

# The Scholarship of Transdisciplinary Action Research

## Toward a New Paradigm for the Planning and Design Professions

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**ABSTRACT** This article draws on recent literature to articulate the challenge of framing research and practice in landscape architecture and planning in the face of the complexities and multiplicity of scales that characterize sustainability. It posits a framework for a scholarship of transdisciplinary action research (TDAR) as an emerging paradigm that propels landscape architectural and planning research into those complexities and scales. This framework informs a meta-analysis of the eight plural design case studies composing the bulk of this special issue. The conclusions posit a unified research paradigm responding to the complexities and multiplicity of scales of sustainability.

**KEY WORDS** Transdisciplinary, action research, meta-analysis, research methods

### INTRODUCTION

Over the last several years *Landscape Journal* has featured a series of articles describing the challenges to scholarly discourse faced by a discipline whose focus of study is a social construct delineated in physical and temporal reality on a case-by-case basis.<sup>1</sup> Those articles contribute to a body of literature attesting to the need for systematic methods of inquiry capable of gleaning insights that transcend discrete cases to advance the growth of knowledge in the planning and design professions. In the meantime, the social, economic, and ecological complexities and the multiplicity of scales inherent in the broad goals of sustainability pose new challenges across all disciplinary and geographic boundaries. This special issue of *Landscape Journal* explores the contributions of recent approaches to transdisciplinary action research (TDAR) for their potential to inform the development of a unified research paradigm responding to the complexities and multiplicity of scales inherent in sustainability.

### IN PURSUIT OF SUSTAINABILITY: FROM PLURAL DESIGN TO TRANSDISCIPLINARY ACTION RESEARCH

Recognizing that the planning and design professions collectively apply a wide range of approaches to the complexities and multiplicity of scales of sustainability and hoping to help the profession “think systematically

about that practice,” Crewe and Forsyth (2003, 49) identify six theories of practice, each with distinguishing intellectual and ethical underpinnings. Brown and Jennings (2003) respond by calling for the development of a collective consciousness informed by both the ecocentric and anthropocentric values of the profession.

Recognizing the relatively coherent underpinnings of the ecocentric approaches, Brown and Jennings turn to critical social theory to construct an equally coherent framework addressing the theoretical and methodological blind spots to the anthropocentric values revealed in Crewe and Forsyth (2003). Significantly, both articles recognize the intersection of ecocentric and anthropocentric values in one of the six theories of practice identified in Crewe and Forsyth’s typology—the plural/participatory design approach.

### Plural Design and Environmental Justice

Crewe and Forsyth describe plural design as the “landscape architectural equivalent of the advocacy and progressive planning traditions” empowering residents through processes that increase their capacity to participate in decision making (2003, 46). Randy Hester corroborates this assessment when he aligns the emergence of “participatory design” with the rise of advocacy partnerships with civil rights leaders rebelling against urban renewal policies in the 1960s and the adoption of the National Environmental Protection Act of 1970, which conferred legal standing to public participation in policies affecting natural resources (Hester 1999, 2).

The terms *participatory design*, *plural design*, and *community design* are frequently used interchangeably. However, practitioners often use the term *plural design* to problematize approaches to the design of public spaces using participatory methods (for example, facilitated group processes employing visuals and manipulable scale models to engage nondesigners in the design process) that do not necessarily address issues of civil rights and environmental justice (Hester 1999; Hou, Francis, and Brightbill 2005; Rios 2005). Crewe and Forsyth recognize the founding precepts of sustainability

(inter- and intra-generational equity in access to environmental resources [Weiss 1990]) when they suggest the intention of plural design is to address “issues of inequality by dealing with immediate needs” (2003, 38).

### Plural Design and Sustainability

A binding international agreement, *Agenda 21: Earth's Action Plan*, inextricably links plural design and sustainability (Robinson 1992). In its list of activities for local initiatives, the plan notes: “Through consultation and consensus building, local authorities would learn from citizens and from local, civic, community, business, and industrial organizations and acquire the information needed for formulating the best strategies” (519). The President’s Council on Sustainable Development (PCSD) recommends implementation of local “visioning processes” in which residents become “proactive change agents” in the development and implementation of plans for sustainable development addressing their “unique local economic, environmental, social, or technological demands” (Espanosa and Perrault 1997, 61).

