



Review Article

Retrospective and reconsideration: The first 25 years of the Steinitz framework for landscape architecture education and environmental design

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ABSTRACT

Carl Steinitz' "Framework for Theory" is a valuable heuristic for organizing environmental design processes. Originally designed for use in the discipline of landscape architecture, it has diffused into related environmental design disciplines; its most prominent current use is in the multidisciplinary approach of geodesign. The framework has been used for academic and professional purposes and modified multiple times since it was first published in 1990. The framework has proven especially robust in providing disciplinary focus, organizing multifaceted research and planning projects, bridging individual and collective design tensions, and parsing convoluted decision-making. This article revisits the use of frameworks in the environmental design disciplines, the framework's creation and initial publication, and considers its early positionings that, while not widely followed, offer promising disciplinary services. It further explores limitations and criticisms of the framework, contemplates its use for emerging disciplinary needs, and advocates for the framework's use in the environmental design disciplines.

1. Introduction

Carl Steinitz' "Framework for Theory" was initially developed for use in professional landscape architecture education at Harvard's Graduate School of Design (GSD). In the years since its 1990 publication, the framework has been altered, re-defined, fleshed-out, and adapted for use in a number of landscape architecture applications and related fields, most notably providing the theoretical structure for geodesign (Huang & Zhou, 2016). As the breadth of research presented in the December 2016 *Landscape and Urban Planning* Special Issue on geodesign demonstrated, the framework's use in education, research, and practice has expanded to support multiple fields (Steiner & Shearer, 2016).

This article traces the course of the framework's development over its first quarter-century, exploring its use and modification in a number of design-related fields, and anticipates its continuing trajectory. It begins with a contextualization of the framework's development within environmental design fields, a review of the use of frameworks by designers, and an overview of physical planning frameworks in particular. After an introduction to the Steinitz Framework's development and use, the article reviews the multiple repositionings of the framework in its early years. A discussion of modifications and changes made to the framework as it was applied and tested follows before a review of

criticisms and possible weaknesses in the framework are addressed.

A concluding section advocates for robust reconsideration of the framework's use in the environmental design disciplines. The framework's flexibility in application, customizability for scale, the ability to include public engagement and feedback, and the rigor associated with a predetermined process for moving through the framework support its use for systematic investigation of and application to environmental decision-making. Here the article further suggests that the potential of the framework to establish disciplinary values, ethics, and practices in the landscape architecture profession should be revisited in these environmentally and ecologically challenging times. While its development and use in landscape architecture education may be its most widely known application, the framework's contributions to theory and practice supporting a wide range of academic fields suggests that it is perhaps time to reconsider its use for a new generation of environmental designers.

2. Frameworks and design professionals

To begin, an understanding of the framework's creator and his contemporaneous influences puts its development into context. Carl Steinitz earned his doctorate in city and regional planning at MIT, working under Kevin Lynch. He spent his academic career at the GSD,

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teaching both in the master in landscape architecture program and interdisciplinary studios and seminars. In 1990, Steinitz published his “Framework for Theory Applicable to the Education of Landscape Architects (and other Environmental Design Professionals)” (Steinitz, 1990, 1993, 2002, 2012).

Steinitz’ framework reflects the systems analysis strain of environmental design that was influential in the 1960s and 1970s, advocated by theorists like Herbert Simon and architects Serge Chermayeff and Christopher Alexander (Sachs, 2018). During that time, he developed an early environmental simulation model with Peter Rogers, comprising a “systematic negotiation process, informed by computer-generated evaluations based on private interests” (Carlsson, 2017, p. 46). While this model was intended for semi-automated computer operation in an interdisciplinary studio environment, it anticipated Steinitz’ later solo framework development in two ways. The first was its structural similarities: a focus on decision-making, following a pre-determined process-model sequence, and use in pedagogical exploration. It also made Steinitz aware of the danger of “program taking over” a decision-making process; as students became familiar with the model and could anticipate conflicts between competing interests, they adapted their actions to avoid conflicts in the interest of facilitating a smooth process through the program. This threat to the pedagogic intentions of the framework inspired Steinitz to note that “at this time in my professional life I would push for a clearly structured process” (Steinitz & Rogers, 1970, p. 66).

Inherently naturalistic, Steinitz’ framework was developed through years teaching landscape planning concepts and geographic information systems (GIS) techniques. In explaining the purpose of his framework, Steinitz referenced Rapoport’s distinction between theories, models, and frameworks as a way of explaining what his construction is, and what it is not: “a theory explains, a model predicts, and a framework organizes. A framework can be judged on its reasonableness and its utility, but claims no exclusivity vis-à-vis other frameworks” (Riley, 1990, p. 49; Steinitz, 1993, p. 42).

In the 1990 article introducing it, Steinitz hand-drew a general structure for the framework, demonstrating relationships between individual model levels, progression through the framework, and the multiple possible feedbacks and iterations that may occur as a designer applies the framework to a given design problem (Fig. 1).

3. Frameworks and decision-making

While this framework clearly reflects its connection to systems analysis, it is also situated in a tradition within the design disciplines of organizing the phases and process of decision-making; Steinitz himself asserted that “there is an overwhelming (and perhaps necessary) structural similarity among the questions asked by and of landscape planners and other environmental design professionals” (1993, p. 42). One of these other, earlier explorations of decision-making is Lynch’s description of how decision-making by “significant actor[s], public or private” occurs in large urban settlements (1981, p. 42). Lynch suggested that these decision efforts have

...typical features. The first question is: “What is the problem?” The consciousness of a problem is always an integrated perception, however vague, that is simultaneously an image of the situation and its constraints, of the goals to be achieved, of who the clients are, and what kinds of resources and solutions are possible. Problems do not exist without some inkling of all of these features, and the decision process is no more than a progressive clarification of this set, until a firm basis for action is found... (1981, p. 42)

Lynch’s description of the separate pieces that constitute perception of a problem and clarification process anticipate both Steinitz’ model levels and notion of methodologically processing these steps in an iterative manner. Steinitz’ further development of the “decision process” would involve processing the steps in a predetermined manner.

In its segmentation of the decision-making process, the framework particularly echoes Dyckman’s 1960s exploration of planning and decision theory which saw decision-making in planning as requiring a synthesis of the rational planning normative model with objective, behaviorist methods “dealing with the action context and the location of the actor in the system of action” (1961, p. 335). These “synthetic” methods include three

...distinguishable phases of decision: intelligence, design, and choice. In the words of Simon, these are ‘processes for scanning the environment to see what matters require decision, processes for developing and examining possible courses of action, and processes for choosing among courses of action’. In any given action sequence, these phases may be intermingled (Dyckman, 1961, p. 336; Simon, 1955).

Steinitz’ models of representation and process, evaluation and change, and impact and decision can be seen as loose representations of Dyckman’s three phases of intelligence, design, and choice.

Inasmuch as the framework is a new interpretation of existing theories about decision-making within the environmental design disciplines, it is also noticeably part of a longer, pre-existing conversation.

