

“How Do You Know One When You See One?”  
Interdisciplinary Designs: A Typology

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### Abstract

This paper explores the idea that a typology of Interdisciplinary Research designs can be developed from the study of doctoral student work and its relationship to faculty-advocated interdisciplinary definitions. This inquiry was designed as a case study of dissertations from one of the largest Interdisciplinary Studies Ph.D. programs in the United States, the Union Institute and University's Graduate College (GC). An initial faculty-based template was created by analyzing GC faculty taskforce statements on Interdisciplinarity from 1987 and 2002. An analysis of a sample of GC dissertations covering a 5-year span between the years 1999-2003 led to the refinement of the initial template. The analysis of student interdisciplinary designs was used to organize types of designs along gradients of abstraction and complexity. Findings differentiated along the typology support significant design and methodological differences between types of student interdisciplinary doctoral research. The components of each of six types, Multidisciplinarity, Crossdisciplinarity, Conceptual Interdisciplinarity, Formative Interdisciplinarity, Transdisciplinarity, and Radical Interdisciplinarity, are presented and distinctions drawn among six types of Interdisciplinary designs.

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## INTERDISCIPLINARY DESIGNS: A TYPOLOGY

The work of defining Interdisciplinarity (ID) continues to hamper the assessment of Interdisciplinary research and to make its outcomes persistently problematic to evaluate. Howard Gardner and Veronica Boix Mansilla reporting from their Harvard Interdisciplinary Studies Project state, "...a re-emerging awareness of interdisciplinarity as a pervasive form of knowledge production is accompanied by an increasing unease about what is often viewed as 'the dubious quality' of interdisciplinary work." Researchers interviewed by Gardner and Mansilla about their means for evaluating ID work supported the view that indirect assessment (e.g., number of publications) is insufficient and an intractable problem that depends on first defining Interdisciplinarity,

"Second, our subjects pointed to a lack of conceptual clarity about the nature of interdisciplinary work and its assessment, recognizing the need for a more systematic reflection in this regard. Third, they emphasized that in highly innovative work where novel territories are uncharted and few precedents are available developing validation criteria is part of the inquiry process itself.

Their interview-based findings regarding how researchers assess interdisciplinary work demonstrate that not only are assessment criteria and procedures underdeveloped but that "Measures that directly address epistemic dimensions of interdisciplinary work (e.g., explanatory power, aesthetic appeal, comprehensiveness) proved rarer and less well articulated" (<http://metromath.org/library/uploads/Mansilla-Gardner-Assessing-Interdisciplinary-work-at-the-frontier.pdf>)

Yet the issue and challenge of defining Interdisciplinarity continues unresolved from every research perspective, as articulated in this statement by discussant Grit Laudel at an international forum on interdisciplinarity in February 2004,

For me it is quite frustrating to have the discussions about different definitions of interdisciplinary going on for more than thirty years now without any progress. A definition is a convention about the meaning of a specific term. Some conventions seem to work better than others because they relate better to the existing body of knowledge. But finally it is the members of the scientific community who agree to define and use a term in this or another way. Why can't we as members of the community that investigates interdisciplinarity attain such an agreement in our scientific discussions? (<http://www.interdisciplines.org/interdisciplinarity/papers/11>)

The National Academy of Sciences, supporting interdisciplinary research as “part of our mission to educate the world on issues of science, engineering, and health” concludes from its list of “Challenges to Overcome”,

Social-science research has not yet fully elucidated the complex social and intellectual processes that make for successful IDR [Interdisciplinary Research]. A deeper understanding of these processes will further enhance the prospects for creation and management of successful IDR programs. (<http://www.nap.edu/catalog/11153.html>)

This study attempts to address the primary need of these challenges by proposing various definitions of the concept of interdisciplinary work and organizing these into a typology. By utilizing typological classification to distinguish among characteristics, traits

and properties shared and not shared by variants, the task of advancing a coherent definition of interdisciplinary work is carried out. The classification of similarities and differences is an attempt to place all sample variations of interdisciplinary design into a typology that clearly distinguishes between type variations. Lastly, the typology is driven by the definitional purpose of this study, that is, that all the types should help clarify the concept of Interdisciplinary Research and that the proposed types should accurately reflect and be a good fit within the dimensions of the data base.

### *Researcher Bias*

It is necessary to disclose my relationship to the Graduate College as clarification of my personal knowledge of the institution and what privileges of access I enjoyed both as a researcher and as an employee of the institution I was researching. After serving as GC Assistant Dean from 1990-1992 I transferred to faculty and served there for the next 15 years as a professor of Interdisciplinary Studies with special interest in Education, Creativity and Consciousness Studies. I have been the core faculty advisor for over 40 dissertations ranging from Microbiology to Transpersonal Anthropology. These experiences gave me intimate knowledge, that is, member's knowledge of institutional history and the personal narratives that create and sustain organizational culture. This intimate knowledge and its possible biases about the research setting, e.g., which faculty members were considered to be lazy or irresponsible and did shoddy work, was buffered by utilizing a research assistant to do all primary data collection, basic sorting, coding and classification. This bias buffer was intensified by the fact that I was convalescing at home from a "massive heart attack" and had already set the project in motion with Research Assistant Netoff traveling to the research setting. We spoke daily on the phone going over data operations and logistical

problems but my recent cardiac infarction prevented me from joining graduate student Netoff for the hands-on process. RA Netoff kept details records and photocopied all documents and related materials. All coding and classification was done over the phone and computer at this point. This material became the data base for this study's report. This project was funded by a GC faculty research grant.

### *The Research Setting*

In 1964 a consortium of 10 college presidents formed the Union for Research in Higher Education (URHE) located at Goddard College, Vermont. The purpose of URHE was to promote alternative access to Higher Education for adults. From these institutional roots, the Union for Experimenting Colleges and Universities (UECU) was launched in 1969 as an adult alternative institution with baccalaureate programs (University Without Walls – UWW) and a Ph.D. program (Union Graduate School-UGS), located at Antioch College, Ohio. All degree programs were designed to create access for mid-career adults unable to leave jobs to attend college fulltime and for the socially and economically disadvantaged who were historically excluded from American Higher Education.

By 1990 multiple avenues to Higher Education, such as Distance Education and low residency programs, developed and expanded rapidly with the advancement of computer technology. Alternatives to campus-based programs increased the window of access for working adults and the historically excluded and the Union for Experimenting Colleges and Universities formalized itself as The Union Institute (TUI). It had evolved from a unique outreach focused institution with an experimenting mandate to include, along with Baccalaureate centers across the U.S., a low-residency 1,250 doctoral student body with a

broadly dispersed, socially complex, interactive educational laboratories in Interdisciplinary Studies for working adults with creative ideas.

