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## Iterative Approaches to Planning and Strategizing: Learning from the Architectural Studio Model

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This paper investigates linear and non-linear strategies for organizing and planning, and explores how these strategies correlate to both higher education and architectural education. The study reveals that the strategies for planning and designing typically employed in the field of architecture reflect the sort of non-linear, iterative, and synthesizing processes scholars recommend universities use to improve the effectiveness of strategic planning (Birnbaum, 1988; Cutright, 2001; Presley & Leslie, 1999; Rowley, Lujan, & Dolence, 1998; Swenk, 2001). Opportunities abound for using design processes to enhance various institutional operations as explored in *Proposal for using a studio format to enhance institutional advancement* (Chance, 2008) and *Assessing university strategic plans: A tool for consideration* (Chance & Williams, in press). An overarching theme is that the architectural design studio provides an optimal example of (a) how to use iterative processes in planning and (b) how to teach holistic, critical thinking to students. This particular paper focuses on using iterative design strategies to enhance formal planning processes.

Non-linear thinking permeates design disciplines. The ability to synthesize emerging information through an iterative process is one of the most essential skills instilled in students through the design studio model. Architectural, environmental, landscape, urban, and product design curricula commonly use this model. The field of architecture has used the studio format since formalizing its educational structure. Because the format encourages collaboration and critical thinking, professional architecture firms commonly employ the format as well.

Jackson and Ward (2004) explain that the process of developing knowledge in areas where lev-

els of agreement are low and uncertainty is high – or where situations and contexts are emerging or transient – requires continual re-negotiation. These characteristics are inherent to the field of architecture. As such, architectural design methodology requires designers to consider questions from multiple perspectives and continually synthesize new information, components, and concerns in the design of complex objects.

The design studio represents a laboratory for exploration and problem solving, where hands-on experiential learning facilitates the integration of art and science in the process of design and planning. The design studio represents a specialized type of classroom where students learn strategies for planning and designing all sorts of objects, buildings, and environments... and, often, events and processes as well. It is important to understand that the “design studio” is more than just a location. It represents a method of teaching students to be critical, contextual, and iterative thinkers who can synthesize a wide range of concerns in the process of addressing increasingly complex design assignments.

Studio-based education offers a unique way of teaching students that can and should serve as a model for educators in other disciplines (Boyer & Mitgang, 1996). The Boyer Commission (1998) recognizes the studio format as a unique contribution to the field of education and recommends using the model to help “reinvent undergraduate education.” Much of the existing literature (regarding planning, strategy formation, and organizational theory) emphasizes the importance of non-linear thinking. Since the design studio helps transfer to students the ability to address complex and shifting problems, it provides a model for implementing iterative thinking in planning.

## METHOD

The sampling method employed in this paper represents a purposeful, critical case approach. The author identified the "architectural design studio" as an information-rich case for investigation. The author then investigated one specific facet of this case, which may be defined as "strategic practices within the architectural design studio." This method probes the Boyer Commission's (1998) claim that the studio format enhances "problem-solving, teamwork, and cooperative learning" and thus enhances critical thinking among students.

This investigation stems from a study conducted by Chance and Williams (in press) that explored approaches to strategic planning and found two basic families of thought: (a) one linear and business-like, and (b) the other non-linear and iterative. This paper investigates the shared approaches to thinking, organization, and planning that an organization such as a university employs to guide decisions. This paper examines such issues from a variety of scales – exploring "strategy" from the perspective of the *university*, the *architectural program*, and the *architectural design studio*.

The initial investigation of linear and non-linear organizational theories (Chance and Williams, in press) revealed that universities often suffer when they use simple, linear, cause-and-effect thinking in strategic planning (Presley & Leslie, 1999; Rowley, Lujan, & Dolence, 1998). That literature review, combined with the knowledge that architectural education has achieved high levels of success at teaching students to design and plan using non-linear strategies (Boyer Commission, 1998; Boyer & Mitgang, 1996), prompted the development of three hypotheses for enhancing higher education. The first two hypotheses describe why architectural education should be used as a model for programs in other disciplines and how architectural design and planning strategy can provide a model for university planning. A third hypothesis – involving how the field of architectural education can supplement its successful approaches by consciously recognizing and incorporating a wider array of models informed by the fields of business and strategic planning – is also described briefly.

