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Inside

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Landmark text focuses on 'doing' IDS

Repko's Interdisciplinary Research *will influence field*

Review of *Interdisciplinary Research: Process and Theory*. Allen F. Repko. Thousand Oaks, CA: Sage Publications, 2008. 395 pp. ISBN 978-1412959155 paperback; 978-14129-59148 hardcover. Subject and author indexes; references. $49.95 paper; $99.95 hardcover.

Reviewed by William H. Newell, Western College Program, Miami University.

Members of AIS are all aware of a few landmark books that have been published on interdisciplinary studies in the last few decades—C.E.R.I.'s *Interdisciplinarity: Problems of Teaching and Research in Universities,* published by the OECD in 1972, and Julie Thompson Klein's *Interdisciplinarity: History, Theory, and Practice,* published by Wayne State University Press in 1990, spring immediately to mind. Add Repko's *Interdisciplinary Research* to that select list.

Repko's focus is on research, on *doing* interdisciplinary studies, but he draws widely on the latest professional literatures on theory as well as practice, and integrates their diverse and sometimes conflicting insights into his own coherent understanding of interdisciplinarity. He practices what he preaches.

Not surprisingly, Repko draws from the full range of AIS-related publications, but he also draws from literatures on epistemology, disciplinarity, common ground theory from cognitive psychology, and other specializations with which many AIS members may be unfamiliar. And he doesn't hesitate to reach out to conceptions of interdisciplinarity that are at odds with those held by most AIS members. In short, he takes a highly inclusive approach to theory.

Precisely because he had not been a partisan participant in AIS-sponsored debates about the theory and practice of interdisciplinarity before starting work on the book, Repko brings a refreshing new perspective to key theoretical issues facing interdisciplinarians. His goal in writing the book was to provide a text for students such as his own who have purely instrumental interests in interdisciplinarity. They want to confront real-world complex problems, and they see interdisciplinarity as an effective approach to contemporary problem-solving and decision-making.

A valuable feature of the book is that it provides examples of interdisciplinary research in the humanities, social sciences, and natural sciences—some carried out by professionals, others by students—that are threaded through the entire second half of the book (Part III Drawing on Disciplines and Part IV Integrating Insights) where he focuses on individual steps in the interdisciplinary process. The threaded examples are supplemented in each chapter by examples from other fields or on other topics that illustrate the special challenges of that step in the interdisciplinary process.

The first half of the book addresses the definition and history of interdisciplinarity (Part I About Interdisciplinary Studies) and then Theories of Interdisciplinary Studies (Part II) focuses on operationalizing disciplinarity, defining the elements

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Interdisciplinary Research ...

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of disciplines, and explaining the importance of integration.

Repko's textbook is highly unusual in that it draws students into current theoretical debates in the professional literature. There are numerous quotes from AIS-related literature setting out one side or another on the various issues we grapple with as professionals. But Repko does not hesitate to take a stand on each issue, using the interests of students and the mission of the textbook as the arbiter. The result is a textbook that is accessible and pragmatic, yet it does not talk down to students.

Repko's approach to writing the textbook was highly collaborative. He shared drafts (in some cases multiple drafts of each chapter) with most of the members of the AIS Board of Directors, listening intently to detailed and often critical feedback and responding positively to all suggestions consistent with his overall approach.

What I find most exciting about this book is that it draws on the latest professional literature and integrates its insights into the full interdisciplinary process at precisely the time in the evolution of the profession when we are finally able to contribute to every step in the interdisciplinary process, including the integrative steps. Thus, we have at last an explication of interdisciplinarity that is both coherent and comprehensive.

I waited to write this review until I saw how Repko's book was received by faculty at two very different institutions. In early August, I served as a consultant to Laureate University, which is designing a four-year interdisciplinary studies undergraduate major, and the following week as a consultant to ASPECT, a new interdisciplinary doctoral theory-based program in the social sciences and humanities at Virginia Tech.

The response from the course design team at Laureate was overwhelming positive. They plan to organize their entire major around the book and its approach to interdisciplinary studies. Interdisciplinary studies is being treated as the flagship major in their undergraduate curriculum, and all students will be encouraged to take the introduction to interdisciplinary studies course (for which Repko's book will be a required text). Current plans are to assign a few chapters from it in the intro course, use his steps in the interdisciplinary process to organize all topical IDS courses, and then use the book as the primary text for the senior-level methodology course. The ASPECT doctoral program will be using Repko's book as the textbook for the required methodology course. Several chapters of Repko's book were assigned reading for the workshop I attended, and discussion of those chapters proved useful in getting faculty from three disciplinary departments and the interdisciplinary studies department to confront the differences in their conceptions of interdisciplinarity. Participants left the workshop with the realization that they need to work quickly to develop a program-wide definition of interdisciplinarity.