In 1964 the Union's organizational and pedagogical model was the geographically dispersed University Without Walls model originally funded by the Ford Foundation and the U.S. Office of Education. The UGS Ph.D. program led by Dr. Goodwin Watson featured open learning, self-direction and robust faculty mentoring in the context of humanistic and existential learning and interactive development. Doctoral program 'learners' (UGS term for 'student' signifying equality of participation and validation of life-experience learning) were encouraged to follow their emotional creativity and intellectual interests across disciplinary boundaries and eventually to negate the concept of boundaries and therefore all boundaries, that is, to engage in Transdisciplinary practices. In sum, the UGS faculty advocated 'stretching the envelope' and 'thinking outside the box' as learners prepared their learning programs and research projects. Due to the program's emphasis on stretching or transforming disciplinary boundaries my research proposal assumed the academic and research work produced by experienced adult learners would span innovative, exploratory, and perhaps the problematic range, of Interdisciplinary approaches to research.

#### *Uniqueness of the Research Data Base*

Typologies developed from interviewing teaching faculty and researchers in interdisciplinary programs and projects have been proposed elsewhere (e.g., Lattuca, 2001) but no study includes the uniquely discrete interdisciplinary data base inadvertently created at the Union Graduate School. The database for this study, unlike any other in American Higher Education, was produced by a 35 year history of conferring the Ph.D. in both discipline-defined areas of study and in novel fields under the domain of Interdisciplinary

Studies. The GC interactive program provided an experiential laboratory of required seminars and participation in a peer learning activity network in which creative and transdisciplinary learning experiences were encouraged, supported and verbalized by faculty as professional, institutional, academic and personal innovation. Mid-career adult students (many of them already accomplished and publishing professionals and practitioners) seeking the Ph.D. were allowed and encouraged to freely experiment and explore and, at times without academic supervision and with only occasional mentoring, to work as independent individuals. A distinct body of Interdisciplinary student work and faculty practice was created in largely unmonitored academic and administrative conditions no longer possible in Higher Education today. Benjamin Davis, professor emeritus and ex-UECU Dean, refers to these historical conditions as 35 years of “laissez faire education” for adults.

In 1989 The Union Graduate School was changed to The Graduate College of The Union Institute but still operated in a slack administrative environment with little if any academic monitoring and oversight. The resultant *laissez faire* doctoral program for adults conducting doctoral Interdisciplinary research provides a discrete field of data that can be circumscribed from 1970 (when the first UGS doctoral learners were admitted) to the advent of the 2005 Graduate College program-ending “teach-out.” Admissions were halted and program responsibilities taken over by state and regional academic monitoring agencies beginning with site reviews in July 2001. Thus the *laissez faire* educational data base can be circumscribed by these events from 1970 to 2005.

#### *An Aging Faculty and Institutional Memory*

The faculty views of an doctoral Interdisciplinarity faculty working solely in a geographically dispersed program constitute an unusual data base in the history of American

doctoral education in several significant ways. Prominent among unique characteristics of the data base are the longevity and stability of the faculty as a practicing group (50% percent of the faculty was over 60 years of age in 2004). Approximately 65 fulltime faculty, with an additional 30 three-quarter or half-time faculty, served over 1,200 learners. The faculty tended to be seen by learners as wise and senior. A second salient characteristic was the size of the doctoral program, which was extraordinary. The size of the program was supported and facilitated by a non-hierarchical collegial culture in which “learners” were viewed as associates. The culture blurred professional differences and status boundaries among faculty regardless of their fulltime or parttime status as seriously as it erased social barriers between learning and teaching among adults, faculty or learners.

The faculty worked together and aged together as a group, sharing 35 years of defining themselves as a “teaching faculty” for adult students in an intellectual terrain that encompassed a host of disciplinary fields available to be drawn upon by and for individualized study programs. Faculty learner loads, increasing over 40% from a range of 14-18 learners to a range of 20-24 learners, served to reinforce the notion of the GC as primarily a teaching program. In 2001, the Ohio Board of Regents declared this self-definition as a teaching program erroneous for a Ph.D. program.

*Transdisciplinarity and Organizational Drift*

By emphasizing transdisciplinary orientations and emergent fields of study UGS/GC faculty as a group shifted their academic orientations and interests away from their original discipline-based degrees to engage in new interdisciplinary fields such as Women’s Studies and Environmental Studies. Some faculty decisively took academic and research directions involving complex areas of academic theory that utilized interweaving multiple disciplines

and perspectives, such as Transpersonal Studies, Complexity Studies and Consciousness Studies. The GC became focused on defining ‘emergent’ academic areas and researching complexity in phenomena. Increasingly transdisciplinary, the pedagogical culture became a practice of crossing and blurring boundaries as the context for all ideas, discussions and actions. Faculty pursued their own interests, at times in somewhat exotic directions, and presented these in broadly interdisciplinary seminars they convened. This proliferation of faculty interests provided varied and complex intellectual resources in the interdisciplinary instructional program. At the same time, however, the focus on embedded teaching modes did not make the articulation and theoretical development of the program’s concepts and methods an urgent concern to the faculty or the administration, even though this structure was seen as underlying the program’s embedded learning and teaching activities.

*The Data Base and the Graduate College Teachout*

This creative interdisciplinary doctoral program culture produced a body of work over 35 years that came under review during a 2001 Ohio Board of Regents (OBR) site visit. The results of this review lead to increased agency regulation and oversight in 2002. Working from a questionable sampling of dissertations (no rationale was ever provided to the faculty by OBR for its selection of doctoral products) the 2002 OBR evaluation team rejected 100% of Graduate College dissertations/PDEs in its sample. This devastating OBR review was followed by rising agency regulatory demands such as the U.S. Department of Education’s requirement that fundamental changes to the UWW framework be implemented. Union’s Board of Trustees and the administrative leaders decided to adopt a bureaucratic response, as it was put about the agencies by the Vice President in charge of the managing the review, “If they ask for 40% give them 70%.” The program began to

change immediately from a dynamic, developmental, process-oriented, experimental, individualized graduate program to a segmented, pre-organized, minutely monitored educational system focused on measuring academic progress. By January 2003, the unique conditions of “laissez faire education” in Union’s doctoral interdisciplinary program had ceased to exist. The Ph.D. program had been placed in “academic receivership” under total system monitoring by the Ohio Board of Regents. Learner enrollment dropped over 60% from 1250 to 484 learners in two years. Numerous faculty layoffs and retirements ensued. OBR’s dismal evaluation pointed to the lone bright spot: Graduate College PDE’s were “creative.” The data base had become completely circumscribed by these events.