## LITERATURE REGARDING PLANNING STRATEGY

The Boyer Commission's (1998) report reflects trends described by Magsaysay (1997) who "tells us that a profound transformation in the foundation of society, work, and family is underway" (cited in Rowley, Lujan, & Dolence, 1998, p. 106). Magsaysay says that organizations of the 20th century were typified by:

stability and predictability, size and scale, top-down leadership, control by rules and hierarchy, closely guarded information, quantitative analysis, need for certainty, reactivity and risk aversion, corporate independence, vertical integration, focus on internal organization, sustainable advantage, and the capacity to compete for today's markets.

While organizations of 21st century are moving toward:

discontinuous change, speed and responsiveness, leadership from everybody, permanent flexibility, control by vision and values, shared information, creativity and intuition, tolerance of ambiguity, proactive and entrepreneurial initiatives, corporate interdependence, "virtual" integration, focus on the competitive environment, constant reinvention of advantage, and the creation of tomorrow's market. (p. 110)

Kunstler (2005) extends this idea, stating that "it is not only technology that is changing, or even the categories of knowledge and interpretation, it also the nature of cognition and information processing itself" (p. 181). The Boyer Commission's (1998) report acknowledges such changes and identifies interdisciplinary programs and studio-based models as effective ways to prepare students for emerging changes. Design education prepares students to intersperse rational, analytical, and intuitive thinking in the development of places, buildings, and objects that are meaningful, creative, and beautiful. Students learn to balance these various sets of concerns in creating appealing, meaningful, and functional designs.

Such shifts have also influenced the practice of strategic planning. However, it seems that universities have been slower to address these changes (or to implement responsive planning methodologies) than other types of organizations have.

Pearson (1990) insists that *strategy* is best used in higher education to: (1) set direction, (2) focus effort, (3) encourage consistency of effort over time, and (4) promote flexibility (cited in Presley & Leslie, 1999, p. 202). The architectural design studio often refers to *strategy* in terms of an overarching concept that has the flexibility to guide design decisions through an iterative process that continually synthesizes new (and often competing) issues into a coordinated, comprehensive, and coherent design response.

Likewise, *strategic planning* has been defined as "a formal process designed to help an organization identify and maintain optimal alignment with the most important elements of its environment" (Rowley, Lujan, & Dolence, 1997, p. 15). Architectural planners, urban planners, urban designers, master planners, and campus planners all use strategic planning techniques in their design work. Leslie and Fretwell (1996) assert that *strategic planning* works best when seen as a continual process of experimentation that allows multiple decisions to emerge on many different fronts simultaneously. This suggests use of a non-linear model where feedback regarding implementation and current context informs upcoming efforts.

These metaphors accurately depict the decision-making processes used in architectural design to feed new discoveries or issues through the loop of prior decisions so that they effectively correspond to a complex arrangement of components and ideas in a way that serves to enhance and/or reinforce the overarching concept. Non-linear models (in both architecture and planning) emphasize that planning is a tool for setting direction and charting an ever-changing course in a way that will enhance an organization's internally shared vision. In non-linear design models, an overarching concept is developed to set the overall framework; it allows development of appropriate criteria for decision-making.

Scholars of planning agree that organizations can effectively respond to unforeseen challenges in advantageous ways when they define a collective vision and chart a course aligned with their vision – through a truly strategic and ongoing planning process (Barnetson, 2001; Cutright, 2001; Gordon, 2002; Rowley, Lujan, & Dolence, 1997; Swenk, 2001). It appears, however, that higher education

inadvertently adopted a very linear and internally oriented form of planning more appropriately described as "long-range planning" (Presley & Leslie, 1999, p. 209). Long-range planning is generally more prescriptive and does not provide the flexibility to incorporate unforeseen changes and opportunities that truly "strategic" planning affords.