4. Frameworks and planning

Steinitz’ framework is also part of a long history of design and planning practitioners and academics outlining the physical planning process. Amongst these are frameworks or models focused on urban planning (Moore, 1988), urban design (Levin, 1966; Palazzo & Steiner, 2011), environmental planning (Ahern, 1999; Albert et al., 2016; Doornkamp, 1982a; Doornkamp, 1982b; Steiner & Brooks, 1981; Van Riet & Cooks, 1990), landscape planning (Leitao & Ahern, 2002; Steiner, 1991), land-use planning (Van Lier, 1998), and adaptive planning (Kato & Ahern, 2008).

The majority of these processes are explained through the use of a process diagram like the one accompanying Steinitz, 1990 publication. Although early frameworks such as Levin’s Urban Design Process (1966) and Steiner & Brooks’ Ecological Planning Method (1981) did not publish diagrams visually demonstrating progression through their prescribed processes, they otherwise established an early pattern. Each specified a precise number of steps leading from problem identification through project initiation and implementation, on to administration and evaluation (Steiner & Brooks) or selection of alternatives (Levin). Both clearly imply a sequential progression through steps as well as multiple iterations of either the entire process or feedback loops within the process; these characteristics are all common to the majority of these physical planning models, including Steinitz’.

The Steinitz framework, as drawn, displays a number of similarities to other models published contemporaneously, including Moore’s Alternative Planning Model (1988) and Van Riet & Cooks’ Ecological Planning of Natural Resources Model (1990), but is perhaps most similar to Steiner’s Model for Physical, Land-Use, or Landscape Planning (1991). One primary difference is that Steiner’s model places citizen involvement at its core (this is also indicated visually); the Steinitz framework did not specify citizen participation initially, only including it with later adaption for geodesign (Steinitz, 2012). Structured steps calling for citizen engagement is highly variable amongst these planning processes, although it has become more common in the most recent frameworks, with the exception of Albert et al.’s Ecosystem Services in Planning Model (2016).

As processes describing (or prescribing) how planning happens, these two frameworks are characteristic. However, they stand out amongst this set of physical planning models, frameworks, and processes because both are positioned by their creators as fulfilling multiple needs. Steinitz suggests that his framework is useful for landscape architecture education and demonstrates how it would be used to undertake a planning study, a research project, and a garden design

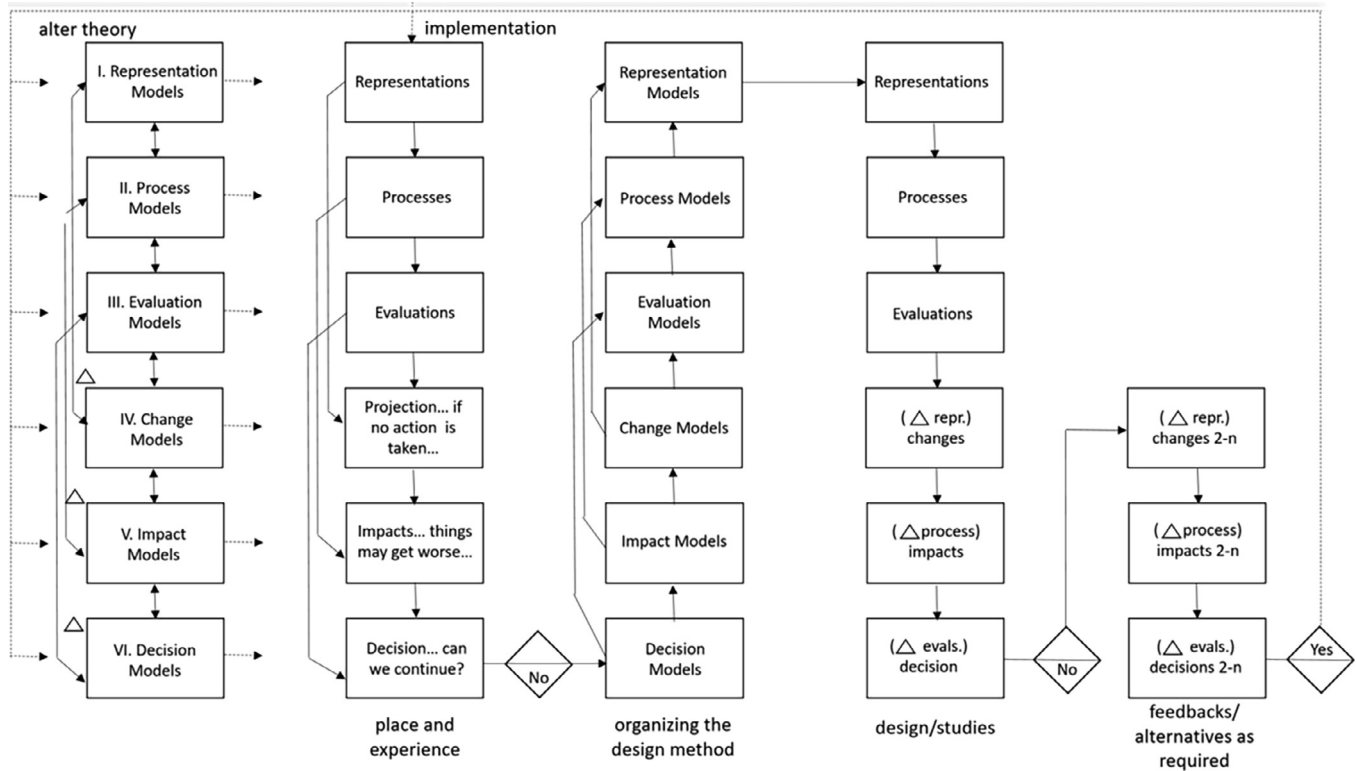


Fig. 1. Steinitz framework as published in “A Framework for Theory Applicable to the Education of Landscape Architects (and Other Environmental Design Professionals)”. Source: Figure 1. A Framework for Theory: General Structure, from Steinitz (1990, p. 138). Reproduced by author from hand-drawn original.

(1990). Steiner similarly demonstrates how his would be used for a planning project, and suggests that adoption of his method would enable comparison of case studies, thus augmenting research efforts (1991, p. 528). In their concern about the normative approach to planning as well as attention to the potential contributions of their processes to both practice and education, both models go beyond descriptive or prescriptive processes.

Historically, the Steinitz framework can be viewed as fitting within multiple traditions in the planning and design disciplines. Its investigation into the decision-making process owes much to earlier theorists while its exploration of the planning process is only one amongst a much larger multi-disciplinary tradition. However, while evincing similarities to a number of other frameworks and processes developed to aid decision-making or organize the planning process, the Steinitz framework is unique in that it was designed to fulfill both functions, in addition to supporting education and research.

5. The Steinitz framework: development, description, and general use

Steinitz’ focus, and the impetus for publishing this framework, was his experience in landscape architecture education. He notes that landscape architecture is a field that involves, on a fundamental level, multiple types of knowledge and theories, from ecological and aesthetic to planting design and construction. As a result,

...often these are idiosyncratically defined and presented (if at all), and they are rarely integrated into our educational methods and curricula... Since I believe that we should foster an integrative approach..., I propose that we cease our often narrow definitions of theory and examine ourselves more broadly in terms of the questions we ask, what we know about what we do, and what we teach. (Steinitz, 1990, p. 136)

With the need for a “broader interpersonal experience” in mind,

Steinitz’ framework had been gestating for years, “tested and adapted in [his] research, teaching, and projects,” influenced by multiple associated literatures, and discussed with peer environmental design academics and practitioners (Steinitz, 1990, p. 136). The resulting framework was intended to link typical questions associated with landscape change to discrete knowledge-related models answering these questions, thus identifying “areas where contributions of theory are needed” (Steinitz, 1990, p. 136). The result of working progressively through this framework is that a decision is ultimately made, either a “yes” decision suggesting implementation or a “no” decision suggesting feedback and alteration made to a prior model level.