I expect that *Interdisciplinary Research* will provoke the kind of productive discussions in our profession that Klein's *Interdisciplinarity* did when it came out almost twenty years ago. Instead of continuing to discuss issues individually, Repko's coherent, integrated conception of interdisciplinarity as a whole will force us to examine the overall implications of our position on each issue. Since Repko offers a first cut on interdisciplinarity, I fully expect that his view (and subsequent editions of his book) will evolve as the profession vets it. But the very nature of the debate will change because of *Interdisciplinary Research*. For me, that's a pretty good test of a landmark book. ■■■

Groundbreaking collaboration

By Cynthia Pannucci
Founder/Director, Art & Science Collaborations, Inc. (ASCI);
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How can an artist's sensitive pastel drawings of Antarctic topography be useful in creating new nano-surfaces for micro-biological forms to grow? Let me introduce you to ASCI's current Featured Member Team, the unusual, on-going, collaboration of New Zealand artist, Claire Beynon, and New York-based polar research biologist, Sam Bowser.

Claire and Sam's collaborative art-science work begins with several field research trips to Antarctica, but fundamentally it is distinguished by a unique collaborative process in which each has embraced and been influenced by the other's work and process [in the field, laboratory, studio, and gallery settings]. Most artist-scientist collaborations that I have seen over the years involve the artist being inspired by the scientist's research and/or helping the scientist visualize his/her research. Rarely does it move in the other direction of influence!

Sam studies an ancient group of unicellular creatures called Foraminifera ("forams"), in an attempt to understand their role in the functioning of marine ecosystems.

In their novel art/science collaboration, Claire's artwork, inspired by research trips in Antarctica with Sam's team, is taken by Sam and miniaturized through nanolithographic methods and used as a template to produce a feature-rich growth substrate for forams to inhabit. Information on their motile behavior and structure is gathered using time-lapse video light microscopy and scanning electron microscopy, which in turn is applied to generate scientific hypotheses for more formal experimental tests.

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Transdisciplinarity and interdisciplinarity:
Companion volumes illumine terms' commonalities, differences

Review of *Principles for Designing Transdisciplinary Research.* Christian Pohl & Gertrude Hirsch Hadorn (Translated by Anne Zimmerman). Munich, Germany: Oekom Verlag, 124 pp. Paperback, 29.80 Euro. (ISBN: 13: 978-3-86581-046-5); and *Handbook of Transdisciplinary Research.* Gertrude Hirsch Hadorn, Holger Hoffmann-Riem, Susette Biber-Klemm, Walter Grossenbacher-Mansuy, Dominque Joye, Christian Pohl, Urs Wiesmann & Elisabeth Zemp (Eds.). Berlin, Germany: Springer, xix, 448 pp. Hardcover, $199. (ISBN: 978-1-4020-6698-6).

Reviewed by Ken Fuchsman, Assistant Extension Professor, Center for Continuing Studies, University of Connecticut, Storrs, Connecticut.

Transdisciplinarity and interdisciplinarity are like fraternal twins who were raised apart and then reunited in adulthood. They find how much they share in common and yet how different they are. Their modern birth is the Organization for Economic Cooperation and Development (OECD) seminar on interdisciplinarity in 1970. The first uses of the term transdisciplinarity were made there by Jean Piaget, Eric Jantsch, and Andre Lichnerowicz.

Over the years, interdisciplinarity has been the more popular twin. On Google in August 2008, there were 423,000 results for transdisciplinary and 19,200,000 for interdisciplinary. Despite their being raised in separate families, their paths have sometimes crossed over the years; and the realities of each raise important issues for the other.

While there are the normal divisions within interdisciplinary studies, transdisciplinary studies have developed multiple personalities, having strands that are barely related to each other. There are at least four distinct conceptions of transdisciplinarity, two of which go beyond the disciplines, a third is barely distinguishable from interdisciplinarity, and the fourth might be described as applied interdisciplinarity. The two books under review here fall under the fourth definition.