### **The Problem of Linearity**

In university and business arenas, strategic planning has traditionally been based in rational, linear, cause-and-effect thinking. Using the linear model in academia has not generally yielded the clear and measurable gains for education that it did for business (Rowley, Lujan, & Dolence, 1997). Even in business, linear models were supplemented and enhanced in ways that educational organizers somehow overlooked (Presley & Leslie, 1999). It seems that education adopted a paired-down, strictly linear approach and that this approach was ill suited to the arena of higher education. Cutright (2001), Presley and Leslie, and Rowley et al. emphasize the importance of integrating non-linear perspectives in the planning and organization of higher education. This is because university governance procedures, stakeholder roles, and educational missions all stand in the way of predicting or enforcing a direct path for identifying, defining, or reaching a desired change... and often for simply defining the specific desired change.

Linear, Newtonian-type, cause-and-effect approaches are steeped in mechanical and political metaphors that are orderly and goal-driven. According to Barnetson (2001), linear metaphors also tend to assume that tight control is required to avoid eventual break down; they fit with Western scientific, religious, and political views that presume that people will act in their own self-interest if unregulated. Such approaches also "assume decision making is rational – that is that decision makers act to achieve goals" (p. 147). Tight control and the blanket assumption of self-interest run contrary to the grain of higher education. Nevertheless, universities do face increasing pressure to operate on rational business principles and to create plans for reaching specific, measurable, pre-defined goals.

Rowley, Lujan, and Dolence (1997, 1998) assert that higher education needs special attention to address conditions that are quite different from

the fast-paced business world. Traditional business-oriented planning models inadequately reflect the complex inter-relationships inherent in higher education. For instance, the corporate world is largely unencumbered by service missions, public accountability, or the need for the type of broad-based buy-in that is necessary to facilitate change at a university. Substantive change often requires agreement from faculty as well as public legislators. Prescriptive, linear models lack the type of flexibility necessary to align institutions' aspirations with their quickly-changing opportunities and their fluid contexts.

Planning in business was traditionally operations-driven, but even the business world has updated its strategies. Business plans now seek to harness unanticipated opportunities; methods to enhance *operational effectiveness* and *strategic management* represent shifts away from linear, cause-and-effect planning assumptions (Presley & Leslie, 1999, p. 209). Despite the development of new and improved approaches, most contemporary universities still use traditional (rather than genuinely strategic) planning methods, and in doing so they overlook critical distinctions that could render their efforts more effective. Chaffee (1985) finds that while strategy formation in business actually had three facets (linear, adaptive, and interpretive), higher education has stayed in the linear mode. By limiting itself to linearity, higher education has restricted its own planning effectiveness – rendering itself ill prepared to interpret and adapt to tumultuous economic, political, and social contexts.

Non-Linear Strategies in Architecture and Planning Scholars use various terms and metaphors to describe non-linear approaches. This paper groups various non-linear strategies together, based on the common denominator that they all require iterative thinking. *Iteration* (2005), according to Merriam-Webster, constitutes “a procedure in which repetition of a sequence of operations yields results successively closer to a desired result.” Iterative theories include strategic monitoring and management, spiral processing, cybernetic thinking to foster learning institutions, chaos theory as a metaphor for planning in higher education, design strategy, improvisation, and multiple perspectives (Adams, 1991; Birnbaum, 1988; Chaffee, 1985; Cutright, 2001; Hamilton, 1991; Inbar, 1991; Kennie, 2002; Wilson, 1997).

### Strategic Monitoring and Management

Strategic monitoring represents an early form of strategic management. Monitoring is defined as “a process of measuring, recording, collecting, processing and communicating information to assist project management decision-making” (Clayton & Perry, 1983, cited in Wilson, 1997, p. 32). Wilson states that monitoring and formal assessment are now generally conducted at the middle and end of an implementation process. Strategic management aims to capitalize on the effort of monitoring by adjusting activities in light of discoveries made through such assessment. However, Wilson asserts that most organizations fail to actually use such feedback to improve future action. Even the United Nations programs that took the lead in strategic monitoring have had trouble using formative feedback to improve program delivery, he says.

Rowley, Lujan, and Dolence (1997) emphasize that strategic planning requires persistence and suffers from rigidity. While traditional planning sought to establish specific goals, strategic planning helps chart a course with the recognition that environmental conditions will exert unpredictable forces. Rowley, Lujan, and Dolence point out that, similar to steering a slow-reacting ship, strategic management requires the organization to continually “trim the sails” in order to maintain an intended course.