As noted in the graphic in Fig. 1, the six-model set does not have to be processed in one direction. Both forward and backward (reverse-numerical) order progressions through the six-model set are advocated for specific task segments of a design, research, or study project. For instance, the types of questions that are associated with each model level are presented in reverse-numerical order in the 1990 article (as shown below). The model levels are:

- VI. Decision – To be able to decide to propose to make a change (or not), one needs to know how to compare alternatives.
- V. Impact – To be able to compare alternatives, one needs to predict their impacts from having simulated changes.
- IV. Change – To be able to simulate change, one needs to specify (or design) the changes to be simulated.
- III. Evaluation – To be able to specify potential changes (if any), one needs to evaluate the current conditions.
- II. Process – To be able to evaluate the landscape, one needs to understand how it works.
- Representation – To understand how it works, one needs representational schema to describe it (Steinitz, 2002, p. 234).

Each of the six model levels is related to those directly adjacent to it, “with each level defining its necessary contributing products from the

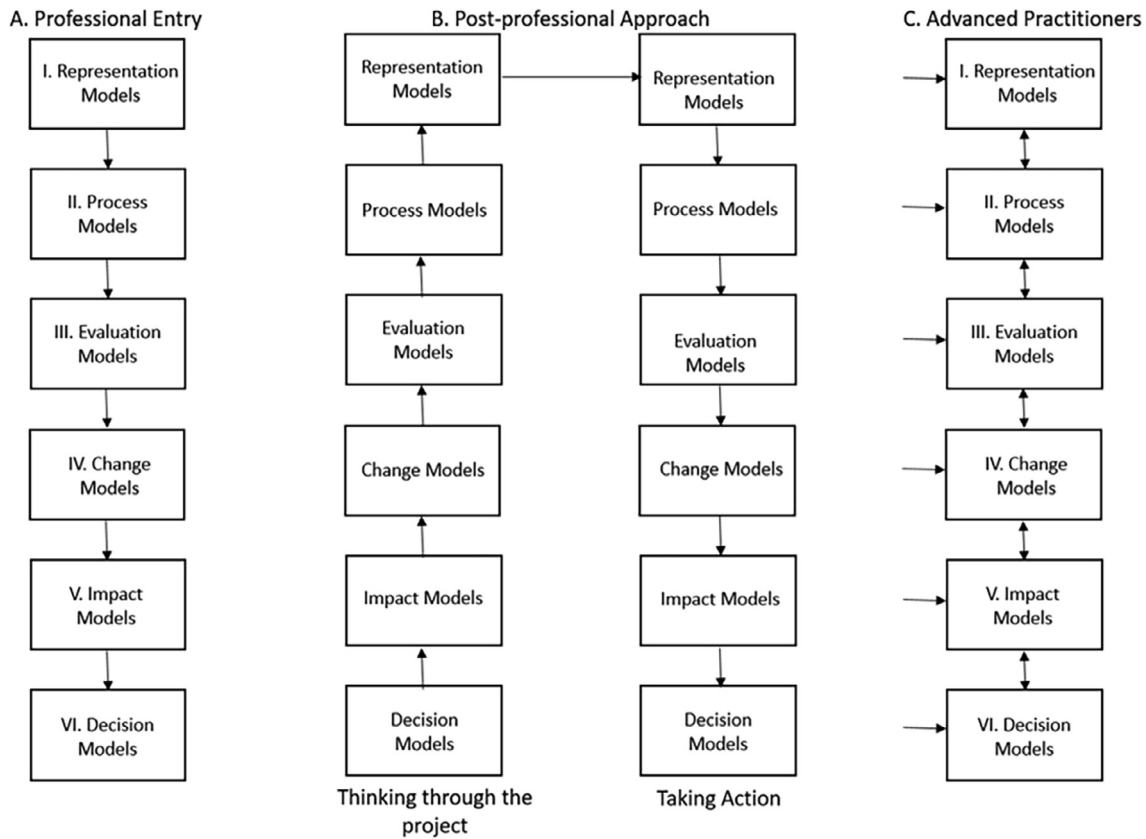


Fig. 2. Professional, post-professional and advanced practitioner movement through Steinitz framework. Source: Drawn by author from textual description in Steinitz (1990).

models next above in the framework” (2002, p. 234).

For design education purposes, he advocated multiple methods of movement through the framework; the path would be dependent upon the educational or professional level of the inquirer as well as the intended use of the framework (Fig. 2). For instance, the typical path for beginning designers would be working forward through the framework once, a simplified path that Steinitz described as “data-analysis-synthesis-evaluation,” (1990, p. 142) shown as path A in Fig. 2. For the post-professional student, the path through the framework would be two-fold: first thinking through the design study in reverse-numerical order, then taking action in the standard forward manner, shown as path B in Fig. 2.

Furthermore, not all model steps are required. For those in “the world of critical scholarship and creative practice [who] may take an iconoclastic attitude towards the state of theory itself,” Steinitz suggests that “...any level is an appropriate starting point or focus in the framing of questions and in the search for answers” (1990, p. 142). In his *A Framework for Geodesign*, Steinitz echoed this point, suggesting both that “the framework is normally not linear in its application” (2012, p. 33) presumably for geodesign purposes, and that for the most advanced practitioners and researchers, “any of the six questions is an appropriate starting point or focus” (2012, p. 193), shown above as path C in Fig. 2. However, his consistent call for less-than-expert practitioners and researchers to utilize the appropriate and entire model process demonstrates a constant belief in the benefit gained from structured use of the framework.

5.1. Repositioning: the framework providing disciplinary answers

In the first few years after initial publication, Steinitz expanded the breadth and depth of his framework to embrace more questions and subfields within environmental design. In 1992, Steinitz was

approached by the editors of *Landscape Journal* to answer the question “What do you consider the most important question(s) in landscape architecture today? We particularly have in mind questions that suggest directions for continuing inquiry, questions that seek conceptual and intellectual advances as well as practical ones” (Riley & Brown, p. 160). Demonstrating that the framework was still very much at the forefront of his mind, Steinitz responded: “I believe that there are many ‘central questions’ and that the central question of central questions is the search for the framework which organizes, or which enables the interactions among, the questions which many individuals are asking and pursuing” (Riley & Brown, 1992, p. 165).

Here Steinitz shifts his conversation about the framework, directly positioning the framework as a unifying tool, synthesizing multiple sources and types of information. He notes that while the field of landscape architecture is “a ‘discipline’ to the extent that ways of understanding and acting are commonly shared,” it is an expressly voluntary one, including as members those who choose to do so, who come to the field from very different backgrounds and experiences (Riley & Brown, 1992, p. 165). Because of the unique makeup of the field, Steinitz posits that the “‘central questions’ are those which this voluntary association collectively considers important because they lead to the theoretical models which shape our understanding and actions” (Riley & Brown, 1992, p. 165).