### *The Research Project*

It is to the analysis and definition of this rich and largely undefined interdisciplinary data base that this study turns to as an intellectual terrain. This study is an effort to distinguish key features of multiple approaches to interdisciplinary research design drawn from a kind of frontier image of an experiment in higher education.

This paper first reviews the 1987-1988 faculty UGS program statements on Interdisciplinarity and Interdisciplinary study. Presented and discussed next is an analysis of faculty discussions and program statements. This discussion results in a hypothetical six category Interdisciplinary typology. The proposal of six ID designs (A Hypothetical Typology of Interdisciplinary Design, Cedillos, 1994) was presented to the GC faculty in 1994. Next, a 2002 paper prepared by a GC faculty group responding to questions from external agencies about Interdisciplinarity is excerpted to highlight current GC faculty definitions of Interdisciplinarity and Interdisciplinary study. The 1987-1988 UGS program statements and 2002 GC faculty views were compared and used to refine the 1994 proposed

typology of interdisciplinary designs. This resultant faculty-based template is then used as the sorting framework for the dissertation data base.

Communication of interdisciplinarity concepts from the faculty to the learners is briefly described and addresses the question, ‘Are learners who are given unusual freedom to design interdisciplinary research projects clearly adopting and integrating faculty guidance?’ The pedagogical effects of faculty concepts were gauged by how learners understood and used interdisciplinary concepts to create a research design. This is useful to know since continuity of effects across reference points provides the basis for a valid and reliable data base. This paper then uses commonalities between faculty Interdisciplinarity concepts and learner work to initiate the definitional purpose of this study as a final proposed typology framework.

The definitional purpose of this study led to the investigation of the thesis that Interdisciplinarity research design consists of composing a research process from a variety of possible designs, a compositional process Denzin and Lincoln (1999) refer to as research “bricolage.” This concept is the compositional approach of the multi-method expert who uses and fashions tools, adjusts concepts and develops skills during the research process. Specifically, the typology’s thesis was that Interdisciplinarity is an adaptive approach employing any number of combinatory designs made during the research discovery process rather than as a set of prescribed methods to be applied to a specified phenomenon. This project sought conceptual leverage on this thesis by examining the relationship, if any, between how faculty members defined Interdisciplinarity Studies and the work their Learners produced. It was reasoned that if learner work applied or attempted to apply the faculty espoused concepts the outcomes could be analyzed as a descriptive base specifically

for ways to approach designing interdisciplinary research under learning conditions favoring wide-ranging creativity. Consequently, this study assumed that learners produced an experimenting, exploratory and design-rich source of data as doctoral interdisciplinary inquiry. My experience as Assistant Dean and as core faculty advisor strongly supported that assumption.

The development of a grounded typology of approaches to interdisciplinary studies is briefly reviewed next.

### *Constructing the Initial Typological Framework*

The Union Institute's Ph.D. Interdisciplinary Studies program, offered through the Graduate College, formed a 15 member faculty committee to formulate a guiding policy statement for inclusion in the College's guidelines and related materials. The committee, called the 1987 Ad Hoc Committee on Interdisciplinarity, met for 15 months via regular biweekly and ad hoc conference calls. Committee meeting minutes were fully recorded and a file on committee documentation was maintained in the Graduate Office. An ex-officio administrator, Associate Dean John Tallmadge, organized and participated in committee discussions.

After acceptance of the committee's statement on Interdisciplinarity by the Graduate School Dean, the committee disbanded in December 1988. At the end of its 15 month engagement the committee delivered the following policy and pedagogical guidance statement which became part of the 1998-1999 Learner Handbook:

The Graduate College expects you [Learner] to organize your program to include interdisciplinary study that takes you beyond traditional boundaries. By examining the tensions and relations between fields as defined, you have

the opportunity to reorder or redefine existing constructions of knowledge; to discover new meanings and relationships between facts, theories, and methods. By pushing back the frontiers of knowledge, you can engage in new modes of inquiry while building upon the foundations of those long established. (Page 1)

Interdisciplinary inquiry is a way of seeing, thinking, conversing about, and imagining how issues and problems cut across relevant fields. (Page 2)

Because each Graduate College program is unique, a strict set of definitions and rules is inappropriate. The definitions, principles, and related expectations previously outlined are to be used as a guide for you and your committee in responding to the intellectual commitment of the Graduate College. (Page 2)

The Committee on Interdisciplinarity explored the philosophical and conceptual dimensions of rethinking fundamentals of inquiry, groundbreaking scholarship in emerging fields and the meaning of going beyond traditional boundaries. The institutional mandate characterizing UECU *as an experimenting institution* also oriented and framed the committee's purpose. The committee, noting the combinatorial range of possible applications, did not formulate "a strict set of definitions and rules," but instead constructed a set of general guidelines which could accommodate ongoing discussion and support for the experimenting mandate. The committee, regarding Interdisciplinarity as a core

actualizing concept central to the experimenting mandate, explored Interdisciplinarity through wide-ranging discussions.

Archival data containing the conference minutes and discussions of the GC 1987 Ad Hoc Committee on Interdisciplinarity leading to the above program statements was used to develop “A Hypothetical Typology of Interdisciplinary Designs” (Cedillos 1994). The archival data of committee wide-ranging discussions attempting to define Interdisciplinarity was used to identify terminology and references to Interdisciplinarity by degree of semantic abstraction (philosophical, conceptual and applied). A frequency count of terms and references in these discussions revealed conceptual patterns among levels of abstraction and increasing orders of complexity, that is, some references consisted of applications, some consisted of discipline-based concepts and some consisted of theoretical concerns going beyond disciplinary boundaries. These frequency units were sorted by similarities and differences into types of Interdisciplinary conceptualization and inquiry. Faculty ways of thinking and talking about defining Interdisciplinarity were organized on a continuum of conceptual types along a gradient (from less to more complex and from less to more abstract) derived from the data. The typological distinctions and categorizations among types of Interdisciplinary designs and their arrangement on a continuum were not made by the ad hoc committee, which were not in the committee’s charge, but by this analysis of the committee’s discussions and statements. The committee’s discussion was coded (see Appendix A for coding protocol) and sorted into a typology. The sorting process yielded six distinct conceptual systems for designing Interdisciplinarity research. The six hypothetical types, from Type 1 (most discipline-based) to Type 6 (least disciplinary-based) were, labeled

1. Multidisciplinarity
2. Cross-Disciplinarity
3. Formative Interdisciplinarity
4. Conceptual Interdisciplinarity
5. Transdisciplinarity
6. Creative Interdisciplinarity

This hypothetical typology, its conceptual foundations and its construction process were presented to the faculty for discussion at a GC national faculty meeting (Cedillos 1994). Support for the validity of the hypothetical typology was widespread without dissention and with encouragement for further research and publication.