### Spiral Thinking

Wilson (1997) emphasizes that assessment should be used formatively and not just summatively, so that it continually informs the system and shapes the system's subsequent actions. He suggests that strategic monitoring could more effectively inform implementation if it were conceptualized as a spring-shaped helix. In fact, architectural educators often diagram the process of design as a spiral where each group of decisions gets revisited in light of new findings and emerging conditions.

Implementing plans in the process of constructing (a) buildings or (b) institutions for higher learning requires thoughtful monitoring to ensure quality. In both architectural and institutional planning, the final product is infinitely better when project monitors take time to investigate emerging opportunities, address unanticipated conflicts, and recalibrate plans accordingly... especially when those charged

with monitoring have an overarching vision or concept to guide their decision-making.

The field of architecture uses a form of monitoring known as construction administration; it represents one of the five basic architectural services that typify the professional design process. In the implementation of strategic plans in higher education, however, this important job often gets overlooked. Universities often fail to empower an individual or entity to monitor and adjust the plan during its implementation. The actual results of the plan are seldom known (Presley & Leslie, 1999).

### Cybernetic Learning

Birnbaum (1988) used the term *cybernetic* to refer to those organizations that “monitor the environment, relate that information to their operating norms and, recognizing significant deviations, initiate action in order to avoid undesirable states – perhaps by altering organizational structure, activity, or goals” (as summarized by Barnettson, 2001, p. 149). Cybernetic thinking requires high level of self-discipline and self-evaluation not traditionally found in organizations. This model requires the organization to determine its core values and to define reference points for use in monitoring (Barnettson; Birnbaum).

The field of design also encourages identifying core values and concepts and then continually referencing and monitoring these core values. The design studio emphasizes self-evaluation and self-discipline, placing the responsibility of education squarely on the student. The studio format centers on student learning, not on content delivery. The process of discovery drives information acquisition.

Planning models that involve “continual learning, rigorous analysis, and creative responses” enhance the ability of an organization (or designer) to survive in a competitive and dynamic environment (Dever, 1997, cited in Swenk, 2001, p. 51). Today’s constantly changing environments present opportunities as well as challenges and crises that can overwhelm traditional ways of coping with change and can destroy the system (Rowley & Sherman, 2001; Swenk). This underscores the need for a strategic planning process that evolves into a long-term process of strategic management (Rowley & Sherman).

Planning scholars believe that the university of the future will be more porous and connective, easily accommodating the movement of people as well as ideas and problems (Cutright, 2001; Rowley, Lujan, & Dolence, 1998). Each organization must develop methods for adapting to highly fluid contexts in ways that align with its own “base of distinction, including its particular heritage, character, strengths, capabilities, and programs of excellence” (Rowley et al., p. 263). The Association of Collegiate Schools of Architecture’s ACSA Board of Directors report (2008) reflects similar beliefs, as expressed in its statement on core values.

### Chaos Theory

Cutright (2001) offers an intriguing way to conceptualize planning in higher education. He proposes adopting a new metaphor based in chaos theory to overcome the limitations inherent in the industrial, machine metaphor. *Chaos theory* is used to identify patterns within systems that initially appear chaotic.

The main tenets of chaos theory involve self-similarity, strange attractors, and self-organization; these tenets hold a great deal of applicability in higher education (Swenk, 2001). Cutright (2001) indicates that strategic planning in higher education constitutes a process for identifying *strange attractors* so as to bring together complementary strengths and opportunities. “Strange attractors organize a system despite turbulence, establish its boundaries, and give it a general direction for the future. Attractors allow actors within the system to make decisions consistent with the organization’s collective identity, purposes, and goals” (Swenk, p. 41). This represents a far different approach than typically employed where organizations expend massive energy to remedy the most obvious symptoms of a problem. Chaos theory suggests using a “diagnostic” approach to troubleshooting.