Specifically addressing the framework itself, Steinitz rhetorically asks

...for me, the central question is: “How can I selectively integrate my knowledge and experience, much of which is derived from that of others, into efficacious action for the common good? It is very important that the emphases be placed on the individual, on integration, and on efficacious action.

If the (never-ending) search for the integrating framework is a

central question, then what is the (always tentative) answer? (Riley & Brown, 1992, p. 165)

Steinitz points to his 1990 article, and the framework as presented there, as being “as close to [his] response regarding central questions as it can currently be,” (Riley & Brown, 1992, p. 165) in that it enabled the central questions of landscape architecture to be asked, integrated, grouped by categories of theory, and then acted upon for the common good.

This vision of the framework as a method of coalescing the multitude of central questions attributable to individual landscape architecture practitioners is intriguing; it has not, however, proven influential over time. Steinitz noted at the time that he did not find it “strange to... combine an organizing framework with an individualistic and pluralistic perspective” as he thought that achieving this “synthesis is the essence of any live discipline, including landscape architecture” (Riley & Brown, 1992, p. 165). However, achieving this synthesis has been elusive as the voluntary, and often ill-defined, nature of membership in the landscape architecture profession continues to work against establishing an overarching set of definitions, practices, and theories.

Steinitz’ interest and belief in the usefulness of his framework for addressing high-level disciplinary questions and dilemmas continued with “Design is a Verb; Design is a Noun.” Here, he returned to the topic of the “communal-professional versus individual-creative tension” inherent to designers (1995, p. 188), proposing an adapted “dual framework” resolving the tension between these two worldviews (Fig. 3). Steinitz suggests that the tension between the “needs for common language, conventions, and methods” associated with design professions and “individual experience, self-awareness, interpretation, and expression” make “design and design education especially challenging” (1995, p. 188).

Recognizing the possibly conflicting dual professional and artistic natures of the design professions, this approach pairs an established set of agreed-upon communal, professional questions supporting intentional design projects and processes (design as a verb) with the individual, creative, contextual answers that respond to overarching disciplinary questions (design as a noun). With this dual framework, Steinitz was attempting to dissolve disciplinary tension and establish the connection between individual, creative responses to design problems and a collective, communal, agreed-upon disciplinary approach.

5.2. Repositioning: the framework as an information needs assessment tool

Also in 1992, Steinitz published a brief paper on visualization in environmental management. Steinitz notes here that the cutting-edge of data visualization technologies is located far from the design professions: in military, automotive, and other industries. In response to what he perceived as the potentially misdirected talents of “major research program[s] directed from inside the field... with an emphasis on representational techniques,” Steinitz again turned to his framework,

positioning it here as a research tool that could “begin to build direct links between representational techniques and the information needs of the several kinds of models through which any project must pass” (1992, p. 273). He argues for environmental data managers to instead question what data to visualize and how visualization helps audiences to understand data, rather than to advocate, generally, for the development of additional visualization technologies.

This short opinion piece on data visualization techniques seems an abrupt departure from work on pedagogy and disciplinary needs; however, it reflects another of Steinitz’ proposed uses of the framework. Since at least 1966, he had been working in the field of scenario analysis; the development of alternative land use scenarios for a region, resulting from the implementation of different choices, requires the use of data visualization (Steinitz, 2014). Despite the potential use of the framework for optimizing the combination “of data and visualization techniques which already exist and which will surely increase in years to come,” this additional vision of the possible uses of the framework has also not had any lasting influence (Steinitz, 1992, p. 274).

In the two years between the 1990 introduction of the framework and these 1992 journal articles, it appears certain that Steinitz was looking to expand its applicability. In 1990, the framework was introduced as a way of organizing questions and required knowledge associated with landscape change, identifying gaps in a landscape design project where theory is needed, and shaping both research and design processes according to education level. By 1992, the framework was presented as fulfilling two new roles. Firstly, it was offered as the tool to integrate individual and collective knowledge and experiences for the purposes of answering the central questions of landscape architecture. Contemporaneously, it was potentially a tool that environmental data managers could use to coordinate the environmental visualization needs of design project with available technologies. It is possible that with these new presentations of the framework, Steinitz was looking for an area in which it would gain traction; this would come quickly after a 1993 article associating it with GIS software.

5.3. Repositioning: the framework as the result of GIS experience

In 1993, Steinitz re-issued the framework in *GIS Europe* in the second of three articles written under the general title “GIS: A Personal Perspective.” Here he noted that “over the past three years, this framework has become the primary organizational basis of my teaching, research and projects” (1993, p. 42). In this article, he shifted the impetus for the framework’s development from his research, teaching, and projects, stating instead that it resulted from his twenty-five years of experience “applying GIS to many projects” causing him to come “to the realization that there was a common structure to this work” (1993, p. 42).

This association of GIS with the framework presages Steinitz’ later GIS-related publications in alternative futures, scenario analysis, and geodesign. It also reflects his experience with early computing systems, honed while working with Kevin Lynch at MIT, and their use in

Design as a Verb	Design as a Noun
I Which “landscape” is it?	Representation
II How do people understand the landscape?	Process
III What is the problem?	Evaluation
IV Which design strategy should be pursued?	Change
V Is the proposed change an improvement?	Impact
VI Is it a good design?	Decision

Fig. 3. Dual framework as published in “Design is a Verb; Design is a Noun”. Source: Fig. 4. Design as a verb: Design as a noun. From Steinitz (1995, p. 200) reproduced by author.