*Faculty Views, 2002*

The unpublished typology was used in 2003 as a sorting template with the objective of subjecting the initial typological research to critical review as a definitional tool. A refinement and articulation phase of the typology began by integrating faculty views expressed almost 15 years after the 1987 faculty guiding statements.

In a 2002 faculty commentary on Interdisciplinarity generated in response to a critical agency review Core Professors Rita Arditti, Bethe Hagens, Elizabeth Minnich and Mary Sheerin wrote, “The current proliferation of terms such as *multidisciplinary*, *interdisciplinary*, and *transdisciplinary* suggests that we are in the middle of a process of rethinking strong discipline-based scholarship.”

Nancy Owens (GC faculty) makes these observations on the factors concerning an adult Learner’s orientation and the complexity it adds to the scope of interdisciplinary study:

The aspect of interdisciplinary studies that has been most meaningful to me in helping the learners I work with is the value of an interdisciplinary framework for solving problems...Having already been active in the world of activism on many levels, they are often long on practice and short on theory. However, the practical experience they have assists them in looking at the problem in broad terms, knowing the interconnectedness of many strands of thinking, knowledge, experience, and looking for a way of talking about, reconceptualizing, this problem and possible solutions.

(Personal communication, 5/31/02)

Owens introduces “interconnectedness,” “broad-thinking” and connectionist approaches as fundamental aspects of interdisciplinarity. Focusing on the need for connectionist skills among various disciplines in working with the multidisciplinary complexity of African American Education Cynthia Jackson (former GC faculty) points out how an Interdisciplinarity approach is indicated and required by the breadth of the field’s complexity:

African American education is an interdisciplinary topic. A topic is interdisciplinary when it is essential for one to make connections among disciplines in order to understand the breadth and scope of the topic.

(African American Education: A Reference Handbook, 2001, p. xi)

Norman Harris (former GC Faculty), speaking from developments in Black Studies addresses the complexity of the interdisciplinary approach and sketches a range of cognitive dynamics and distinctions differentiating Multidisciplinarity and Interdisciplinarity. Harris’

differentiations serve to underscore faculty awareness of categorically different ways of understanding and applying Interdisciplinarity:

Multidisciplinarity means the use of assumptions and methods of discrete disciplines to analyze phenomenon. Interdisciplinarity means the use of holistic assumptions and methods to analyze phenomenon. The major philosophical difference between the two is that Multidisciplinarity derives from a worldview which assumes that the world is best understood by an ever proliferating stipulation of differences. By contrast, Interdisciplinarity derives from a worldview which assumes that the world is best understood by discovering what beneath the surface links the various expressions reality assumes. The former is similar to Newtonian physics in that phenomenon, including our consciousness, is thought to result from the mechanical parts comprising them. The latter is similar to quantum physics in that phenomenon, including our consciousness, is thought to result from numerous interactions, the measurement of which introduces yet another variable. Reality is thus a “statistical probability.” Put less prosaically, a quantum view (interdisciplinarity) of reality is like jazz (be-bop in particular) and a Newtonian view (Multidisciplinarity) is more like classical music. (Personal communication, 5/27/02)

Arditti, Hagens, Sheerin and Minnich also addressing interdisciplinary complexity by differentiating types of Interdisciplinarity wrote that a new design emerges from the development of interdisciplinary expertise:

And finally, *transdisciplinary* emerges as the term of choice when scholars realize that their work not only isn't just additive, or mutually challenging and enriching, but can genuinely engage on all levels across disciplines. This is the area in which new fields emerge, perhaps enroute to becoming disciplines themselves, but still working with the tensions among standing fields for now.

To “genuinely engage on all levels” across disciplines means, in the conduct of Interdisciplinary research, to engage in reflexive epistemological analysis for the purpose of constructing meaning and knowledge forms instrumentally applicable, being both tool and product, to and as the conduct of specific inquiry. And, as Minnich states below, to develop an interdisciplinary approach which involves “modes of knowing as such:”

In interdisciplinary/transdisciplinary scholarship, the focus is on relationships between and among constructs: the personal, the social, the political, the theoretical, and academic. There is an invitation to examine the tensions that arise from close encounters with arenas often considered hostile to or competing with one another. By raising awareness of these relationships and tensions, the richest kinds of scholarship ensue. For example, problematics that arise within a discipline's interpretative community can be fruitfully explored through the methods and critical history of the discipline; through relevant borrowings from other disciplines; and by a reflexive turn that takes one outside of both fields to a more philosophical perspective that concerns modes of knowing as such.

These views expressed the plasticity of Interdisciplinarity as a concept and as a research approach. David Bates, 1999 Union Graduate in Ethnomethodology, addressing the plastic nature of Interdisciplinarity in an institutional context as a cautionary tale, summarizes:

As a general matter, practices and procedures need not be prespecified and rules of application need not be set down in advance in order for practices and procedures to be noticed and described as actual activities occurring in the world and as actual activities evident in products such as PDE's. The foundational unspecifiability of interdisciplinary work blocks its prespecification and preregulation. This accords well with The Union Institute's self-claimed status as an experimenting institution, but it does not imply either that the institution must allow anything to pass as proper interdisciplinary work or that the institution cannot draw from experience in assessing learners' work. (Personal communication, 9/19/01)

*Summary*

Under the conditions of rethinking disciplinary boundaries the GC faculty maintained that Interdisciplinarity is learned through application, particularly in learning its integrative concepts, and through engaging in the active construction of intersecting knowledge structures.

It stands to reason that since the UGS/GC faculty did not conduct research into the interdisciplinary construct, and since, by and large, the 1987 faculty were the same faculty in 2002, continuity and level of articulation of views were to be expected. Faculty and learner views on Interdisciplinarity developed in a number of

conceptual directions but the constructivist concept of interdisciplinary work had remained consistent over time. The conceptual continuity strongly supported the validity and the reliability of the typological arrangement as a sorting and reference tool. Learners, of course, kept changing and bringing new ideas to the Union ‘laboratory’ leading to continuing experimentation in the ways Interdisciplinary study was attempted.

### AN EXAMINATION OF LEARNER RESEARCH WORK

Conceptualizing faculty views as a sorting template began the second phase of the research project. This project, with the research assistance of GC doctoral learner Juanita Netoff, chose to “cut into” into the phenomenon of Interdisciplinarity by examining the relationship, if any, between how faculty defined Interdisciplinarity and the work their Learners produced. Guiding questions in this examination were: “Were Learners allowed unlimited, tacit idiosyncratic turns at Interdisciplinarity, or did stable and general pedagogical effects, such as an emphasis on creativity, emerge as effects in the teaching/learning culture? What limits to Learner experimentation and exploration, if any, exist? If so, what do patterns of effects from these limits indicate about Interdisciplinary methods and research design?” These questions concerning relationships among data points guided the contextual examination of learners’ research programs during data collection and sorting procedures.