The tie to landscape planning and design is evident when Hester, “the most active spokesperson for plural design over the last three decades” (Crewe and Forsyth 2003, 47), notes: “Of all our institutions, local participation is best situated to help reform unsustainable behavior because it represents the local part of thinking globally and acting locally” (Hester 1999, 22). Further examining the link between plural design and sustainability, Thering and Doble (2000) explore connections between the environmental and social justice movements in the late 20th century and the emergence of participatory processes in community decision making. Thering and Doble include a working definition for the hotly debated term *sustainability* that merges ecocentric and anthropocentric values. Their definition frames the term as an emerging paradigm for education and research. Recalling *Agenda 21* and the PCSD report, Thering and Doble suggest that plural design projects enable the attainment of the highest ideals of

sustainability and, concurrently, the highest ideals of the profession, by enhancing environmental awareness, design literacy, and the capacity for participatory community decision making (2000, 198).

### The Dilemma of Plural Design

As research continues to reveal the complexities and multiplicity of scales inherent in sustainability, the limitations of plural design are increasingly evident. The processes of plural design seem unable to accommodate these complexities in all but small-scale projects (Brown and Jennings 2003; Crewe and Forsyth 2003). Crewe and Forsyth’s analysis reveals and Brown and Jennings explicitly state: “the cumulative lessons of these discrete projects have not yet coalesced into a coherent dialogue” (2003, 111).

Herein lies the core dilemma of plural design: when the scale of a project renders plural design approaches impractical, the theoretical underpinnings default to ecocentric values or perhaps split into separate conceptual frameworks with no methodology to inform integrative processes or analyses among ecocentric and anthropocentric values (Brown and Jennings 2003). In an effort to resolve the dilemma of plural design, this special issue, *The Scholarship of Transdisciplinary Action Research: Toward a New Paradigm for the Planning and Design Profession*, presents eight case studies by academic practitioners of plural design working across the complexities and multiplicity of scales of sustainability. The central idea of this issue is that the dilemma of plural design is pregnant with its own solution and this solution may emerge through examination of the collective insights of its leading practitioners.

Deming and Palmer articulate the dilemma inherent in the writing and publication of plural design projects, asking what to do with “one off” case studies that do not fare well in peer review because they fail to “validly and reliably identify general themes through systematic inquiry across a series of similarly prepared cases” (Deming and Palmer 2005, iv–v). Deming and Palmer offered a theme issue of *Landscape*

*Journal* (2005) as an “imperfect truce,” gambling that “the whole is greater than the sum of its parts.” Though they acknowledge that the compendium lacks “forceful overarching argument or general principles,” Deming and Palmer use the opportunity to ask their readers to look for cogent principles and synthesize the broader patterns. Thus, the critique of plural design comes from two quarters: the imperatives of sustainability and the rigors of scholarship. These critiques and admonitions articulate a resounding challenge to academic practitioners of plural design that can no longer be ignored. In operational terms, the challenge is to “get meta” in both thinking and writing across design experiences while staying grounded in the founding principles of plural design and sustainability (Thering 2007).

**The Stay Grounded challenge.** Three facets characterize the Stay Grounded challenge:

1. The *principles* facet asks that as the complexities and scales of projects increase, academic practitioners iteratively check their decisions about process, protocols, tools, and methods against the ethics, codes, and principles at the core of the landscape planning, the design disciplines, and the imperatives of sustainability. Hester (1999) leads this challenge when he lambastes the parochial abuses of participatory design and articulates a strategy for “non-local balance to local control” intended to forward the long term goals of environmental justice and ecological sustainability at the scale of a bioregion (1999, 25).
2. The *people* facet recognizes that sustaining trusting relationships is essential to the long-term success of plural design projects. It also recognizes, however, that as the scales of practice increase in response to the imperatives of sustainability, the partnerships increasingly include state and federal agencies and national nonprofit organizations. Doble and King (2011) echo this challenge when reflecting on the conflicting priorities of professionals, academics, agency staff, and community groups in a statewide initiative.

3. The *place* facet recognizes that appropriate responses to the confluence of history, culture, politics, geographic location, and bioregional characteristics making each place unique frame the long-term goals of plural design and sustainability. Inherent in the multiplicity of scales of sustainability is the challenge of recognizing and preserving the unique aspects of small-scale places embedded in large-scale projects. Carlson, Koepke, and Hanson (2011) illustrate the challenges of facilitating a place-based initiative in a vast region delineated by the ecological and economic repercussions of iron-ore mining.