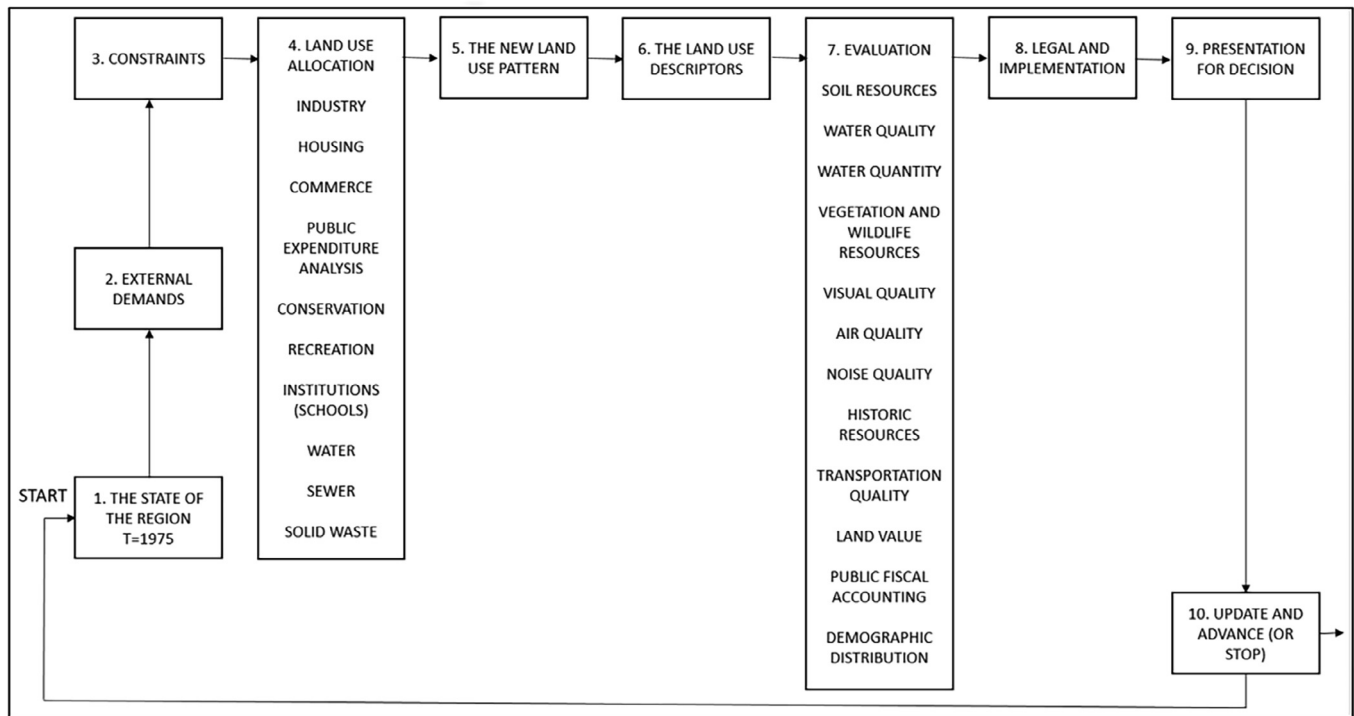


Fig. 4. Massachusetts scenic rivers simulation model from “Simulating Alternative Policies for Implementing the Massachusetts Scenic and Recreational Rivers Act: The North River Demonstration Project”. Source: Fig. 4. Simulation model format. From Steinitz (1979, p. 57) reproduced by author.

exploring and modeling environmental change (Steinitz, 2014; Steinitz & Rogers, 1969). One earlier computer-based project was the North River, Massachusetts pilot project implementing the designation and management of scenic and recreational rivers. In this project, Steinitz’ research team at the GSD utilized portions of a simulation model, integrating housing and visual quality models for the purposes of evaluating how the impact of housing developments affect the scenic character of the study area (Steinitz, 1979).

As shown in Fig. 4, this earlier research project had multiple points of connection to Steinitz’ framework: the state of the region – representation models; land use allocation – process models; the new land use pattern – change models; evaluation – impact models; presentation for decision – decision models, and incorporated the use of feedback loops. These earlier experiences combine to support his 1990 assertion that the framework had been gestating over a period of time. In this 1993 article, Steinitz reasonably made the connection between the framework, his work in scenario analysis, and GIS; however, the question remains of why he shifted the impetus for his framework’s development from its pedagogical usefulness to experience with the application of GIS. Arguably, the shift was intended to appeal to practitioners and GIS users that read *GIS Europe*; perhaps the shift can be attributed to Steinitz’ realization of the increasingly mainstream use of GIS technology in 1993. Either way, the framework’s use in GIS-related fields would come to be its strongest area of influence.

6. Early modifications made to the framework

In this 1993 article in *GIS Europe*, Steinitz no longer mentions the need to differentiate movement through the framework according to pedagogical needs associated with education level, shown in paths A-C in Fig. 2. He still suggests that “it is more helpful to consider [the six levels] in reverse order, both as a more effective way of organizing a landscape-planning study and specifying its method, which [he considers] the key strategic phase,” but for the first time, Steinitz proposes that this reverse-numerical orientation also results in “a more effective educational approach” (1993, p. 43). Similarly, while his pedagogical

assessment in 1990 suggested that a single forward progression through the framework’s models would be sufficient for beginning designers, he now suggests that for any landscape planning projects, there is a need to progress through the model twice: backwards (reverse-numerical) and then forwards, shown as path B in Fig. 2. This is a distinct change from the 1990 article, in which designers at different educational levels would progress forward, backward, or begin at a selected intermediate point, according to their skills.

In the 1993 article, Steinitz also clarified the designated path for researchers. In comparison to the 1990 suggestion that those utilizing the framework would “progress *forward* at least once through each level of inquiry and modeling type,” and that it would be “advantageous to organize a ... design study *in reverse order*” (Steinitz, 1990, p. 138) (emphasis in original), in 1993 he anticipates that

...project managers and researchers will work through the framework at least three times in any project: first, in defining the context and scope of the project; second (and in reverse order) in specifying the project methodology; and third, in carrying the project forward to its conclusion (p. 43)

This modification (called out in the box in Fig. 5 below) acknowledges the challenge of achieving operational alignment among the six models; it is unlikely that the process of reconciling the models with each other can be done with a strictly linear approach. In Steinitz’s writings, the second round is given emphasized importance as it specifies the data, information, and knowledge that must be known or acquired (Shearer, 2012).

In this article, Steinitz also nuances his approach to decision-making with the framework. He still suggests that the two primary outcomes of the decision model are a “yes” or a “no,” with a “no” resulting in a feedback loop to a prior model level. However, here he introduces the concept of a “contingent yes” outcome, suggesting that this outcome “(still a no) may also trigger a shift in the scale, size or time of the study... In a scale shift, the study will again proceed through the six levels of the framework as described above” (1993, p. 44).

