming from, and things like that, and I feel that that's really important in having a community, is to understand another person's point of perspective.
>
> S_4: I would like to, to have more, or even just have a class dedicated to talking to each other, about how our projects can find common ground in some way? I don't know, I'd like to learn more about everyone's individual projects, and like, there could even be, like, in the future for scholars, even senior projects in general, like, co-projects or, um, parts of your senior project where you partner up with, um, maybe someone else in a program.

Remarks such as these have two implications. First, the fact that the students found this class exercise helpful in "connecting [their] projects" and said that they would like to have more discussions like this suggests the Toolbox workshops were useful in facilitating IC. True, WSP 301 instructors reported students had been talking about their projects with one another all semester. Still, the transcripts indicate students experienced the Toolbox dialogue as a special event precisely because it promoted learning through such dialogue. Second, the transcripts indicate IC does exist as something over and above disciplinary consciousness. That is, students did not typically learn anything more in the Toolbox dialogues about the disciplines they had been studying in other courses. Yet, the dialogues prompted articulation of individuals' disciplinary training and description of the disciplinary aspects of their projects, even if that was not the primary focus of the dialogues. And WSP students did also learn something about how their disciplines fit together, experienced as something new and different.

Students' positive response to the discussion of the Toolbox dialogues also sheds light on questions such as whether students are really interested in developing IC and whether it is as important to their work as, say, specific interdisciplinary skills and practices. Surely all these things are important. One general consideration in favor of encouraging the development of IC is its role as *know-how* in guiding the employment of interdisciplinary tools and methods. But the remarks above, representing the many comparable remarks throughout the transcripts, highlight that students appreciate and

are drawn to the enhanced sensitivities that come with IC, which makes it a valuable accompaniment to other elements of the interdisciplinary experience Whittier Scholars pursue in the WSP program.

6. Discussion

As noted above, we conducted eight Toolbox workshops using the WSP Toolbox instrument with WSP 301 courses, two each in the spring semesters of 2014-2017. A variety of different workshop experiences appeared across this set. WSP 301 groups and their discussions were quite diverse – some quiet, others voluble; some collaborative, others dominated by a few voices. Consistent with the Toolbox dialogue approach, we invited participants to begin at the point in the instrument that they found most interesting or provocative (Looney et al., 2013). Each of the eight workshop discussions began in a different location in the instrument, which suggests that different aspects of the scholarly process with which the prompts dealt were salient for each group; given the dependence of this type of dialogue on the contexts occupied by the participants, the difference in salience does not come as a surprise.

Further, some workshops featured engagement at the project level among students who attempted to work out relationships among their projects in a way that involved some sort of interdisciplinary integration. Other workshops stayed more or less clear from specific details of projects and focused instead on the questions raised in the prompts, although typically in a way that reflected disciplinary differences (e.g., sciences vs. humanities).

As we have said, WSP students do not collaborate on interdisciplinary projects, but their membership in a collaborative, multidisciplinary community influences their pursuit of interdisciplinary goals. A robust and active IC such as the Toolbox workshops help them to develop also helps them to derive project-relevant lessons from experiences as they arise. Presence of robust IC can enable students and older researchers alike to profit from other disciplinary perspectives when encountering them, regardless of where they may be in the interdisciplinary process (cf. O'Rourke, 2017).

Understood as a kind of *know-how*, IC manifests as a complex ability to integrate insights from one's own perspective with those from other perspectives into an understanding that is more informed and responsive to a greater number of relevant considerations. The integrative function of IC requires a cognitive framework that makes salient relevant aspects of different perspectives (Nikitina, 2005; Boix Mansilla, 2010). Whittier students acquire this framework in WSP 301, and the WSP Toolbox foregrounds dimensions of this framework (e.g., inputs, process, outputs)

that enable them to tease out differences among perspectives.[9]

This contribution by the Toolbox to WSP 301 highlights the purpose of the Toolbox in its WSP application that we have been highlighting up until now: The Toolbox can enhance IC by structuring dialogue in which participants articulate their own views and learn about views of their conversational partners, engaging in mutual teaching and learning that supports co-creation of meaning through elaboration, critique, and negotiation. For example, the Output module begins with the prompt "The goal of my project is to arrive at the truth." This prompt motivated conversation in several workshops about varying relationships between student projects and the surrounding world. In some cases projects aim to *get the world right*, whereas in others the goal is to *change the world*. Also, the "same views" prompts, e.g., "Most Whittier scholars use the same sort of process that I do," motivated comparative discussions about the different dimensions of scholarship represented in the room, thereby revealing further helpful similarities and differences among student perspectives.