**The Get Meta challenge.** Three facets characterize the Get Meta challenge:

1. The *geographic* facet asks plural design practitioners to contribute their hard-won knowledge about the processes, tools, and protocols most effective in local scale projects to the development and implementation of regional, state, and global sustainability initiatives. Chanse (2011) discusses the organizational development challenges inherent in coordinating a large-scale participatory watershed stewardship program composed of multiple local watershed volunteer groups
2. The *cognitive* facet recognizes that the subtleties and complexities of the iterative and reflective processes involved in the development, testing, and evaluation of plural design tools, processes, and protocols often require use of autonomous as well as nonautonomous design decision making heuristics (Stanovich et al. 2008). *Autonomous* heuristics are cognitive decision making processes indicative of implicit mastery of one’s profession in that decisions often occur almost by reflex and do not require much conscious attention. Practitioners use *nonautonomous* heuristics when they encounter a new situation requiring conscious attention and inquiry to produce an appropriate response (Stanovich et al. 2008). Nonautonomous heuristics have the capacity to override autonomous

heuristics in serial processing acts of hypothetical reasoning during which the reasoner tests out actions and explores alternative causes (255). Master practitioners using autonomous and nonautonomous heuristics become reflective practitioners when they “question the definition of [their] task, the theories-in-action that [they bring] to it, and the measures of performance by which [they are] controlled” (Schon 1983, 337). Heuristic case practices integrate autonomous and nonautonomous design practices into a double looped model wherein one set of heuristics is embedded within and informs another (Poulter 2003).

Reflection on the use of these heuristics is a form of *meta-cognition* (Schraw and Dennison 1994, 460) helping practitioners articulate how, when, and why to use various strategies as well as how to debug and evaluate their effectiveness. The *cognitive* facet of the Get Meta challenge asks practitioners of plural design to become so acutely aware of their decision making heuristics that they can describe them in scholarly terms that transcend disciplinary boundaries (for example, deductive and inductive reasoning, theory testing, assumptions about relationships between process and outcomes, heuristics, evaluation criteria, and protocols)

3. The *analytical* facet recognizes the subtleties and complexities of the iterative and reflective processes facilitating comparisons of multiple plural design projects and informing the development of appropriate tools and processes. These relatively informal multiple-case comparisons often are similar in both methods and intentions to more formal processes of meta-analysis inasmuch as they seek to inform theory, explore phenomena, increase validity of findings, and improve practice and policy (Bondas and Hall 2007; Paterson et al. 2001; Walsh and Downe 2005; Zimmer 2006). As noted above, it is through the capacity of design and planning practitioners to think integrally across their experiences that they become reflective practitioners (Schon 1983).

## **The Investigative Powers of Qualitative Meta-Analysis<sup>2</sup>**

The literature regarding qualitative meta-analysis is of particular relevance to the intention of this special issue in two distinct regards. Among the goals of researchers experimenting with methods of qualitative meta-analysis is making “sense of a large body of research that appears to have no apparent framework and that has remained largely unexamined by others” (Paterson et al. 2001, 24). The results of qualitative meta-analysis also inform the development of frameworks for comparison and contrast across multiple case studies, which makes qualitative findings more accessible for interpretation and more valid in application to practice and public policy (Paterson et al. 2001, 14). The former precisely describes the intentions of this special issue, while the latter precisely describes the nature of scholarship required to meet the multifaceted Get Meta/Stay Grounded challenge of scholarship and sustainability.

The issues of scope and the criteria for inclusion are key aspects and topics of debate in designing qualitative meta-analysis of multiple case studies. The research question, purpose, or aim determines an appropriate framework for developing criteria for the inclusion and analysis of multiple cases (Bondas and Hall 2007; Walsh and Downe 2005; Zimmer 2006). Fortunately, a recent transdisciplinary action research approach to public health recognizing geographic, analytic, and organizational complexities offers some direction for developing criteria for inclusion and a framework for qualitative meta-analysis of multiple case studies that responds to the intentions of this special issue.

## **THE CYCLE OF TRANSDISCIPLINARY ACTION RESEARCH**

### **Defining Transdisciplinary Action Research**

Stokols (2006) paints a vivid picture of transdisciplinary action research (TDAR). By gathering the expertise and value systems of multiple disciplines and stakeholder groups as well as the expert and local knowledge

cultures that are committed to a process of facilitating “the social construction of knowledge,” TDAR seeks to integrate multiple world views with the intent of constructing new understandings of and insights into particular problems in the time and space in which they exist (2006, 67).<sup>3</sup> In contrast to multidisciplinary and interdisciplinary action research approaches in which researchers work from the perspective of their respective disciplinary models and methods (Rosenfield 1992, cited in Stokols 2006, 67), Stokols defines *transdisciplinarity* as the process of developing a shared conceptual framework that addresses a common research topic in a way that synthesizes and expands upon the concepts, methods, and approaches of these differing disciplines (Stokols 2006, 67).