The first conception of transdisciplinarity seeks the interconnection of all knowledge. Transdisciplinarity, Piaget writes, would be "a higher stage succeeding the stage of interdisciplinary relationships." It would go beyond "interactions ... between specialized research projects" in order to "place these relationships within a total system without any firm boundaries between disciplines." Piaget maintains that at present the sciences are incomplete. Physics illuminates the inanimate, but there is not yet a sufficient body of knowledge about "the process of living" and "the process of thinking." These would be necessary to reach "full transdisciplinarity" (Piaget, 1972, pp. 138-139). For purposes of convenience, this first conception will be called systems transdisciplinarity.

A more recent variation of systems transdisciplinarity is contained in the 1994 Charter of Transdisciplinarity. The signers of the Charter see the "keystone of transdisciplinarity" in the "unification of the meanings that *traverse* and *lie beyond* different disciplines." Their aim is to "open all disciplines to that which they share and to that which lies beyond them" (Nicolescu, 2002, p. 149). While Piaget focuses on the sciences, the Charter of Transdisciplinarity contains a humanistic concern with the "increasingly impoverished inner identity" as well as with the "inequality between those who have and those who do not" (Nicolescu, 2002, p. 147). Somehow transdisciplinarity is supposed to help in dealing with these pressing human dilemmas.

The driving force behind the Charter of Transdisciplinarity, the Romanian physicist, Basarab Nicolescu, expanded his views in the *Manifesto of Transdisciplinarity*. He too sees transdisciplinarity as at the peak of the knowledge heap, and certainly higher than interdisciplinarity. Interdisciplinarity both overflows the disciplines yet remains "within the framework of disciplinary research" (Nicolescu, 2002, p. 43). Transdisciplinarity, on the other hand, "is at once between the disciplines, across the different disciplines, and beyond all discipline" (Nicolescu, 2002, p. 44). The goal of transdisciplinarity is the "understanding of the present world," which cannot be attained through discipline dependent interdisciplinarity (Nicolescu, 2002, p. 46). The methodology of transdisciplinarity, Nicolescu claims, is set by the various levels of reality, complexity, and something he calls the logic of the included middle. While these methods are not fully spelled out in the manifesto, the redemptive value of this variation of systems transdisciplinarity is stressed.

Not all transdisciplinarians embrace the grand visions of Nicolescu. Some are more modest. For a second conception of transdisciplinarity, Julie Thompson Klein delineates the distinction between transdisciplinarity and its interdisciplinary twin. She writes: "transdisciplinarity draws on interdisciplinary developments in the disciplines while taking boundary-crossing a step further" (Klein, 2001, p. 38). Examining problems in certain fields, Klein believes, raises moral and ontological questions that

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Transdisciplinarity ...

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are beyond disciplinary expertise. In transdisciplinarity, "knowledge production is related to 'unstructured' problems" (Klein, 2001, p. 40). There might be issues that are not within the domain of disciplines per se or cannot be adjudicated just by finding common ground between the disciplines.

Roderick Macdonald explains: "Interdisciplinarity exists between and among disciplines. Transdisciplinarity imposes a new discipline upon our thinking….transdisciplinarity is not the bridging of existing disciplines; it is their transcendence by a new epistemology" (Macdonald, 2000, p. 69). The transdisciplinary "integrating relationship," Gavan McDonell says, "is taken to the extent of there being a transcendent language, a metalanguage, in which the terms of all the particular disciplines are, or can be, expressed" (McDonell, 2000, p. 27). The rhetoric of this conception of transdisciplinarity is not translated into an actual theory of knowledge, methodology, or metalanguage. The new standards of knowledge and languages developed will not come from between or among the disciplines but in some transcendent locale. The adherents to this conception of transdisciplinarity though are not seeking a co-ordination of all knowledge, as do the systems transdisciplinarians. Again, for convenience, this second conception will be labeled transcendent transdisciplinarity.

While the first two conceptions of transdisciplinarity are removed from the interdisciplinary enterprise, a third bears a close resemblance to interdisciplinarity. Some uses of transdisciplinarity appear indistinguishable from the Klein and Newell consensus definition of interdisciplinarity as addressing a problem too complex to be solved by one discipline by integrating disciplinary insights into a more comprehensive perspective (Klein & Newell, 1996, p. 3). For example, Sheldon Krimsky lists several meanings of transdisciplinarity. These are: "the transcendence of disciplines for addressing meta-questions; the intersection of two or more disciplines for explicating problems; and the combination of methods/techniques/theory from several disciplines in the framing or testing of a hypothesis" (Krimsky, 2000, p. 111). Certainly, the second and third of these meanings could be described as interdisciplinary, and the first might even fall under that rubric.