### Design Strategies

Crismond (2008) describes a variety of design approaches that include troubleshooting, diagnostics, and iteration. Crismond’s *Design Strategies Rubric* (Figure 1) constitutes a helpful tool for understanding and assessing learning progression in the context of design. This rubric defines critical phases of the design process and provides criteria for assessing

an individual’s performance. Each row represents a contrasting pair of statements about a specific type of strategy. Crismond’s rubric is applicable in a wide variety of design scenarios ranging from artistic to scientific design and combinations thereof.

**Improvisation**

Other planning scholars emphasize the need to shift from rationalist assumptions to planning models that integrate social, political, and consensual dimensions (Adams, 1991; Hamilton, 1991; Inbar, 1991). Inbar uses the term *improvisation* to describe non-linear modes of operating that are discrete from the behaviors of programming, planning, and systematically randomized responses. Inbar defines improvisation as a “process of generating rapid acts that relate different types of knowledge toward the accomplishment of determined visions” (p. 65).

III. Test & Evaluate Solutions, Reflect on Practice	Ignore or pay too much attention to pros or cons of ideas without also thinking of <b>benefits &amp; tradeoffs</b> .	Balance systems of <b>benefits &amp; tradeoffs</b> when <b>making</b> design <b>decisions</b> , & use rules of thumb to make choices.
	Design in <b>haphazard</b> ways, working on whatever problems emerge. Do design as a set of steps done once in <b>linear order</b> .	Do design as a <b>managed, iterative process</b> , using feedback to improve ideas. Strategies used in any order, as needed.
	Do <b>tacit</b> designing with little self-reflection & monitoring of actions.	Practice <b>reflective thinking</b> by keeping tabs on design work in a meta-cognitive way.
(Crismond, 2008)		

Figure 1: Design Strategies Rubric by David Crismond (2008)

PHASE OF DESIGNING	WHAT BEGINNING DESIGNERS DO	WHAT INFORMED DESIGNERS DO
I. Explore the Challenge	<b>Premature Decisions</b> – make choices too soon, after reading brief.	<b>Delay Decisions</b> – hold off from making decisions until exploring the challenging.
	<b>Skip Research</b> – and instead start posing solutions immediately.	<b>Do research and information searches</b> about the problem.
	Do <b>few</b> or no early <b>investigations</b> or conduct <b>confounded experiments</b> .	Do <b>valid tests</b> to help designers learn quickly about the design.
II. Generate, Build & Communicate Ideas	<b>Idea Fixation</b> – get stuck on their first design ideas that they won’t let go of.	Practice <b>Idea Fluency</b> – via sketching, brainstorming & rapid prototyping.
	<b>Describe &amp; sketch</b> devices that would not work if built.	Use <b>words, drawings &amp; models</b> to explore design ideas and show how parts connect and work together.
	Have a generalized, <b>unfocused way</b> to view tests and troubleshoot ideas.	Use <b>diagnostic vision</b> to focus attention on problems & troubleshoot ideas/ devices.

**Multiple Perspectives**

Chaffee (1985) discovered that the most powerful strategic plans actually incorporate three different paradigmatic perspectives: (1) a foundation in linear, rational analysis, (2) an understanding of flexibility and adaptability to changing context, and (3) interpretive strategy or an intuitive or constructivist metaphor for organizing the institution that includes a future-oriented vision for the institution. Chaffee’s description reflects the processes and methodologies employed in the field of architecture. Her three paradigmatic perspectives provide a way of understanding the success of the architectural studio model, wherein students gain a footing in rational analysis as well as the flexibility to continually interpret, contextualize, and integrate emerging information.

In similar fashion, Kennie (2002) describes a set of perspectives that have emerged in the profession of planning – ones also common in the field of architecture. The first of these perspectives is the formal, rational perspective – which includes techniques like SWOT (Strengths, Opportunities, Weaknesses, Threats) analysis and STEPE (to gauge Social, Technological, Economic, Political, Environmental aspects of the external environment). Kennie describes additional perspectives as the: (2) competitive market positioning perspective, (3)

cultural perspective, (4) performance measurement perspective (which includes the balanced scorecard, benchmarking, and business excellence models), (5) sensitivity analysis perspective, (6) "emergent" perspective, and (7) scenario perspective.