### **The Scholarship of Transdisciplinary Action Research**

Stokols distinguishes between transdisciplinary action research and the *science* of transdisciplinary action research (2006). The conduct of transdisciplinary action research requires coordination among different types and scales of collaboration among multiple individuals, groups, or institutions to advance programmatic outcomes. The *science* of transdisciplinary action research seeks to better understand the elements that both facilitate and impede effective transdisciplinary collaboration across nested scales, such that future initiatives may be organized to more effectively achieve their community problem solving goals (65). It also requires the systematic study of the connections among those types and scales of collaboration and their higher order outcomes.

The Get Meta/Stay Grounded challenge of scholarship and sustainability is echoed by Stokols (2006) in his explanation that higher-order outcomes link the insights gleaned from local-scale projects and translate these insights into public policies and programs at regional, state, national, and or global scales. He calls for new research methods and processes that forward the science of transdisciplinary action research (65). This explanation is particularly relevant to the stated

intentions of this special issue of *Landscape Journal* as these cross-scalar collaborations comprise the interrelated facets and sequential phases of a unified transdisciplinary action research cycle.

### **Substantive Theory and Procedural Theory**

Lang’s (1987) differentiation of procedural theory from substantive theory further illustrates the nuances of Stokols’s ideas. Substantive theory informs investigations as to the nature of the environment, human responses to the environment, and the nature of human behavior in the environment (that is, aspects relative to people and place), while procedural theory informs investigations as to the nature of praxis (that is, aspects relative to the nuances of design practice).

TDAR initiatives engage and directly affect a finite group of people in a specific place (leading to the development of substantive theory). The *science* of TDAR investigates the similarities, differences, and outcomes of discrete research initiatives with the intention of developing innovative ways to address the complexities and multiplicity of scales of sustainability (leading to the development of a theory of praxis).

The science of transdisciplinary action research is Stokols’s framework for constructing new understandings and new knowledge to inform innovative approaches to transdisciplinary action research in the social and health sciences. Given the multiple epistemologies used in research on landscape architectural and other planning and design issues, the term *scholarship* of transdisciplinary action research is perhaps a more appropriate characterization of research in the planning and design disciplines.

### **A Framework for Scholarship**

For the science of transdisciplinary action research, Stokols (2006) posits three axes:

1. *Geographical* scale (local, community, regional, and national/global)
2. *Analytical* scope (biological, psychological, social/environmental, and community/policy)
3. *Organizational* scope (intraorganizational, interorganizational, and intersectoral)<sup>4</sup>

Partnerships, community coalitions, and scientific collaborations are comparable based on their positions along the three axes (Stokols 2006, 66). As one moves from site to neighborhood, to city/region, to state/nation on the geographic scale, projects become more complex. The analytical axis illustrates the increasing magnitude of difficulty when bridging disciplines and branches of academia. The organizational axis illustrates the increasing management demands of integrating organizational and bureaucratic protocols (Stokols 2006, 66).

#### **APPLICATION OF THE SCHOLARSHIP OF TRANSDISCIPLINARY ACTION RESEARCH TO LANDSCAPE ARCHITECTURE AND PLANNING A Framework and Criteria for Meta-Analysis**

As stated previously, the central idea of this special issue is that the dilemma that plural design is pregnant with its own solution and that this solution may emerge by examining the collective insights of its leading practitioners. Stokols's (2006) three dimensions of a science of transdisciplinary action research informed the selection of the eight case studies included in this compendium. Each of the selected cases fits the geographic dimension of the selection criteria by transcending "one off" case studies of local initiatives to address regional or statewide issues relevant to sustainability. Each fits the analytical dimension of the selection criteria by engaging local and expert knowledge as well as by examining insights offered by the natural sciences, social sciences, design, and public policy. Each case also fits the organizational dimension of the selection criteria by engaging and

effecting decision-making and communication processes between and among communities, organizations, and sectors.

#### **An Overview of the Case Studies in this Special Issue**

Each academic practitioner contributing to this special issue reports on the confluence of history, culture, politics, geographic location, and bioregional characteristics making each place and project unique. They reflect on how their projects unfolded as the formation of transdisciplinary collaborations and shifting understandings of the complexities iteratively affected the adaptation of processes, tools, and methods. As such, each case study is a concrete example of the social construction of knowledge.