The modifications mentioned in this section comprise a full

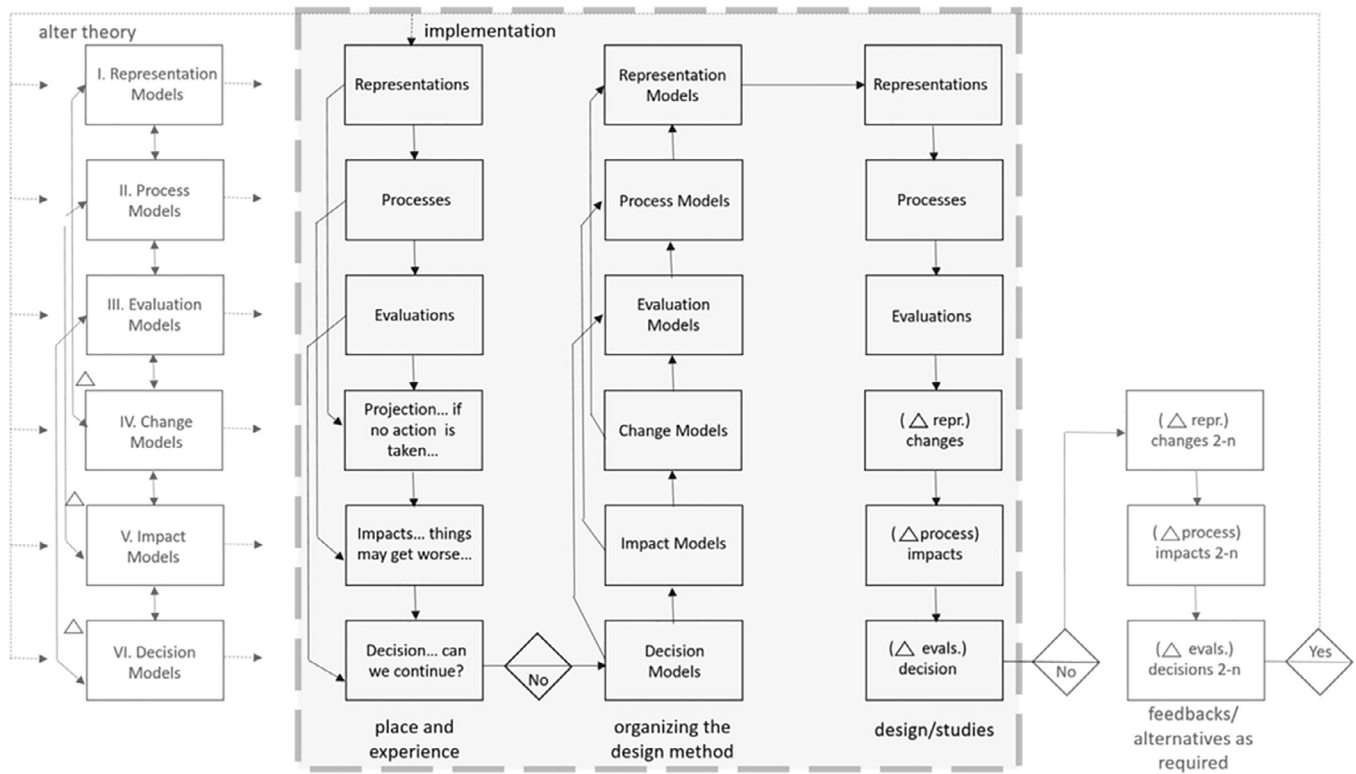


Fig. 5. Designated process through framework for researchers and project managers as described in “A Framework for Theory and Practice in Landscape Planning” (1993). Source: Figure 1. A Framework for Theory: General Structure. From Steinitz (1990, p. 138) reproduced by author from hand-drawn original, with emphasis added by author.

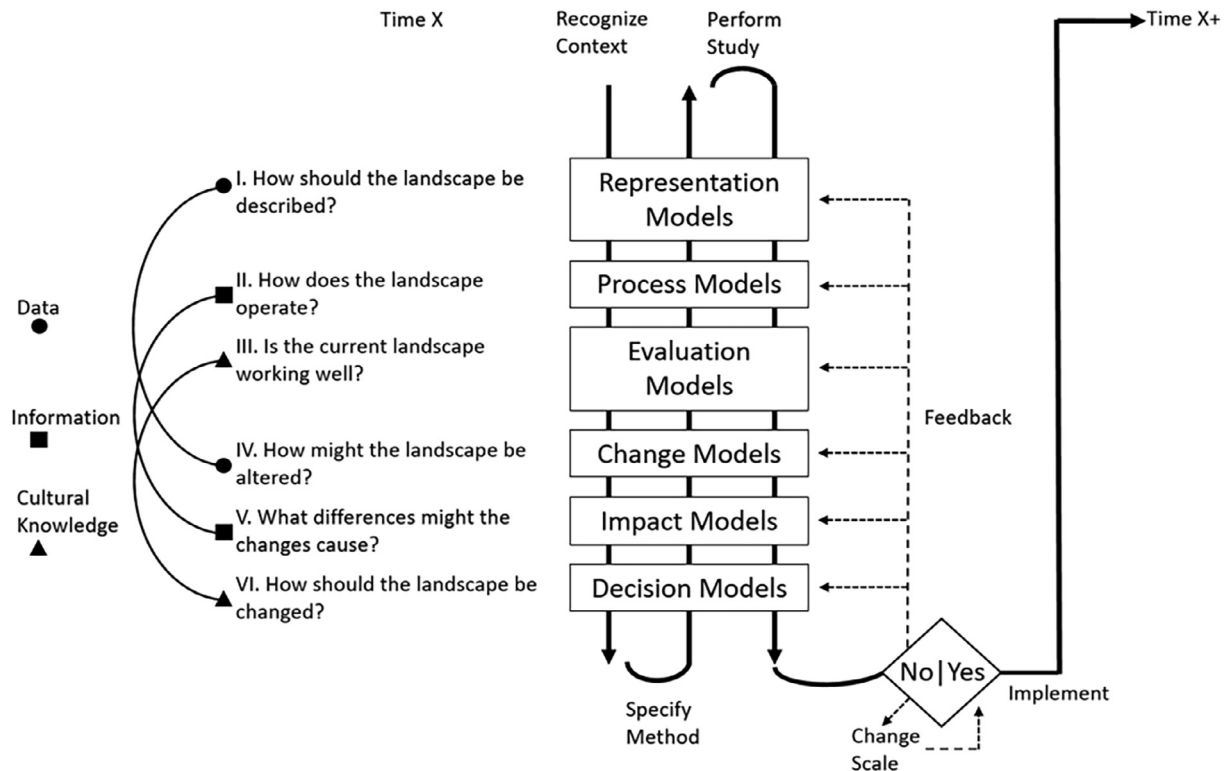


Fig. 6. Steinitz framework as published in *Alternative Futures for Changing Landscapes: The Upper San Pedro River Basin in Arizona and Sonora*. Source: Figure 3.1 The research framework. From Steinitz et al. (2003, p. 14) reproduced by author.

development of the current framework (as shown below in Fig. 6). The framework is moved through in a reverse-numerical order for both landscape planning and educational purposes and for those of all skill levels. It is progressed through at least twice for practitioners, backwards and then forwards; it is progressed through three times for project leaders and researchers, adding an additional forwards progression at the beginning to scope a project. After a proposed study or project has arrived at the final decision model, there are three options available: yes, no (requiring a feedback loop to an earlier model level), and contingent yes, which suggests both a shift in the parameters of the project and a feedback loop. While fully developed by 1993, Steinitz’ framework would continue to be altered as it was put to use over time in a series of alternative futures, scenario analysis, and geodesign applications, presaging modifications made as it diffused into a number of increasingly-unrelated fields.

6.1. Changes to the framework: alternative futures studies

Steinitz published the first implemented adaptation of his framework in a 1996 alternative futures study of the Camp Pendleton region in California. The classification of three distinct levels of epistemology (data, information, and cultural knowledge) was integrated into the model, titled in this study “The Framework for Research” (Steinitz et al., 1996). This classification recognizes the different sources of knowledge upon which each model depends. Data-driven models are based in fact, with judgment restricted to the recognition of relevant and non-relevant facts: representation and change. Information-driven models rely to a greater extent upon expert recognition of environmental and social processes that impact upon a given site or situation: process and impact. Cultural knowledge-driven models rely on the normative judgment of experts and local actors who are able to distinguish between working and nonworking processes and desired and undesired outcomes: evaluation and decision.

The framework as used at this time also saw the development of an altered change model with the recognition that “at least two important types of change should be considered: those brought about by current trends and those caused by the implementation of purposeful change via actions such as plans, investments, and regulations” (Steinitz et al., 1996, p. 8). This further specification of change model types was not reflected in the visual diagram of the framework.

6.2. Changes to the framework: geodesign applications

An additional set of decision-makers was added in 2012’s *A Framework for Geodesign: Changing Geography by Design*. When using the framework for a geodesign project, Steinitz includes those with vested interests as the ultimate arbiters. Any “yes” decision reached by a team of geodesigners suggests that the “study or proposed framework project is poised for presentation to the stakeholders for their review towards implementation and action” (Steinitz, 2012, p. 32). These ultimate decision-makers then have the choices of: no – the end of the study; maybe (a term used in place of a “contingent yes” is this version of the framework) – resulting in feedback loops; and yes – implying implementation (Steinitz, 2012, p. 88).