Kirsten Hollaender and colleagues in the *Handbook*, one of the two books under review here, say that for "transdisciplinarity, in contrast to interdisciplinarity, …specific problems have to be resolved to achieve a cognitive integration that is more than merely an addition of different perspectives and partial problem solutions" (*Handbook*, p. 387). Many interdisciplinarians contend that they achieve real integration and do not just add perspectives together. Hollaender's characterization of transdisciplinarity could just as well be called interdisciplinarity. Here is where one twin is mistaken for the other. Crossing boundary lines is a mantra in interdisciplinary studies. In this third conception of transdisciplinarity, finding a boundary line between these versions of transdisciplinarity and interdisciplinarity is a challenge. This third use of the term will be called interdisciplinary transdisciplinarity.

In the *Handbook* there is a discussion on two senses of inter- and transdisciplinarity by Gertrude Hirsch Hadorn and colleagues. They write: understanding "specific problems," might entail "transgressing disciplinary boundaries and integrating different disciplinary perspectives…. Endeavors of this kind…are often termed 'interdisciplinarity.'" There are pressing real world issues that also call for crossing boundaries and integrating disciplinary perspectives. These too have been considered to be interdisciplinary (*Handbook*, 2008, p. 28). Hirsch Hadorn and associates then illustrate this by quoting the definition of interdisciplinarity given in the National Academy of Science 2005 report on *Facilitating Interdisciplinary Research*. This definition, which derives from Klein and Newell's, states that interdisciplinary studies "integrates information, data, techniques, tools, perspectives, concepts, and/or theories from two or more disciplines…to solve problems whose solutions are beyond the scope of a single discipline or area of research practice" (*Handbook*, p. 28). Focusing on the real life issues, Hirsch Hadorn and associates say various terms have been proposed for dealing with life-world demands and these include "interdisciplinary problem-solving," "goal oriented interdisciplinarity," or Module 1 or Module 2 interdisciplinarity. "It is, however, more useful," Hirsch Hadorn et al. write, "to use a different term, such as the term 'transdisciplinarity'" (*Handbook*, p. 28). While Hirsch Hadorn and collaborators may prefer the term transdisciplinarity for problem solving research; they recognize that others with the same goal call their efforts interdisciplinary.

Pohl and Hirsch Hadorn, in *Principles*—the other book under review here, also try to clarify the distinction between transdisciplinarity and interdisciplinarity. They write: "Even if interdisciplinary collaboration focuses on life-world problems, the organization and assessment of knowledge is primarily determined by scientific concerns. In transdisciplinary research, this role is played by the life-world problem and its solution oriented analysis" (*Principles*, p. 76). Those who favor using transdisciplinary rather than interdisciplinary here then rely on a distinction between investigations that are still primarily academic and those that seek solutions to life-world problems and use input and knowledge from outside academic specialties to realize their ends. Whether or not

this distinction stands up, it is this differentiation that is the basis for using the term transdisciplinarity in these circumstances. This last conception will be entitled real world transdisciplinarity.

The two books under review, *Principles for Designing Transdisciplinary Research* and *Handbook of Transdisciplinary Research*, explicate this last and most recent use of the term. These are companion volumes, as the first book on principles provides "the conceptual basis and structure for the Handbook" (*Handbook*, p. 6). In *Principles*, Christian Pohl and Gertrude Hirsch Hadorn define the "aim of transdisciplinary research" as helping to "solve societal problems and develop knowledge about how to fashion adequate solutions for specific problems" including sanitation, pollution, poverty, epidemiology. Research in these areas requires "constructive collaboration between different academic cultures, between research and 'life-world' perspectives, as well as between different institutions" (*Principles*, 2007, p. 13). To reach its goal of "practice-oriented problem solving," transdisciplinarity must "come to terms with the complexity of problems" and develop a "concrete process of integration" (*Principles*, pp. 20, 22). Real world transdisciplinarity employs the notions of complexity and integration that are quite familiar to interdisciplinarians.