The editors and guest editors of this special issue of *Landscape Journal* present this compendium as a reference for a growing community of scholars advancing the scholarship of transdisciplinary action research in the planning and design professions. Each reader will approach this reference with a unique set of skills and scholarly intentions. These case studies are presented in three broad categories for ease of reference. Each category responds to a facet of the "Get Meta" challenge:

*Category 1* case study authors reflect on the lessons learned from long careers of planning, facilitating, and evaluating complex participatory and collaborative design projects. These case studies embody Schon's (1983) ideal of reflective practice. The academic practitioner authors reflect on and share the hard-won, field tested lessons learned from projects of great complexity carried out across changing groups of stakeholders, across multiple scales, and over extended periods of time. Carlson, Koepke, and Hanson (2011) report on a partnership focused on contemporary iron ore mining in northern Minnesota as a basis for reknitting both local and regional economies and ecologies. Doble and King (2011) report on creating a statewide partnership to address issues unique to remediation and redevelopment of small city waterfronts in New York State. McNally (2011) reflects on two decades of coordinating

regional urban open space initiatives in the greater Los Angeles area.

*Category 2* case study authors focus on analyses of transdisciplinary processes used in particular projects, and how these processes informed the generation of new knowledge and advanced the project. These case studies demonstrate how academic practitioners advance the growth of knowledge in TDAR by bringing the traditions of plural design to bear on specific societal issues that transcend scales and disciplinary boundaries. Bowns (2011) analyzes the processes and results of a three-year partnership focused on comprehensive planning along the Middle Susquehanna River in Pennsylvania and discusses the implications for practice and policy across scales. Rios (2011) develops and tests a framework for analyzing transdisciplinary action research informed by social ecology in the context of an obesity prevention initiative in Pennsylvania. Chanse (2011) analyzes approaches to organizing and managing multiple small-scale volunteer groups in a regional watershed stewardship initiative in Contra Costa County, California.

*Category 3* case studies focus explicitly on developing and testing methods, theories, and evaluation protocols to forward a scholarship of TDAR in the planning and design professions. Schroth et al. (2011) develop and test evaluation protocols to assess the role of interactive visualization tools in providing place-responsive collaborative solutions to a large-scale landscape management initiative in a biosphere reserve in Switzerland. Thering (2011) describes how a grounded theory approach informed by periodic retreats to social science literature informed the development of a methodology for documenting and evaluating the intangible outcomes of transdisciplinary partnerships.

### **Modeling Meta-Analysis of Multiple Case Studies**

Lang's (1987) differentiation between substantive theory and procedural theory operationalizes Stokols's (2006) differentiation between transdisciplinary action research and the scholarship of transdisciplinary action research in terms that are useful to the planning

and design professions. This differentiation helps make sense "of a large body of research that appears to have no apparent framework" (Paterson et al. 2001, 24). Thus, phase 1 of the meta-analysis here began with scanning for the similarities and differences among the case studies. This analysis revealed seven dimensions of particular relevance to the development of substantive theory (impacting people and place).

Phase 2 of the meta-analysis responded to the "Get Meta" challenge. Drawing on the literature of cognitive development, education theory, and psychology to frame the initial readings of the case studies, the authors noted a distinct similarity in the case studies by Carlson, Koepke, and Hanson (2011) and McNally (2011). These authors report on reflective processes that include informal meta-analyses of the similarities and differences among plural design projects (that is, the analytical facet of the Get Meta challenge). Their reflections generate a framework for action that guides intentional processes of action, reflection, and evaluation; they describe that process in terms of testing (cognitive facet). In both cases, the framework for action addresses both ecocentric and anthropocentric issues across multiple scales (geographic facet).

With this simple cross-case comparison as a model, the authors searched the other case studies for similar language and similar concepts. Drawing on literature of cognitive development, education theory, the philosophy of science, and psychology, phase 2 revealed a taxonomy of heuristics. This taxonomy reflects the cognitive facet of the Get Meta challenge and reveals a set of meta-strategies responding to the analytical facet of the Get Meta challenge.

### **Phase 1 Meta-Analysis: Identifying the Dimensions of Transdisciplinary Action Research Specific to the Planning and Design Professions**

Phase 1 meta-analysis revealed seven dimensions of transdisciplinary action research. The first three of these dimensions are elaborations of Stokols's (2006) axes of transdisciplinary action research: The remaining four emerged uniquely from the editorial analysis.