In the design of objects, buildings, and cities, architects generally seek to balance the range of perspectives described by Kennie (2002). Formal education in architecture seems to have favored the formal, rationalist perspective since its beginning. With the development of the Bauhaus in the 1920's, however, the field broadened to encompass Kennie's "emergent" perspective. From the 1970s onward, the profession has paid increasing attention to cultural and sensitivity analysis perspectives. Architectural education (and indeed the larger field of architectural practice) has not yet developed adequate understanding in the areas that Kennie (2002) describes as competitive marketing and performance measurement.

Like the field of architecture, higher education faces criticism regarding competitive marketing and performance measurement. Higher education also faces pressure to account for how expenditures yield desirable outcomes, pressure that often precipitate strategic planning in the university. Kennie (2002) notes that more and more universities are using the scenario perspective in strategic planning, in response to ever-increasing levels of uncertainty in the environment.

Adams (1991) raises similar concerns and enumerates five "alternative national planning approaches." He calls them the: (1) rational approach, (2) incremental approach, (3) mixed-scanning approach, (4) general systems approach, and (5) learning-adaptive approach (p. 10) and he shows how each of these five approaches varies with regard to key concepts, locus of power, role of planners, major methods, implementation, and epistemology. Adams states, however, that all planning theory seems to fall into just two general categories – rational and interactive. The linear and non-linear categories used in this paper reflect the same division.

## FINDINGS

Rowley, Lujan, and Dolence (1998) describe two major shifts underway, both of which highlight the need for good strategic planning by universities: (a)

a change in the way organizations think and make decisions to better visualize what they want to accomplish and then align resources to support that vision, and (b) a shift from emphasizing content delivery to emphasizing learning. They assert that institutions that lead the change – those organizations that define and employ new paradigms regarding knowledge and information – will also reap the highest educational and economic benefits. They indicate that it is not enough for institutions to simply shed their mechanistic and deterministic traditions. Each institution can benefit more, they assert, by consciously and proactively shaping behaviors that allow it to design its own future in a more effective and responsive ways.

The second shift described by Rowley, Lujan, and Dolence (1998) emphasizes learning over presentation of content. In higher education, students should learn, teachers and researchers should learn, and institutions should also learn. The increased emphasis on student and organizational learning seeks to build skill in all areas of Kolb's (1984) decision-making cycle – including active experimentation, concrete experience, reflective observation, and abstract conceptualization.

Here again, the architectural studio provides helpful precedence, because Kolb's cycle aptly describes learning within the design studio format. This particular model requires students to operate in the upper range of Bloom's (1956) Taxonomy from the first moment of schooling. Studio design projects also require students to demonstrate high-level abilities on Perry's (1999) schema. Studio-based education continually fosters graduates who integrate high levels of purpose and intentionality as described by Chickering and Reisser (1993).

## Emergent Hypotheses

Data originally collected in a study of university planning models reflects a high correlation with issues and practices inherent in architectural design and planning studios. In comparing and contrasting the fields of architecture and strategic planning, three poignant hypotheses emerged.

First, *architectural education offers a unique way of educating students that can and should serve as a model for educators in other disciplines.* In effect, this study offers support for Boyer and Mitgang's



(1996) proposal to use architectural education as a precedent for studio-based education in more disciplines. The Boyer Commission (1998) indicates that by the late 1980s some institutions had begun incorporating studio-based and cross-disciplinary models into educational settings outside the discipline of architecture. A program at Rensselaer Polytechnic Institute, for instance, uses the "studio format for introductory sciences" (Boyer Commission, p. 15).

A relatively new program developed at the Georgia Institute of Technology uses the studio model for introductory courses in biomedical engineering. Within this introductory program, any given course section is team-taught by more than a dozen professors from various institutions (Newstetter, 2008). Georgia Tech has a large school of architecture and the developers of the biomedical studio courses actively collaborate with architecture faculty.