This project examined the interdisciplinary properties of the two major terminal documents produced by graduating learners. The sample consisted of 94 selected Project Demonstrating Excellence (PDE) dissertations paired with their companion Program

Summaries (PS). The pool of learner documents consisted of those reviewed by the Quality Assurance Committee (QAC) for the years 1999 and 2000, the 2001 PDE nominations for the Faculty Circle of Scholars Award, the 2001 nominations for the Sussman Award, and the fifty-six documents reviewed by the Ohio Board of Regents evaluators in July 2001. From these 94 document sets, 22 permissions to access documents were returned by graduates. Permission was requested by a common email with email and telephone follow-up for those with questions concerning the research project and/or the permission request. The 22 document sets were examined in Union Institute and University's Library at 440 E. McMillan, Cincinnati, Ohio, the administrative site of the Graduate College.

The research objectives were to unearth all specified references to Interdisciplinarity in the research sample, sort the references into categories and analyze the properties of each category. Research Assistant Juanita Netoff conducted data collection, coding and microanalysis under daily supervision of the 22 document sets. Data collection consisted of extracting the PDE title, Abstract, PS statement on Interdisciplinarity, PS statement on Social Relevance, PS statement on Personal Development, the PDE research question and the methodology from the PDE and PS. The 22 data sets consisting of all specified interdisciplinary references embedded in a Learner's PDE and PS were examined and coded (see appendix A for sorting protocol). Doctoral committee composition, member qualifications and nomination rationales were also reviewed.

An Interdisciplinary Design category code was assigned to each PDE from the six types presented in "A Hypothetical Typology of Interdisciplinary Design" in the project's proposal. After data collection, sorting and coding through microanalysis, thematic

development was used to form methodological categories linking the 22 document sets relative to their Interdisciplinary properties.

### A TYPOLOGY OF EXPERIMENTING DESIGNS

Since the faculty intentionally provided only guidelines, each learner was obligated to design and construct, with assumed core faculty guidance and oversight, an interdisciplinary statement emphasizing a unique integration of knowledge perspectives appropriate for her/his research program. As each category (type) accumulated properties distinguishable from other categories it was assigned a position on a continuum by degree of disciplinary order, that is, from less interdisciplinary complexity to more interdisciplinary complexity. Thus, type one (Multidisciplinarity) is more discipline-based than type 2 (Cross-Disciplinarity) which is more discipline-based than type 3 (Conceptual Interdisciplinarity) and so on. Attention was also paid to the emergence of properties not provided by the typology template. However, the category for anomalies contained insufficient data for conceptualization since all 22 data sets were able to be typed.

The design possibilities fall into six distinct variations or types of Interdisciplinary practice and design. The six types, now modified, are labeled 1. Multidisciplinary, 2. Cross-Disciplinarity, 3. Conceptual Interdisciplinarity, 4. Formative Interdisciplinarity, 5. Transdisciplinarity and 6. Radical Interdisciplinarity.

The following diagrams of each type indicate possible patterns in graphic form but these diagrams only represent a way of visually thinking about the types and are not presented as exact structures. The six types are described as follows:

*Findings: A Typology of Interdisciplinary Designs*

TYPE 1 Hypothetical Definition: Multidisciplinarity is characterized by an “interface between and among disciplines.” This concept can be diagrammed as individual relationships of the same order between the inquiry source (center) and various disciplines:

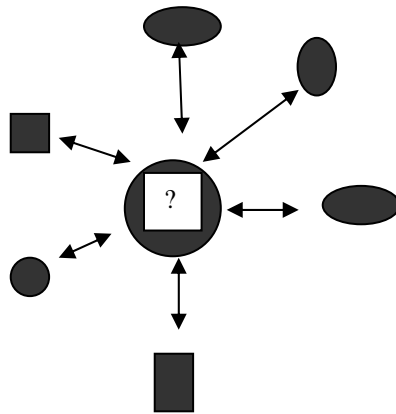


Figure 1. Multidisciplinary Design

Findings: 35% of the data sets were multidisciplinary in design. Typically the learner’s doctoral committee was multidisciplinary. Research problems constituted one reality with diverse understandings. Projects tended to enrich its home discipline. Assumptions, methods and paradigms employed were characteristic of the home discipline or some variation on these. Methodology was established by discipline, either quantitative or qualitative, or some combination for different purposes. Complexity and uncertainty were managed by acquiring undisputed knowledge with explanatory, predictive power in a clearly defined and bounded territory which is then defended rigorously.

TYPE 2 Hypothetical Definition: Cross-Disciplinarity is characterized more dynamically as interactive and as an “enriching experience of introducing another perspective to one’s previously chosen field (s) of study.” Cross-Disciplinarity can be diagrammed using a simple Venn design to indicate the influence of crossing two perspectives, in this case Biology and Ethics, to form a third perspective on the conduct of inquiry.

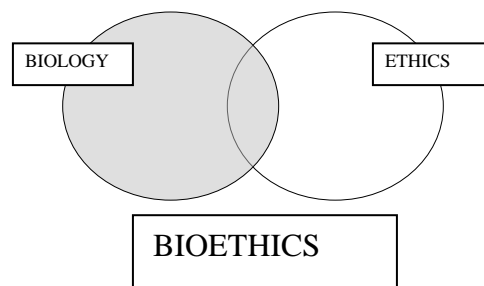


Figure 2. Cross-Disciplinary Design

Findings: 9% of data sets were Cross-Disciplinary. Methodology was established by disciplines, either quantitative or qualitative or some combination for different purposes. Research problem emerged from one or the other discipline but cannot be addressed comprehensively without both. Context is still largely academic in that problem solving reflects a combination of codes of practice characterizing one or both disciplines. The research project enriches discipline fusion. Dynamical relationship between the two disciplines, their assumptions, methodologies, theories and values reflect a blending of two

disciplines. Complexity and uncertainty are managed by acquiring knowledge with explanatory, predictive power in clearly defined and bounded territories which are then defended rigorously.

TYPE 3 Hypothetical Definition: The third type is Conceptual Interdisciplinarity characterized by “fruitful recombinations, multiple realities, and integrates ‘unscientific thinkers.’” The additional emphasis in this design is on construction of a metacognitive perspective organized as a complex adaptive system. Rather than realize its own frameworks, this meta-type relies on adapting by improvising meta-methods as new information is encountered.