Real world transdisciplinarity has little in common with what Piaget envisioned by the term; nor is there discussion of establishing a new metalanguage or epistemology. Given the goal of solving real world problems, the criteria for successful transdisciplinarity go in different directions than for other conceptions of the field.

While the *Principles* volume provides concepts, the *Handbook* is divided among nineteen case studies and analysis of issues arising from transdisciplinary research. The real world problems that transdisciplinarity addresses range in degree of complexity and magnitude. Certain issues such as pollution, global warming or poverty are of great magnitude and require major plans; other issues can be more local in scope and manageable in principle. With some important exceptions, the case studies in the *Handbook* are more local or national than international, and of lesser magnitude than say the spread of HIV or conflicts between nations. They tend to involve academics, governments, and non-governmental agencies rather than private enterprise. The case studies investigate such projects as integrating river basin management in a section of Kenya, sustainable mobility strategies in two German cities, grazing land management in France, the Swiss Constitution on human-animal biological mixtures, an international agreement on use of certain toxic chemicals, conceptual examination of global warming issues, impact of divorce on Swiss children, providing health services to nomadic pastoralists in Chad, and declining suburbs in Quebec, Canada. There are clearly wide ranges of real world problems tackled by this transdisciplinary approach. Keeping the projects empirically manageable is also a characteristic of this conception of transdisciplinarity. The natural and social sciences are more likely to be employed than the humanities. In keeping the projects empirically manageable, the level of complexity taken on in these investigations may not always match the level of complexity of many real world problems. This fourth version of transdisciplinarity as expressed in these two books works best when dealing with manageable problems that can be fully addressed through the empirical methodology of the natural and social sciences. As there are many real world problems that require cooperation among academic specialists, government officials, and stakeholders, this conception of transdisciplinarity serves pressing societal needs.

Can real world transdisciplinarity fulfill the goals that it establishes for itself? Because it seeks to solve complex real world problems, there are standards that this research needs to meet. These would include a determination that the problems and proposals are complex, the solutions are integrated, and once implemented they are measured and evaluated for effectiveness. Real-world problems are solved within the context of political give-and-take. For transdisciplinary solutions to be effective, they must take account of political, institutional, and group realities. Since the goal of transdisciplinary research is the solution of these problems, the research is not complete until the effectiveness of the solutions has been evaluated after being implemented.

What is striking about the *Handbook* is how many of the case studies focus mostly on the research process itself and cease before the proposed solutions have been implemented, yet alone measured afterwards. As many case studies are not followed through to actualization, they are not fully transdisciplinary. They are frequently stuck in the dynamics of how academics and representatives from outside academia can effectively interact to come up with processes and proposals, but not whether these recommendations can actually work. Once plans are put into practice, there might be unintended consequences and surprising results. As Funtowicz and Ravetz point out in the *Handbook*: "the military commander….knows that he must have a plan before going into battle. But he also knows that on contact with the enemy the plan is the first casualty" (*Handbook*, p. 362).

Follow-up research to measure the effectiveness of solutions must be an integral part of the transdisciplinary process. Often it is not, and so some transdisciplinary projects do not live up to their own standards.

Integration is another standard transdisciplinarians proclaim as part of their research agenda. In the case studies

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Transdisciplinarity ...

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in the *Handbook* some seek to integrate disciplinary insights and the input from the stakeholders, but in other instances there is not enough evidence presented to ascertain whether what is achieved is true integration or mere consensus. Christian Pohl and colleagues recognize that "integration in transdisciplinary research…is still poorly understood, making it harder to train researchers in integration and to evaluate its effectiveness" (*Handbook*, p. 421).

Transdisciplinarity could benefit from the integration process developed for interdisciplinary investigations by Klein and Newell, among others. In the *Handbook*, Elzinga discusses three phases of transdisciplinary projects: first there is "problem identification and structuring," then second is "probing aspects of a problem, concept and hypothesis formation, and analysis," third is "implementation, whence results…are integrated in a real world setting" (*Handbook*, p. 350). The second stage is where interdisciplinary methods can be utilized. The third phase of implementation in the real world would require a set of evaluative criteria that has barely been started among transdisciplinarians. The concept of integration is often used too loosely and honored in the breach.