In *A Framework for Geodesign*, Steinitz continued to develop and clarify the framework, ostensibly here for use in geodesign applications.

He includes an additional set of four “overarching questions relevant to making methods choices for any kind of geodesign study” (2012, p. 29). These questions provide additional information needed for a geodesign team to succeed:

- Who should participate and how? Local residents? Political leaders? Corporate directors? Outside experts?
- What are the tradeoffs between faster results and rapid action versus possibly better research but delayed decisions?
- Will the study end with a single “product” or will it develop a continuing decision support process?
- What is the appropriate cost of the study? How much time, money, and basic research are needed? (Steinitz, 2012, p. 29)

These additional questions are not included when working through the six model levels of the framework; instead, they establish the parameters of the environment in which the model is used.

In this specific revision of the framework, Steinitz goes into particularly close detail on the change model level, noting that all change models process through four hierarchically organized phases: vision, strategy, tactics, and action. By systematically answering questions of why and what (vision), what and where (strategy), where and how (tactics), and how and when (actions), decision and implementation models will be successfully arrived at (Steinitz, 2012, p. 50). While these additional questions and four phases are described here in the context of their use in a geodesign study, their use as a heuristic across multiple types of landscape design projects can also be envisioned.

Changes to the framework resulting from its application in alternative futures and geodesign projects reflect its “real world” application. It is possible that as the framework is adapted for use in other fields, alterations resulting from similarly applied uses may be grafted onto it; one of the framework’s strengths is its adaptability.

7. Criticisms of the framework

As may be expected from a framework such as this one that has been widely used, across multiple fields, and for various purposes in each over the course of twenty-five years, there have been a number of criticisms made.

7.1. Too broad

In Stiles’ (1994) exploration of landscape design and landscape planning as possibly two distinct disciplines, he both utilizes Steinitz’ framework to explore similarities and dissimilarities between the two areas while simultaneously calling it out for specific criticism. Here Stiles searches for a common theoretical basis shared by the two areas, “on the assumption that a unified discipline can expect to be governed by a unified theory, while a fundamentally divided discipline cannot” (1994, p. 141). Proposing that landscape design and landscape planning are, in fact, two parts of the same discipline, Stiles defines that overarching discipline, landscape architecture, as the “discipline/profession concerned with the conservation and enhancement of landscape resources for the benefit of current and future generations” (1994, p. 141) such that it encompasses both areas. He further demonstrates how both this definition and the Steinitz framework “are built around the same

Definition of the profession	Landscape Resources (Natural and Cultural)	Conservation and Enhancement	Benefit of Current and Future Generations
Modified Steinitz framework	Representation Models + Process Models	Project Models + Intervention Models	Impact Models + Design Models

Fig. 7. Alignment of definition of landscape architecture profession and Steinitz framework from “Landscape theory: a missing link between landscape planning and landscape design?” Source: Fig. 3. Relationship between definition of the profession and the Steinitz framework. From Stiles (1994, p. 143) reproduced by author.

basic conceptual model” of the discipline (1994, p. 143). (See Fig. 7 below) However, Stiles notes that this definition of landscape architecture is far too broad to define a singular discipline, as it could also describe many of the environmental design professions, suggesting further that Steinitz’ framework similarly aims to encompass all in one fell swoop, resulting in an overgeneralized model that “risks being no real unity at all” (1994, p. 143).

Despite the framework being used here as a heuristic tool for narrowly exploring the nature of landscape architecture theory, Stiles’ criticism has broader implications. As discussed earlier, the Steinitz framework has found purchase in a number of fields outside of landscape architecture, largely due to its flexible and inclusive nature. However, do these characteristics suggest that the framework is an overly-broad, and perhaps inexact, representation of landscape change processes?

7.2. Geographically limited

Kato, Yokohari, and Brown (1997) article about ecologically-based planning for rural Japanese landscapes noted that landscape planning in the U.S. is unique, in that it “developed in a setting of abundant land, making it feasible for many alternatives to be considered and allowing local residents to be involved in decision-making” and that the Steinitz framework reflects this context (Kato et al., 1997, p. 70). The decision-making framework developed by the authors in response to the Japanese context includes cognates of Steinitz’ six model levels but does not include a point at which public, or stakeholder, input would be included; instead, municipal-level planners would make decisions to preserve lands solely based on the quality of ecological functions and services they provide. Kato et al. suggest that their framework could possibly be of use to other Asian nations with similar landscapes and historical development patterns (1997, p. 81).

While the Steinitz framework may not be as useful a heuristic in centrally planned nations for these reasons, it has been particularly noted for expressing a landscape planning process similar to that used in Germany and select Western European nations (von Haaren & Bathke, 2008) that often face similar development pressures and densities to Japan. It has, additionally, been successfully used internationally, ranging from Lisbon, Portugal (Ahern, 1994); Sonora, Mexico (Steinitz et al., 2003); and Australia (Morley, Trammell, Reeve, McNeill, Brunckhorst, & Bassett, 2012; Perkins, Gleeson, & Keating, 2003) to domestic locations including Arizona (Steinitz et al., 2003; Perkl, 2016); California (Davis, Costello, & Stoms, 2006; Kahyaoglu-Koracin, Bassett, Mouat, & Gertler, 2009; Mouat, Kiester, & Baker, 1998; Steinitz et al., 1996; Stewart & Duane, 2009); Massachusetts (Ahern, 1999); Oregon (Hulse, Branscomb, Enright, & Bolte, 2009); and Pennsylvania (Steinitz & McDowell, 2001). The framework has also been theorized to be useful in both areas susceptible to desertification (Mouat, Bassett, & Lancaster, 2006) and on deforested agricultural lands (Bentrup, Dosskey, Wells, & Schoeneberger, 2012).

7.3. Purely theoretical

In the area of landscape conservation planning, the Steinitz framework has been criticized for being representative of frameworks that solely “focus on theoretical aspects of design or education methodology” (Poiani et al., 1998, p. 144). This observation is made in a 1998 article reporting the development of a framework for scale-independent site conservation planning that goes “beyond theory to offer a practical, efficient method for conservation planning that is applicable at all special scales and levels of complexity” (Poiani, et al., p. 145). By 1998, only two articles had been published reporting use of the Steinitz framework for undertaking landscape planning activities, both by government agencies (Mouat et al., 1998; Steinitz et al., 1996; it is possible that its practical use was not widely known at this time. The dismissal of the Steinitz framework as being “primarily geared toward educating

environmental design professionals” (Poiani et al., 1998, p. 144) could explain the time lag between the framework’s development and its use by those unconnected to Steinitz. However, the ten-fold increase in publications utilizing the framework for landscape planning purposes since 1998 suggests this criticism was largely a result of unfamiliarity with the framework’s possible utilizations.