Second, *methodologies used in architectural design and environmental planning can provide keys for improving strategic planning efforts by universities*. Flexible and effective strategic planning requires cybernetic thinking (Birnbaum, 1988). Acting cybernetically, universities can become "learning organizations" that carefully evaluate their accomplishments and assess their environmental contexts in order to respond to changing conditions in ways that effectively align with their overall goals. These techniques mirror architectural methodologies for (a) developing an overarching concept to guide subsequent design choices and (b) continually synthesizing new information into complex design "equations" while frequently referring to and refining the overall meaning or concept. In fact, iterative strategies hold promise for improving a wide array of functions within universities, ranging from teaching, to institutional operations such as advancement (Chance, 2008), to assessing the quality of strategic plans (Chance & Williams, in press).

Thirdly, *architectural education could enhance educational and professional practice by placing more emphasis in two areas: (1) developing structured and heuristic, yet flexible, research models and (2) recognizing and integrating successful, yet flexible, business approaches*. Many established research methods and business principles are linear in nature, but there is good reason for architecture to

scan the field for relevant practices, to implement these practices in careful and intentional ways, and in doing so, to develop new or enhanced models for approaching research and business in iterative ways.

The field of architecture could benefit from incorporating outcomes assessment and other structured approaches to research. It needs to integrate research into all stages of the design process (including pre-design, design, and post-design phases). Moreover, both higher education and architecture could benefit from incorporating interpretative, evaluative, iterative, and non-linear processes with a balanced integration of rational and linear approaches. Both fields need to conduct research that enhances practice and learning; but they must take care to develop methods that are not overly restrictive. Shahjahan (2005) explains how standard procedures for obtaining research grants actually stifle results by requiring scholars to prematurely predict and promise unforeseeable findings.

Both architecture and education need to develop better research standards and mechanisms for funding. Architecture, in particular, could benefit from acknowledging the importance of the business realm. Architecture has neglected to equip students with basic understanding of economics and the profession has failed to assess the long-term costs, consequences, and outcomes of various design and construction techniques. Moreover, architectural education stands to benefit from integrating structured (but nonetheless adaptive and interpretive) research and business approaches. By developing a shared research agenda (i.e. a strategic plan for architectural research), the field could attract increased levels of outside funding. While architectural education has resisted business logic, ignoring this seems shortsighted and detrimental to development. The field has a strong history with regard to interpretive and adaptive thinking; it could certainly modify existing principles and procedures as needed to effectively support its own goals and aspirations.

Enhancing linear models with adaptive and interpretive processes can benefit students, architecture programs, and universities as a whole. Architects and university planners must conscientiously tailor their research and business strategies to include structured iterative processes such as those defined by Crismond (2008).

## CONCLUSION

Development of this paper utilized an iterative process of research, reflection, and writing to investigate planning strategy and develop ideas for improving architectural education and higher education. The hypotheses constructed through this process incorporate (a) existing knowledge of organizational, planning, and design models, and (b) an analysis of how such models are reflected in higher education and in the specific fields of architecture and architectural education.

Existing data indicate that university-level planning has suffered from linear thinking. Linear approaches are not well suited to academia, but unfortunately universities and their constituent components (colleges, schools, and departments) sometimes resort to simplistic, linear thinking in the push for accountability. Linear business models inadequately address the complex variables found in higher education settings due to a host of differences between business and education sectors (Presley & Leslie, 1999; Rowley, Lujan, & Dolence, 1997; Shahjahan, 2005; Swenk, 2001). Conscientious tailoring is necessary to address these critical areas in ways that complement the needs and characteristics of universities and their various programs.

Unfortunately, when academic organizations adopt business models, they usually fail to integrate a comprehensive range of strategies. The paradigmatic shifts described by Kunstler (2005) and Mag-saysay (1997) have influenced the way that corporations conduct, implement, and monitor their strategic planning efforts. However, scholars emphasize that universities have not integrated enough of these methods in their own planning practices and most universities limit their planning and decision-making processes to the most straightforward, linear business approaches.

Helpful precedents for non-linear planning already exist on university campuses that offer studio-based curricula. Planning strategies employed in the architecture and other studio-based curricula incorporate non-linear, iterative, synthesizing processes. The studio format itself requires high-order thinking in even the earliest classes and, as such, studio-based curricula can serve as models for developing well-synthesized designs and plans.

Universities can and should learn from the design studio example in an effort to improve their strategic planning processes and foster critical thinking among students in a wider array of disciplines.

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