**Elaborations on Stokols.** The three dimensions elaborating on Stokols are:

1. *Regional delineation.* While all the case studies describe multiple plural design projects set within larger-scale and cross-scalar sustainable landscape planning and design initiatives, three differences relative to the delineation and scope of the larger scales are evident: (a) The boundaries of the larger scale may be delineated by political (Bowns 2011) or biophysical boundaries (Carlson, Koepke, and Hanson 2011). (b) The cross-scalar dimensions may involve contiguous space as exemplified by Chanse (2011), who investigated small-scale projects within a set of contiguous watersheds, and by Doble and King (2011), whose investigation of waterfront redevelopment cases in individual cities in New York State exemplifies cross-scalar comparisons involving discrete space. (c) The progression of projects from a specific place to a geographically more extensive area is exemplified in Thering (2011) discussion of a statewide initiative that began in response to a request for assistance from one community, while others focus entirely on a broader geographic scale (Rios, 2011).
2. *Interdisciplinarity.* While all of the case studies constitute analyses that bridge disciplines, they vary in terms of the number of engaged disciplines, in terms of which discipline(s) play major organizing roles, and in terms of scale. Rios (2011) notes that public health science partners took the lead in an initiative that included landscape architecture, planning, and social science, while Schroth (2011) describes a case in which landscape architects led an initiative that included planning, ecology, geography, and social science
3. *Transdisciplinarity.* All of the case studies involve the formation of formal or semiformal partnerships across multiple geographic scales and sectors to address multiple aspects of sustainability. In some instances, the partnerships existed at the outset of the initiative, while others evolved as the cases unfolded. Chanse (2011) describes how different

types of partners fit into an organizational context, while Doble and King (2011) reflect on the challenges of intersectoral collaborations.

**Emerging Dimensions.** The four dimensions emerging uniquely from editorial analyses are:

1. *Student engagement.* Students were involved in some capacity in most of the case studies. The types of engagement include studio-based instruction, technical assistance, and service learning. The activities range from concept development and grant writing to assisting faculty with civic engagement, research, and charrettes and workshops. Carlson, Koepke, and Hanson (2011) describe the enduring and student-generated concept of using mining to reknit the ecology and economy of the northern Minnesota landscape, and Bowns (2011) examines the implications of TDAR for universities engaging students in plural design and participatory methods.
2. *Outcomes.* All the case studies report on substantive outcomes (relative to people and place, for example, plans, designs, and policies) or procedural outcomes (informing practice, for example, new processes, heuristics, and methods) or both. Schroth et al. (2011) test and evaluate new tools for visualization. Doble and King report on new protocol and curricula. Bowns (2011), Rios (2011) and Carlson, Koepke, and Hanson (2011) report on new frameworks for alliance among the economic development, public health, design, planning, and natural resource management fields.
3. *Time.* Many of the case studies span several years and reflect the importance of the dimension of time in the development of TDAR partnerships. Use of inconsistent temporal frameworks by various members of a partnership posed common challenges across the case studies. Academics follow the schedule of the academic calendar, while government agency personnel operate from one fiscal year to the next, and politicians follow the election cycle. The analysis suggests that having



to deal simultaneously with diverse temporal frameworks may thwart progress.

4. *Evaluation.* The eight case studies illustrate several different approaches to evaluation. Research questions, funder needs, and advancing the science of transdisciplinary action research generate varying definitions of evaluation. Schroth et al. (2011) describes the delicate balance maintained between their quest for information on the effectiveness of interactive visualization techniques and the public agencies' desire for consensually based solutions to resource management issues. Doble and King (2011) discuss the dilemma of trying to meet the varying goals of collaborating partners in evaluating project success. Chanse (2011) describes the difficulty of integrating the evaluation of TDAR work on the short- and long-term benefits for stewardship volunteers with its effects on planning program results and physical outcomes in the landscape. Thering (2011) frames the development of acceptable planning solutions in a survivor community while testing a generalizable methodology for TDAR case studies.

## **Phase 2 Meta-Analysis: Responding to the Get Meta/Stay Grounded Challenge**

Phase 2 of the meta-analysis examined the case studies for heuristics that demonstrate the explanatory power to advance the growth of knowledge (Lakatos and Musgrave 1970, 132–137). The development of a taxonomy of heuristics was informed by juxtaposing Stanovich et al. (2008), who posited a “taxonomy of heuristics and biases” to investigate gaps in the literature of developmental psychology, with Schon’s writings on reflective practice (1983) and Poulter’s (2003) explanation of the theory-building functions of heuristic case practice. The set of two meta-strategies was informed by Patterson et al. (2001) description of the two intentions of qualitative meta-analysis.