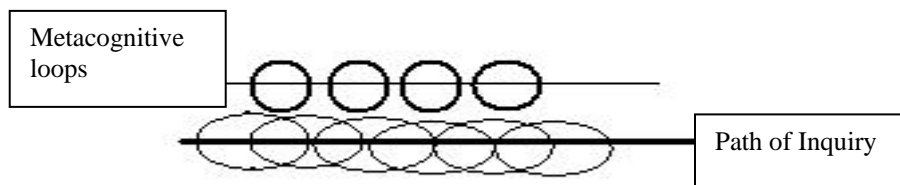


Figure 3. Conceptual Interdisciplinary Design

Findings: 13% of the data sets were of this type. Methodology was established by culture (e.g., feminist methodology) and tends to be qualitative and involve combinations for different purposes. The research problem emerges from any area of interest and is addressed partially in numerous disciplines but not satisfactorily in any or all. Construct tends to be mixed academic theory in a context of application. The research project enriches any discipline that considers it useful. Conceptualization reflects complex adaptive systems design and involves reconceptualization of assumptions, theories, rules, propositions, roles

and relations. Complexity and uncertainty are managed by acquiring knowledge with explanatory, predictive power contingent on scopes such as time, conditions, actors, cultures.

**TYPE 4 Hypothetical Definition:** The fourth type, Formative Interdisciplinarity, is characterized by “organic relations between disciplines with social and political implications, relationships and tensions” and by feedback and feed forward processes. This process provides guidance toward realizing its own utilization-focused frameworks by pragmatically selecting contextual feedback.

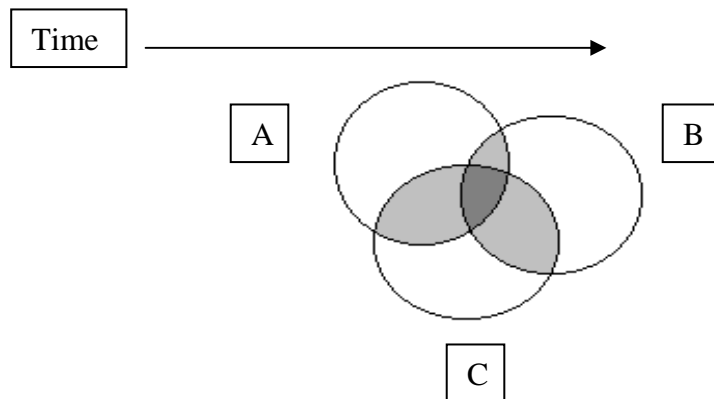


Figure 4. Formative Interdisciplinary Design

Findings: 22% of data sets are of this type. Methodology is established by culture or target blending space represented by the conterminous overlap of disciplines. Methods tended to be qualitative and usually involved combinations for different pragmatic purposes. The research problem emerged from a diversity of perspectives and is addressed partially in numerous disciplines but not satisfactorily in any or all and requires restructuring of culture

to properly solve. Conceptualization tends to remain largely in the context of academia with application in a context of application. The research enriches any discipline that considers it useful. Conceptualization reflects aspects of complex adaptive systems at local and global levels of conceptualization with intervention an option. Conceptualization involves reconceptualization of assumptions, theories, rules, propositions, roles, policies and practices. The design demonstrates dynamical systems thinking style linked to policy and practice and change. Complexity and uncertainty are managed by acquiring knowledge with explanatory, predictive power for situated actions.

TYPE 5 Hypothetical Definition: The fifth type, Transdisciplinarity constituted 13% of the data sets. Transdisciplinarity is characterized by transgressive action and “puzzles of translation tracing phenomenon through whatever fields and focusing on contextual meaning.” The “tracing phenomenon” aspect is diagrammed as a path of problem-based inquiry through various fields and interfaces in this extended design:

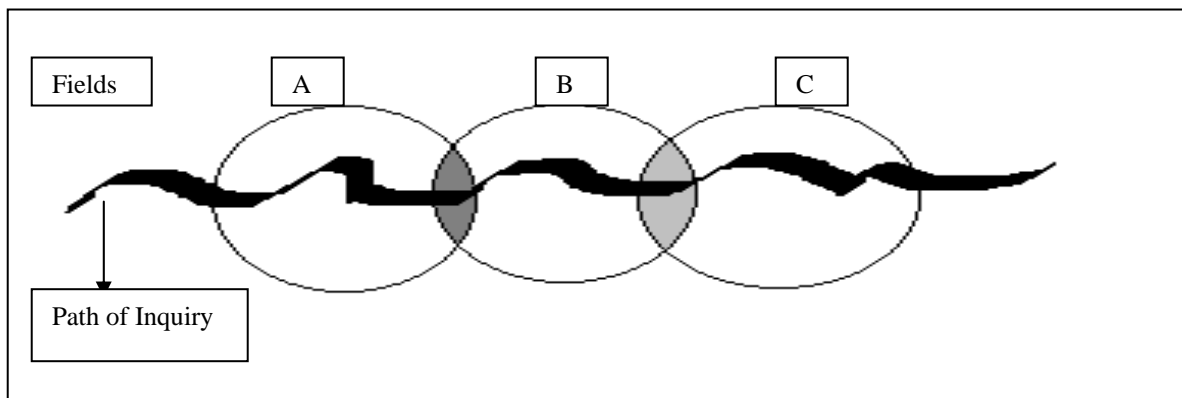


Figure 5. Transdisciplinary Design

Findings: 13% of data sets were of type 5 design. Complexity and uncertainty were managed by understanding complexity, accepting uncertainty as primary, preparing for novelty by developing flexibility and improvisational skills, expecting knowledge to be located anywhere and anytime in any form whenever minds get together to collaborate on an activity. Perspectives and frames are integrated in a blended space shared by many minds: a global dynamically evolving superposition of views and emergents via the activity.

Methodological issues are referred to as the global problematique. Science and Culture are part of the problem. Methodology is determined by activity/task and by all participants; improvisational and determined in context of application; quantitative or qualitative or some combination for different purposes. Problems emerge from wherever, are emergent and are addressed by an ad hoc team of experts from wherever (e.g., NGO's, business, garage, the internet); requires restructuring of minds and cultures to even temporarily resolve. Type 5 pushes the frontiers of knowledge and ontology and negotiates rules of practice.

Conceptualization reflects complex adaptive systems at local and global levels of process, product and intentionality with participation of those affected in initial contextualization of issue addressed. Its contexts of application are varied and spread widely across domains.

Assumptions, experts, and rules are part of target blending spaces. Methods are used in ad hoc approach. Responsibilities and rewards shared from the beginning with representatives of groups of individuals affected. Complexity and uncertainty are managed by accepting them and preparing for novelty by developing flexibility and improvisational skills, expecting knowledge to be located anywhere and anytime in any form whenever minds get together to collaborate on an activity.