We also want to acknowledge that the WSP Toolbox serves as a tool for instructors to assess student ability to participate in interdisciplinary dialogue. Several questions related to its use as a tool for such *diagnosis* arise:

> 1. Do students know enough about disciplinary inputs into their own process to represent them in dialogue?
>
> 2. Are students adequately open to the similarities and differences among their perspectives?
>
> 3. Can they adopt other orientations for the purpose of making comparisons among them?

Although workshops were conducted only once in each section of WSP 301, Toolbox dialogue could be conducted more than once, perhaps with individuals adopting perspectives of others in the group for the purpose of discussion. Typical use of the Toolbox among older interdisciplnarians or people engaged in interdisciplinary projects, in both research-focused and education-focused applications, grounds dialogue in individual reflexivity with perspective seeking emerging through sharing of different orientations. Flipping dialogue through a kind of "epistemic role-play" exercise would explicitly challenge undergraduate students, too, to seek out and understand alternative perspectives, grounding the experience in perspective seeking

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[9] Understood as a kind of *know-how*, IC contributes to the development of an individual's interdisciplinary perspective, which in turn frames how the individual looks at the research landscape. Thus, IC and one's interdisciplinary perspective, although different, are mutually reinforcing.

and encouraging reflexivity by allowing them to see their own perspectives through others' eyes.

This possibility highlights the pedagogical flexibility of materials we have produced for WSP 301. In a class of undergraduates who are acquiring training in different disciplines and/or in an interdisciplinary studies classroom, one could use the assignment in Appendix D and the WSP Toolbox prompts in Appendix C as two parts of a single curriculum that illuminates central dimensions of scholarship and frames a dialogue that can enhance IC. Alternatively, one might use the WSP Toolbox early in the term and then again late in the term, perhaps using the "epistemic role-play" framing for the second workshop to assess how well students have come to understand different perspectives represented in a class. Third, materials in the instrument might be divided up and modules used individually in short, 20-minute dialogues designed to get students thinking about different dimensions of scholarly work. Although we designed the WSP Toolbox for an interdisciplinary college class, shorter, module-based discussions could also add value to a disciplinary class interested in the research process, with appropriate changes being made to the language of the prompts.

7. Conclusion

At Whittier, WSP gives self-directed students an opportunity to develop an interdisciplinary course of study and a substantive interdisciplinary product (in the form of their senior project). In the case of WSP 301, the core course students take in their junior year, students need to transition from riding the bus (of college education) to driving the bus by shifting from simply being consumers of knowledge in a number of disciplinary contexts to also being producers of knowledge in the form of the senior projects they have begun to plan. In pursuing these program objectives, students need to develop IC so they can communicate about their work across disciplinary lines to faculty and other students in their cohort community. The Toolbox experience, modified from its usual form to better suit undergraduate students and integrated into the course, provides them with a structured opportunity to exercise skills constitutive of IC, foremost among them reflexivity and perspective seeking.

Our experience with WSP supports our general conclusion that interdisciplinarity does not have to be postponed until after the acquisition of disciplinary expertise (as some have argued) but can usefully be cultivated at the same time. It also supports a variety of more specific conclusions: that interdisciplinary consciousness exists as an identifiable phenomenon;

that undergraduate students can develop IC at the same time as they achieve disciplinary expertise (at least, expertise sufficient to do the projects they have proposed); that working with communities of students engaged in the same process is an effective way of doing this; and that versions of the Toolbox can be a useful way to help identify the presence of IC and facilitate its development. It is our hope that sharing these findings about the evolution of our course and that of the version of Toolbox we have integrated into it will help us further clarify what IC is, how to detect and promote it, and how to situate the report described here in the context of ongoing study of its fuller development.

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Appendix A – Differentia of Design-Your-Own-Major and Integrative Studies Programs[10]

Stage	Differentia	Institutions
Initiation	Typically an optional course of study as opposed to a requirement of all undergraduates	Evergreen, Hampshire, Marlboro
	Sometimes requires competitive application	James Madison, Leslie, University of Michigan
	Typically requires some sort of proposal	Leslie, Marlboro, New College of Florida, UC San Diego, University of Scranton, University of Washington
Progress	Typically involves individual course of study built out of existing courses, but sometimes: 1. Limited to combining existing majors	1. Cornell College, North Greenville University, University of Maryland, Warren Wilson, Wheaton
	2. Limited to choice among existing emphases	2. Evergreen, North Central College
	3. Allowing for the study of something not otherwise offered	3. Gallatin, Hanover
	Typically courses are unified around a question or theme Sometimes courses are unrelated	U Minnesota
	Typically individual faculty advisors or mentors	CUNY, Swarthmore, UC San Diego, U Maryland, U Minnesota, U Washington
	Sometimes individual faculty advisors or mentors and with committees. Programs include:	Bennington, Oberlin, U Michigan, Whittier
	1. Core course 2. Writing courses 3. Integrative studies courses 4. No required classes	1. Mount Union, Radford 2. Marlboro, Emory 3. Michigan State, Seattle University 4. California College of the Arts
	Evaluations typically with grades; Sometimes with narrative evaluations	Evergreen, New College of Florida
	Typically with semester classes; Sometimes one-course-at-a-time	Cornell College
	Typically individual; Sometimes with emphasis on development of ID community	St. Leo, St. Olaf, Whittier
	May include study abroad	Cornell College, Leslie, U Maryland, Warren Wilson
Conclusion	Typically involves a final paper or project	Indiana Bloomington, Scranton, Simpson, Swarthmore, UC Berkeley
	Can involve a final paper or project and a presentation	New College at the University of Alabama, Wheaton, Whittier