Complexity is another standard within real word transdisciplinarity. But it is complexity within certain limits. Heidi Simoni and colleagues declare that transdisciplinary research utilizes "various scientific perspectives and methods in order to make the topics empirically manageable without sacrificing its complexity" (*Handbook*, p. 272). There are innumerable areas where complexity can be handled within what is empirically manageable; at other times the full complexity of an issue cannot be contained within what is scientifically manageable. For instance, take the case study in the *Handbook* about the impact of divorce on children. This research project is described as "scientific analyses of the amended Swiss divorce law" of 2000 to ascertain "its outcomes on children's well-being" and to encourage "familial allocation of duties and responsibilities in an appropriate manner" (*Handbook*, p. 259).

The project was overseen by both a jurist and a psychologist. The authors cite the rise in divorce rate in Switzerland from 13% in 1960 to 44% in 2004. They state that "children's welfare and parental divorce is still a highly explosive issue" (*Handbook*, p. 265). Their approach, though, is to remove themselves from some of the complex turmoil that can accompany family dissolution. Simoni, Perrig-Chiello and Buchler state that a "scientific perspective" enables them to "study the research object systematically, objectively" as empirical "research steps back to observe…events at a distance" (*Handbook*, p. 265). The concepts they employ reinforce the emotional distance of these investigators; divorce is seen as "transition in the familial life cycle" that leads to "the family reorganization process." The writers want to make sure that the "scientific perspectives and methods" utilized in this study are "empirically manageable." One of their goals is "the regulation of the child's interest in the course of divorce proceedings and in everyday life" (*Handbook*, p. 267, 270, 272, 268). To achieve these ends, a structured questionnaire was developed to be used for interviews in 2002 and 2003 to see how divorced families in three Swiss cantons "organize their everyday lives after divorce" and how the family members "feel in this situation" (*Handbook*, pp. 269-70). On one hand, the authors do not tell us the findings of the questionnaire, nor do they see it as part of their research to compare their results to other research findings on the consequences of divorce for children and families. The aura of distance is maintained, and there is barely a hint at the full complexity accompanying divorce. The consequences for children of divorce can be both short and long range, and interviews conducted for just two years cannot measure the impact divorce may have on children.

There has been a good deal of research on how divorce may disrupt family relationships. Not surprisingly children feel the impact of their parents' divorce. Wallerstein and colleagues report that "children from divorced and remarried families….experience more depression, have more learning difficulties, and suffer from more problems with peers than children from intact families" (Wallerstein et al., 2000, p. xxiii). Marital instability is often transmitted across generations. Paul Amato and Danelle DeBoer write that adult children of divorce have double the divorce rates of those whose parents remained married. The chance of divorce of adult children increases if there was a high level of discord between their mother and father prior to the dissolution of their parents' marriage (Amato & DeBoer, 2001). Simoni and colleagues may understand that the "disintegration of the bourgeois marriage and family" has "profound repercussions for family life," but their distanced outlook and their concern for having things manageable keeps them from reporting and understanding the deep and long lasting impact of divorce (*Handbook*, p. 260). The concepts they employ prevent them from getting to the core complexities involved in family disruption.

The real-world problems tackled in the *Handbook* usually omit those that involve too much emotional or political complexity. They are more involved with tackling problems that seem scientifically manageable. As such, there is little of the human-emotional dimension included in these discussions. Outside of some architects, there are few representatives from the humanities among the contributors to the *Handbook*. Real world transdisciplinarity reinforces the gap that separates the sciences from the humanities, and as such, is transdisciplinary and complex only up to a certain point.

Transdisciplinarity as presented in *Principles* and the *Handbook* has some issues to work out before it can live up to the standards and criteria it sets for itself. It needs to combine its emphasis on research and collaboration with implementation; it needs thorough standards of measurement and evaluation of that which has been implemented; it needs workable standards of integration; it needs to study the full complexity of the problems addressed; and it should find ways of incorporating approaches from the humanities where relevant into their scientific approach. There are real world problems whose dimensions and scope may not be scientifically manageable; transdisciplinarity needs to find ways of dealing with these issues.

As a whole, transdisciplinarity is not an integrated field. Systems transdisciplinarians will take a different path than most of those working to develop scientifically manageable solutions for real world problems. Given the disparities within transdisciplinarity, what can it offer to interdisciplinary studies and vice versa? Interdisciplinary studies, by and large, is not seeking to systematize knowledge or develop its own metalanguage. Some of the concerns faced by real world transdisciplinarity might also be pertinent to interdisciplinary projects involving real world issues. This would include participation in the interdisciplinary process by stakeholders. Part of the interdisciplinary process involves testing the integrated understanding. When the problem being addressed involves a real world solution, the testing of the interdisciplinary results will include evaluation after the recommendations have been implemented. Developing guidelines for this evaluation and measurement process could be a task for both interdisciplinarians and transdisciplinarians. Transdisciplinarity, as already mentioned, can learn from interdisciplinary studies about developing a thorough process of integration. As some transdisciplinarians make large claims such as developing a metalanguage, they can also learn from interdisciplinary studies about the need to develop processes and methods to realize these grand ideals.