TYPE 6 Hypothetical Definition: The sixth type of interdisciplinarity cited and discussed, Radical Interdisciplinarity, is characterized by “chaos, creativity; only partially defined by Interdisciplinarity; the truly radical function is going beyond, expanding inward and outward.” This version falls within The Dynamical Hypothesis which posits that all is motion and that appropriate methods and concepts are motion-designed; that is, dynamical, and that all order is contingent on behavior. Emphasis here is on philosophical and pragmatic improvisation and eurhythmy, “consistency, balance and effectiveness” (<http://www.interdisciplines.org/interdisciplinarity/papers/6>).

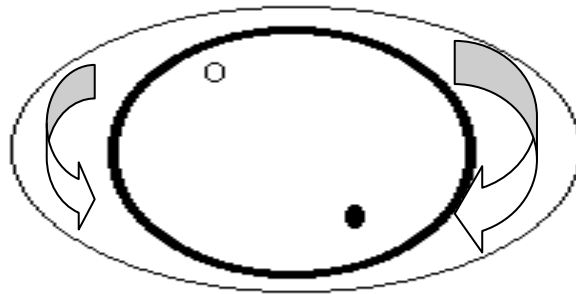


Figure 6. Radical Interdisciplinarity

Findings: This type represented 7% of the cases. Research demonstrates identification of personal identity with an evolving creative process. Automated aesthetic skills and bisociative abilities are demonstrated at the level of proficiency. Methodology is exploratory and improvisational. Foci include compressing what is defuse and achieving human scale. Incoherence and clashes are typically resolved by creating new conceptual environments, restructuring contexts, reframing and recoordination of concepts, actions, activities and actors. This type assumes multiple realities and incommensurate frames of reference.

*Summary*

Based on a continuum ranging from disciplinary conceptual and methodological boundedness to unboundedness and from ordered relations to increasing levels of ambiguity and complexity the interdisciplinary types were arranged by the degree those qualities were present and utilized in each type.

The six interdisciplinary design types proposed from examination of the original faculty discussions were refined by examining Learner programs. The resulting six types (Multidisciplinarity, Cross-Disciplinarity, Conceptual Interdisciplinarity, Formative Interdisciplinarity, Transdisciplinarity and Radical Interdisciplinarity) clearly indicated that the faculty's interdisciplinary conceptual approach was adopted as was evidenced by learner applications.

A basic evaluative question underlying such interdisciplinary methodological conditions is whether the methodology fits the interdisciplinary research design. In the absence of assessment criteria this study asks, does exploration include the development of an appropriate methodological design and research procedures for what is to be studied? For example, Learners engaged in Creative Arts research are more likely to select a more experimental Interdisciplinarity design with low boundary definitions as appropriate to her/his research focus, whereas a Learner in Organizational Science may select a highly delineated multidisciplinary design with explicit disciplinary perspectives as the most appropriate team approach to researching complex corporate problems. However the extensive use of mixed designs mitigated the development of high definition methodological components and operations.

The findings show that learner choice of Interdisciplinary designs fell into a normal bell curve distribution except that Multidisciplinary design (Type 1) spiked to 35% of the data sets. This anomaly can be examined as a learner choice of the less complex and concrete form of Interdisciplinary design but this view is complicated by not knowing the distribution and concentrations of fields among learner programs. The “team approach” which Multidisciplinary design strongly suggests is apparently more easily adopted than designs with less ordered and less explicit structures. Holding this anomaly aside the median choice (22%) is Type 4, which encompasses the complexity of “the conterminous overlap of disciplines” and the easing of conceptual boundaries. Learner freedom of personal choice and professional preference as navigational guides to creative thinking allowed wide-ranging design experimentation across the disciplines and among interdisciplinary types but this intellectual terrain did not include an explicit model of the Interdisciplinary conceptual blending process and the Transdisciplinary conceptual exploratory space (e.g., see Fauconnier and Turner 2002) to support the methodological freedom provided by the program. The freedom to pursue thought and passion simultaneously resulted in endemic experimentation by adult learners in most disciplinary directions, often attempting to go beyond pre-organized conceptual spaces to creative synthesis and amalgams of ideas and practices, theory and reality, as a matter of course rather than design.

## CONCLUSIONS

The thesis of this study is that Interdisciplinarity is an adaptive concept employing a number of combinatory design decisions during the research process. Faculty views were

consistent in their theoretical orientation with a Constructivist approach as Fosnot describes it:

Constructivism is a theory about knowledge and learning; it describes both what “knowing” is and how one “comes to know.” Based on work in psychology, philosophy, science, and biology, the theory describes knowledge not as truths to be transmitted or discovered, but as emergent, developmental, non-objective, viable constructed explanations by humans engaged in meaning-making in cultural and social communities of discourse. Learning from this perspective is viewed as a self-regulatory process of struggling with the conflict between existing personal models of the world and discrepant new insights, constructing new representations and models of reality as a human meaning-making venture with culturally developed tools and symbols, and further negotiating such meaning through cooperative social activity, discourse, and debate in communities of practice. (Fosnot, 2005, ix

Based on this individualized approach to constructivist, exploratory meaning-making in research, each learner research data set was unique and individualized yet patterns of interdisciplinary conceptualization across fields of study were clearly evident. Some learner data sets were clearly more conventional and others more innovative in fashioning methodologies. What was also clear from the 22 data sets was that while all programs employed mixed Interdisciplinary designs the graduate faculty had not examined or explicated, hence had not communicated, a coherent concept of interdisciplinary design integrity.

The data sets demonstrated mixed approaches to Interdisciplinary design theory in the outcomes of individualized doctoral programs. For example, one doctoral program

mixed designs by including a Multidisciplinary committee composition, a Cross-Disciplinary research focus and a Transdisciplinary framework of analysis. Lacking specific design analysis by the Learner, however, the components of the mixed designs did not necessarily interrelate and augment each other; that is, the interdisciplinary data did not demonstrate Learner knowledge or awareness of how Interdisciplinarity design structured and organized doctoral program epistemological and research processes. This does not mean that Learners did not understand and, or erroneously employed, interdisciplinary thinking and perspectives, only that these elements were often used in ad hoc manners and appeared not to optimize or reinforce the conceptual power of the Learner's work for want of a coherent conceptual and theoretical model.

In summary, doctoral Learner learning and research with Interdisciplinarity designs reflects faculty members' understandings of the experimental range and character of Interdisciplinary Studies. Although a tacit Constructivism underlay the pedagogical orientation of the GC this framework was not articulated or made explicit or otherwise specifically communicated to learners.

It remains unclear whether mixed designs are useful and necessary in examining complex problems, or whether mixed designs are awkward and ill-fitted composites of efforts to grasp complex phenomena. In other words, did the program lack rigor because faculty views were generally stated but not integrated into explicit doctoral designs and learning or because experimentation necessarily encompasses such work in extreme types of designs? Also remaining unclear is whether the faculty understood and had certain expectations of composite Interdisciplinary designs and their evolving applications in

guiding doctoral program planning and execution. Addressing this question would necessitate a series of interviews of faculty from a now defunct program.