**A taxonomy of heuristics.** As noted earlier, the conduct of plural design often requires autonomous as well as

nonautonomous decision making heuristics (Stanovich et al. 2008). A taxonomy of heuristics is particularly useful inasmuch as it simultaneously captures the duality of action research while it “refutes the positivist epistemology of research that separates means from ends” (Schon 1983, 165).<sup>5</sup> The following taxonomy of heuristics offers a “powerful problem-solving machinery” (Lakatos 1977, 5) in that each type of heuristic in this taxonomy offers a different approach to discovery.

*Working hypotheses* are “useful for arriving at satisfactory solutions” with modest amounts of time and energy (Simon 1990, 207). All of the case studies include working hypotheses in the form of unspoken assumptions about the relationship between process and outcomes. For example, a presumption of a relationship between participation in plural design processes and increased understanding of the multiple meanings of place is a consistent theme among all of the case studies. Schroth et al. (2011) describe research methods developed specifically to test this assumption.

*Ex post facto*<sup>6</sup> heuristics are often revealed as a result of critical reflection following the completion of a project or a phase of a project—in other words, after the fact). McNally (2011) and Carlson, Koepke, and Hanson (2011) illustrate this concept in describing an informal process of analysis (much like meta-analysis) of the complex intersection of social, economic, and ecological issues in multiple localities, revealing common themes and issues and informing the development of tools and processes addressing regional issues.

*Reinterpreted* heuristics are adapted to transdisciplinary action research intentions from other disciplines. The academic practitioner synthesizes the concepts, methods, and strategies of the original heuristic with the concepts, methods, and strategies relevant to the design professions. Rios (2011) analyzes a transdisciplinary action research initiative founded on the heuristic of social ecology, which proved useful in a series of unrelated community health initiatives.

*Grounded-theory* heuristics are fully articulated and grounded in recognized theory. They emerge from systematic analysis at some point in the transdisciplinary

action research process and frame all subsequent actions.<sup>7</sup> An *ex post facto* heuristic revealed during the early stages of a project may become a grounded theory heuristic if it is subsequently articulated and linked to recognized theory. Thering (2011) explicitly states that her analysis of the interactions of people and place across multiple cultures and multiple sectors revealed a heuristic (survivor communities) grounded in sociological and education theory.

***Meta-strategy responses to the analytical facet of the Get Meta challenge.*** In her contribution to this special issue, McNally (2011) illustrates effective use of a meta-strategy. She describes how the initial stages of plural design often require reflection on the processes and tools that have proven useful under similar circumstances. These proven strategies enable the testing of ideas against planning and design norms as well as local idiosyncrasies (McNally 2011). Thering (2011) describes finding a common dynamic in contrasting and comparing case studies that, at first read, have little in common.

These two examples recall the two main intentions of meta-analysis posited by Paterson et al. (2001). Thering initiated a meta-analysis from “a desire to make sense of a large body of research that appeared to have no apparent framework” (24), while McNally initiated a meta-analysis to make the findings from earlier projects “more accessible and more valid in application to practice and public policy” (Paterson et al. 2001, 14). Informed by these two models, we scanned the other six case studies for similar concepts. The results posit a set of meta-strategies of particular relevance to the planning and design disciplines.

Meta-analysis strategies informing *substantive theory* include both autonomous and nonautonomous cognitive processes through which an academic practitioner may compare and contrast projects and scales with the intention of affecting people and place.

Meta-analysis informing *praxis* includes only the intentionally reflective processes through which an academic practitioner examines multiple case studies with

the intention of identifying and explaining phenomena. This type of meta-analysis relates to the production of procedural theory (outcomes affecting praxis). In their contribution to this special issue, Schroth et al. (2011) exemplify this type of meta-analysis.

Each of the case studies in this compendium demonstrates either or both of these two meta-strategies. Most of these case studies illustrate Shon’s (1983) observation of the advanced level of reflective practitioners who “reveal a capacity for reflection on their intuitive knowing in the midst of action and sometimes use this capacity to cope with the unique, uncertain, and conflicted situations of practice” (8–9).