Whatever the divergences, transdisciplinary and interdisciplinary studies both pursue integration, and are related in the belief that many issues are too complex to be handled by a single discipline. As extraordinary as disciplinary knowledge has been, is and will be, there are vital human concerns that require rigorous stretching of the intellect and imagination. This often entails the proverbial crossing of those odd shaped disciplinary boundaries. Transdisciplinarity and interdisciplinarity will remain familial allies in the uphill battle for moving beyond disciplinary limits, and in seeking solutions for complex intellectual and practical problems.

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Collaboration ...

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Claire then utilizes these scientific images as prompts for new artwork.

To their knowledge, this work is the first to explore ways in which Antarctic microorganisms are influenced by topographic features similar in scale to that of their native environments. By cycling information through artistic, scientific, and microbial processes in a way that is analogous to how energy and resources flow through Antarctic ecosystems, they believe their collaborative process presents a new creative paradigm that will be widely applicable to other life science disciplines.

The Art & Science Collaborations, Inc. (ASCI), is a 20-year-old nonprofit organization based in New York serving the international art-sci-tech field. To access ASCI's Featured Member Page, go to http://www.asci.org/artikel978.html. Contact information and individual websites for both Claire and Sam are linked at the bottom of *ASCI's Featured Member page*.

ASCI is the organizer of "Digital'08: Imagination on Behalf of Our Planet," the 10th International Digital Print Open Competition/Exhibition. The exhibition will be October 4, 2008, to January 25, 2009, at the New York Hall of Science. The entry deadline was August 10, 2008. ■■■

Still time to register for 2008 AIS conference

Members of the Association for Integrative Studies will celebrate the organization's 30th anniversary during the annual conference hosted by the University of Illinois at Springfield October 23-26, 2008. The theme will be "Interdisciplinarity and the Engaged Citizen: Integrating Higher Education, Public Policy, and Global Action."

More than 80 presentations are planned, running a gamut of subjects on interdisciplinarity, civic engagement, global perspectives, technology, and others. A small sampling includes:

- "Active Learning and Engaged Citizenship, (Re)Examining the Roots of Disciplinary Knowledge" (panel discussion)
- "Interdisciplinary Teaching and Learning Perspectives from the Netherlands and Australia"
- "Digital Partnerships for Engaged Learning," with Julie Thompson Klein as presenter

Ray Miller, past president of AIS and the editor of the premier 1982 edition of *Issues in Integrative Studies*, will be the keynote speaker on Friday, presenting "Comments on Interdisciplinarity, Higher Education and Public Policy on the 30th Anniversary of AIS." He is professor emeritus of San Francisco State University and the author of *International Political Economy: Contrasting World Views* (Routledge).

Allen Repko, author of *Interdisciplinary Research : Process and Theory,* is scheduled for a book discussion and signing Thursday evening.

Attendees may also sign up for workshops on the "Experiential and Service-Learning Institute," the "Center for State Policy and Leadership," and "The Nuts and Bolts of IDS Development and Assessment" for an extra charge of $25 each.

The Abraham Lincoln Hotel and Conference Center sits in the heart of the state capitol, near the Abraham Lincoln Presidential Library Museum and other historic sites associated with Lincoln, as well as the Dana Thomas House designed by Frank Lloyd Wright. In addition, there are restaurants, theaters, shopping and other attractions.

October 1, 2008, is the deadline for early registration. The early registration fee is $250 for members and $300 for non-members. After October 1, the rates go up $50. There are also reduced fees for students and retirees ($150). Consider the discount AIS rates at the President Abraham Lincoln Hotel and Conference Center, and it all adds up to a bargain price for a great opportunity to network with colleagues and explore some of the more compelling issues facing higher education and interdisciplinary studies programs today.

So don't miss out; register today. You can easily access the conference's website from the AIS website's homepage, www.muohio.edu/aisorg. ■■■

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