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[10] Based on data in https://www.collegechoice.net/best-bachelors-programs-design-your-own-major/ and http://www.bestcolleges.com/features/top-integrative-studies-programs/

Appendix B – Titles of WSP self-designed majors for the 2017 cohort of Whittier Scholars

Entertainment Industry Studies; Critical Studies in Media Marketing; Gender and Journalism; Cultural Nutrition; Visual Art and Media Marketing; Framing Meaning through Theater and Film; Sociological Approaches to Education Policy; Institutions and Social Justice; Community Public Health and Advocacy; Marketing, Media, and Ministry; Creative Marketing; Pacific Rim Film Production; Spanish Culture in Sports; Urban Community Studies; Storytelling and Spirituality; Film and Creative Writing; Cinematic Cultural Studies; Ethical Practices in Healthcare; Sports in Society; Studies in Post-Conflict Reconciliation; Behavioral Studies in Economics; Latino and Asian Studies; Business Strategies in Film Production.

Appendix C – WSP Toolbox prompts, version 2.0

Response categories: Disagree 1 2 3 4 5 Agree, Don't Know, Not Applicable

Objective
Core Question: What are the main purposes of scholarship?
1. Scholarship gives people something new to think about.
2. Scholarship convinces people of something.
3. Scholarship shows people how to do something.
4. Scholars should be primarily concerned with realizing their own vision for their project.
5. Most Whittier Scholars have the same kind of objectives that I do.

Audience
Core Question: Who is the primary audience for your scholarship?
1. My scholarship has something to say to everyone.
2. My scholarship speaks to people interested in the subject.
3. My scholarship speaks to experts in the field.
4. What the audience thinks is not the most important thing.
5. Most Whittier Scholars feel the same way about their audience that I do.

Input
Core Question: What kind of raw material (e.g., articles, observations, information) does your project consider?
1. Scholarship is grounded in facts about the world.
2. People's opinions are among the facts about the world that I study.
3. Expert opinions are among the facts that I study.
4. Scholarship grounded in facts is very different from scholarship grounded in people's opinions.
5. Most Whittier Scholars use the same raw material that I do.

Output
Core Question: What is your project meant to deliver?
1. The goal of my project is to arrive at the truth.
2. The goal of my project is to express myself.
3. The goal of my project is to argue for a position.
4. In my project, the process is more important than the result.
5. Most Whittier Scholars have the same kind of outputs that I do.

Process
Core Question: How will you get from input to output?
1. My process consists of applying definable skills learned in courses.
2. A scholarly project combines learned skills in original ways.
3. Each scholar has his or her own unique process.
4. Another scholar applying similar methods to similar inputs should reach similar conclusions.
5. Most Whittier Scholars use the same sort of process that I do.

Appendix D – WSP 301 Assignment On Interdisciplinary Scholarship

Please answer each of the following with a word or short phrase. It is not necessary to go into detail; in fact, please don't. I give some examples but do not feel that you have to choose from them: Give the answer that best fits what you plan to do. If you are not sure, give your best guess; this is not binding.

Tentative project title:

Input: In a word or short phrase, name the primary raw material or data that you will start out working with. These could be things like survey results, novels, experimental data, interviews, works of art, academic studies, etc. [One word or short phrase!]
Output: Everyone's output will be a project. In a word or short phrase, describe the form your project will take, that is, what type of project it will be. How will it be different from the input? For example, will it be a description, an argument, a recommendation, or what? [One word or short phrase!]
Process: In a word or short phrase, describe what you will do to get from the input to the output. For example, mathematical analysis, creative response, literary, historical, or sociological interpretation, summary, etc. [One word or short phrase!]
Effect: What effect do you want your project to have on your readers or

audience members? How do you want them to walk away different from the way they walked in? [One word or short phrase!]