#### **THE CHALLENGE MET: A NEW PARADIGM FOR THE PLANNING AND DESIGN PROFESSIONS**

The introduction to this article articulated six challenges that the planning and design disciplines must be prepared to meet if they are to respond effectively to both the challenges of scholarship and the imperatives of sustainability. To assess the current capacity of the planning and design disciplines to meet this challenge, the editors conducted a meta-analysis of eight case studies from leading academic practitioners of plural design who address the complexities and multiplicity of scales of sustainability through methods of transdisciplinary action research. The emergence of a new paradigm often creates such a revolutionary understanding of a phenomenon that it redefines both the questions and methods deemed appropriate for scholarly inquiry (Kuhn 1962). Paradigms help scholarly communities identify avenues of inquiry, formulate questions, and select methods with which to examine questions (Kuhn 1962, 5–6, 111–135; Lakatos and Musgrave 1970, 132–138). The results of this meta-analysis effectively define an analytical structure that integrates TDAR and sustainability into a new paradigm fully capable of meeting the Get Meta/Stay Grounded challenge.

Having been gleaned from analyses of the *practice* of transdisciplinary action research, each of the seven dimensions identified in phase 1 of the meta-analysis

are avenues of inquiry for forwarding the *scholarship* of transdisciplinary action research. As such, the seven dimensions establish a foundation for a scholarly research program capable of addressing the geographic scale facet of the Get Meta challenge while also addressing all three facets of the Stay Grounded challenge (the challenges most relevant to the imperative of sustainability—principles, people, and place).

The taxonomy of four heuristics defines effective ways to formulate questions and a lexicon for articulating the processes of scholarly inquiry capable of meeting the meta-cognitive facet of the Get Meta Challenge. The set of two meta-strategies, combined with the tested and proven methods of plural design, establish appropriate methodological approaches for this new research paradigm. These methods establish a foundation for scholarly research capable of advancing both substantive theory and procedural theory relating to the analytical facet of the Get Meta challenge.

The eight case studies collected in this compendium embody a culture of research that addresses the Get Meta/Stay Grounded challenge. Each of these studies portrays the social construction of knowledge engendered by integrating multiple world views with the intent to construct new understandings of and insights into particular problems in the time and space in which they exist (Stokols 2006, 67). Collectively the studies illustrate the capacity of a scholarship of transdisciplinary action research informed by the traditions of plural design both to address the complexities and multiplicity of scales of sustainability and to advance the growth of knowledge in the planning and design disciplines.

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#### NOTES

1. Authors exploring the development and implications of Western geographic thought frequently cite Cosgrove's (1984) exploration of landscape as socially constructed phenomena.
2. Literature reviews cite Stern and Harris (1985) and Noblit and Hare (1988) as the first to publish methods of qualitative meta-analysis in their respective fields. Stern and Harris conducted a qualitative meta-analysis across multiple case studies of patient/practitioner interactions with the aim of developing a theory that could explain findings. Noblit and Hare developed their approach to meta-ethnography to reconcile various ethnographers' interpretations of the same phenomena in studies of educational institutions. More recently, Paterson et al. (2001) differentiated meta-analysis, meta-method, and meta-theory as distinct components of a meta-study approach, with the aim of identifying similarities and differences among qualitative research reports. For purposes of simplicity, the term *meta-analysis* is used here.
3. In the tradition of Kant's (1902) *Critique of Pure Reason*, and Habermas's (1970) *Theory of Communicative Competence*, Berger and Luffman (1966) expound on the social construction of knowledge and reality. Bruffee (1999) notes: “Knowledge is a social construct, a consensus among the members of a community of knowledgeable peers.”
4. Stokols (2006) uses the term *sector* to avoid repetitively listing the spectrum of organizations, agencies, and institutions (municipal, state, provincial, national, nonprofit, public, educational, and so forth) that share a common focus on specific societal concerns.
5. About the term *heuristic*: A simple dictionary definition is useful. Function: *adjective*. Etymology: from Greek *heuriskein* to discover; involving or serving as an aid to learning, discovery, or problem-solving by experimental and especially trial-and-error methods *heuristic techniques*, a *heuristic assumption*; also of or relating to exploratory problem solving techniques that utilize self-educating techniques (as the evaluation of feedback) to improve performance (Merriam-Webster 2008).

6. From the Latin *ex* from + *post* afterwards + *factus* done.
7. The second edition of Robson's *Real World Research* (2002, 190–193) includes a brief but helpful overview of grounded theory. A commonly used text is Strauss and Corbin's *Basics of Qualitative Research: Techniques and Procedures for Developing Grounded Theory* (1998).

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