Based on the doctoral program culture as represented in dissertations, the refined thesis proposes that Interdisciplinary research is an active multifaceted epistemic employing adaptive research methods for investigating complex phenomena. The continuum of interdisciplinary types begins with an emphasis on explicit structural designs with operational consistency and moves toward increasingly dynamical forms and reflexive methods.

Both Transdisciplinarity and Radical Interdisciplinarity as extreme dynamical and reflexive designs emphasize “going beyond” disciplinary boundaries in researching experience and other phenomena, but the emphasis on Transpersonalism as a behavioral epistemology in uncharted research spaces is central in Radical Interdisciplinarity but not in Transdisciplinarity. Transdisciplinarity, with consequences from employing transgressive methods, is highly epistemological in action whereas Radical Interdisciplinarity is more ontological in orientation.

The highest abstraction level of interdisciplinarity entails identifying, locating and formulating transitional, contingent and improvisational designs, as well as integrating real time conditions with conceptual spaces as fundamental experiences. This radical element in Interdisciplinary Studies - the reemergence of origins forming a different epistemological departure - stimulated GC faculty and learners to “rethink strong discipline-based scholarship.” In response they evolved a range of innovative Interdisciplinary practices, such as media integration, multiple perspective fusion, counterintuitive creativity, embodied knowledge and complex social learning instruction. These new practices were created in

response to intransigent social problems and/or emerging research areas, such as Transpersonal Anthropology and Creativity Studies. Faculty views on the “proliferation of terms” and their evolving distinctions supported Learner creative use of a range of interdisciplinary study and discouraged adoption of focused, single systems models.

This project, however, did not assess whether a reference to Interdisciplinarity was expertly conceptualized or used. It did not attempt to determine the writing quality of Learners’ work, or to examine the efficacy of Learner-Core professor relationships, or the effectiveness of doctoral committees, all of which have implications for future research. The focus of this research was the sorting of discrete data, the classification of aggregates and the organization of aggregate categories into a typology. This report supports only the definitions of the typology proposed as a tool for creating assessment criteria.

Contextual analysis of PDE requirements synthesized the interdisciplinary typology into an overarching set of outcomes with implications for future research. For example, it is clear that the Social Meaning component of a learner’s program introduces the motivation of “advocacy” and creativity and that these are linked to the risk profile represented in selected research and design problems. In other words, there appears to be a positive correlation between social advocacy and the willingness to experiment. One of the attendant and salient issues is whether valid and reliable methodological approaches can be developed with research rigor applicable to the various advocacy design types usually centered in some form of Social Action research.

The organization of this interdisciplinary typology can be construed as signifying a “stepping stones” model toward developing and using increasingly abstract and complex methods to exceed current conceptual and design boundaries. The “stepping stones”

configuration is consistent with Constructivism's "scaffolding" as a developmental process for learning higher order concepts. It seems clear that each ID type calls for clarity concerning the conceptual skills necessary for managing increasing complexity and inclusivity as one progresses from Type One as a starting point. The necessity to develop and integrate skills as navigational tools arises as a doctoral learner moves from one type to the next and from one level to the next, stepping stone style. While perhaps not necessary, given the requirements of a specific research problem, a stepping stones model provides a path for the development of epistemological skills for the higher order principles of theory construction, that is, it provides access to the necessary configuration between methods and design.

The typology also separates into two major conceptual levels of Interdisciplinary design. Concept Level One approaches, manages and utilizes ambiguity, creativity and reflexivity in different epistemological frames from those of Concept Level Two designs. Concept Level One includes the first three interdisciplinary types: Multidisciplinarity, Cross-Disciplinarity and Conceptual Interdisciplinarity, and Concept Level Two includes Formative Interdisciplinarity, Transdisciplinarity and Radical Interdisciplinarity. An epistemological difference between the two concept levels is that Concept Level One uses disciplinary structures as part of the design components while Concept Level Two begins to introduce transgressive procedures to break conceptual boundaries and to refashion and ultimately radicalize research methods and meaning. The emphasis on emergent and self-organizing processes is more central to Concept Level Two designs and less central to Concept Level One designs. In Concept Level Two the design elements of ambiguity, creativity and reflexivity become methodologically central as transpersonal navigational

coordinates for investigating complex phenomena. Increasingly researcher awareness behaviors become integrated with and inseparable from the research phenomenon studied.

It is clear that if learners are encouraged to engage Concept Level Two types, they cannot engage exploratory conceptual spaces without adequate preparation in the required epistemological and ontological concepts and attendant Constructivist skills. Further research is required to formulate rigorous interdisciplinary instruction and modes of preparation for such research creativity. To quote Union Graduate David Bates again, “This accords well with The Union Institute’s self-claimed status as an experimenting institution, but it does not imply either that the institution must allow anything to pass as proper interdisciplinary work or that the institution cannot draw from experience in assessing learners’ work.”

From the basic design of two disciplines in direct dialog interrogating a phenomenon (Cross-Interdisciplinarity) to experimental designs requiring paradigmatic shifts and an operative definition of consciousness in more than three dimensional realities (Radical Interdisciplinarity), rigor was found to be lacking by OBR evaluators while they acknowledged the creativity of the work produced by the program. This study arrives at the same general conclusions.

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## APPENDIX A

### DATA SORTING PROTOCOL

The sorting and classification process proceeded as follows: PDEs were initially classified by completeness of “degree of interdisciplinary design” using the following eight indicators developed by Birnbaum (1977, cited in Latucca, 2001, p. 13):

- A. Different bodies of knowledge are represented in the research group
- B. Group members use different problem-solving problems
- C. Members of the group perform different roles in solving problems,
- D. Members of the group work on a common problem
- E. The group is responsible for the final product
- F. The group shares common facilities
- G. The nature of the problem determines the selection of group members
- H. Members are influenced by how others perform their tasks

1. Identify PDE title, date of graduation

2. Scan Abstract, code for general idea of Learner Interdisciplinary purpose, process and results
3. Code Interdisciplinary statement in Program Summary
4. Rate ID statement on 1-8 point scale
5. Code social relevance statement in PS for themes, concepts, and nature of interdisciplinary links between academic and non-academic world
6. Code research focus for interdisciplinary themes and concepts and purpose
7. Code research question for research design, methodology and concepts
8. Code composition of committee for disciplines and kinds of disciplinary interaction
9. Classify preliminary design type on the basis of the above
10. Follow up by selective coding from PDE and PS in probable areas of richness or determinacy.