7.4. Undefined context

In the process of creating a “Redevelopment Process Framework for Reclaiming Postindustrial Landscapes” for a 2004 MIT master in city planning thesis, Ekman reviewed the Steinitz framework for possible adoption or adaptation. While Ekman determined that its “flexibility and bottom-up approach to landscape planning makes it an appropriate method for organizing reclamation efforts in the postindustrial landscape,” he had concerns about the “openness to define the initial context and scope” that defines the first forward pass through the framework (Ekman, 2004, p. 90). In believing that this openness could lead to important issues being overlooked, Ekman echoed concerns and adaptations made by Kirkwood in the development of his own brownfields planning framework (BPF). Kirkwood’s BPF was derived from the Steinitz framework with two specific alterations: customized model-level sub-questions organized around brownfield redevelopment and a preliminary step of identifying issues associated with the underdevelopment of brownfields for the purpose of linking these issues with specific model types and understanding their relationships with other issues and model levels (Kirkwood, 2001). Ekman’s concern about, and Kirkwood’s inclusion of, a preliminary scoping step both make sense from the perspective of one wanting to use the framework for an easily replicable, detailed, and targeted purpose. They are also reminiscent of Steinitz’ own addition of overarching questions to be asked when undertaking a geodesign study (2012). For more open-ended design, research, or educational purposes, however, the framework’s omission of an initial, pre-determined, process-limiting step can be considered one of its strengths.

7.5. Too rational

Thwaites and Simpkins traced design methodology within the field of landscape architecture in a 2007 article, noting the rise of rational, analytical, and systematic approaches in the 1970s–1990s in response to: professional insecurities; perceptions of low interdisciplinary respect; increasingly complex and “wicked” design problems; and a “wish to remove the ‘romantic nonsense that often goes for rational thought’” (Kelsey, 1970, p. 425; Rittel & Webber, 1973; Thwaites & Simkins, 2007, p. 11). They characterize these modernist developments within the field as representing the belief that by using a good design method, good design output can be assured, to the exclusion of other evaluative metrics including the eventual user of a space. The Steinitz framework is particularly noted as being representative of this worldview, as Thwaites and Simpkins call attention to the manner in which it elevates a set of abstract procedures to the level of theory (2007).

Similarly, Britton criticized the framework as representing a perspective in landscape architecture education which “emphasizes an exterior world of form, function, aesthetics and environment with little attention towards enabling students to acquire abstract knowledge of ‘how best to design’” (Britton, 2015, p. 45). This statement was made in the context of her suggested educational approach to developing students’ awareness of their own personal values and the place of these values in the design process.

From a certain perspective, these criticisms are reasonable; if the Steinitz framework is understood to be a limiting one, controlling and mandating exact parameters of a design study or research project, then it could easily be interpreted as being overly rational and stifling of any individuality or creativity. However, returning to Steinitz’ original 1990 article, he specifically notes that the framework only helps

“identify areas where contributions of theory are needed,” (p. 136) not create theory itself. Similarly, while the framework does not teach students how to best design, it does enable them to comprehensively evaluate proposed designs, leading one to ask of Britton: Does the framework need to do all things for it to be useful?

8. Conclusion and discussion

The Steinitz framework is one of many developed by those in the design fields and has an established base within the field of landscape architecture. Over more than twenty years, Steinitz made many alterations and specifications to his framework. These changes resulted from experience using it, the types of applications for which it was being used, adaptations made to fit specific contexts, and changing ideas about who would be wielding the framework and who should be the ultimate decision-makers. It has moved from the field of landscape architecture and design education to related fields like landscape ecology (Maksymenko, Klesch, Titenko, Shumilove, & Cherkashnya, 2017) and urban planning (Pullar & McDonald, 1999), and diffused to more distant topics areas, including: ecology (Albert et al., 2016), soil science (Robinson, Burke, & Norng, 2015), health (Jørgensen, Jepsen, Fridlund, & Holton, 2017), climate change (Albert et al., 2012), and agricultural conservation easements (Stewart & Duane, 2009). Its diffusion into these areas reflects its wide-ranging applicability and theoretical strength. Were it simply a set of steps to take in project planning, the framework would perhaps have been superseded. From the beginning, however, Steinitz’ framework has been more than a set of steps; it synthesizes and bridges relationships between data and information, theory and practice, and the individual and the collective in a transparent manner. Its strengths include its flexibility in application, customizability for scale, the ability to include public engagement and feedback, and the rigor associated with a predetermined process for moving through the framework.

The framework failed to find a broad audience with some of its early publications, which may warrant a review of its early positioning. This is especially true for Steinitz’ positioning of the framework as an answer to fundamental disciplinary tensions within landscape architecture. Using the framework to investigate the epistemology of landscape architecture knowledge could result in a disciplinarily agreed-upon, common set of theories around these six models. The possibility that the framework could be used to group multiple central questions associated with the field into categories of theory, perhaps arriving at agreed-upon, overarching questions, is tantalizing, particularly as it could be adapted for similar use in other ill-defined environmental design disciplines. Likewise, using it to negotiate the tension between individual design responses and collective professional needs offers a solution to ongoing definitional, disciplinary problems. This is not to suggest that the Steinitz framework is a panacea; these earlier posited abilities of the framework should be thoroughly reconsidered and tested.

Organizing frameworks have a long history in the environmental design disciplines. The sheer number and variety of frameworks for environmental design demonstrates the need to organize and explicate planning processes. Many of these other frameworks, both those investigating decision-making and those focused on the planning or design process, have had very little lasting impact on the design disciplines. On the other hand, the number of publications utilizing the Steinitz framework, both within the environmental design disciplines and in broader fields, suggests that many have embraced it. As Steinitz made modifications to the framework over the years, other practitioners, academics, and educators have felt similarly able to use and modify it and take advantage of its strengths.

Potential adopters and adapters of the framework need to be cognizant of criticisms that: 1) it is limited to certain types of cultural or political planning environments, and 2) it allows the context for a project to remain undefined. In both cases, adapting the framework to the particular needs of a situation can mediate its inherent

shortcomings. Of note are Ekman (2004) and Kirkwood (2001) uses, and criticism, of the framework. While their adaptations remain two of the very few published uses of the framework within urban planning, they demonstrate its usefulness in managing otherwise convoluted planning processes.

A more serious criticism is Stiles’ assertion that the definition of landscape architecture upon which the framework is based is too broad (1994). This distinction would pose a challenge for the framework’s use in answering definitional, disciplinary questions, as discussed above.

Perhaps the gravest criticism of the Steinitz framework is that it is too rational. The belief that a systematic, procedurally-arranged framework, engaging the *analysis|synthesis* relationship, adheres too closely to the positivistic theoretical viewpoint has been long discussed within environmental design fields at large (Corner, 1991; Rowe, 1983). A purely surficial evaluation of the framework’s steps, orientations, and progression would appear to support this criticism. However, such a reading would ignore the framework’s adaptations, refinements, and clarifications. A closer reading suggests that the framework is, instead, adaptable and customizable, with built-in feedback loops and iterative processes as well as public engagement and contextual elements. Above all, however, the framework is an abstraction, and “should not be read too literally since any visually understandable diagram is probably far too much of a simplification of what is clearly a highly complex mental process” (Lawson, 2006, p. 49).

As the fields of landscape architecture and other environmental design disciplines stretch to engage and embrace new knowledge, beliefs, and discoveries, the Steinitz framework may be increasingly useful in its ability to identify specific knowledge or theory gaps in the design, research, or practice process and direct the user to search out new information. Thus it may be that the strongest future use of the framework is the most traditional – systematic progression through the framework in the furtherance of an educational project, research question, or design process.

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